JOINT TECHNICAL DOCUMENT

Volume II-A

Appendices A through F
Gregory Canyon Landfill
San Diego County, California

September 2010, January 2011

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Joint Technical Document

Gregory Canyon Landfill

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JOINT TECHNICAL DOCUMENT
FOR THE
GREGORY CANYON LANDFILL
VOLUME II-A

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APPENDIX A

SUBTITLE D COMPLIANCE CHECKLIST

CALIFORNIA WATER RESOURCES CONTROL BOARD
SUBTITLE-D COMPLIANCE CHECKLIST

Note: This checklist is designed to test a municipal solid waste (MSW) landfill's compliance with the federal MSW regulations of 40CFR258. Criteria include: location restrictions, facility design, and operating criteria, ground water monitoring requirements, corrective action requirements, financial assurance requirements, and closure and post-closure care requirements. Requirements for "new" landfills and "lateral expansions" (for both terms, the Unit or portion thereof first accepted waste after 10/9/91) and "existing" units (portions already covered by waste as of 10/9/91) differ. For example, existing units (or portions) are not required to remove wastes to install liners. The checklist is not intended to assess compliance with other Federal and State regulations including Division 2 of Title 27 of the California Code of Regulations, governing discharges of solid waste to land, or with State Water Resources Control Board Resolution No. 93-62.

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INSTRUCTIONS FOR COMPLETING SUBTITLE D COMPLIANCE CHECKLIST

General Instructions

Complete a Checklist for each landfill subject to the federal MSW landfill regulations (40CFR Part 258). At facilities with several landfills, fill out a Checklist for each landfill; Questions that pertain to all landfills at the facility should be answered only once.

Detailed Instructions

This packet consists of three spreadsheets: a Subtitle D Compliance Checklist; a Landfill Synopsis spreadsheet; and a one-line Regional Board Office spreadsheet (the one line pertains to the landfill in question).

The Subtitle D Compliance Checklist contains four columns titled 1) QUESTION, 2) CITATION, 3) DECISION POINT, and 4) COMPLIANCE. The first column states a question closely paraphrasing language contained in the federal regulations. The second column identifies the location in the Federal regulations from which the question has been based. The third and fourth columns contain checkboxes but with different results:

> DECISION POINT This column contains check boxes if the accompanying question involves a "decision point." In other words, a "Yes" or "No" does not necessarily imply compliance or noncompliance. A question which has checkboxes in this column is usually followed by additional question(s) which ultimately end up in the Compliance column. Occasionally, the "decision point" answer serves to determine whether you should skip forward to a different portion of the checklist.
>
> COMPLIANCE This column will determine whether or not the discharger has violated the regulation paraphrased in the accompanying question SINCE THE LAST TIME THE CHECKLIST WAS FILLED OUT, even if the discharger is again (currently) in compliance. The right-most available answer (usually a "No") indicates that the discharger is, or has been, out of compliance with the Federal regulations.

Note that the on-screen checklist shows all the answers given for the previous update of the checklist.

IMPORTANT: For most checklist items, you need only change the answers for those questions for which there has been a change of compliance status since the prior checklist was done for that landfill. Note, however, that you must always fill in your initials and the current date, at the start of the checklist (just before question A.1), before beginning work on the spreadsheet revision.

Determination of compliance/non-compliance

If the right-most checkbox in the COMPLIANCE column is checked, the MSWLF is either currently out of compliance for the Subtitle D regulation displayed in the CITATION column or has been out of compliance at some time since the checklist was last filled out.

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Reporting of Findings

After going through the checklist and making any changes needed, go to the end of the checklist and you'll find a landfill synopsis spreadsheet that lists each compliance status change in numerical order. The synopsis sheet will also list any violations noted on the prior checklist that remain unresolved.

For each line-item on the landfill compliance summary spreadsheet, note down the action taken (or to be taken) and the date of issuance (e.g., C&A planned for 20/2001) in the **Compliance Measures** column, then fill in the date by which the discharger must carry out the fix in the **Compliance Target Date** column. If desired, included a short explanatory note in the last column. Take the same approach for any violations carried over from the prior checklist.

For items that are on the synopsis sheet because they have come into compliance for a violation noted on the prior checklist, the **Compliance Measures** column will contain a description of the compliance measure specified on the prior checklist. In this case, make any needed changes then fill in the date when the discharger came into compliance in the **Compliance Target Date** column.

Upon completing the landfill summary sheet, note that the very last spreadsheet is a Regional Board Office synopsis for that landfill. If the landfill is **CURRENTLY** in compliance (e.g., there may have been problems since the last checklist, but these are now all resolved), then write "Yes" in the **Compliance?** column; otherwise insert a "No." As long as the discharger has not initiated the fix, as of the date you are filling out the checklist, the answer in the **Compliance?** column is "No," even if you have already issued the compliance measure instrument (e.g., letter or C&A). Provide a brief synopsis for any remaining out-of-compliance items in the **Comments** column.

Lastly, click on the "Send" button at the very end of the checklist to submit the updates to the Division of Clean Water Programs.

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BEGIN HERE:
Subpart A–General Subtitle D Applicability

Your Initials: JRB/SB Current Date (format = 10/25/2001): 05/30/03 Region (e.g., R5F): R9
LF's Name: Proposed Gregory Canyon Landfill WDS ID#: ____________________
Provides definitions necessary for proper interpretation of new Subtitle D and identifies other Federal laws with which owners/operators (dischargers) of MSW landfills must comply.

A.1 Determine the landfill's status with respect to:

a. **FEDERAL DEADLINE**: (Check one of three.)

- **Very Small Rural Landfill** is an MSW landfill which meets conditions in Section 258.1(f)(1) of Subtitle D. The federal deadline for a Very Small Rural Landfill is **October 9, 1997** [40CFR258.1(e)(4)];
- **Small Landfill** is an MSW landfill which accepts less than 100 tons per day [258.1(e)(2)] and does not qualify as a very small rural landfill. The federal deadline for a Small Landfill is **April 9, 1994** [40CFR258.1(e)(2)]; or

X **Regular Landfill** is an MSW landfill which accepts more than 100 tons per day. The federal deadline for a Regular Landfill is **October 9, 1993** [40CFR258.1(e)(1)]; and

b. **WASTE FOOTPRINT:** (Check all applicable)

- **Existing MSW landfill** is the portion of an MSW landfill which has accepted waste before its federal deadline. This is also known as the landfills **Existing Footprint**.
- **Federal lateral expansion** is that portion of an MSW landfill which accepted waste for the first time after the landfills applicable federal deadline.

X **New MSW landfill** is an MSW landfill which has accepted municipal solid waste only after its applicable federal deadline.

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This is NOT the start! Please answer question A.1 on prior page.

QUESTION	CITATION	DECISION POINT	COMPLIANCE	JTD PAGES
A.2 Has the MSWLF ceased receiving waste on or before October 9, 1991? *[If "Yes," the MSWLF is not subject to Subtitle D. Do not continue with this checklist.]*	258.1(c)	☐Y ■N		New Facility
A.3 Has the MSWLF received waste after October 9, 1991, but stopped receiving waste before its "federal deadline"? *[If "Yes," the MSWLF is exempt from all Subtitle D requirements except the final cover requirement specified in. 258.60(a), but ONLY IF they complete the final cover installation no later than one year following the MSWLF's respective federal deadline. In this case, do only Subpart A and question F.1. Dischargers that failed to complete cover installation within this time are subject to all parts of Subtitle D [answer Subpart A through G questions].]*	258.1(d)	☐Y ■N		
• A.4 Has the RWQCB determined that this landfill qualifies (or does the Unit continue to qualify) as a very small rural landfill (**VSRLF**) because it meets ALL the requirements of 258.1(f), based upon a demonstration by the discharger? *[NOTE: If "Yes," be sure that the official Operating Record includes a copy of this demonstration [258.1(f)(2)]. Qualifying VSRLFs are exempt from the* ***federal*** *Subpart D (design) & E (monitoring) requirements. However, if the discharger's monitoring under Title 27 later shows the Unit is undergoing a release to ground water, then the exemption becomes void and the discharger must, from that time forward, comply with subparts D and E [see 258.1(f)(3)].*	258.1(f)(1)	☐Y ■N		

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Subpart B–Location Restrictions

Establishes ***location restrictions*** *for MSWLFs including: Floodplain Protection, Wetland Protection, Fault Area Hazard, Seismic Impact Zones Hazards, and Unstable Area Hazard. Subpart B also describes requirements for Closure of Existing Units that cannot comply with restrictions for Floodplain Protection, or Unstable Areas. The discharger must demonstrate that all location restrictions related to water quality are met and must notify the RWQCB and put copies of any demonstrations in the operating record.*

QUESTION	CITATION	DECISION POINT	COMPLIANCE	JTD PAGES
B.1 Is the MSWLF located in a 100-year floodplain? *(If "Yes," answer the next three questions.)*	258.11	☐Y ■N		Section D. 2.3 Figure 30B
Has the discharger demonstrated that the MSWLF will not				
• restrict the flow of the of the 100-year flood?	258.11(a)		☐Y ☐N	
• reduce the temporary water storage capacity of the floodplain?	258.11(a)		☐Y ☐N	
• result in washout of solid waste so as to pose a hazard to water quality?	258.11(a)		☐Y ☐N	
NOTE: If the Unit is a federal "existing MSWLF Unit" and has no federal lateral expansion, skip to B.5.				
B.2 <u>New or lateral expansion only:</u> Is MSWLF located in wetlands? *(If "Yes," answer the rest of the questions in this box.)*	258.12(a)	☐Y ■N		
Has the discharger demonstrated to the RWQCB that a practicable alternative is not available?	258.12(a)(1)		☐Y ☐N	
Has the discharger demonstrated that the construction and operation of the MSWLF will not:	258.12(a)(2)(i) 258.12(a)(2)(ii)		☐Y ☐N ☐Y ☐N	
• Cause or contribute to violations of any applicable State water quality standard?	258.12(a)(2)(iii)		☐Y ☐N	
• Violate any applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act?				
• Jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of a critical habitat, protected under the Endangered Species Act of 1973?	258.12(a)(2)(iv) 258.12(a)(3)		☐Y ☐N	
• Violate any requirement under the Marine Protection, Research, and Sanctuaries Act of 1972 for the protection of a marine sanctuary?	258.12(a)(3)(i)		☐Y ☐N	
Has the discharger demonstrated that the MSWLF will not cause or contribute to significant degradation of wetlands, including a consideration of:	258.12(a)(3)(ii)		☐Y ☐N	
• The erosion, stability, and migration potential of native wetlands soil, muds, and deposits used to support the MSWLF unit?	258.12(a)(3)(iii) 258.12(a)(3)(iv)		☐Y ☐N ☐Y ☐N	

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• The erosion, stability, and migration potential of dredged and fill materials used to support the MSWLF unit? • The volume and chemical nature of the waste managed in the MSWLF unit? • Impacts on fish, wildlife, and other aquatic resources and their habitat from the release of the solid waste? • The potential effects of catastrophic release of waste to the wetland and the resulting impacts on the environment? • Any additional factors, as necessary, to demonstrate that ecological resources in the wetland are sufficiently protected?	258.12(a)(3)(v) 258.12(a)(3)(vi)		☐Y ☐N ☐Y ☐N	
B.3 <u>New or lateral expansion only:</u> Is MSWLF located within 200 feet of a fault that has had displacement in Holocene time? *(If "Yes," answer the next question.)* Has the discharger demonstrated to the RWQCB that an alternative setback distance of less than 200 feet will prevent damage to the structural integrity of the MSWLF and will be protective of water quality?	258.13(a)	☐Y ■N	☐Y ☐N	Section D.4.4.; Appendix C, pgs. 1-13, 1-14
B.4 <u>New or lateral expansion only:</u> Has the discharger demonstrated to the RWQCB that all containment structures , including liners, leachate collection systems, and surface water control systems, are designed to resist the maximum horizontal acceleration in lithified earth material for the site?	258.14(a)		■Y ☐N	Section D.4.6; Appendix C, pgs.3-6 thru 3-10.
B.5 <u>Any MSW landfill:</u> Is the MSWLF located in an unstable area (e.g., it is sitting on a landfill)? *(If "Yes," answer the next question.)* Has the discharger demonstrated to the RWQCB that engineering measures have been incorporated into the MSWLF's unit's design to ensure that the integrity of the structural components of the MSWLF will not be disrupted? *(If "Yes," answer the next three questions.)* Did the discharger consider the following, at a minimum, when determining whether the area is unstable: • On-site or local soil conditions that may result in significant structural settling? • On-site or local geologic or geomorphologic features? • On-site or local human-made features or events (both surface and subsurface)?	258.15(a) 258.15(a)(1) 258.15(a)(2) 258.15(a)(3)	☐Y ■N	☐Y ☐N ☐Y ☐N ☐Y ☐N ☐Y ☐N	Appendix C, pgs 1-1 thru 1-2; pg. 1-7; pgs 1-14 thru 1-15

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B.6 *If the discharger cannot make the demonstration specified in §258.11(a)[floodplains] or §258.15(a)[unstable areas], answer the next question.* Did the MSWLF close by October 9, 1996? *(If "No," answer the next question.)* Did the RWQCB extend the deadline for closing no longer than 2 years past October 9, 1996, upon the discharger's demonstrating that 1) there is no available alternative disposal capacity, and 2) there is no immediate threat to water quality?	258.16(a) 258.16(b)	☐Y ☐N ☐Y ☐N	☐Y ☐N	New Facility

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Subpart C–Operating Criteria

Describes ***operating criteria*** *requirements including: Alternative Cover Materials, Run-on/Run-off Control Systems, Surface Water Requirements, Liquids Restrictions, and Recordkeeping Requirements.*

QUESTION	CITATION	DECISION POINT	COMPLIANCE	JTD PAGES
NOTE: For closed Units, answer "Yes" and answer only C.4., C.5, and C.8 C.1 Is the discharger using alternative daily cover? *(If "Yes," answer the next question.)* Has the RWQCB checked that any ADC material that remains in the landfill is material that the landfill could accept as waste? *[Note: the CIWMB implements most of the ADC program, but the RWQCB is responsible for making this check to be sure the o/o is not in violation.]*	258.21(b)	☐Y ■N ■Y ☐N	☐Y ☐N	Section B.4.4.5.1
C.2 Has the discharger constructed and maintained a run-on control system to prevent flow onto the active portion of the landfill during the peak discharge from a 25-year storm?	258.25(a)(1)		■Y ☐N	Sections B.5.4 and C.2.8
C.3 Has the discharger constructed and maintained a run-off control system to collect and control at least the water volume resulting from a 24-hour, 25-year storm?	258.25(a)(2)		■Y ☐N	Sections B.5.4 and C.2.8
C.4 Has the MSWLF caused a discharge of pollutants into **SURFACE** waters of the United States, including wetlands, that violates any requirements of the Clean Water Act, including, but not limited to, the National Pollutant Discharge Elimination System (NPDES) requirements, pursuant to Section 402?	258.27(a)		■N ☐Y	
C.5 Has the MSWLF caused the discharge of a nonpoint source of pollution to waters of the United States, including wetlands, that violates any requirement of an area-wide or State-wide water quality management plan that has been approved under Section 208 or 319 of the Clean Water Act?	258.27(b)		■N ☐Y	
C.6 Has bulk or noncontainerized liquid waste (other than household waste excepting septic waste) been placed in the MSWLF unit? *(If "Yes," answer the next question.)* Is the liquid waste leachate or gas condensate? *(If "Yes," answer the next two questions.)* Was the leachate or gas condensate derived from the MSWLF unit? Is the MSWLF equipped with a composite liner and leachate collection system?	258.28(a)(1) 258.28(a)(2)	☐Y ■N	☐Y ☐N ☐Y ☐N ☐Y ☐N	

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C.7 Are containers holding liquid waste placed in the MSWLF unit? *(If "Yes," answer the next three questions.)* Is the container small and similar in size to that normally found in household waste? Is the container designed to hold liquids for use other than storage? Is the waste a household waste?	 258.28(b)(1) 258.28(b)(2) 258.28(b)(3)	☐Y ☐N	 ☐Y ☐N ☐Y ☐N ☐Y ☐N	New Facility
C.8 Does the discharger record and retain near the facility (or in an alternative location if approved by the RWQCB) an operating record that contains the following information as it becomes available: • Any location restriction demonstration required under Subpart B of this part? • **Recirculating Units only:** Any MSWLF design documentation for placement of leachate or gas condensate in a MSWLF as required by . 258.28(a)(2)? *[non-recirc Unit = "N/A"]* • Any demonstration, certification, finding, monitoring, testing, or analytical data required by Subpart E? • Closure and post-closure care plans and any monitoring, testing, or analytical data as required by . . 258.60 and 258.61? • Any cost estimates and financial assurance documentation required by Subpart G? • **Qualifying VSRLF Units only**: any information demonstrating compliance with small community exemption as required by . 258.1(f)(2)? *[non-qualifying Unit = "N/A"]*	258.29(a) 258.29(a)(1) 258.29(a)(4) 258.29(a)(5) 258.29(a)(6) 258.29(a)(7) 258.29(a)(8)		☐Y ☐N ☐N/A ☐Y ☐N ☐Y ☐N ☐Y ☐N ☐Y ☐N ☐N/A ☐Y ☐N	New Facility

//

Subpart D–Design Criteria

*Establishes **design criteria**. Note: The following section applies only to those portions of the landfill that have received waste after the unit□s applicable federal deadline. However, two categories of MSWLFs are exempt from this Subpart:*

1) *Very small rural landfills (VSRLFs) that qualify under §258.1(f), or*
2) *MSWLFs sited in an area where 1) there is no aquifer underlying the facility and it is not reasonably foreseeable that fluids migrating from the MSWLF could reach any aquifer or surface water body in the ground water basin, or 2) the ground water in the basin underlying the facility has no beneficial uses and a hydrogeologic investigation shows that it is not reasonably foreseeable that fluid migrating from the MSWLF could reach any aquifer or surface water body having beneficial uses. [See State Board Resolution No. 93-62, Section I.C. (Applicability in the absence of useable waters).*

QUESTION	CITATION	DECISION POINT	COMPLIANCE	JTD PAGES
D.1 **Skips**				
Has the RWQCB determined that the Unit qualifies for the exemption #1, above (qualifying VSRLF, including no evidence of a release)? *[If "Yes," skip to F.1]*	258.1(f)	□Y ■N		
Has the RWQCB determined that the Unit qualifies for exemption #2, above (no affectable ground water)? *[If "Yes," skip to section E.1]*	258.50(b)	□Y ■N		
Does the Unit have the federal prescriptive composite liner system (including LCS) described in 258.40(a)(2)? ***[If "yes," then skip to E.1]***	258.40(a)(2)	■Y □N		Section C.2.4
Is this only an "existing MSWLF unit" (no waste beyond the area covered by waste on the Unit's federal deadline)? *[If "Yes," skip to E.1.]*	258.40	□Y □N		
D.2 Does the new MSWLF or lateral expansion have a composite liner **other than** the prescriptive composite liner that has been approved by the RWQCB and that ensures that all concentration values listed in Table 1 of □ 258.40 will not be exceeded at the relevant point of compliance? *(If "Yes," answer the next question.)*	258.40(a)(1)		■Y □N	Section C.2.4 and Appendix H
Has the RWQCB considered the following factors when approving the alternative design:	258.40(c)			
• Hydrogeologic characteristics of the facility and surrounding land?	258.40(c)(1)		■Y □N	
• Climatic factors of the area?	258.40(c)(2)		■Y □N	
• Volume and physical characteristics of the leachate?	258.40(c)(3)		■Y □N	

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D.3 Has the RWQCB considered the following factors when approving the alternative design: • Hydrogeologic characteristics of the facility and surrounding land? • Climatic factors of the area? • Volume and physical characteristics of the leachate?	258.40(c) 258.40(c)(1) 258.40(c)(2) 258.40(c)(3)		☒Y ☐N ☒Y ☐N ☒Y ☐N	

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Subpart E--Groundwater Monitoring and Corrective Action

Describes requirements for Groundwater Monitoring and Corrective Action including: To Whom the Requirement Applies, When Groundwater Monitoring Must be in Place, What Criteria the Groundwater Monitoring System Must Meet, Procedures for Sampling and Analysis, and Steps required in Groundwater Monitoring and Corrective Action Programs (including detection monitoring, assessment monitoring, and corrective action requirements). Qualifying VSRLFs (i.e., meeting §258.1(f), including the no-evidence of a release) are exempt from this Subpart [go to F].

QUESTION	CITATION	DECISION POINT	COMPLIANCE?	JTD PAGES
E.1 Is ground water monitoring being conducted while the MSWLF is active and during the post-closure care period?	258.50(e)		■Y □N	Section B.5.1.3, Section E.2.5, Appendix G, pgs. 19 thru 26.
E.2 Does the ground water monitoring system consist of a sufficient number of wells, installed at appropriate locations and depths to yield ground water samples from the uppermost aquifer that: • Represent the quality of background ground water that has not been affected by leakage from the unit? • Represent the quality of ground water passing the relevant point of compliance?	258.51(a)(1) 258.51(a)(2)		■Y □N ■Y □N	Section B.5.1.3, Appendix G,.pgs. 19 thru 26; Figure 5.
E.3 ***[Skip question if facility has only one MSWLF]*** Has the RWQCB approved a multi-unit ground water monitoring system instead of separate systems for each MSWLF unit? *(If "Yes," answer the rest of the questions in this box.)* Does the multi-unit system meet the requirements of §258.51(a) , and is it as protective of water quality as individual monitoring systems for each MSWLF unit, based on the following factors: • Number, spacing, and orientation of the MSWLF units? • Hydrogeologic setting? • Site history? • Engineering design of the MSWLF units? • Type of waste accepted at the MSWLF unit?	258.51(b) 258.51(b)(1) 258.51(b)(2) 258.51(b)(3) 258.51(b)(4) 258.51(b)(5)	□Y ■N	□N/A □Y □N □N/A □Y □N □N/A □Y □N □N/A □Y □N □N/A □Y □N	
E.4 Are the monitoring wells cased in a manner that maintains the integrity of the monitoring well bore hole?	258.51(c)		■Y □N	Appendix G, Table 2;Att. 2.
E.5 Has the discharger notified the RWQCB that records of the design, installation, development, and decommissioning of any monitoring wells, piezometers and other measurement, sampling, and analytical devices have been placed in the operating record?	258.51(c)(1)		■Y □N	Appendix G, Table 2; Attachment 2.
E.6 Is the monitoring system operated and maintained so that it performs to the design specifications throughout the life of the monitoring program?	258.51(c)(2)		■Y □N	Appendix G, pg. 19thru 22.

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E.7 Are the number, spacing, and depths of the monitoring system: • Based upon site-specific information? • Certified by a qualified ground water scientist or approved by the RWQCB?	 258.51(d)(1) 258.51(d)(2)		 ■Y ☐N ■Y ☐N	Appendix G, pg 13 thru 15. App. C-1, Plates 1 through 3
E.8 Has the discharger notified the RWQCB that the sampling and analysis program documentation been placed in the operating record?	258.53(a)		■Y ☐N	Appendix G, Attachment 1
E.9 Does the sampling and analyses program documentation include procedures and techniques for: • Sample collection? • Sample preservation and shipment? • Analytical procedures? • Chain of custody control? • Quality assurance and quality control?	 258.53(a)(1) 258.53(a)(2) 258.53(a)(3) 258.53(a)(4) 258.53(a)(5)		 ■Y ☐N ■Y ☐N ■Y ☐N ■Y ☐N ■Y ☐N	Appendix G, Attachment 1
E.10 Does the ground water monitoring program include sampling and analytical methods that are appropriate for ground water sampling and that accurately measure hazardous constituents and other monitoring parameters?	258.53(b)		■Y ☐N	Appendix G, pgs 23 thru 24; Attachment 1
E.11 Are the sampling procedures and frequency protective of water quality?	258.53(c)		■Y ☐N	Appendix G, pg 22 to 23; pg. 26; Att. 1
E.12 Each time ground water is sampled, • Are ground water elevations measured immediately prior to purging? • Does the discharger determine the rate and direction of ground water flow? • Are wells which monitor the same unit measured within a short period of time?	258.53(d)		 ■Y ☐N ■Y ☐N ■Y ☐N	Appendix G, Attachment 1
E.13 Has the discharger established background water quality in a hydraulically upgradient or background well(s) for each of the monitoring parameters or constituents required in the particular ground water monitoring program that applies to the MSWLF as determined under §258.54(a) or §258.55(a)?	258.53(e)		■Y ☐N	Section D.5.3, Appendix C, pg 2-13 thru 2-16, Tables 2-3 thru 2-19; App. G, pg. 15 thru 19
E.14 Has a sufficient number of samples been collected to establish ground water quality data that is consistent with the appropriate statistical procedures determined pursuant to §258.53(g)?	258.53(f)		■Y ☐N	Appendix G, pgs 18 thru 19.

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E.15 Has the discharger specified in the operating record one of the following statistical methods, approved by the RWQCB, to be used in evaluating ground water monitoring data for each constituent of concern? • A parametric analysis of variance (ANOVA) followed by multiple comparison procedures to identify statistically significant evidence of pollution. • An analysis of variance (ANOVA) based on ranks followed by multiple comparisons procedure to identify statistically significant evidence of pollution. • A tolerance or prediction interval. • A control chart approach. • Another statistical procedure that meets the performance standards of §258.53(h).	258.53(g) 258.53(g)(1) 258.53(g)(2) 258.53(g)(3) 258.53(g)(4) 258.53(g)(5)		■Y ☐N	Appendix G, pg. 25.
E.16 Does the ground water detection monitoring program include, at a minimum, the constituents listed in Appendix I of 40CFR258? *(If "Yes," answer next two questions.)* • If the discharger is NOT monitoring for all the Appendix I volatile organic compounds (VOCs), is the discharger monitoring all VOCs except those which the RWQCB has excused under §258.54(a)(1)? • **Two Part: 1)** Is the discharger monitoring for all inorganic constituents established [via 258.28(a)(2)] as surrogates for the metals of Appendic I; and • **2)** do the surrogates provide a reliable indication of inorganic releases from the unit?	258.54(a) 258.54(a)(1) 258.54(a)(2)	☐Y ■N	■N/A ☐Y ☐N ☐N/A ■Y ☐N ☐N/A ■Y ☐N	Appendix G, pg. 23 thru 25.
E.17 Does the discharger: • monitor for the Appendix I constituents (or alternative list) at least semiannually during the active life and post-closure period of the facility? *[Less frequent Appendix I monitoring is not allowed in California.]*; and • use approved data analysis methods (i.e., either the statistical and nonstatistical methods listed in the 1993 Super Order or other RWQCB-approved methods) to test for evidence of a release?	258.54(b) 258.53(i)		■Y ☐N ■Y ☐N	Appendix G, pg. 22 thru 23 Appendix G, pg. 25

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E.18 Has the discharger determined that there is a statistically significant increase over background for any constituent listed in Appendix I or the alternative list? *(If "No," skip to Part F. If "Yes," then discharger MUST implement an Assessment Monitoring Program {AMP} AND {if exceeded constituent is on the Appendix II list} start Assessment of Corrective Measures and {in due time} Corrective Action Program {CAP}. Remember: AMP continues along with the CAP!)*	258.54(c)	□Y ■N		N/A New Facility
E.19 Did the discharger: • Place a notice in the operating record indicating which constituents have shown a statistically significant change from background levels and notify the RWQCB within 14 days? • Establish an assessment monitoring program meeting the requirements of §258.55 within 90 days? • Demonstrate that a source other than a MSWLF caused the pollution or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in ground water quality.? *(If "Yes," discharger may continue detection monitoring. Skip to Part F.)*	 258.54(c)(1) 258.54(c)(2) 258.54(c)(3)	 □Y □N	 □Y □N □Y □N	N/A New Facility
E.20 Has the discharger, within 90 days of triggering an assessment monitoring program, sampled and analyzed ground water for all applicable Appendix II constituents at all Point of Compliance wells? *(Answer "N/A" only if 90 days have not yet passed. If "Yes," answer the next question.)* If the discharger is not monitoring all wells for Appendix II constituents, has the RWQCB specified an appropriate subset of wells for Appendix II analysis? *[Answer "N/A" if monitoring all wells; otherwise either "Yes" or "No."]* If the discharger is not monitoring all Appendix II constituents (at the frequency established by the RWQCB), are the non-monitored constituents only those which the RWQCB has determined are not reasonably expected to be in/derived from the Unit? *[Answer "N/A" if monitoring all wells; otherwise either "Yes" or "No."]*	258.55(b) 258.55(b) #1 258.55(b) #2	□Y □N	 □N/A □Y □N □N/A □Y □N	N/A New Facility

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E.21 **Appendix II Frequency:** Is the discharger monitoring for the approved list of Appendix II constituents at least annually? *(If "Yes," answer the rest of the questions in this box.)* Has the RWQCB specified an alternative Appendix II sampling and analysis frequency for assessment monitoring, after considering all the following factors: • Lithology of the aquifer and unsaturated zone? [§258.55(c)(1)] • Hydraulic conductivity? [§258.55(c)(2)] • Ground water flow rates? [§258.55(c)(3)] • Minimum distance between the upgradient edge of the MSWLF and the downgradient well screen? [§258.55(c)(4)] • Resource value of the aquifer? [§258.55(c)(5)]	258.55(c) 258.55(c)	☐Y ☐N	 ☐Y ☐N	N/A New Facility
E.22 Has the discharger, after obtaining the results from the initial or subsequent Appendix II sampling events: • Placed a notice in the operating record identifying the Appendix II constituents that have been detected, and notified the RWQCB? *[If none detected, answer "N/A" and skip to E.23.]* • Within 90 days, and on at least a semiannual basis thereafter, resampled all Point of Compliance wells for all Appendix I constituents AND those Appendix II constituents that were detected in response to §258.55(b), carried out approved data analysis on them, and recorded their concentrations, any any WQPS exceedances, in the operating record? • Established background concentrations for all detected Appendix II constituents? *[Note: Given the approach in the Super Order, the discharger should ALREADY have background values for these constituents and so should have a background-based GWPS for each of them.]* • Established ground water protection standards (GWPSs) for each detected Appendix II constituent. *[See §258.55(h) or (i)]?*	258.55(d)(1) 258.55(d)(2) & 258.53(i) 258.55(d)(3) 258.55(d)(4)		☐N/A ☐Y ☐N ☐Y ☐N ☐Y ☐N ☐Y ☐N ☐Y ☐N	N/A New Facility
E.23 Have all the concentrations of all **Appendix II** constituents that have been detected: • Been shown to be below background levels for two consecutive sampling events? *(If "Yes," skip to part F. The discharger must notify the RWQCB and may then return to federal detection monitoring.)* • Been shown to be above background levels, but below ground water protection standards? *(TRICK QUESTION! In California, the Standard is always background until CAP allows CLGBs, so answer is always "no.")*	258.55(e) 258.55(f)	☐Y ☐N ☐Y ☐N		N/A New Facility

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E.24 Have one or more **Appendix II constituents** (not nontoxic surrogates) been detected at significant levels above their respective GWPS, using an approved statistical or nonstatistical test? *[If "Yes," answer the rest of the questions in this box]*	258.55(g)	☐Y ☐N	☐Y ☐N	N/A New Facility
• Has the discharger, within 14 days of this finding, placed a notice in the operating record identifying the exceeding Appendix II constituents and notified the RWQCB?	258.55(g)(1)(i)		☐Y ☐N	
• Begun characterization of the nature and extent of the release by installing additional monitoring wells as necessary?	258.55(g)(1)(ii)		☐N/A ☐Y ☐N	
• Installed at least one additional well at the facility boundary in the direction of contaminant migration and sampled this well in accordance with §258.55(d)(2)? *[Answer "N/A" only if plume direction is not yet determined.]*	258.55(g)(1)(iii)		☐N/A ☐Y ☐N	
• Notified all persons who own the land or reside on the land that directly overlies any part of the contaminant plume if contaminants have migrated off-site? *[Answer "N/A" only if plume is not known to be beyond the facility boundary.]*	258.55(g)(1)(iv) 258.55(g)(2)	☐Y ☐N	☐N/A ☐Y ☐N	
• Within 90 days , initiated an assessment of corrective action measures [See §255.56]? • Demonstrated to the RWQCB's satisfaction that a source other than a MSWLF caused the pollution, or that the statistically significant increase resulted from error in sampling, statistical evaluation, or natural variation in ground water quality? *(If a successful demonstration is made, the discharger must continue in assessment monitoring unless the Appendix II constituents are at or below background levels [return to DMP].)*				
E.25 Is the ground water protection standard (GWPS) for all detected Appendix II constituents one of the following (check all that apply, below; answer "No" only if one or more constituents lacks a GWPS or if there is a GWPS that is not one of the following):	258.55(h)		☐Y ☐N	N/A New Facility
• For constituents for which a maximum contaminant level (MCL) has been promulgated under the Safe Drinking Water Act, no higher than the MCL for that constituent?	258.55(h)(1)	☐Y		
• For constituents for which MCLs have not been promulgated, the background concentration for the constituent?	258.55(h)(2)	☐Y		
• For constituents for which the background level is higher than the MCL (or health based levels identified under §258.55(i)(1) by the RWQCB), the background concentration?	258.55(h)(3)	☐Y		
• A concentration higher than the background level but, for a constituent with an MCL, not higher than the MCL [§258.55(i)]?	258.55(i)	☐Y		

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E.26 *[Note: If 1st answer to E.24 = "No," then skip to F.1; otherwise answer E.26 et seq.]* Has the discharger, within 90 days of measurably exceeding (statistical or nonstatistical test) the WQPS **for an Appendix II constituent**, initiated an assessment of corrective measures, and completed the assessment within a reasonable amount of time? *[Answer "N/A" only if the 90 days have not yet passed.]*	258.56(a)		☐N/A ☐Y ☐N	N/A New Facility
E.27 Is the discharger continuing assessment monitoring?	258.56(b)		☐Y ☐N	N/A New Facility
E.28 Does the assessment of corrective measures address the following: • The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual pollution? • The time required to begin and complete the remedy? • The costs of remedy implementation? • State or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy?	 258.56(c)(1) 258.56(c)(2) 258.56(c)(3) 258.56(c)(4)		 ☐Y ☐N ☐Y ☐N ☐Y ☐N ☐Y ☐N	New Facility
E.29 Has the discharger discussed the corrective measures assessment, prior to the selection of a remedy, in a public meeting?	258.56(d)		☐Y ☐N	N/A New Facility
E.30 Within 14 days of selecting a remedy, has the discharger notified the RWQCB that a report describing the remedy has been placed in the operating record?	258.57(a)		☐Y ☐N	N/A New Facility
E.31 Is the remedy likely to meet the following standards, **after sufficient application**? • Protect human health and environment? • Attain the ground water protection standard [of §258.57(h or i)]? • Control the source(s) of releases so as to reduce or eliminate further releases of Appendix II constituents? • Comply with standards for management of wastes as specified in §258.58(d)?	 258.57(b)(1) 258.57(b)(2) 258.57(b)(3) 258.57(b)(4)		 ☐Y ☐N ☐Y ☐N ☐Y ☐N ☐Y ☐N	N/A New Facility
E.32 In selecting a remedy, did the discharger consider the evaluation factors contained in §258.57(c)	258.57(c)		☐Y ☐N	N/A New Facility
E.33 Has the discharger proposed a schedule, approved by the RWQCB, for initiating and completing the remedial activities as set forth in §258.57(d)(1-8) and that initiates remedial activities within a reasonable period of time?	258.57(d)		☐Y ☐N	N/A New Facility

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E.34 Has the RWQCB determined that remediation is not necessary because the discharger has demonstrated that: • The ground water is additionally contaminated by substances that have originated from a source other than the MSWLF and that cleanup of the MSWLF release would provide no significant reduction in risk to actual or potential receptors? Or, • The constituent(s) is present in ground water that, (i) is not currently or reasonably expected to be a source of drinking water; and (ii) is not hydraulically connected with waters to which hazardous constituents are migrating or likely to migrate in a concentration(s) that would exceed the ground water protection standard? Or, • Remediation of the release is technically impractical? Or, • Remediation results in unacceptable cross-media impacts? *[**Achtung!** If discharger has finished up the ACM but has not yet started the CAP, **and is not delaying the start,** then answer "yes" at right and skip to Part F. Otherwise, continue with E.35 et seq.]*	258.57(e) 258.57(e)(1) 258.57(e)(2) 258.57(e)(3) 258.57(e)(4)	☐Y ☐N ☐Y ☐N		N/A New Facility
E.35 Has the discharger established and implemented a corrective action program that: • Meets the requirements of an assessment monitoring program (AMP) under §258.55? *[Note: The AMP continues throughout the CAP.]* • Indicates the effectiveness of the corrective action remedy over time? • According to the timeline [§258.57(d)], and based on observations to date, will bring (or has brought) the MSWLF into compliance with ground water protection standards? *[Answer "No" if CAP measures are not working well & need revision.]*	258.58(a)(1)(i) 258.58(a)(1)(ii) 258.58(a)(1)(iii)		☐Y ☐N ☐Y ☐N ☐Y ☐N	N/A New Facility
E.36 Is the discharger actually implementing the corrective action remedy selected under §258.57?	258.58(a)(2)		☐Y ☐N	N/A New Facility
E.37 Has the discharger taken any interim measures necessary to ensure protection of human health and environment and considered the factors described in §258.58(a)(3)(i-vii)?	258.58(a)(3)		☐N/A ☐Y ☐N	N/A New Facility
E.38 Has the discharger, based on information developed after implementation of the remedy has begun or other information, determined that compliance with §258.57(b) is not being achieved through the remedy selected and implemented other method or techniques to achieve compliance?	258.58(b)	☐Y ☐N		N/A New Facility

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E.39 Has the discharger determined that compliance with §258.57(b) cannot be practically achieved with any currently available methods? *(If "Yes," answer the rest of the questions in this box.)* Has the discharger: • Obtained certification of a qualified ground water scientist or approval by the RWQCB that §258.57(b) compliance cannot be practically achieved? • Implemented alternate measures to control exposure to residual pollution? • Implemented alternate measures for control of the pollution source? • Notified the RWQCB that a report justifying the alternative measures has been placed in the operating record prior to implementing the alternative measures?	258.58(c) 258.58(c)(1) 258.58(c)(2) 258.58(c)(3) 258.58(c)(4)	☐Y ☐N	☐Y ☐N ☐Y ☐N ☐Y ☐N ☐Y ☐N	N/A New Facility
E.40 Are all solid wastes that are managed pursuant to a corrective action remedy or interim measure managed in a manner that: • Is protective of water quality? • Complies with applicable RCRA requirements?	258.58(d) 258.58(d)(1) 258.58(d)(2)		☐N/A ☐Y ☐N ☐N/A ☐Y ☐N	N/A New Facility
E.41 Is the corrective action remedy considered complete? *(If "Yes," answer the next three questions.)* • Has the discharger complied with the ground water protection standards established under §258.55(h) or (i) at all points within the portion of the plume of pollution that lies downgradient from the relevant point of compliance? • Has the discharger complied with the ground water protection standards by demonstrating through statistical testing that concentrations of Appendix II constituents have not exceeded the ground water protection standard for a period of three years? *[Note: The RWQCB may specify an alternative length of time; see §258.58(e)(2)(i-iv).]* • Have all actions required to complete the remedy been completed? *[Answer "No" if there are any ongoing active measures needed to keep the Unit from exceeding.]*	258.58(e) 258.58(e)(1) 258.58(e)(2) 258.58(e)(3)	☐Y ☐N	☐Y ☐N ☐Y ☐N ☐Y ☐N	N/A New Facility
E.42 Upon completion of the remedy, has the discharger, within 14 days, notified the RWQCB that a certification that the remedy has been completed in compliance with the requirements of §258.58(e) has been placed in the operating record?	258.58(f)		☐N/A ☐Y ☐N	N/A New Facility
E.43 Has the discharger been released from the requirements for financial assurance for corrective action under §258.73?	258.58(g)	☐Y ☐N		

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<u>Subpart F--Closure and Post-Closure Care</u>

Describes requirements for ***closure of landfill units*** *in accordance with specified standards and for monitoring and* ***maintenance of units after closure****. Required activities include: installation of the final cover, 30-year post-closure care, and preparation of closure and post-closure plans. Note that existing MSWLFs that closed prior to one year following their respective federal deadline need only address question F.1.*

QUESTION	CITATION	DECISION POINT	COMPLIANCE?	JTD PAGES
F.1 Is the MSWLF still operating? *(If "No," answer the rest of the box's questions.)*	258.60(a)	■Y ☐N		
Is the MSWLF required to close under §258.60(f)? *[If "no," skip to F.2.]*		☐Y ☐N		
Has the discharger installed a final cover system comprised of an erosion layer underlain by an infiltration layer as follows: • The infiltration layer must be comprised of a minimum of 18 inches of earthen material that has a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less, and	258.60(a)(1)	☐Y ☐N		
• The erosion layer must consist of a minimum of 6 inches of earthen material that is capable of sustaining native plant growth.	258.60(a)(2)	☐Y ☐N		
If "No" to either of the above two questions, answer the next question Has the RWQCB approved an alternative cover that achieves the standards cited in §258.60(a)(1&2)?	258.60(b)		☐Y ☐N	
F.2 Has the discharger prepared a written closure plan that describes the steps necessary to close all MSWLFs at any point during its active life in accordance with the cover design requirements? *(If "Yes," answer the rest of the questions in this box.)*	258.60(c)		■Y ☐N	Parts E and F
Does the closure plan, at a minimum, include the following information:	258.60(c)(1)		■Y ☐N	
• A description of the final cover, and the methods and procedures to be used to install the cover?	258.60(c)(2)		■Y ☐N	
• An estimate of the largest area of the MSWLF ever requiring a final cover at any time during the active life?	258.60(c)(3)		■Y ☐N	
• An estimate of the maximum inventory of wastes ever on-site over the active life of the landfill facility?	258.60(c)(4)		■Y ☐N	
• A schedule for completing all activities necessary to satisfy the closure criteria in §258.60?				

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F.3 Has the discharger notified the RWQCB that a closure plan meeting F.2 has been prepared and placed in the operating record no later than the latter of either 10/9/93 or (for Units built after that date) the date of initial receipt of waste? Has Unit begun or completed closure (for Units w/rolling clousre, this applies only to the last portion to be closed)? *[If "No," skip to F.11]*	258.60(d)	 ☐Y ■N	☐Y ☐N	N/A New Facility
F.4 Prior to beginning closure of each MSWLF, has the discharger notified the RWQCB that a Notice of Intent to close the MSWLF has been placed in the operating record?	258.60(e)		☐Y ☐N	
F.5 Has the discharger begun closure activities no later than 30 days after the date on which the MSWLF received the known final receipt of waste? *(Answer "No" if closure of full Unit is delayed or if non-full Unit is inactive. If "Yes," skip to F.6.)* Does the Unit have any remaining waste capacity? *[If "No," skip to F.6.]* Will closure activities start no later than one year after the most recent receipt of wastes? *(If "No," answer the next question.)* Has the RWQCB granted an extension beyond the one year deadline because the discharger has demonstrated that the MSWLF has the capacity to receive additional wastes and the discharger has taken all steps necessary to prevent threats to water quality from the unclosed MSWLF unit?	258.60(f) 258.60(f) 258.60(f) 258.60(f)	☐Y ☐N ☐Y ☐N	 ☐Y ☐N ☐Y ☐N	
F.6 Has the discharger completed closure of the MSWLF within 180 days following the beginning of closure? *(If "No," answer the next question.)* Has the RWQCB granted an extension beyond the 180 day closure period because the discharger has demonstrated that closure will, of necessity, take longer than 180 days and the discharger has taken all steps necessary to prevent threats to water quality from the unclosed MSWLF unit?	258.60(g)	☐Y ☐N	 ☐Y ☐N	
F.7 Has the discharger, following closure of each MSWLF unit, notified the RWQCB that a certification, signed by an independent professional engineer, verifying that closure has been completed in accordance with the closure plan, has been placed in the operating record?	258.60(h)		☐Y ☐N	

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F.8 *(If not yet closed, answer "N/A" and skip to F.9)* Has the discharger, following closure of all MSWLF units, recorded a notation on the deed to the landfill property and notified the RWQCB of the notation? *(If "Yes," answer the next question.)* Does the notation on the deed notify any potential purchaser of the property that: • The land has been used as a landfill facility, and • Its use is restricted under §258.61(c)?	258.60(l)(1) 258.60(i)(2)(i) 258.60(i)(2)(ii)		☐N/A ☐Y ☐N ☐Y ☐N ☐Y ☐N	
F.9 Is the MSWLF closed? *(If "Yes," answer the rest of the questions in this box.)* Is the discharger conducting post-closure care, including at least the following: • Maintaining the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover? • Maintaining and operating the leachate collection system in accordance with the requirements in §258.40? Note: The RWQCB may allow the discharger to stop managing leachate if the discharger demonstrates that leachate no longer poses a threat to water quality. • Monitoring the ground water in accordance with the requirements of subpart E, and maintaining the ground water monitoring system, if applicable? • Maintaining and operating the gas monitoring system in accordance with the requirements of §258.23?	258.61(a) 258.61(a)(1) 258.61(a)(2) 258.61(a)(3) 258.61(a)(4)	☐Y ☐N	☐Y ☐N ☐Y ☐N ☐Y ☐N ☐Y ☐N	
F.10 The post-closure care must be conducted for 30 years. However, the RWQCB may decrease or increase the time period based on the MSWLF unit's threat to water quality. Is the discharger conducting post-closure care for the time period specified in either §258.61(a) or (b)? *[N/A is for Units not yet closed.]*	258.61(a) or 258.61(b)(1) or 258.61(b)(2)		☐N/A ☐Y ☐N	
F.11 Has the discharger prepared a written post-closure plan that includes, at a minimum: • A description of the monitoring and maintenance activities required in §258.61(a) for each MSWLF unit, and the frequency at which these activities will be performed? • Name, address, and telephone number of the person or office to contact about the facility during the post-closure period? • A description of the planned uses of the property during the post-closure period?	258.61(c) 258.61(c)(1) 258.61(c)(2) 258.61(c)(3)		■Y ☐N ■Y ☐N ■Y ☐N	Part E

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F.12 Has the discharger notified the RWQCB that a post-closure plan, meeting F.11, has been prepared and placed in the operating record either prior to October 9, 1993, or by the initial receipt of waste, whichever is later?	258.61(d)		☐Y ☐N	N/A New Facility
F.13 Has the post-closure care period for the MSWLF expired? *(If "Yes," answer the next question.)* Has the discharger notified the RWQCB that a certification, signed by an independent professional engineer or approved by the RWQCB, verifying that post-closure care has been completed in accordance with the post-closure plan, has been placed in the operating record?	258.61(e)	☐Y ■N	☐Y ☐N	

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Subpart G--Financial Assurance Criteria

ALL MSWLF units that did not close prior to one year following their federal deadline MUST have closure and post-closure financial assurance. Any such Unit that has an exceedance of the WQPS for an Appendix II constituent (using statistical or nonstat. method) MUST have corrective action financial assurance. Note that the FEDERAL corrective action financial assurance requirement would NOT apply if the exceedance was only for a non-hazardous constituent (e.g., TDS).

QUESTION	CITATION	DECISION POINT	COMPLIANCE?	JTD PAGES
G.1 Has the discharger prepared a detailed written estimate of the cost of hiring a third party to close the largest area of all the MSWLF units ever requiring a final cover in accordance with the closure plan? Has the discharger established closure financial assurance that will meet the above-described costs using a CIWMB-approved mechanism?	258.71(a) 258.71(b)		☒Y ☐N ☒Y ☐N	Part F
G.2 Has the discharger prepared a detailed written estimate of the cost of hiring a third party to conduct post-closure care for the MSWLF unit for the first 30 years following closure? Has the discharger established post-closure financial assurance that will meet the above-described costs using a CIWMB-approved mechanism?	258.72(a) 258.72(b)		☒Y ☐N ☒Y ☐N	Part F
G.3 Is the MSWLF undergoing corrective action? *(If "Yes," answer the next questions.)* • Has the discharger prepared a detailed written estimate of the cost of hiring a third party to perform the corrective action? *[Answer "N/A" only if estimate is in-progress and the discharger is not behind schedule.]* • Has the discharger established corrective action financial assurance that will meet the above-described costs using a CIWMB-approved mechanism? *[Answer "N/A" only if mechanism is still being established and the discharger is not behind schedule.*	258.73 258.73(a) 258.73(b)	☐Y ☒N	☐N/A ☐Y ☐N ☐N/A ☐Y ☐N	

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APPENDIX B

PROPOSITION C

COUNTY OF SAN DIEGO
Proposition C

(This proposition will appear on the ballot in the following form.)

PROP C GREGORY CANYON LANDFILL AND RECYCLING COLLECTION CENTER ORDINANCE. Shall the Gregory Canyon Landfill and Recycling Center Initiative Ordinance be adopted?

NORTH COUNTY RECYCLING AND SOLID WASTE DISPOSAL INITIATIVE

The People of San Diego County Do Hereby Ordain as Follows:

SECTION 1. INTENT.

It is the intent of this initiative measure:

A. To provide for the siting of a new recycling collection center and class III solid waste landfill to allow the residents and businesses in northern San Diego County to dispose of their solid waste in an environmentally sound and economically competitive manner.

B. To ensure that the recycling collection center and landfill are designed, constructed, and operated in a safe and efficient manner by requiring that they fully comply with all environmental laws and regulations. The Project will be monitored during its life on a regular basis by regulatory agencies including, but not limited to, the Integrated Waste Management Board, the San Diego County Air Pollution Control District and the Regional Water Quality Control Board.

C. To amend the General Plan, Zoning Ordinance and other ordinances and policies of the County of San Diego to allow the construction and operation of a recycling collection center and class III solid waste landfill on approximately 270 acres of land within the 1683 acre Gregory Canyon site located off State Route 76 approximately 3 1/2 miles east of the intersection of Interstate 15 and State Route 76 in San Diego County. The general location of the Gregory Canyon site is shown on Figure 1 attached to this measure.

D. To provide that at least 1313 acres of the Gregory Canyon site will be dedicated as permanent open space to create a substantial preservation area for sensitive habitat and species.

SECTION 2. FINDINGS AND PURPOSE.

A. The San Marcos landfill is the only remaining landfill serving northern San Diego County which includes the cities of Carlsbad, Encinitas, Del Mar, Solana Beach, Escondido, Oceanside, San Marcos and Vista, and the unincorporated areas of northern San Diego County including Pauma, Bonsall, Valley Center, and Fallbrook.

B. The 1986 San Diego County Regional Solid Waste Management Plan and studies performed by the County of San Diego have documented the critical need for new solid waste facilities to serve the growing north San Diego County population.

C. The County of San Diego has been unsuccessful in siting any landfills in northern San Diego County since the San Marcos landfill was approved in 1977. This has occurred as a result of local opposition and the County of San Diego not proceeding with acceptable sites which have been extensively studied.

D. The conditional use permit issued in 1992 by the City of San Marcos for expansion of the San Marcos landfill requires the County of San Diego to aggressively pursue alternative north county landfill sites, and will expire by or before the year 1999, unless the City of San Marcos agrees to extend the term of the permit.

E. Local opposition to landfill sites and disagreement between north county cities and the County of San Diego over the handling of the solid waste system has created a solid waste crisis involving disputes between the cities and the County of San Diego.

F. The Gregory Canyon site was selected as one of three preferred landfill sites by the County of San Diego based upon a 1987 study which evaluated 168 alternative sites in northern San Diego County covering a study area of 1150 square miles. Subsequently, one of these sites, Blue Canyon, was dropped by the County of San Diego and two new landfill sites have been added. The Gregory Canyon site is now one of four finalist sites.

G. In 1990 the County of San Diego prepared an environmental impact report evaluating the environmental impacts of operating a landfill at the Gregory Canyon site. This Environmental Impact Report concluded that a landfill could be operated at the Gregory Canyon site consistent with all federal and state regulations governing landfill operations.

H. All of the San Diego County landfills have been successfully operated by a private party for the County of San Diego since 1982.

I. The Gregory Canyon site is located in a sparsely populated area of San Diego County. Solid waste operations will occur on approximately 270 acres of the Gregory Canyon site. At least 1313 acres will be dedicated as permanent open space to provide an important habitat and sensitive species preserve.

J. The voters hereby find and determine that the project will be compatible with other uses in the area and the County's general plan for uses in the area upon implementation of the mitigation measures required by this measure.

K. The voters hereby reaffirm the policy of the County of San Diego that each sub-region of the County shall be responsible for providing sufficient solid waste facilities to handle the solid waste generated in each sub-region and solid waste shall not be shipped from one sub-region to any other sub-region except where an emergency exists.

SECTION 3. DESCRIPTION OF THE PROJECT.

The Project will include the following components:

A. General Description of the Project.

The recycling collection center and landfill will occupy approximately 270 acres of the Gregory Canyon site. The landfill footprint containing refuse will cover approximately 150 acres of the site. The main features of the Project include a lined landfill, construction of a new access road and bridge providing access to the site from Highway 76, a scale area, a recycling collection center, a facilities and operation area, a borrow and stockpile area, a leachate collection system, and storm-water retention facilities. The facilities and operation area will include a visitors' center, an office building, a maintenance office, a shop and yard, a fueling station/storage area, a water tank truck wash and wash-water treatment area, a water supply well, groundwater monitoring wells, a landfill gas collection and recovery system, and a leachate collection tank. The Applicant shall be entitled to adjust the size and location of solid waste operations and to alter the proposed facilities based on a detailed site plan to be submitted to the Integrated Waste Management Board for its review and approval as part of the solid waste facilities permit.

B. Dedicated Open Space.

The remaining 1413 acres of Gregory Canyon site shall be dedicated as permanent open space to the County of San Diego, the Pala Band of Mission Indians, another public agency, or a Resource Conservation Group for long-term preservation of sensitive habitat and species. The actual amount of acreage dedicated may be adjusted as necessary to accommodate construction and operation of the Project. The open space area shall not be less than 1313 acres as a result of any adjustment.

C. Access Road.

The Project includes construction of a new access route and bridge from Highway 76 to the Gregory Canyon site.

D. Relocation of San Diego Gas & Electric Power Lines.

The project includes relocation of San Diego Gas & Electric transmission lines that are located within the area for the proposed landfill and recycling collection center. All such relocation will occur in accordance with plans reviewed and approved by San Diego Gas & Electric.

E. Realignment of Highway 76.

The Project includes the widening and realignment of State Road 76 on either side of the new access road to improve sight distance and to facilitate truck movements. The realigned segment would provide approximately 1000 feet of sight distance in both directions for traffic leaving the landfill. The Applicant shall contribute on a fair share basis to the widening of State Route 76 west of the access road to applicable state standards. The fair share shall be based upon the state standard average daily trips. This realigned portion of Highway 76 will be restriped to provide for acceleration/deceleration lanes and an over-take lane for through traffic. Detailed plans for the realignment of Highway 76 will be submitted to CalTrans for review and approval prior to commencing any realignment work.

F. Bridge.

The Project will include a bridge over the San Luis Rey River to provide separate roadways for access to and from the landfill, and to and from the topsoil stockpile area. This will facilitate adequate internal circulation for the landfill operations.

G. Protection of San Diego Aqueduct.

The Project will include work required to protect any San Diego Aqueduct pipelines to the extent and in the manner required by the San Diego County Water Authority.

A map showing the Project elements is shown on Figure 2 attached to this measure. The Applicant shall be entitled to alter or change these elements based upon a detailed site plan to be submitted to the Integrated Waste Management Board for review and approval in conjunction with the solid waste facilities permit.

SECTION 4. PERMITS.

To ensure that the Project is designed, constructed and operated in a safe and efficient manner, the Project shall be required to secure all of the following permits and approvals to the extent required by state or federal law:

A. Environmental Review.

The Project shall complete any additional environmental review required by federal or state law to secure the remaining permits and approvals.

B. Consultation with Advisory Council on Historic Preservation.

The Applicant shall consult with the Advisory Council on Historic Preservation in accordance with §106 of the National Historic Preservation Act.

C. 404 Permit.

The Applicant shall secure a permit relating to §404 of the Clean Water Act from the Department of the Army Corps of Engineers.

D. U.S.Fish & Wildlife Service.

The Applicant shall conduct a §7 consultation with the Department of Interior, U.S.Fish & Wildlife Service in compliance with the Endangered Species Act and shall coordinate the §404 permit with the U.S.Fish & Wildlife Service as required by federal law.

E. California Department of Fish and Game.

The Applicant shall secure a §1601 Streambed Alteration Agreement with the California Department of Fish & Game and any other permits required by the California Department of Fish & Game.

F. State Water Resources Control Board.

The Applicant shall secure a National Pollutant Discharge Elimination System Permit from the State Water Resources Control Board.

G. Regional Water Quality Control Board.

The Applicant shall secure a Waste Discharge Permit from the Regional Water Quality Control Board.

H. California Integrated Waste Management Board.

The Applicant shall obtain a Solid Waste Facility Permit from the California Integrated Waste Management Board and from the local enforcement agency for the California Integrated Waste Management Board.

I. California Department of Transportation.

The Applicant shall secure an encroachment permit from the California Department of Transportation as necessary for improvements to Highway 76.

J. State Office of Historic Preservation.

The Applicant shall review cultural sites within the Gregory Canyon site with the State Office of Historic Preservation for eligibility for the National Register of Historic Places.

K. County of San Diego.

The Applicant shall secure a Water Course Alteration Permit, Bridge Permit, Grading Permit and Building Permit from the County of San Diego. The County of San Diego is hereby authorized and directed to include the Project in its Integrated Waste Management Plan as required by State law and to make any findings required for issuance of any necessary permits.

L. San Diego Air Pollution Control District.

The Applicant shall secure all permits required by the San Diego Air Pollution Control District to construct and operate the solid waste facilities authorized by this measure.

M. San Diego Local Agency Formation Commission.

The Applicant shall obtain approval from the San Diego Local Agency Formation Commission for any possible annexation into local water districts as required by the rules and regulations of the San Diego Local Agency Formation Commission.

N. Utilities Services.

The Project shall comply with the requirements of local utility suppliers in securing electric, telephone, water and fire protection services. Sewer service will be provided by chemical toilets used by workers at the landfill. The Applicant will be required to provide the sewage disposal service, removing effluent once per week by pumper truck from the chemical toilets for treatment and disposal away from the site.

O. Other Permits and Approvals.

The Applicant shall secure all other permits and approvals as required by federal or state law.

SECTION 5. MITIGATION MEASURES.

To ensure that the Project is constructed and operated in a manner which minimizes its environmental impacts, the following mitigation measures are hereby adopted as a condition of voter approval of the Project:

A. Days of Operation.

The solid waste facilities shall remain open for the receipt of refuse a minimum of eight (8) hours a day, six (6) days a week, excepting those holidays observed by county-owned landfills.

B. Hours of Operation.

Solid waste operation shall occur only between the hours of 7:00 AM and 6:00 PM, Monday through Friday, and 8:00 AM to 5:00 PM on Saturday unless different hours are established by the Integrated Waste Management Board. For the purposes of this mitigation measure "solid waste operations" shall include the receipt, handling, processing, and/or disposal of solid waste or recyclable materials; cover operations; site grading and/or excavation, including blasting and rock crushing; and heavy equipment operation. Other site activities such as the operation of gas and leachate collection and treatment systems, remedial activities required by a regulatory agency, maintenance within the maintenance yard, and activities conducted in a completely enclosed building shall not be limited to these hours of operation.

C. Litter and Illegal Dumping.

At least five (5) days each week, the Applicant shall inspect for, and clean up, all litter and illegal dumping which occurs on, or adjacent to, the landfill access road and that portion of Highway 76 between the intersection with Interstate 15 and the site. The clean up team shall consist of at least one truck with a minimum crew of two persons.

D. Hazardous Waste Exclusion Program.

The Applicant shall maintain trained, full-time personnel engaged exclusively and continuously in the inspection of incoming refuse loads for hazardous waste. These personnel shall be stationed at the working face of the landfill whenever the landfill is open to accept waste and shall inspect loads as they are tipped. Hazardous wastes encountered in this fashion shall be handled and disposed of in accordance with state regulations.

E. Liner and Leachate Collection System.

A liner and leachate collection system shall be installed and monitored as required by the Regional Water Quality Control Board.

F. Landfill Gas System.

The Project shall include a network of vertical extraction wells, lateral transmission pipes to a gas recovery facility, and perimeter gas monitoring probes. With this system, the landfill gas will be extracted from the landfill and combusted in an enclosed flare.

G. Water Quality.

The Project shall comply with all requirements of the Regional Water Quality Control Board to ensure protection of surface and underground water quality.

H. Earthquakes.

All structures located at the Gregory Canyon site shall be designed by a qualified engineer to withstand the maximum probable earthquake to avoid potential impacts associated with earthquakes and ground shaking.

I. Traffic Impacts.

In order to mitigate traffic impacts, the Applicant shall widen and realign State Route 76 on either side of the access road to improve sight distance and to facilitate truck movements. The realigned segment will provide approximately 1000 feet of sight distance in both directions for traffic leaving the landfill. The Applicant shall contribute on a fair share basis to the widening of State Route 76 west of the access road to applicable state standards. The fair share shall be based upon the state standard average daily trips. Striping will be provided for acceleration/deceleration lanes and an over-take lane for through traffic. These realignment plans may be modified as necessary to meet CalTrans requirements.

J. Air Quality.

Air quality impacts associated with the Project shall be mitigated by meeting all requirements imposed by the San Diego County Air Pollution Control District for the Authority to Construct and Authority to Operate permits.

K. Noise Abatement.

The Applicant shall prepare a Noise Abatement Plan to include:

1. Physical design provisions to ensure that ambient noise levels do not exceed 65 CNEL at the boundaries of the Gregory Canyon site;
2. Installation of landfill equipment and vehicles with noise suppressing equipment to assist in meeting the above restrictions;
3. Provisions for at least 24 hour in advance written notice of any blasting on-site to residents within a one-mile radius of the blast site.
4. Where ambient noise levels exceed 65 CNEL at the boundaries of the Gregory Canyon site, the Applicant shall retain a qualified noise expert to evaluate the problem and recommend mitigation measures. These mitigation measures shall be implemented by the Applicant.

L. Odor Control.

To control odors on-site, the Applicant shall submit an Odor Control Plan to the San Diego County Air Pollution Control District for review and approval.

M. Dust Control Plan.

To control dust from Project operations, the Applicant shall submit a Dust Control Plan to the San Diego County Air Pollution Control District for review and approval.

N. Biological Impacts.

All sensitive species and habitat impacted by the Project shall be mitigated in accordance with requirements imposed by the United States Fish & Wildlife Service as part of the §7 consultation.

O. Visual Impacts.

In order to mitigate visual impacts associated with the Project, the Applicant shall employ extensive use of landscaping emphasizing native vegetation, and rounding/undulation of slopes on the refuse column and changes in slope angles. All landscaping shall be performed by a licensed landscape architect in the State of California. This licensed architect shall prepare a detailed landscape plan designed to minimize visual impact associated with the Project to the maximum feasible extent. The plan prepared the licensed architect shall be implemented by the Applicant upon completion.

P. Cultural Impacts.

Impacts to Native American resources impacted by the Project shall be mitigated through the development of a Memorandum of Agreement between the Applicant and the appropriate regulatory agencies in accordance with §106 of the National Historic Preservation Act. To mitigate archaeological impacts caused by the Project, the Applicant shall retain a qualified archaeologist to investigate and recommend appropriate mitigation measures. These mitigation measures shall be implemented by the Applicant.

Q. Citizen Environmental Review Board.

A Citizen Environmental Review Board (the "Board") shall be established by agreement between the Applicant and the cities or other governmental entities agreeing to supply waste to the Project. The members of such Board shall be appointed by each such city or entity and shall be individual citizens who are not employees or officials of such city or entity. The Board shall have the authority to inspect and review all reports submitted by the Project to any other regulatory agency and to make recommendations to any such regulatory agency with respect to the operation of the Project, including any enforcement actions the Board may deem appropriate. The Board shall establish an environmental review team consisting of qualified personnel to monitor the operations of the landfill which team shall have reasonable access to the landfill during all hours of operation of the landfill.

R. Additional Mitigation Measures.

Mitigation measures included as part of any subsequent environmental review of the Project shall be included as additional mitigation measures for the Project. The Applicant shall submit a mitigation and monitoring program meeting state and federal law to the Integrated Waste Management Board for review and approval as part of the solid waste facilities permit.

SECTION 6. TIPPING FEE AND FINANCIAL GUARANTEES.

A. Tipping Fee.

It is the intention of the voters to ensure that the tipping fee charged by the Project to any public agency supplying waste to the project does not exceed the tipping fee currently charged at county-owned landfills as adjusted for inflation. This fee is currently $43 per ton. For calendar year 1994, this tipping fee shall be $43 per ton. Commencing January 1, 1994, and continuing on January 1 of each year thereafter, this tipping fee may be increased by the percentage charge in the Consumer's Price Index, All Urban Consumer's for the Los Angeles - Anaheim - Riverside Area (1967 = 100) for December of the prior year to December of the year the price increase is to occur.

The tipping fee as set in this section shall be subject to changes or adjustments based upon tipping fees negotiated between the Applicant and various public agencies agreeing to provide solid waste to the Project.

B. Financial Guarantees.

The Applicant shall provide a closure and post-closure plan complying with federal and state law and shall provide bonds or other financial guarantees to ensure performance as required by federal and state law.

SECTION 7. IMPLEMENTATION.

A. Amendments to County General Plan.

Upon the effective date of this initiative, the land use element of the County General Plan and all sub-regional and community plans which apply to the Gregory Canyon site and any related maps shall be amended to designate the Gregory Canyon site Public/Semi-public lands with a Solid Waste Facility Designator. Notwithstanding the Public/Semi-public designation, the Gregory Canyon site shall remain private lands unless purchased or condemned by a public agency.

B. Amendments to County Zoning Ordinance.

Upon the effective date of this initiative, the County Zoning Ordinance shall be amended to create a new zoning classification designated Solid Waste Facility ("SWF"). This SWF zoning classification shall be applied only to the Gregory Canyon site and shall allow the Project without the need for any permits from the County of San Diego except the Water Course Alteration Permit, Bridge Permit, Grading Permit and Building Permit.

C. Amendments to Other County Ordinances and Policies.

All other County ordinances, rules and regulations which constitute legislative acts shall be amended as necessary to accommodate the Project as set forth in this initiative.

D. County Cooperation.

The County of San Diego shall cooperate with the Applicant wherever possible in issuing permits and approvals so that the Project can proceed in a timely fashion.

The County of San Diego is hereby authorized and directed to amend other elements of the General Plan, sub-regional plans, community plans, Zoning Ordinance, and other ordinances and policies affected by this initiative as soon as possible and in the manner and time required by State Law to ensure consistency between this initiative and other elements of the County's General Plan, sub-regional and community plans, Zoning Ordinance and other County ordinances and policies.

SECTION 8. DEFINITIONS.

For the purpose of this measure, the following words and phrases shall have the following meanings:

A. "Applicant" shall mean Servcon-San Marcos, Inc. or its assignee or authorized representatives.

B. "Gregory Canyon site" shall mean the approximately 1683 acres of land located off State Route 76 approximately 3 1/2 miles east of the intersection of Interstate 15 and State Route 76 occupying portions of Sections 4 and 5 of Township 10 South and Sections 32 and 33 of Township 9 South Range 2 West of the San Bernardino Principle Meridian.

C. "Integrated Waste Management Board" shall mean the State of California Integrated Waste Management Board.

D. "Project" shall mean the recycling collection center and landfill and associated structures and improvements as described in Section 3 of this initiative measure as subsequently modified by a detailed site plan submitted by Applicant to the Integrated Waste Management Board as part of the solid waste facilities permit.

E. "Recycling collection center" shall mean a facility for the buy-back of source separated materials but not the processing of mixed waste.

SECTION 9. PURCHASE BY PUBLIC AGENCY.

The Gregory Canyon site shall remain private land until purchased by a public agency or Joint Powers Authority for its fair market value. Nothing contained herein shall restrict the right of any public agency to exercise its eminent domain power as authorized by law to acquire the Gregory Canyon site.

SECTION 10. AMENDMENT OR REPEAL

This measure may be amended or repealed only by a majority of the voters voting in an election thereon.

SECTION 11. INTERPRETATION AND SEVERABILITY.

This measure shall be interpreted so as to be consistent with all federal and state laws, rules and regulations. If any section, sub-section, sentence, clause, phrase, part or portion of this measure is held to be invalid or unconstitutional by a final judgment of court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this measure. The voters hereby declare that this measure, and each section, sub-section, sentence, clause, phrase, part or portion thereof would have adopted or passed irrespective of the fact that any one or more sections, sub-sections, sentences, clauses, phrases, parts or portions are declared invalid or unconstitutional.

SECTION 12. CONSISTENCY WITH OTHER BALLOT MEASURES.

In the event that another ballot measure is placed on the same ballot as this measure purporting to deal with the same subject matter, and if both measures should pass, the voters expressly declare their intent that both measures shall be put into effect except to the extent that specific provisions of such measures are in direct conflict. In the event of such a direct conflict, the measure which obtained more votes will control as to the conflicting provisions only. The voters expressly declare this to be their intent, notwithstanding any language to the contrary in any other ballot measure.

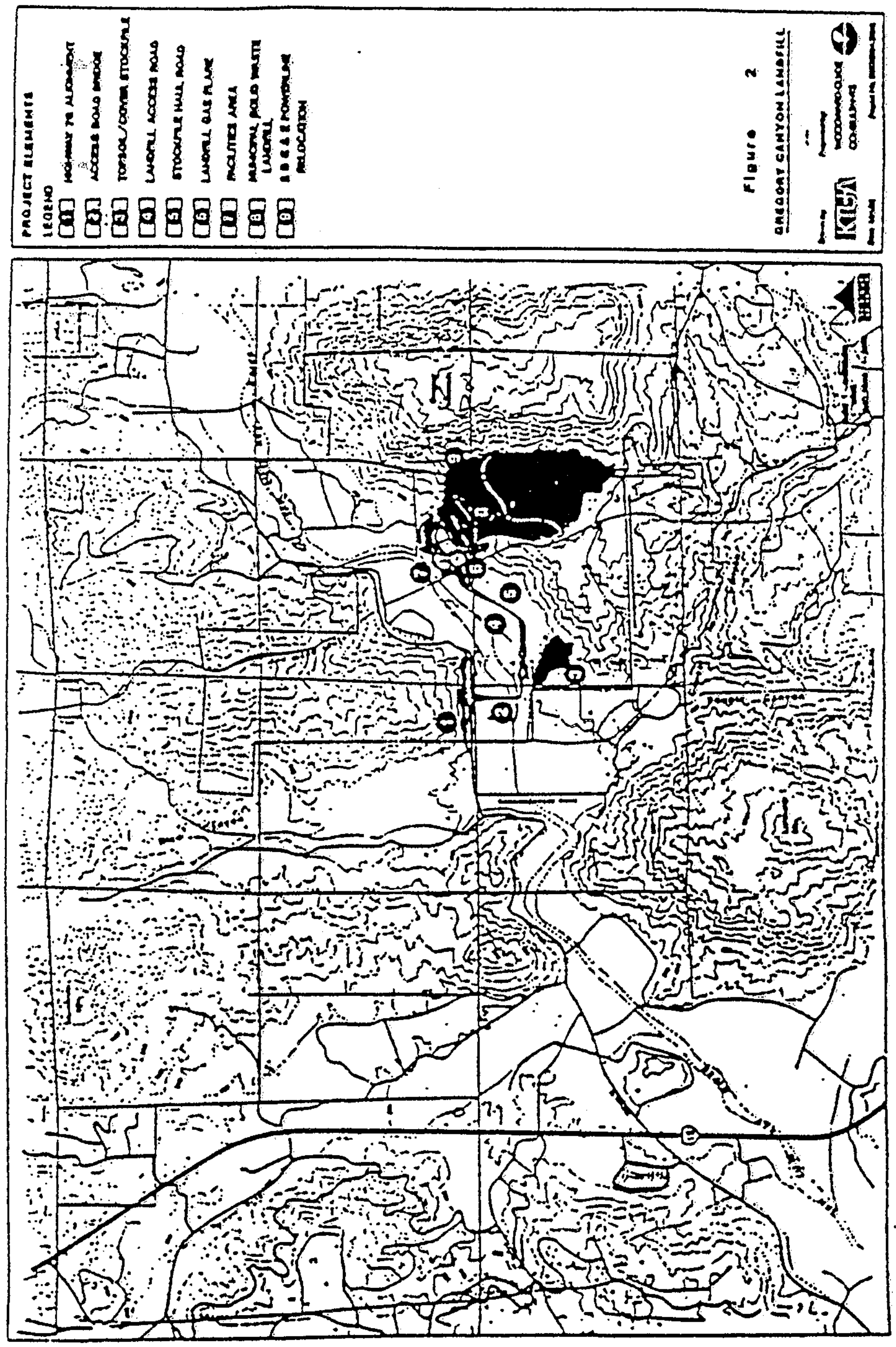
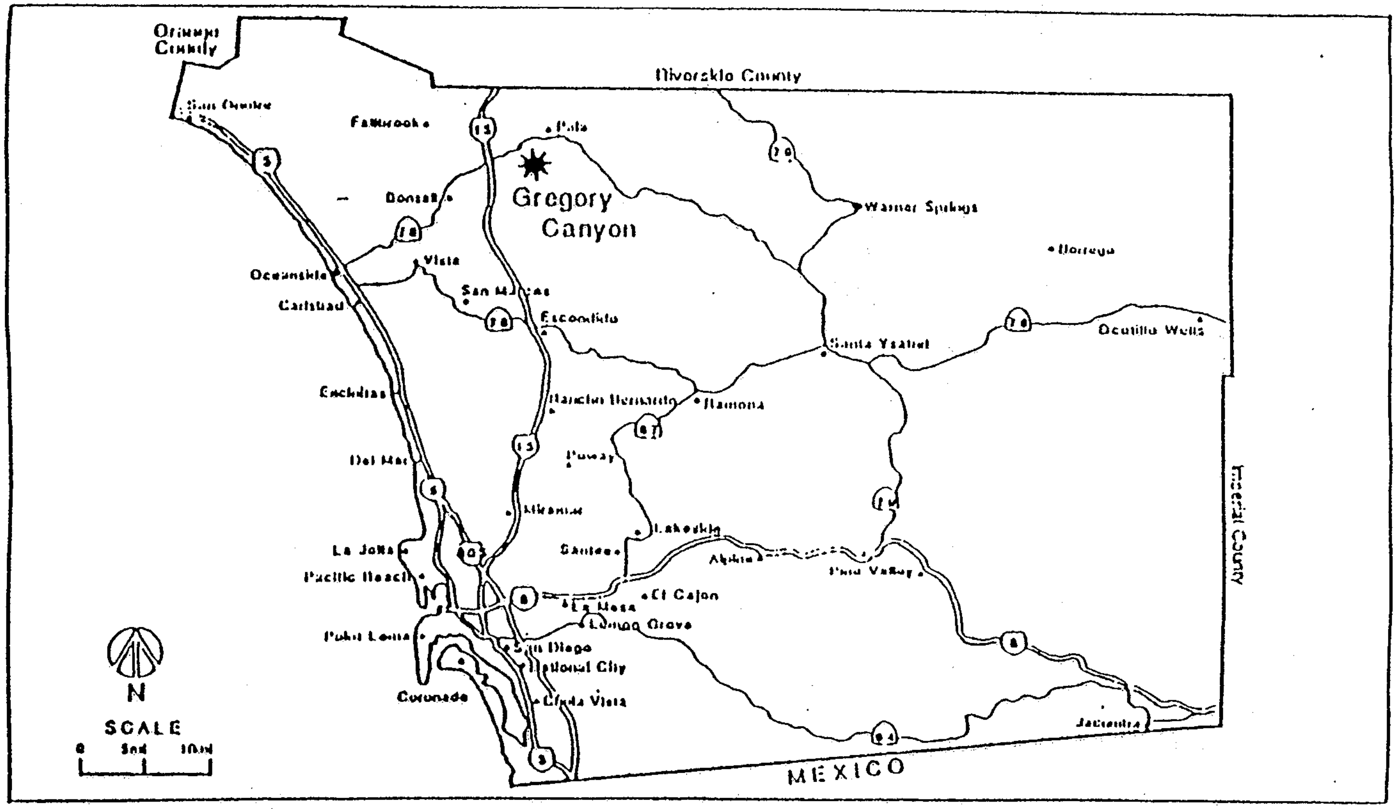


Figure 2
GREGORY CANYON LANDFILL



Butler Roach Group

SOURCE: DMA, 1909.

Proposed North County Landfill

FIGURE
1

COUNTY COUNSEL'S IMPARTIAL ANALYSIS

You are asked to vote on the Gregory Canyon Landfill and Recycling Collection Center Initiative. The declared intent of this measure is to permit the siting of a new recycling collection center and Class III solid waste landfill at Gregory Canyon ("Project") to allow residents and businesses of northern San Diego County to dispose of their solid waste in an environmentally sound and commercially competitive manner. Gregory Canyon is located off State Route 76 approximately three and one-half miles east of the intersection of Interstate 15 and State Route 76 in northern San Diego County.

This measure would amend the San Diego County General Plan and Zoning Ordinance to permit the development of the Project on approximately 270 acres at Gregory Canyon without the need for additional permits from the County except as specified in the initiative. The Project would be subject to any applicable State or federal permits and any environmental review needed to obtain those permits. The Project would remain private land unless purchased or condemned by a public agency.

The measure would provide that, if the Project is approved, at least 1313 acres of the Gregory Canyon site must be dedicated as permanent open space to create a preservation area for sensitive habitat and species. It would provide for the establishment of a Citizen Environmental Review Board to monitor the Project, sets forth tipping fee provisions and contains certain operating rules and other provisions as a condition of voter approval intended to mitigate the environmental impacts of the Project.

The Project, as described in the measure, would require the construction of a new access route and bridge, the relocation of gas and electric powerlines, the protection of any San Diego Aqueduct pipelines and the widening and realignment of State Route 76 with the Project Applicant contributing its fair share based upon average daily trips. The Applicant is defined to mean Servcon San Marcos, Inc., its designee or authorized representatives.

The measure contains findings concerning the need for a landfill in north San Diego County and reaffirming County policy that each subregion of the County provide for its own waste disposal. The measure may be amended or repealed only by vote of the people and contains various provisions relating to implementation and interpretation.

IMPARTIAL FISCAL IMPACT STATEMENT

The regional solid waste disposal system within San Diego County (except the City of San Diego solid waste disposal system) is administered by the County of San Diego. The governance of the assets, liabilities and obligations of the solid waste disposal system is being transferred to the Solid Waste Joint Powers Authority (Authority). This is an independent governmental agency which is composed of various cities within the region and the County of San Diego representing the unincorporated area. The system is administered like a business through a Solid Waste Enterprise fund which charges a system user fee to recover the cost of maintaining a financially solvent solid waste disposal system. These revenues (tipping fees) and expenditures (costs) are solely the responsibility of the solid waste disposal system and not the County of San Diego.

The revenues and expenses created by this initiative will be the responsibility of the Authority upon the transfer of all assets, liabilities and obligations to the Authority. Accordingly, this initiative does not have an effect on the revenues and expenditures of the County of San Diego. The effect of this initiative on the fees charged by the Authority for use of the solid waste disposal system are incalculable at this time due to the unknown variables which effect the charges such as solid waste tonnage, cost of permitting such a facility, construction cost and other systemwide costs.

APPENDIX B-1

NONEXCLUSIVE LICENSE AND OPERATING AGREEMENT
(SAMPLE ONLY)

NONEXCLUSIVE LICENSE AND OPERATING AGREEMENT

THIS AGREEMENT is made this ___nd day of _______, 2003 by and between the Gregory Canyon Ltd., LLC, a California limited liability with its principal place of business at Suite 2360, Three Embarcadero Center, San Francisco, CA 94111 ("Licensor") and ____________________, a ____________ corporation with its principal place of business at ____ ("Licensee"), in consideration of the promises made herein and intending to be legally bound, as follows:

RECITALS

WHEREAS, Licensor is the owner of that certain real property located within the County of San Diego and more particularly described on the map attached hereto as Exhibit "A" (the "Property"); and

WHEREAS, Licensor intends to use the Property for operation of a solid waste disposal facility commonly known as the Gregory Canyon Landfill ("the Facility"); and

WHEREAS, Licensee has substantial experience in the operation of solid waste disposal facilities and has the ability to carry out the operation of the Facility; and

WHEREAS, Licensee desires to assume Licensor's operations at the Facility under the terms and conditions set forth herein; and

WHEREAS, Licensor is willing to grant Licensee a nonexclusive license to use the Property and conduct operations at the Facility at the times and upon the conditions hereinafter set forth.

NOW, THEREFORE, for good and valuable consideration, the parties agree as follows:

1. Definitions.

1.1. "Acceptable Waste" means all garbage, refuse, rubbish and other materials and substances discarded or rejected as being spent, useless, worthless, or in excess to the owners at the time of such discard or rejection and which are normally disposed of, or collected from residential (single family or multi-family), commercial, industrial, governmental and institutional establishments, and which are acceptable for disposal at the Facility in accordance with Applicable Law.

1.2. "Agreement" means this Nonexclusive License and Operating Agreement between Licensor and Licensee, as it may be amended or modified from time to time.

1.3. "Applicable Law" means RCRA, CEQA, any Legal Entitlement and any other rule, regulation, requirement, guideline, permit, action, determination or order of any Governmental Body having jurisdiction, applicable from time to time to the siting, design, permitting, acquisition, construction, equipping, financing, ownership, possession, management, operation or maintenance of facilities used for the transportation, handling, treatment or disposal of Acceptable Waste, or any other transaction or matter contemplated hereby (including any of the foregoing which concern health, safety, fire, environmental protection, labor relations, mitigation monitoring plans, building codes, non-discrimination and the payment of minimum wages).

1.4. "Facility" means the Gregory Canyon Landfill.

1.5. "Property" means that certain real property located within the County of San Diego located at ____________________,as described on the map attached hereto as Exhibit A.

2. Grant of Nonexclusive Revocable License. During the term of this Agreement, Licensor hereby grants to Licensee a nonexclusive revocable license to the Property, subject to all of the terms and conditions herein, and an exclusive right to operate the Facility.

3. Permitted Uses.

3.1. Use of Property. During the term of this Agreement, the Property may be occupied and used by Licensee, its contractors, and subcontractors, for purposes, including, but not limited to the ingress and egress of employees, equipment and/or Acceptable Waste, the storing of materials and equipment; the operation of the Facility, and other encroachments on the Property necessary to and related to the operation, repair and maintenance of the Facility.

3.2. Use of Name. During the term of this Agreement, Licensee shall be authorized to use the name "Gregory Canyon Landfill" for the sole purpose of identifying the Facility and its operations, but for no other business or purpose.

4. Assignment; Sub-Licenses. It is expressly agreed that Licensee shall not have the right to assign or sub-license its rights under this Agreement without the prior consent of Licensor, which shall not be withheld unreasonably. Notwithstanding the above, Licensee may assign this Agreement to an affiliate without the consent of Licensee.

5. Licensee has no Interest or Estate. Licensee agrees that it does not and shall not claim at any time any interest or estate of any kind or extent whatsoever in the Property by virtue of this License or Licensee's occupancy or use hereunder.

6. Personal License Only. It is agreed between Licensor and Licensee that this license is personal to Licensee and, except as provided in Section 4 above, shall not inure to the successors or assigns of Licensee.

7. Term.

   7.1. This Agreement and the license granted hereunder shall be for a term commencing on ___________ and expiring on __________.

   7.2. Notwithstanding the above, either party shall have the right to revoke this Agreement for cause arising from a breach of the terms and conditions of this Agreement, upon thirty (30) days written notice to the other and reasonable opportunity to cure, which may extend beyond the thirty (30) day notice period where the breaching party initiates the cure within such period and thereafter diligently pursues completion thereof. In the event of a termination for cause, Licensee shall be obligated to pay Licensor pursuant to Section 13 up to and including the date of termination. In addition, in the event of a breach, the non-breaching shall have the right to pursue all remedies and damages permitted under this Agreement and the laws of Arizona.

   7.3. Notwithstanding the above, should Licensee, by force of any law, ruling or regulation, at any time during the term hereof, be ordered or required to do any act relative to this Agreement which substantially impairs or materially changes the Licensee's ability to perform under this Agreement, then Licensee may notify Licensor of this condition and may terminate this Agreement upon providing at least sixty (60) days advance written notice of termination to Licensor. Nothing in this Agreement shall prohibit either party from obtaining or seeking to obtain modification, reversal or repeal of such law, ruling or regulation or restrict either party's right to legally contest the validity of such law, ruling or regulation. Licensee shall not be considered in breach of this Agreement during such time as Licensee is contesting or appealing any notice of violation, ordinance, rule, regulation, ruling or law.

   7.4. The provisions of Sections 9, 14, 15 and 16 shall survive the revocation, expiration or other termination of the license or this Agreement until such time as the Property has been fully restored in accordance with Section 9 and any all liens discharged in accordance with Section 15, after which time Sections 14 and 16 only shall survive.

8. No Waste. Licensee shall not cause, do or suffer any permanent waste, disfigurement or injury to the Property or any improvements thereon during the term of this Agreement.

9. Restoration of Property, Removal of Property, and Return of Equipment.

   9.1. Immediately following the expiration of the term of the license, and/or upon revocation, surrender or other termination thereof, Licensee shall peaceably and immediately remove any and all personal property from the Property and surrender the Property to Licensor in as good a condition as the Property was in at the time of Licensee's entry of the Property, normal wear and tear excepted. Licensee agrees that Licensor shall obtain title to all structures and improvements existing upon the Property at the date of revocation, expiration or other termination of the license.

   9.2. If Licensee shall fail to do so within thirty (30) days after the time of any revocation, expiration other termination of the license, however brought about, Licensor shall have the right to: (i) remove and store any of Licensee's personal property at Licensee's sole cost and expense; and (ii) restore the Property at Licensee's sole cost and expense. Licensee shall pay to Licensor the aforementioned costs and expenses upon demand.

10. Obligations of Licensee. Licensee shall be responsible at its sole expense for all of the following activities related to the use of the Property:

10.1. Conducting the day to day operation of the Facility in accordance with the specifications set forth in Exhibit "B" hereto.

10.2. Furnish all necessary labor, materials, fuel, tools and equipment necessary for the operation of the Facility.

10.3. Obtaining and maintaining the insurance coverages required pursuant to Section 17 hereof and the Performance Bond and the required pursuant to Section 18.

10.4. Placing signage at the Property in the name of "Gregory Canyon Landfill", unless otherwise directed by Licensor.

10.5. Timely paying all property taxes due and owing with respect to the Property as required by the Lease, or otherwise.

10.6. Creating a trust fund, for the benefit of Licensor, to be used for the sole purpose of implementing closure and post-closure activities at the Facility. Licensee shall make payments to the trust fund on a per ton basis for each ton of Acceptable Waste received for disposal, determined by dividing the estimated cost of closure and post-closure activities by the amount of the remaining permitted disposal capacity at the Facility. This determination shall be revised annually each July 1 during the term of this Agreement. During the term of this Agreement, until the trust fund has assets in the amount of the estimated cost of closure and post-closure activities, Licensee shall provide one or more additional closure/post-closure financial assurance mechanisms for the differential between the estimated cost of closure and post-closure activities and the amount in the trust fund, to the extent required by Applicable Law.

10.7. Operating the gate house and collecting all fees received for the disposal of Acceptable Waste. Licensee shall be entitled to all proceeds received from the operation of the Facility.

10.8. Complying with Applicable Law and cooperating with Licensor to maintain all permits, licenses, or approvals (the "Approvals") which are required for the use of the Facility.

10.9. Payment of all utilities.

11. Risk of Loss. Subject to the requirements of Section 14 below, Licensee shall bear the entire risk for any loss and damage to the Facility, any part thereof, or any equipment located on the Property. In addition, no loss or damage to the Facility, any part thereof, or any equipment located on the Property, except where caused by the negligence of Licensor, shall impair any obligation of Licensee under this Agreement, which shall continue in full force and effect.

12. Obligations of Licensor. Licensor shall:

12.1. Maintaining the Approvals in the name of Licensor.

12.2. Implementing all closure and post-closure activities as required by Applicable Law. In so doing, Licensor may utilize the assets of the trust fund created by Licensee for this purpose.

13. Operating Fee. In consideration of Licensee conducting operations at the Facility, Licensor shall pay Licensee the following fee: (TBD)

14. Indemnification.

14.1. Licensee agrees to defend, indemnify and hold Licensor harmless and assume full responsibility for payment of all State and Federal taxes for unemployment insurance, workers' compensation, old age pensions or under any social security laws or law, as to all employees of Licensee engaged in the performance of this Agreement.

14.2. Licensee agrees to defend, indemnify and hold Licensor harmless for losses, damages, injuries or death that arise in connection with the acts or omissions of Licensee in the performance of its duties under this Agreement, or a violation of applicable laws and regulations.

14.3. Licensee agrees to defend, indemnify and hold Licensor harmless for any losses, injuries, or claims (including but not limited to Removal or Remedial actions brought pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C Section 9601 et seq., or any similar state or local law) that arise in connection with the release of Hazardous Substances (as that term is defined under 42 U.S.C. Section 9601(14) or any similar state or local law) from the Facility caused by or arising from Licensee's operation of the Facility.

14.4. Licensor agrees to defend, indemnify and hold Licensee harmless for damages, injuries or death that arise in connection with the acts or omissions of Licensee in the performance of its duties under this Agreement, or a violation of applicable laws and regulations.

15. Liens. During the term of this Agreement, Licensee shall not permit to remain and shall promptly discharge, at its sole cost and expense, all mechanics', laborers', and materialmen's liens, encumbrances and charges (other than liens, encumbrances and charges created or suffered by Licensor or any person acting for or on behalf of Licensor) at the Property or on any part of the same, provided that the existence of any mechanics', laborers', or materialmens' liens or rights incident thereto shall not constitute a violation of this section if payment is not yet due as provided in the contract which is the basis of the same. Licensee shall have the right to contest with due diligence the validity or amount of any lien or claimed lien, if Licensee procures and records a lien release bond issued by a corporation authorized to issue surety bonds in California in an amount equal to the amount of the claim of lien. Such bonds provide for the payment of any sum that the claimant may recover with respect to the claim in question, together with costs of suit to the extent that such claim recovers the same. On any adverse,

final determination of the lien or claim for lien, Licensee shall immediately pay any judgment rendered with all proper costs and charges and shall have the lien released or judgment satisfied at Licensee's sole cost and expense and, if Licensee fails to do so, Licensor may in its sole discretion pay any such final judgment. If Licensee fails to record a lien release bond as provided in this section and such failure is not cured by Licensee within a reasonable time after demand by Licensor, Licensor may contest the validity or amount of any such lien or claim of lien or settle or compromise the same without inquiring into the validity of the claim or the reasonableness of the amount of the same.

16. Insurance.

16.1. Licensee agrees to obtain and maintain and to furnish to Licensor certificates attesting to the existence of, the following insurance to protect against any losses or damages occurring the period of Licensee's use of the Property:

Coverage	Limits of Liability
Workmen's Compensation	Statutory
Employer's Liability	$500,000 Each Occurrence
General Liability, Including Bodily Injury, Property Damage and Contractual Liability	$2,000,000 Combined Single Limit, Each Occurrence
Automobile Liability, Including Bodily Injury and Property Damage	$2,000,000 Combined Single Limit, Each Occurrence

16.2. Each such certificate shall contain a statement of the insurer's obligation to notify the party to whom the certificate is addressed at least thirty (30) days prior to cancellation of any policy covered thereunder.

16.3. Licensee's General Liability and Automobile Liability policies shall name Licensor as an additional insured.

17. <u>General Conditions.</u>

17.1. Uncontrollable Circumstances. Neither party hereto shall be liable for its failure to perform in whole or in part hereunder due to contingencies beyond its reasonable control, including, but not limited to, strikes, labor unrest, riots, war, fire, acts of God, compliance with any law, regulation order or action, whether valid or invalid, of the United States of America or any other governmental body or any instrumentality thereof, whether now existing or hereafter created.

17.2. Independent Contractor. The work and labor herein provided for shall be performed and furnished by the parties as independent contractors and under the sole supervision, management, direction and control of each party in accordance with the terms and conditions of this Agreement. This Agreement shall not be construed to create a partnership, joint venture or employment relationship between the parties.

17.3. Waivers. Failure by Licensor to complain of any act or omission on the part of Licensee, no matter how long the same shall continue, shall not be a waiver by Licensor of its rights hereunder. No waiver by Licensor, express or implied, of any breach of any provision of this Agreement shall be deemed a waiver of any other provision of this Agreement or consent to any subsequent breach of the same or any other provision.

17.4. Sole and Only Agreement. This Agreement constitutes the sole and only Agreement between the parties hereto with respect to the services herein described and correctly sets forth the obligations of each party. Any representations or agreements not specifically contained herein are null and void.

17.5. Amendment. Neither this Agreement nor any provision hereof may be changed, modified, amended or waived except by written agreement duly authorized and executed by both parties.

17.6. Law to Govern. This Agreement shall be construed according to, and the obligations of the parties hereunder governed by, the laws of the State of California..

17.7. Counterparts. This Agreement may be signed in counterparts, each of which shall constitute an original and which collectively shall constitute one instrument.

17.8. Notices. Any notice required or permitted by this Agreement shall be in writing and sufficiently given if delivered in person, delivered via facsimile, or sent by certified or registered mail, postage prepaid, to the notice address of the respective parties set forth in this Agreement. Changes in the respective addressees to which such notices may be directed may be made from time to time by any party by notice to the other party. The present addresses of the parties are:

Licensor:
Gregory Canyon, Ltd. LLC
Suite 2360
Three Embarcadero Center
San Francisco, CA 94111
Attn: Jerry Riessen
Telephone: (415) 391-2833
Facsimile: (415) 788-2030

Licensee:

____
____
____
____
Telephone: ________________
Facsimile: ________________

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the dates opposite their respective signatures:

GREGORY CANYON LTD., LLC

Date: ________________________ By ________________________

Title:________________________

____

Date:________________________ By: ________________________

Title:________________________

EXHIBIT "A'

PROPERTY DESCRIPTION

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EXHIBIT "B"

PERFORMANCE SPECIFICATIONS

1. No open burning shall be permitted and Licensee shall use all reasonable means to prevent said burning. Should any such fires occur, it shall be the responsibility of the Licensee to use all available methods to control such fires whether on the surface or underground.
2. Maximum densification of deposited refuse shall be accomplished through compaction with Licensee's equipment and employing methods used in good sanitary landfill operations.
3. The working face of the fill shall be kept as narrow as is consistent with proper operation of collection vehicles and equipment, for minimal surface area and exposure time of waste material.
4. Roads shall be maintained by Licensee within the Facility. Roads within the Facility shall be planned and constructed for use during wet weather. This may require stockpiling of materials and temporary road construction for access to the dumping area.
5. Effective steps shall be taken by Licensee to control blowing papers at the disposal site by constructing and maintaining movable fencing adjacent to areas in use, and/or other facilities to adequately control paper at all times, whether refuse-covered or not.
6. A gate is provided at the entrance to the disposal site. It shall be closed and locked at the time designated for closing the disposal site. It is the responsibility of the Licensee to enforce this provision.
7. Scavenging shall not be permitted by the public, and signs to this effect shall be provided by Licensee.
8. Control of birds, rodents and insects shall be maintained. Approved pesticides and poisons may be used for such purposes to control these pests, whenever necessary. Use of pesticides and poisons shall be regulated so percolation of runoff through natural drainages from the immediate are of use will be precluded.
9. Sufficient equipment shall be available at all times to prevent delay in refuse compaction and covering because of breakdowns or peak loads.
10. Licensee shall provide for on-site drainage of the fill site at all times.
11. Records of all operating factors necessary to determine rate of fill, settlement, availability of soil cover, equipment and personnel operations at the site shall be maintained by the Licensee. Licensee shall have a minimum of one employee on duty at the main entrance at all times to collect and receipt for charges, maintain the records, and operate the scale. There shall be sufficient other employees on duty at all times to direct traffic, control dumping and operate the disposal site, including the equipment therein, to insure that the operations hereunder shall be in accordance with these specifications.
12. Licensee shall maintain some method to apply water or a dust palliative, or both, for the alleviation or prevention of dust nuisance that may occur during his operations.
13. Cracks, depressions, and erosion of the surface and side slopes of the completed fill areas will be promptly repaired.
14. All persons using the disposal facility shall be furnished a receipt therefor. The furnishing, printing and handling and form of the receipts shall be the responsibility of the Licensee.

15. The Facility shall be open to the public for not less than the days and hours provided below, except Holidays.

Weekdays	....	____________________
Saturday	....	____________________

APPENDIX B-2

SUPPLEMENT 1 PREPARED IN RESPONSE TO LEA COMMENTS

GREGORY CANYON LANDFILL
JOINT TECHNICAL DOCUMENT
SUPPLEMENT 1

The proposed Gregory Canyon Landfill project, like most landfill projects (i.e., both new and lateral/vertical expansions) undergo a number of changes, not only through development of the master design plans, but also as a result of California Environmental Quality Act (CEQA)-induced changes related to the reduction of potential impacts. Additionally, as was the case with the proposed Gregory Canyon Landfill, some of the changes were as a result of regulatory agency comments. The "proposed project" for Gregory Canyon Landfill, as presented in the certified Final Environmental Impact Report (FEIR) Chapter 3.0, Project Description was changed/modified during the development and review process. In addition, Section 15126(a) of the CEQA Guidelines requires that an EIR:

> "Describe a range of reasonable alternatives to the proposed project, or to the location of the project, that would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant environmental effects of the project, and evaluate the comparative merits of the alternatives."

Chapter 6.0, Alternatives to the Proposed Project, of the FEIR evaluated alternatives to the project. The project presented in the Joint Technical Document (JTD) reflects a combination of features from both the "proposed project" and the "alternative". Fundamentally, the project described in the JTD was downsized from the "proposed project."

Two of the major changes reflected in the JTD and evaluated in Chapter 6.0 of the FEIR were modifications to the bottom contours or sub-grade of the landfill and the waste containment system. These changes came as result of comments received from the San Diego Regional Water Quality Control Board on the project. Specifically, the subgrade design was changed to bring the bottom of the landfill up above the highest anticipated ground water level. As a result, the excavation quantity and associated refuse capacity were reduced. In addition, the amount of daily and intermediate cover needed over the life of the project was also reduced.

The project described in the JTD will result in less potential impacts than the impacts that would occur from the "proposed project" in the FEIR because the JTD reflects a project that is smaller in size and scope. The following table was prepared to present information presented in the FEIR on the "proposed project", alternatives to the project and the JTD.

Description	FEIR "Proposed Project"	FEIR "Alternative"	JTD
Gross Airspace	64.4 mcy (p. 3-60)	"Not Stated"	59.5 mcy (Section B.1.6)
Net Airspace	61.9 mcy (p. 3-60)	"Not Stated"	57.0 mcy (Sections B.1.6 and C.3.1)
Refuse Volume	49.44 mcy or 33.43 million tons (p. 3-60)	31 Million Tons (p. 6-78)	45.4 mcy or 30.8 million tons (Section B.1.6)
Cover Operations	12.4 mcy (p. 3-36)	12.7 for daily, internal	11.4 mcy + 2.7 for operations layer and final cover (Sections C.2.2.3 and B.4.4.8)
Excavation Materials from Landfill Footprint	9.8 mcy (p. 3-36)	Final Cover (p. 6-67) 7.9 (p. 6-76)	7.9 mcy (Section B.4.4.8)
Material Excavated from Landfill Footprint available for Cover	40% or 3.9 mcy (p. 3-37)	"Not Stated"	4.9 mcy (Section B.4.4.8)
Shortfall of Useable Material	4.0 mcy (p. 3-37)	"Not Stated"	4.7 mcy (Section B.4.4.8)
Use of ADC Reducing Demand for Cover Soil	37.5% (p. 3-37)	"Not Stated"	"by as much as one third" (Section B.4.4.5.1)
Temporary Stockpile	Not Discussed	"Not Stated"	9.4 mcy (Section C.2.2.3)
Phase I Excavation	4.6 mcy (p. 3-61)	"Not Stated"	3.7 mcy (Section C.2.9.2.2)
Phase I Construction of Ancillary Facilities	0.8 mcy of the 4.6 mcy (p. 3-61)	"Not Stated"	0.3 mcy of the 3.7 mcy (Section C.2.9.2.2)
Phase I Gross Airspace	8.5 mcy (p. 3-61)	"Not Stated"	8.1 mcy (Section C.2.9.2.4)
Bridge Length	640′, with five sets of two piles each (p. 3-14)	"Not Stated"	681′, supported by five large diameter piers (Section C.2.9.2.6)
Bridge Buttress (at side slopes)	3:1 (p. 3-19)	"Not Stated"	2:1 (Section C.2.2.1)
Phase II Depth of Excavation	430 feet amsl (Exhibit 3-20)	"Not Stated"	525 feet amsl or 25 feet below ground level (Section C.2.9.3.2)
Phase II Excavation	6.4 mcy (p. 3-64)	"Not Stated"	3.7 mcy (Section C.2.2.1)
Phase II Gross Airspace	10.8 mcy (p. 3-64)	"Not Stated"	6.3 mcy (Section C.2.9.3.4)
Phase III/IV Gross Airspace	43.6 mcy (p. 3-64)	"Not Stated"	43.1 mcy (Section C.2.9.4.4)
Liner Configuration	Single Composite (p. 3-11)	"Double Composite" (p. 6-75)	Double Composite (Section C.2.4)
Depth of Excavation (Bottom)	Between 370 and 440 feet (p. 3-10)	Between 400 and 700 feet (p. 6-76)	Between 380 and 750 feet (Figure 12)

As can be seen on the attached table, the quantities presented in the JTD reflect a reduced project which will create less potential impacts to the environment. As long as the project described in the permitting documents does not exceed the scope and duration of that analyzed in the CEQA document, no additional environmental evaluation is necessary. The project described in the JTD is within the perimeters of the project and alternatives analyzed in the certified FEIR. Therefore, no additional environmental analysis is warranted.

APPENDIX B-3

PROPERTY DESCRIPTION DOCUMENTATION

CHICAGO TITLE COMPANY
PRELIMINARY REPORT

CHICAGO TITLE COMPANY

PRELIMINARY REPORT

Dated as of: April 9, 2004 at 7:30 AM

Reference: GREGORY CANYON LTD

Order No.: 43050450 - U52

CHICAGO TITLE COMPANY hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception in Schedule B or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms.

The printed Exceptions and Exclusions from the coverage of said Policy or Policies are set forth in the attached list. Copies of the Policy forms are available upon request.

Please read the exceptions shown or referred to in Schedule B and the exceptions and exclusions set forth in the attached list of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of title insurance policy and should be carefully considered. It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects and encumbrances affecting title to the land.

THIS REPORT (AND ANY SUPPLEMENTS OR AMENDMENTS HERETO) IS ISSUED SOLELY FOR THE PURPOSE OF FACILITATING THE ISSUANCE OF POLICY OF TITLE INSURANCE AND NO LIABILITY IS ASSUMED HEREBY. IF IT IS DESIRED THAT LIABILITY BE ASSUMED PRIOR TO THE ISSUANCE OF POLICY OF TITLE INSURANCE, A BINDER OR COMMITMENT SHOULD BE REQUESTED

The form of policy of title insurance contemplated by this report is:
AMERICAN LAND TITLE ASSOCIATION LOAN EXTENDED COVERAGE POLICY

Visit Us On The Web: westerndivision.ctt.com

Title Department:

CHICAGO TITLE COMPANY
925 "B" STREET
SAN DIEGO, CA 92101
(619)544-6291 fax: (619)544-6279

Steven R. Brown
TITLE OFFICER

SCHEDULE A

Order No: 43050450 U52 Your Ref: GREGORY CANYON LTD

1. The estate or interest in the land hereinafter described or referred to covered by this report is:

A FEE AS TO PARCEL 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 14, 15, 16, 17, 23, 24, 25, 26, 28, 29, 30, 31, 32, 35, 37, 38, 39, 40, 41 AND 42;

AN EASEMENT MORE FULLY DESCRIBED BELOW AS TO PARCEL 11, 12, 13, 27, 33, 34, 36 AND 43.

2. Title to said estate or interest at the date hereof is vested in:

GREGORY CANYON, LTD., LIMITED LIABILITY COMPANY, A CALIFORNIA LIMITED LIABILITY

3. The land referred to in this report is situated in the State of California, County of SAN DIEGO and is described as follows:

SEE ATTACHED DESCRIPTION

DESCRIPTION

PARCEL 1: (APN: 110-150-25)

THAT PORTION OF SECTION 32, TOWNSHIP 9, SOUTH, RANGE 2 WEST, TOGETHER WITH THAT PORTION OF LOTS 1 AND 2 OF SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, State of California, ACCORDING TO OFFICIAL PLAT THEREOF BEING DESCRIBED AS WHOLE AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION 32; THENCE ALONG THE WESTERLY LINE OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION, NORTH 0° 11' 37" EAST 1344.07 FEET TO THE NORTHWEST CORNER OF SAID NORTHWEST QUARTER OF THE SOUTHWEST QUARTER; THENCE ALONG THE NORTHERLY LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 32, NORTH 89° 48' 57" EAST 2866.62 FEET TO THE NORTHEAST CORNER OF SAID SOUTHWEST QUARTER OF SAID SECTION; THENCE ALONG THE WESTERLY LINE OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 32, NORTH 3° 53' 00" EAST 1357.94 FEET TO THE NORTHWESTERLY CORNER OF SAID SOUTHWEST QUARTER OF THE NORTHEAST QUARTER; THENCE NORTH 49° 24' 48" EAST (RECORD NORTH 45° EAST) 361.63 FEET TO AN ANGLE POINT IN THE LAND DESCRIBED IN PARCEL 6 IN THAT CERTAIN DEED TO STANLEY RACKOW AND JOSEPH J. STOKES, RECORDED MARCH 6, 1961 AS FILE NO. 39855 OF OFFICIAL RECORDS; THENCE ALONG THE WESTERLY AND SOUTHERLY BOUNDARY OF SAID LAND AS FOLLOWS: SOUTH 12° 08' 28" WEST 283.56 FEET; THENCE SOUTH 3° 28' 36" WEST 665.93 FEET; THENCE SOUTH 16° 59' 55" EAST 1002.46 FEET; THENCE SOUTH 6° 35' 24" EAST 781.90 FEET; THENCE SOUTH 28° 40' 06" WEST 341.83 FEET; THENCE NORTH 86° 35' 20" EAST 823.77 FEET TO THE NORTHEAST CORNER OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 32; THENCE ALONG THE EASTERLY LINE OF SAID SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER, SOUTH 7° 00' 06" WEST 1352.95 FEET TO THE SOUTHEAST CORNER THEREOF; THENCE ALONG THE SOUTHERLY LINE OF SAID SECTION 32, SOUTH 89° 55' 10" WEST 846.18 FEET MORE OR LESS TO THE SOUTHWESTERLY LINE OF THE SAN DIEGO AQUEDUCT EASEMENT 150.00 FEET WIDE, AS SAID EASEMENT IS DESCRIBED IN INSTRUMENT RECORDED NOVEMBER 15, 1948 AS DOCUMENT NO. 105285, IN BOOK 3386, PAGE 147 OF OFFICIAL RECORDS; THENCE ALONG SAID SOUTHWESTERLY LINE NORTH 26° 44' 25" WEST (RECORD NORTH 26° 44' 15" WEST) 1012.09 FEET TO THE MOST NORTHERLY CORNER OF THE LAND DESCRIBED IN DEED TO IDA SCHAAP, ET AL, RECORDED NOVEMBER 2, 1962 AS FILE NO. 188661 OF OFFICIAL RECORDS; THENCE ALONG THE NORTHWESTERLY LINE OF SAID LAND AND THE SOUTHWESTERLY PROLONGATION THEREOF SOUTH 53° 33' 03" WEST 2015.52 FEET TO AN ANGLE POINT IN THE NORTHERLY BOUNDARY OF LAND DESCRIBED IN DEED TO WILLIAM VERBOOM RECORDED SEPTEMBER 6, 1962, AS FILE NO. 153647 OF OFFICIAL RECORDS; THENCE ALONG THE NORTHEASTERLY BOUNDARY OF SAID LAND AND THE PROLONGATION THEREOF, NORTH 40° 07' 07" WEST 425.03 FEET TO AN ANGLE POINT IN THE NORTHEASTERLY BOUNDARY OF THE LAND DESCRIBED IN PARCEL 3 IN DEED TO STANLEY RACKOW, ET AL, RECORDED MARCH 6, 1961 AS FILE NO. 39855 OF OFFICIAL RECORDS; THENCE ALONG SAID NORTHEASTERLY BOUNDARY NORTH 32° 12' 26" WEST 1533.38 FEET TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PORTION DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION 32, AS SHOWN ON RECORD OF SURVEY MAP NO. 5821, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 27, 1961; THENCE SOUTH 34° 47' 37" WEST 592.29 FEET; THENCE SOUTH 04° 20' 57" WEST, 349.03 FEET; THENCE SOUTH 41° 20' 43" EAST, 279.00 FEET TO THE CENTER LINE OF PALO ROAD AS SHOWN ON SAID RECORD OF SURVEY; THENCE ALONG SAID CENTER LINE AS FOLLOWS: NORTH 26° 22' 37" EAST, 279.59 FEET TO AN ANGLE POINT THEREIN AND NORTH 40° 11' 57"

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EAST, 459.07 FEET; THENCE LEAVING SAID CENTER LINE NORTH 28° 29' 27" WEST, 503.80 FEET TO THE POINT OF BEGINNING.

PARCEL 2: (APN: 110-072-03 AND 04)

THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 29; THE SOUTH HALF OF THE SOUTHEAST QUARTER OF SECTION 30; ALL IN TOWNSHIP 9 SOUTH, RANGE 2 WEST OF THE SAN BERNARDINO MERIDIAN, CALIFORNIA.

PARCEL 3: (APN: 110-150-45)

THAT PORTION OF THE NORTH HALF OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 9 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION 32 AS SHOWN ON RECORD OF SURVEY MAP NO. 5821, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 27, 1961; THENCE SOUTH 34° 47' 37" WEST 372.09 FEET; THENCE SOUTH 59° 55' 43" EAST, 216.63 FEET TO THE TRUE POINT OF BEGINNING; THENCE CONTINUING SOUTH 59° 55' 43" EAST, 105.00 FEET; THENCE NORTH 20° 20' 50" EAST, 90.00 FEET; THENCE NORTH 43° 05' 17" EAST, 102.22 FEET TO A LINE WHICH BEARS SOUTH 28° 29' 57" EAST FROM THE NORTHWEST CORNER OF SAID NORTHEAST QUARTER OF THE SOUTHWEST QUARTER; THENCE NORTH 28° 29' 57" WEST, 129.96 FEET TO A LINE WHICH BEARS NORTH 30° 30' 17" EAST FROM THE TRUE POINT OF BEGINNING; THENCE SOUTH 30° 30' 17" WEST, 255.97 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL 4: (APN: 110-150-44)

THAT PORTION OF THE NORTH HALF OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 9 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION 32, AS SHOWN ON RECORD OF SURVEY MAP NO. 5821, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 27, 1961; THENCE SOUTH 34° 47' 37" WEST, 372.09 FEET; THENCE SOUTH 59° 55' 43" EAST, 216.63 FEET; THENCE NORTH 30° 30' 17" EAST, 255.97 FEET TO A LINE WHICH BEARS SOUTH 28° 29' 57" EAST FROM THE POINT OF BEGINNING; THENCE NORTH 28° 29' 57" WEST, 220.26 FEET TO THE POINT OF BEGINNING.

PARCEL 5: (APN: 110-150-46)

THAT PORTION OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 9 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SAID NORTHEAST QUARTER OF THE SOUTHWEST QUARTER AS SHOWN ON RECORD OF SURVEY MAP NO. 5281, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY IN SAID SAN DIEGO COUNTY, MARCH 27, 1961; THENCE SOUTH 34° 47' 37" WEST, 372.09 FEET; THENCE SOUTH 59° 55' 43" EAST, 321.63 FEET TO THE TRUE POINT OF BEGINNING; THENCE NORTH 20° 20' 50" EAST 90.00 FEET; THENCE NORTH 43° 05' 17" EAST, 102.22 FEET TO A LINE WHICH BEARS SOUTH 28° 29' 57" EAST FROM THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION 22;

THENCE SOUTH 28° 29' 27" EAST, 153.58 FEET TO THE CENTER LINE OF COUNTY HIGHWAY COMMISSION ROUTE 18, DIVISION 2 (KNOWN AS PALA ROAD) AS SHOWN ON SAID RECORD OF SURVEY MAP NO. 5821; THENCE ALONG SAID CENTER LINE SOUTH 40° 11' 57" WEST, 109.83 FEET TO A LINE WHICH BEARS SOUTH 59° 55' 43" EAST FROM THE TRUE POINT OF BEGINNING; THENCE NORTH 59° 55' 43" WEST 119.57 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL 6: (APN: 110-150-24 AND 43)

THAT PORTION OF OF THE NORTH HALF OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 9 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF THE NORTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION 32 AS SHOWN ON RECORD OF SURVEY MAP NO. 5821, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MARCH 27, 1961; THENCE SOUTH 34° 47' 37" WEST, 372.09 FEET TO THE TRUE POINT OF BEGINNING; THENCE CONTINUING SOUTH 34° 47' 37" WEST, 220.20 FEET; THENCE SOUTH 04° 20' 57" WEST, 349.03 FEET; THENCE SOUTH 41° 20' 43" EAST, 279.00 FEET TO THE CENTER LINE OF SAID PALA ROAD; THENCE ALONG SAID CENTER LINE AS FOLLOWS: NORTH 26° 22' 37" EAST, 279.59 FEET TO AN ANGLE POINT THEREIN; AND NORTH 40° 11' 57" EAST, 349.24 FEET TO A LINE WHICH BEARS SOUTH 59° 55' 43" EAST FROM THE TRUE POINT OF BEGINNING; THENCE NORTH 59° 55' 43" WEST, 441.20 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL 7: (128-470-15 AND 16)

PARCELS 2 AND 3 OF PARCEL MAP NO. 9676, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, FEBRUARY 7, 1980 AS FILE NO. 80-045136 OF OFFICIAL RECORDS.

PARCEL 8: (APN: 128-470-05-01)

AN UNDIVIDED 1/2 INTEREST IN THE FOLLOWING PROPERTY:

THAT PARCEL OF LAND FOR UNDERGROUND WATER SUPPLY WELL PURPOSES BEING A PORTION OF LOT 2 IN SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, SAN BERNARDINO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

COMMENCING AT THE MOST NORTHERLY CORNER OF PARCEL NO. 5 DESCRIBED IN DEED TO IDA SCHAAP, ET AL, RECORDED SEPTEMBER 12, 1972 AS FILE NO. 242810 OF OFFICIAL RECORDS; THENCE FROM SAID POINT SOUTH 05° 40' 31" EAST 565.73 FEET; THENCE NORTH 54° 31' 16" EAST 134.49 FEET; THENCE WEST 9.36 FEET TO THE TRUE POINT OF BEGINNING; THENCE NORTH 20.00 FEET; THENCE EAST 20.00 FEET; THENCE SOUTH 20.00 FEET; THENCE WEST 20.00 FEET TO THE TRUE POINT OF BEGINNING.

SAID LAND BEING ALSO KNOWN AS THAT PORTION OF PARCEL 1, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO PARCEL MAP NO. 9676 FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, FEBRUARY 7, 1980, DESIGNATED AND DELINEATED AS "EXISTING COMMUNITY WELL AND WELL SITE".

PARCEL 9: (APN: 110-370-09)

THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 32, TOWNSHIP 9 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO UNITED STATES GOVERNMENT SURVEY APPROVED NOVEMBER 1, 1913.

PARCEL 10: (APN: 128-020-03)

LOTS 3 AND 4 (NORTH HALF OF THE NORTHEAST QUARTER) SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO UNITED STATES GOVERNMENT SURVEY APPROVED APRIL 4, 1890.

PARCEL 11:

AN EASEMENT FOR ROAD AND PUBLIC UTILITY PURPOSES OVER, UNDER, ALONG AND ACROSS A STRIP OF LAND 60.00 FEET OF EVEN WIDTH LYING WITHIN THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 4; THE WEST HALF OF THE NORTHWEST QUARTER OF SECTION 9 AND THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 8, ALL BEING IN TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO UNITED STATES GOVERNMENT SURVEY, THE CENTER LINE OF SAID 60.00 FOOT STRIP BEING DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF THE WEST HALF OF THE NORTHWEST QUARTER OF SAID SECTION 9; THENCE NORTH 79° 17' 00" WEST 199.34 FEET; THENCE NORTH 85° 10' 00" WEST 421.35 FEET TO THE BEGINNING OF A TANGENT 75.00 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 36° 49' 00" A DISTANCE OF 48.19 FEET; THENCE TANGENT TO SAID CURVE SOUTH 58° 01' 00" WEST 142.89 FEET TO THE BEGINNING OF A TANGENT 60.00 FOOT RADIUS CURVE, CONCAVE NORTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 35° 43' 30" A DISTANCE OF 37.41 FEET; THENCE TANGENT TO SAID CURVE NORTH 86° 15' 30" WEST 126.49 FEET TO THE BEGINNING OF A TANGENT 50.00 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 41° 35' 30" A DISTANCE OF 36.30 FEET; THENCE TANGENT TO SAID CURVE SOUTH 52° 09' 00" WEST 114.53 FEET TO THE BEGINNING OF A TANGENT 50.00 FOOT RADIUS CURVE, CONCAVE NORTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 52° 12' 40" A DISTANCE OF 45.56 FEET; THENCE TANGENT TO SAID CURVE NORTH 75° 38' 20" WEST 46.66 FEET TO THE BEGINNING OF A TANGENT 50.00 FOOT RADIUS CURVE, CONCAVE, SOUTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 85° 01' 40" A DISTANCE OF 74.20 FEET; THENCE TANGENT TO SAID CURVE SOUTH 19° 20' 00" WEST 59.30 FEET TO THE BEGINNING OF A TANGENT 100.00 FOOT RADIUS CURVE, CONCAVE EASTERLY; THENCE SOUTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF 32° 34' 20" A DISTANCE OF 56.85 FEET; THENCE TANGENT TO SAID CURVE SOUTH 13° 14' 20" EAST 243.82 FEET TO THE BEGINNING OF A TANGENT 150.00 FOOT RADIUS CURVE, CONCAVE WESTERLY; THENCE SOUTHERLY ALONG SAID CURVE THROUGH AN ANGLE OF 33° 46' 20" A DISTANCE OF 88.42 FEET; THENCE TANGENT TO SAID CURVE SOUTH 20° 32' 00" WEST 24.80 FEET TO THE BEGINNING OF A TANGENT 500.00 FOOT RADIUS CURVE, CONCAVE NORTHWESTERLY; THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 14° 42' 10" A DISTANCE OF 128.31 FEET; THENCE TANGENT TO SAID CURVE SOUTH 35° 14' 10" WEST 20.90 FEET TO THE BEGINNING OF A TANGENT 100.00 FOOT RADIUS CURVE, CONCAVE NORTHWESTERLY; THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 55° 56' 30", A DISTANCE OF 97.64 FEET; THENCE TANGENT TO SAID CURVE NORTH 88° 49' 20" WEST 99.73 FEET; THENCE NORTH 83° 03' 00" WEST 280.05 FEET TO THE BEGINNING OF A TANGENT 300.00 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 19° 06' 20" A DISTANCE OF 50.02 FEET TO THE TRUE POINT OF BEGINNING; THENCE CONTINUING ALONG SAID ANGLE OF 19° 06' 20" A DISTANCE OF 50.02 FEET; THENCE TANGENT TO SAID CURVE SOUTH 77° 50' 40" WEST 210.56 FEET TO THE BEGINNING

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OF A TANGENT 300.00 FOOT RADIUS CURVE, CONCAVE SOUTHEASTERLY; THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 20° 03' 30", A DISTANCE OF 105.03 FEET; THENCE TANGENT TO SAID CURVE SOUTH 57° 47' 10" WEST 23.00 FEET TO THE BEGINNING OF A TANGENT 100.00 RADIUS CURVE, CONCAVE NORTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 53° 22' 10" A DISTANCE OF 93.15 FEET; THENCE TANGENT TO SAID CURVE NORTH 68° 50' 40" WEST 69.94 FEET TO THE BEGINNING OF A TANGENT 50.00 FOOT RADIUS CURVE, CONCAVE SOUTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 78° 44' 00" A DISTANCE OF 68.72 FEET; THENCE TANGENT TO SAID CURVE SOUTH 32° 24' 20" WEST 101.17 FEET TO THE BEGINNING OF A TANGENT 50.00 FOOT RADIUS CURVE, CONCAVE NORTHWESTERLY; THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 51° 51' 00" A DISTANCE OF 45.25 FEET; THENCE TANGENT TO SAID CURVE SOUTH 84° 15' 30" WEST 199.99 FEET TO THE BEGINNING OF A TANGENT 100.00 FOOT RADIUS CURVE, CONCAVE NORTHERLY; THENCE WESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 10° 23' 40", A DISTANCE OF 181.42 FEET; THENCE TANGENT TO SAID CURVE NORTH 85° 20' 50" WEST 163.04 FEET TO THE BEGINNING OF A TANGENT 50.00 FOOT RADIUS CURVE, CONCAVE SOUTHWESTERLY; THENCE SOUTHWESTERLY ALONG SAID CURVE THROUGH AN ANGLE OF 83° 01' 40" A DISTANCE OF 72.46 FEET; THENCE TANGENT TO SAID CURVE SOUTH 11° 37' 30" WEST 9.68 FEET TO A POINT ON THE CENTER LINE OF COUSER CANYON ROAD, AN EXISTING COUNTY ROAD. SAID STRIP BE BE PROLONGED OR SHORTENED SO AS TO TERMINATE WESTERLY IN THE NORTHERLY LINE OF SAID COUSER CANYON ROAD AND EASTERLY IN THE EASTERLY LINE OF LAND DESCRIBED IN THE DEED TO ARTHUR C. FRENK, ET UX, RECORDED DECEMBER 21, 1965 AS FILE NO. 229211 OF OFFICIAL RECORDS.

EXCEPTING THEREFROM ALL THAT PORTION THEREOF LYING WITHIN PARCEL NO. 32 HEREINAFTER DESCRIBED.

PARCEL 12:

AN EASEMENT FOR INGRESS AND EGRESS FOR ROAD AND PUBLIC UTILITY PURPOSES OVER, ALONG, UNDER AND ACROSS A STRIP OF LAND 60.00 FEET IN WIDTH LYING WITHIN SECTIONS 5 AND 8 IN TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO UNITED STATES GOVERNMENT SURVEY, THE EASTERLY BOUNDARY OF SAID STRIP BEING DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEASTERLY CORNER OF LAND DESCRIBED IN DEED TO WILLIAM P. BRIGGS, ET UX, RECORDED DECEMBER 21, 1965 AS FILE NO. 229209 OF OFFICIAL RECORDS, SAID POINT BEARS SOUTH 88° 23' 10" WEST 289.70 FEET AND SOUTH 7° 28' 50" EAST 348.50 FEET FROM THE NORTHEAST CORNER OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 5; THENCE ALONG THE EASTERLY BOUNDARY OF SAID BRIGG'S LAND AS FOLLOWS:

SOUTH 16° 41' 00" EAST, 425.51 FEET, SOUTH 00° 02' 30" EAST, 183.94 FEET; SOUTH 12° 00' 00" EAST, 251.77 FEET TO THE NORTHEAST CORNER OF THE LAND DESCRIBED IN THE DEED TO ARTHUR C. FRENK, ET UX, RECORDED DECEMBER 21, 1965 AS FILE NO. 229211 OF OFFICIAL RECORDS, THENCE SOUTH 18° 40' 50" WEST, 138.73 FEET TO THE SOUTHERLY LINE OF SAID SECTION 5; SOUTH 03° 01' 50" EAST, 253.18 FEET; AND SOUTH 07° 27' 10" WEST 336.44 FEET TO THE SOUTHEASTERLY CORNER OF SAID BRIGGS' LAND. SAID EASEMENT TO BEGIN IN THE NORTHERLY BOUNDARY OF SAID BRIGG'S LAND AND END IN THE SOUTHERLY LINE OF SAID FRENK'S LAND.

PARCEL 13:

AN EASEMENT FOR INGRESS AND EGRESS FOR ROAD AND UTILITY PURPOSES 40 FEET WIDE

ACROSS A PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO UNITED STATES GOVERNMENT SURVEY, THE EASTERLY LINE OF SAID EASTERLY BEING DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 5; THENCE ALONG THE NORTHERLY LINE OF SAID SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER, SOUTH 88° 23' 10" WEST, 289.70 FEET TO THE TRUE POINT OF BEGINNING; SOUTH 07° 28' 50" EAST, 348.50 FEET TO THE NORTHEASTERLY CORNER OF THE LAND DESCRIBED IN DEED TO WILLIAM P. BRIGGS, ET UX, RECORDED DECEMBER 21, 1965 AS FILE NO. 229209 OF OFFICIAL RECORDS, ALSO ACROSS THAT PROTION OF THE NORTH 10 FEET OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 5, LYING WESTERLY OF SAID 40 FOOT EASEMENT.

PARCEL 14: (APN: 110-150-01)

THE WEST HALF OF THE NORTHWEST QUARTER OF SECTION 32, TOWNSHIP 9 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, State of California, ACCORDING TO OFFICIAL PLAT THEREOF.

PARCEL 15: (APN: 110-362-08)

PARCEL 1 IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, AS SHOWN AT PAGE 1743 OF PARCEL MAPS, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, JULY 19, 1973.

PARCEL 16: (APN: 110-361-16 AND 110-362-09)

LOTS 4 AND 5 AND THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 31; ALL IN TOWNSHIP 9 SOUTH, RANGE 2 WEST OF THE SAN BERNARDINO MERIDIAN, CALIFORNIA.

PARCEL 17: (APN: 128-470-18)

PARCEL 1 OF PARCEL MAP NO. 9676, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, FEBRUARY 7, 1980 AS FILE NO. 80-045136 OF OFFICIAL RECORDS, TOGETHER WITH THAT PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 32, TOWNSHIP 9 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, AND THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, BOTH BEING ACCORDING TO THE OFFICIAL PLAT THEREOF, SAID PORTIONS BEING DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST WESTERLY CORNER OF SAID PARCEL 1; THENCE ALONG THE SOUTHWESTERLY LINE THEREOF SOUTH 22° 51' 03" EAST 495.17 FEET; THENCE LEAVING SAID SOUTHWESTERLY LINE SOUTH 58° 16' 37" WEST 296.97 FEET; THENCE NORTH 80° 14' 00" WEST 355.81 FEET; THENCE NORTH 25° 18' 22" WEST 208.06 FEET, TO A LINE BEARING SOUTH 54° 01' 53" WEST FROM THE POINT OF BEGINNING; THENCE NORTH 54° 01' 53" EAST 617.36 FEET, TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM, THAT PORTION OF SAID PARCEL 1 OF PARCEL MAP NO. 9676 WHICH IS DELINEATED AS "EXISTING COMMUNITY WELL & WELL SITE."

PARCEL 23: (APN: 128-020-02)

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THE WEST 50 ACRES OF THE SOUTH HALF OF THE NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO OFFICIAL PLAT THEREOF.

PARCEL 24: (APN: 128-020-04 AND 06)

THE NORTH HALF OF THE SOUTHWEST QUARTER, AND THE WEST 30 ACRES OF THE NORTH HALF OF THE SOUTHEAST QUARTER OF SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO OFFICIAL PLAT THEREOF.

PARCEL 25: (APN: 128-020-04)

THE SOUTH HALF OF THE NORTHWEST QUARTER, AND THE SOUTH HALF OF THE NORTHEAST QUARTER OF SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, PORTION. EXCEPTING FROM SAID SOUTH HALF OF THE NORTHWEST QUARTER, THE WEST 50 ACRES THEREOF.

PARCEL 26: (APN: 128-020-04)

THE NORTH HALF OF THE SOUTHEAST QUARTER OF SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO OFFICIAL PLAT THEREOF, EXCEPTING THEREFROM THE WEST 30 ACRES THEREOF.

PARCEL 27:

AN EASEMENT FOR PRIVATE ROAD OVER THOSE CERTAIN STRIPS OF LAND AS DESCRIBED IN DEEDS, RECORDED MAY 9, 1952, IN BOOK 4463, PAGE 288 AND JULY 17, 1963 AS DOCUMENT NO. 105479 OF OFFICIAL RECORDS, AS FOLLOWS: THE SOUTH 10.00 FEET OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 6, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN. ALSO THE EAST 20.00 FEET OF THE NORTH 10.00 FEET OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER, THE NORTH 10.00 FEET OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER AND THAT PORTION OF THE EAST 20.00 FEET OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER LYING SOUTHERLY OF THE SOUTHERLY LINE OF THAT 100.00 FOOT EASEMENT DESCRIBED IN DEED TO THE State of California, RECORDED JANUARY 28, 1941, IN BOOK 1129, PAGE 229 OF OFFICIAL RECORDS, ALL IN SAID SECTION 6, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN.

EXCEPTING THEREFROM THAT PORTION LYING WITHIN PARCEL NO. 22 HEREINABOVE DESCRIBED.

PARCEL 28: (APN: 128-020-24)

THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER, SECTION 4, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO OFFICIAL PLAT THEREOF.

PARCEL 29: (APN: 128-020-21 AND 40)

THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER AND THE NORTHWEST QUARTER OF SOUTHWEST QUARTER OF SECTION 4, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

DESCRIPTION

EXCEPTING FROM SAID NORTHWEST QUARTER OF THE SOUTHWEST QUARTER THE SOUTHWEST QUARTER THEREOF.

PARCEL 30: (APN: 128-020-22 AND 41)

THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER, AND THE EAST HALF OF THE SOUTHWEST QUARTER OF SECTION 4, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO OFFICIAL PLAT THEREOF.

PARCEL 31: (APN: 110-160-05 AND 09; AND 128-020-30)

THE SOUTH HALF OF THE NORTHWEST QUARTER AND THE SOUTHWEST QUARTER OF SECTION 33, TOWNSHIP 9 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, TOGETHER WITH LOTS 3 AND 4 IN SECTION 4, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO OFFICIAL PLAT THEREOF.

EXCEPTING THE NORTHWEST QUARTER OF THE SOUTH HALF OF THE NORTHWEST QUARTER OF SAID SECTION 33.

ALSO EXCEPTING ALL THAT PORTION OF THE ABOVE, DESCRIBED AS A WHOLE AS FOLLOWS:

BEGINNING AT THE SECTION CORNER COMMON TO SECTIONS 4 AND 5 IN TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, AND SECTIONS 32 AND 33 IN TOWNSHIP 9 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN; THENCE NORTH 10° 29' 35" EAST ALONG THE COMMON BOUNDARY LINE BETWEEN SAID SECTIONS 32 AND 33, A DISTANCE OF 1,333.43 FEET; THENCE LEAVING SAID COMMON BOUNDARY LINE, SOUTH 04° 51' 07" EAST A DISTANCE OF 465.32 FEET; THENCE SOUTH 01° 12' 27" EAST, A DISTANCE OF 2,095.22 FEET TO THE SOUTHERLY BOUNDARY LINE OF LOT 4 (THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER) OF SAID SECTION 4; THENCE ALONG SAID SOUTHERLY LINE, SOUTH 88° 10' 29" WEST, A DISTANCE OF 300.01 FEET TO THE COMMON BOUNDARY LINE BETWEEN SAID SECTIONS 4 AND 5; THENCE NORTH 01° 12' 27" WEST ALONG SAID COMMON BOUNDARY LINE, A DISTANCE OF 1,257.00 FEET TO SAID SECTION CORNER COMMON SECTIONS 4, 5, 32 AND 33, AND THE POINT OF BEGINNING.

PARCEL 32: (APN: 128-340-31)

THAT PORTION OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 4 AND THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 9, ALL IN TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, State of California, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS A WHOLE AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF THE WEST HALF OF THE NORTHWEST QUARTER OF SAID SECTION 9, BEING THE SOUTHEASTERLY CORNER OF LAND DESCRIBED IN PARCEL 1 IN DEED TO GEORGIETTE M. PFAU, RECORDED MARCH 3, 1960 AS FILE/PAGE NO. 44210 OF OFFICIAL RECORDS; THENCE ALONG THE SOUTHERLY BOUNDARY OF SAID LAND NORTH 79° 17' 00" WEST, 199.34 FEET; AND NORTH 85° 10' 00" WEST, 421.35 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHEASTERLY, HAVING A RADIUS OF 75.00 FEET, SAID BEGINNING OF CURVE BEING A POINT ON THE CENTER LINE OF THAT CERTAIN 60.00 FOOT STRIP OF LAND DESCRIBED AS PARCEL 2 IN SAID DEED TO GEORGIETTE M. PFAU ABOVE REFERRED TO; THENCE ALONG THE CENTER LINE OF SAID STRIP THE FOLLOWING COURSES AND DISTANCES: SOUTHWESTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL

ANGLE OF 36° 49' 00" A DISTANCE OF 48.19 FEET; TANGENT TO SAID CURVE SOUTH 58° 01' 00" WEST 142.89 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHWESTERLY, HAVING A RADIUS OF 60.00 FEET; SOUTHWESTERLY AND WESTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 35° 43' 00" A DISTANCE OF 37.41 FEET; TANGENT TO SAID CURVE NORTH 86° 15' 30" WEST, 126.49 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE SOUTHEASTERLY, HAVING A RADIUS OF 50.00 FEET; SOUTHWESTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 41° 35' 30" A DISTANCE OF 36.30 FEET; TANGENT TO SAID CURVE SOUTH 52° 09' 00" WEST, 114.53 FEET TO THE BEGINNING OF A TANGENT CURVE CONCAVE NORTHERLY, HAVING A RADIUS OF 50.00 FEET; WESTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 52° 12' 40" A DISTANCE OF 45.56 FEET; AND TANGENT TO SAID CURVE NORTH 75° 38' 20" WEST, 46.66 FEET TO AN ANGLE POINT IN THE BOUNDARY OF SAID PARCEL 1 OF SAID LAND OF GEORGIETTE M. PFAU; THENCE ALONG A PORTION OF THE BOUNDARY OF SAID LAND, NORTH 25° 05' 30" WEST, 500.00 FEET TO AN ANGLE POINT IN SAID BOUNDARY; THENCE LEAVING SAID BOUNDARY NORTH 78° 14' 56" EAST, 533.65 FEET; THENCE NORTH 6° 01' 28" WEST, 213.81 FEET; THENCE SOUTH 76° 40' 01" EAST 851.88 FEET TO A POINT ON THE EAST LINE OF SAID SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER; THENCE ALONG SAID EAST LINE SOUTH 4° 47' 28" EAST 486.34 FEET TO THE TRUE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PORTION GRANTED TO SAN DIEGO GAS AND ELECTRIC COMPANY BY DEED RECORDED OCTOBER 13, 1970 AS FILE/PAGE NO. 185466 OF OFFICIAL RECORDS.

ALSO EXCEPTING THEREFROM ONE-HALF OF ANY OIL, MINERAL AND/OR ORE RIGHTS AS RESERVED BY AGNES M. COUSER BY DEEDS RECORDED MARCH 3, 1960 AS FILE/PAGE NO. 44210 AND 44212 OF OFFICIAL RECORDS.

PARCEL 33:

AN EASEMENT FOR ROAD AND PUBLIC UTILITY PURPOSES, OVER, UNDER, UPON AND ACROSS A STRIP OF LAND 30.00 FEET IN WIDTH LYING WITHIN THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 4, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, State of California, THE NORTHEASTERLY LINE OF SAID STRIP BEING THAT COURSE FORMING THE SOUTHWESTERLY LINE OF PARCEL 32 HEREINABOVE BEING DESCRIBED THEREIN AS "NORTH 25° 05' 30" WEST, 500.00 FEET".

EXCEPTING THEREFROM THAT PORTION LYING WITHIN THE 60.00 FOOT STRIP DESCRIBED AS PARCEL 11 HEREINABOVE.

PARCEL 34:

AN EASEMENT FOR ROAD AND PUBLIC UTILITY PURPOSES OVER THAT PORTION OF THE SOUTHWEST QUARTER OF SAID SECTION 4 TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST SOUTHERLY CORNER OF THE LAND DESCRIBED IN THE DEED TO SAN DIEGO GAS AND ELECTRIC COMPANY BY INSTRUMENT RECORDED OCTOBER 13, 1970 AS FILE/PAGE NO. 185466 OF OFFICIAL RECORDS; THENCE NORTH 24° 33' 26" WEST, 375.07 FEET; THENCE NORTH 11° 10' 14" EAST 498.52 FEET; THENCE NORTH 72° 57' 24: EAST, 43.36 FEET TO THE EASTERLY LINE OF SAID WESTERLY 300.00 FEET; THENCE SOUTH 01° 12' 27" EAST PARALLEL WITH THE WESTERLY LINE OF SAID SECTION 4, A DISTANCE OF 20.79 FEET; THENCE SOUTH 72° 57' 24" WEST, 25.82 FEET; THENCE SOUTH 11° 10' 14" WEST, 472.17 FEET; THENCE NORTH 65° 26' 24" EAST, 5.36 FEET; THENCE SOUTH 24° 33' 36" EAST, 305.59 FEET TO SAID EASTERLY LINE OF THE WESTERLY 300.00 FEET; THENCE SOUTH 01° 12' 22" EAST ALONG SAID EASTERLY LINE 75.59 FEET TO THE POINT OF BEGINNING.

DESCRIPTION

PARCEL 35: (APN: 128-340-32)

THAT PORTION OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 4, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE EAST LINE OF SAID SOUTHWEST QUARTER OF SOUTHWEST QUARTER, DISTANT THEREON, NORTH 4° 47' 28" WEST 486.34 FEET FROM THE SOUTHEAST CORNER THEREOF; THENCE NORTH 76° 40' 01" WEST 851.88 FEET; THENCE SOUTH 6° 01' 28" EAST 213.81 FEET; THENCE SOUTH 78° 14' 56" WEST 533.65 FEET TO THE MOST WESTERLY CORNER OF THE LAND DESCRIBED IN PARCEL 1 OF DEED TO GERLAD F. LAMP, ET AL, RECORDED SEPTEMBER 5, 1962 AS FILE/PAGE NO. 153042 OF OFFICIAL RECORDS OF SAN DIEGO COUNTY; THENCE ALONG THE BOUNDARY OF SAID LAND, NORTH 10° 38' 20" EAST 498.48 FEET, NORTH 72° 25' 30" EAST, 198.04 FEET, NORTH 81° 04' 00" EAST 539.56 FEET, AND NORTH 3° 52' 50" WEST 261.33 FEET TO THE NORTH LINE OF SAID SOUTHWEST QUARTER OF SOUTHWEST QUARTER; THENCE ALONG SAID NORTH LINE, NORTH 86° 14' 50" EAST 466.75 FEET TO THE NORTHEAST CORNER OF SAID SOUTHWEST QUARTER OF SOUTHWEST QUARTER; THENCE SOUTH 4° 47' 28" EAST 802.72 FEET TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PORTION GRANTED TO SAN DIEGO GAS AND ELECTRIC COMPANY, BY DEED RECORDED OCTOBER 13, 1970 AS FILE/PAGE NO. 185466 OF OFFICIAL RECORDS.

ALSO EXCEPTING THEREFROM ONE HALF OF ANY OIL, MINERAL AND/OR ORE RIGHTS AS RESERVED BY AGNES M. COUSER, IN DEEDS RECORDED MARCH 3 1960 AS FILE/PAGE NO. 44210 AND 44212 OF OFFICIAL RECORDS.

PARCEL 36:

AN EASEMENT FOR ROAD AND UTILITY PURPOSES OVER, UNDER, ALONG AND ACROSS THAT PORTION OF THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 4, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, INT HE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST WESTERLY CORNER OF LAND DESCRIBED IN THAT CERTAIN DEED TO THE SAN DIEGO GAS AND ELECTRIC COMPANY, RECORDED OCTOBER 13, 1970 AS FILE NO. 185466 OF OFFICIAL RECORDS; THENCE NORTH 78° 14' 56" EAST, 64.89 FEET; THENCE SOUTH 10° 38' 20" WEST TO THE SOUTHWESTERLY LINE OF SAID SAN DIEGO GAS AND ELECTRIC COMPANY'S LAND; THENCE ALONG SAID SOUTHWESTERLY LINE NORTH 25° 05' 30" WEST (RECORD NORTH 24° 33' 36" WEST PER DEED) TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PORTION LYING WITHIN PARCEL 34 HEREINABOVE DESCRIBED.

PARCEL 37: (APN: 128-470-05-02)

AN UNDIVIDED 1/2 INTEREST IN THE FOLLOWING PROPERTY:

THAT PARCEL OF LAND FOR UNDERGROUND WATER SUPPLY WELL PURPOSES BEING A PORTION OF LOT 2 IN SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, SAN BERNARDINO MERIDIAN, ACCORDING TO THE OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

COMMENCING AT THE MOST NORTHERLY CORNER OF PARCEL NO. 5 DESCRIBED IN DEED TO IDA SCHAAP, ET AL, RECORDED SEPTEMBER 12, 1972 AS FILE NO. 242810 OF OFFICIAL

RECORDS; THENCE FROM SAID POINT SOUTH 05° 40' 31" EAST 565.73 FEET; THENCE NORTH 54° 31' 16" EAST 134.49 FEET; THENCE WEST 9.36 FEET TO THE TRUE POINT OF BEGINNING; THENCE NORTH 20.00 FEET; THENCE EAST 20.00 FEET; THENCE SOUTH 20.00 FEET; THENCE WEST 20.00 FEET TO THE TRUE POINT OF BEGINNING.

SAID LAND BEING ALSO KNOWN AS THAT PORTION OF PARCEL 1, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO PARCEL MAP NO. 9676 FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, FEBRUARY 7, 1980, DESIGNATED AND DELINEATED AS "EXISTING COMMUNITY WELL AND WELL SITE".

PARCEL 38: (APN: 128-470-08)

PARCEL 2 ON PARCEL MAP NO. 1743, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, JULY 19, 1973.

PARCEL 39: (APN: 128-470-09)

PARCEL 3 OF PARCEL MAP 1743, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, JULY 19, 1973.

PARCEL 40: (APN: 128-470-20)

ALL THAT PORTION OF PARCEL 4 OF PARCEL MAP 1743, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, JULY 19, 1973, LYING EASTERLY OF THE FOLLOWING DESCRIBED LINE:

BEGINNING AT THE SOUTHWESTERLY CORNER OF LOT 1 OF SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, ACCORDING TO OFFICIAL PLAT THEREOF, SAID CORNER BEING ANGLE POINT IN THE SOUTHERLY BOUNDARY OF SAID PARCEL 4; THENCE ALONG THE WESTERLY LINE OF SAID LOT 1 NORTH 00° 25' 27" EAST TO A POINT ON THE SOUTHEASTERLY LINE OF PARCEL 3 OF SAID PARCEL MAP.

EXCEPTING THEREFROM THAT PORTION DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHWEST CORNER OF PARCEL 1, AS SHOWN AT PAGE 9676 OF PARCEL MAPS, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, FEBRUARY 7, 1980; THENCE ALONG THE SOUTHWESTERLY LINE OF SAID PARCEL 1, NORTH 22° 51' 03" WEST 1065.98 FEET TO THE TRUE POINT OF BEGINNING; THENCE LEAVING THE SOUTHWESTERLY LINE OF SAID PARCEL 1, SOUTH 58° 16' 37" WEST, 296.97 FEET; THENCE NORTH 80° 14' 00" WEST, 355.81 FEET TO AN ANGLE POINT IN THE BOUNDARY OF PARCEL 4 AS SHOWN AT SAID PAGE 1743 OF PARCEL MAPS; THENCE ALONG THE BOUNDARY OF SAID PARCEL 4 NORTH 25° 18' 22" WEST 208.06 FEET; AND NORTH 54° 01' 53" EAST, 617.36 FEET TO THE MOST WESTERLY CORNER OF PARCEL 1 AS SHOWN AT SAID PAGE 9676 OF PARCEL MAPS; THENCE ALONG THE SOUTHWESTERLY LINE OF SAID PARCEL 1 SOUTH 22° 51' 03" EAST, 495.17 FEET TO THE TRUE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM THAT PORTION LYING WITHIN PARCEL 1 OF PARCEL MAP 9676, ACCORDING TO MAP THEREOF FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, FEBRUARY 7, 1980.

AND ALSO EXCEPTING THEREFROM THAT PORTION LYING WESTERLY OF THE FOLLOWING DESCRIBED LINE:

COMMENCING AT AN ANGLE POINT IN THE SOUTHERLY LINE OF SAID PARCEL 4, BEING SOUTH 00° 54' 00" WEST (RECORD SOUTH 00° 25' 27" EAST) A DISTANCE OF 1402.11 FEET FROM THE NORTHWEST CORNER OF SAID SECTION 5, SAID ANGLE POINT BEING ALSO THE SOUTHWESTERLY CORNER OF LOT 1 OF SAID SECTION 5; THENCE ALONG SAID SOUTHERLY LINE OF SAID PARCEL 4, NORTH 89° 29' 35" EAST, 941.93 FEET TO THE TRUE POINT OF BEGINNING; THENCE LEAVING SAID SOUTHERLY LINE NORTH 05° 32' 03" EAST, 59.93 FEET; THENCE NORTH 27° 22' 22" WEST, 721.61 FEET TO THE NORTHERLY LINE OF SAID PARCEL 4.

PARCEL 41: (APN: 128-470-20)

THAT PORTION OF LOT 2 OF SECTION 5, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO OFFICIAL PLAT THEREOF, DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF SAID LOT 2; THENCE ALONG THE SOUTHERLY LINE OF SAID LOT, SOUTH 89° 15' 17" WEST, 516.54 FEET TO THE TRUE POINT OF BEGINNING; THENCE NORTH 23° 05' 21" WEST 832.21 FEET TO THE EASTERLY LINE OF THE LAND DESCRIBED IN PARCEL 1 IN DEED TO WILLIAM VERBOOM, ET UX, RECORDED JUNE 21, 1966 AS DOCUMENT NO. 101776 OF OFFICIAL RECORDS; THENCE ALONG SAID EASTERLY LINE SOUTH 5° 40' 31" EAST, 772.60 FEET TO THE SOUTH LINE OF SAID LOT 2; THENCE ALONG SAID SOUTH LINE NORTH 89° 15' 17" EAST 250.00 FEET TO THE TRUE POINT OF BEGINNING.

PARCEL 42: (APN: 128-470-19)

ALL THAT PORTION OF PARCEL 4 OF PARCEL MAP 1743, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, JULY 19, 1973, LYING WESTERLY OF THE FOLLOWING DESCRIBED LINE:

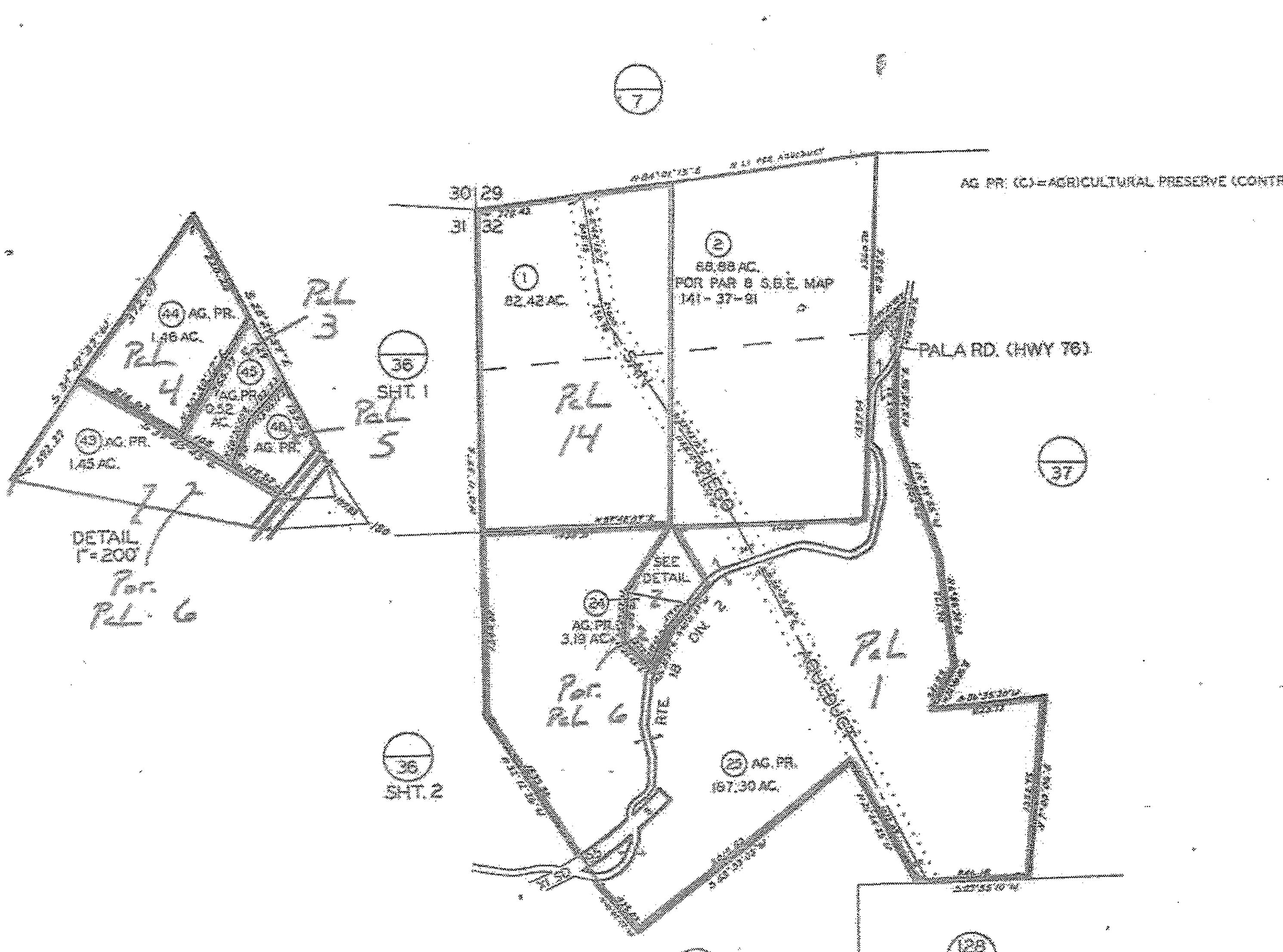
COMMENCING AT AN ANGLE POINT IN THE SOUTHERLY LINE OF SAID PARCEL 4, BEING SOUTH 00° 54' 00" WEST (RECORD SOUTH 00° 25' 27" EAST) A DISTANCE OF 1402.11 FEET FROM THE NORTHWEST CORNER OF SAID SECTION 5, SAID ANGLE POINT BEING ALSO THE SOUTHWESTERLY CORNER OF LOT 1 OF SAID SECTION 5; THENCE ALONG SAID SOUTHERLY LINE OF SAID PARCEL 4, NORTH 89° 29' 35" EAST, 941.93 FEET TO THE TRUE POINT OF BEGINNING; THENCE LEAVING SAID SOUTHERLY LINE NORTH 05° 32' 03" EAST, 59.93 FEET; THENCE NORTH 27° 22' 22" WEST, 721.61 FEET TO THE NORTHERLY LINE OF SAID PARCEL 4.

PARCEL 43:

AN EASEMENT FOR PRIVATE ROAD OVER THOSE CERTAIN STRIPS OF LAND AS DESCRIBED IN DEEDS, RECORDED MAY 9, 1952, IN BOOK 4463, PAGE 288 AND JULY 17, 1963 AS DOCUMENT NO. 105479 OF OFFICIAL RECORDS, AS FOLLOWS: THE SOUTH 10.00 FEET OF THE NORTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 6, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN. ALSO THE EAST 20.00 FEET OF THE NORTH 10.00 FEET OF THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER, THE NORTH 10.00 FEET OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER AND THAT PORTION OF THE EAST 20.00 FEET OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER LYING SOUTHERLY OF THE SOUTHERLY LINE OF THAT 100.00 FOOT EASEMENT DESCRIBED IN DEED TO THE State of California, RECORDED JANUARY 28, 1941, IN BOOK 1129, PAGE 229 OF OFFICIAL RECORDS, ALL IN SAID SECTION 6, TOWNSHIP 10 SOUTH, RANGE 2 WEST, SAN BERNARDINO MERIDIAN.

MAPS

110-15



12-6-79

CHANGES				
BLK	OLD	NEW	YR	CUT
	59	72-75	79	2446
	[illegible]	[illegible]	79	[illegible]

"This plat is for your aid in locating your land with reference to streets and other parcels. While this plat is believed to be correct, the Company assumes no liability for any loss occurring by reason of reliance thereon."

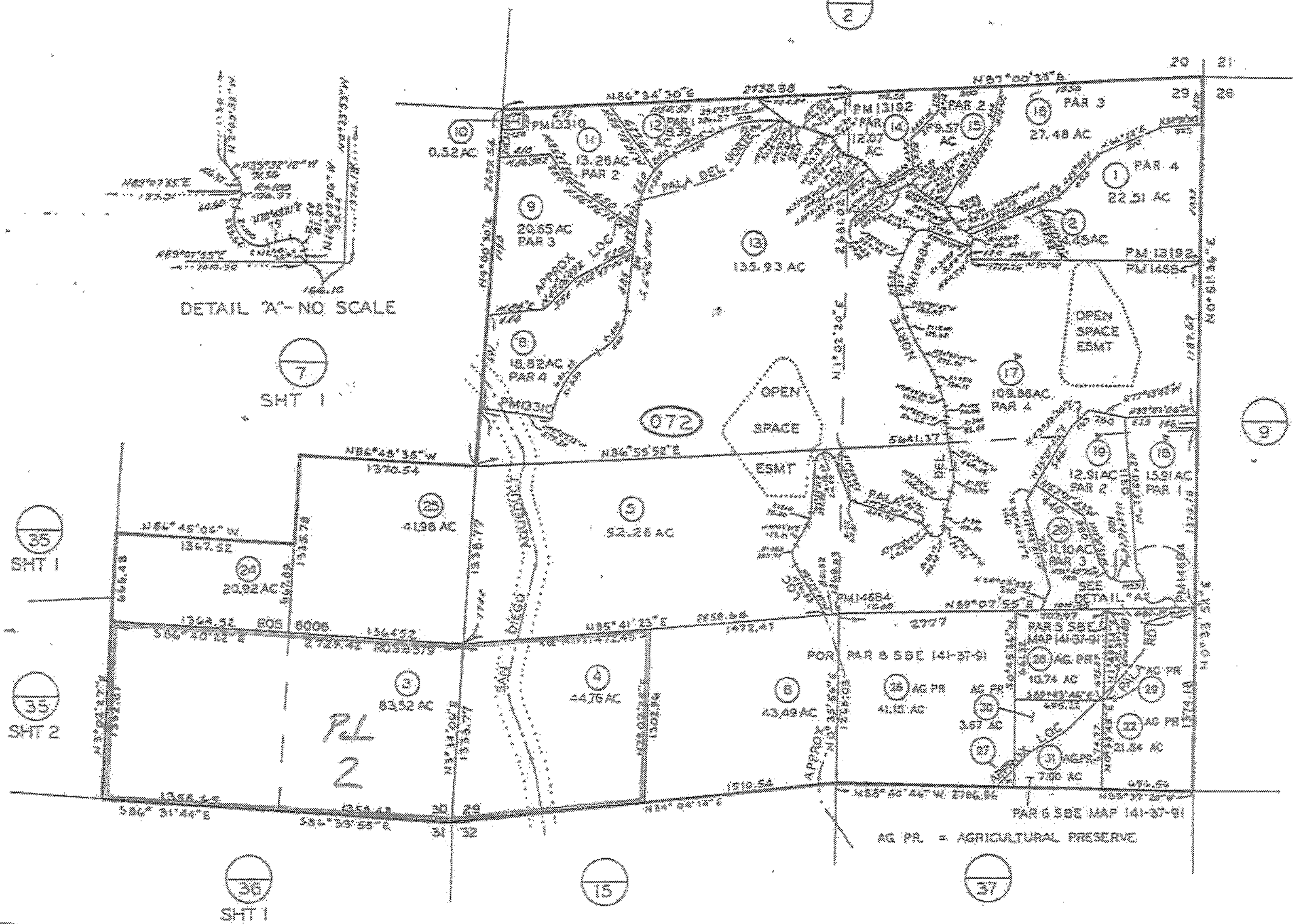
SEC 32 - T9S-R2W - POR
ROS 5821

...EGO COUNTY
...R'S MAP
10 PAGE 15 MAPPED FOR ASSESSMENT PURPOSES ONLY

84

110-070

110-07
SHT 2 OF 2



5-25-58 A.R.

CHANGES				
BLK	OLD	NEW	YR	CUT
070	[illegible]	[illegible]	81	1906
070	[illegible]	[illegible]	81	5505
070	[illegible]	[illegible]	81	5555
070	40	[illegible]	82	2257
	[illegible]	[illegible]	85	[illegible]
	80	[illegible]	84	[illegible]
070	82	89-91	88	[illegible]
	86	[illegible]	88	[illegible]
	[illegible]	[illegible]	87	[illegible]
	[illegible]	[illegible]	90	[illegible]
	91	[illegible]	96	[illegible]
072	[illegible]	[illegible]	96	[illegible]
	7,21,23	25-31	99	1077

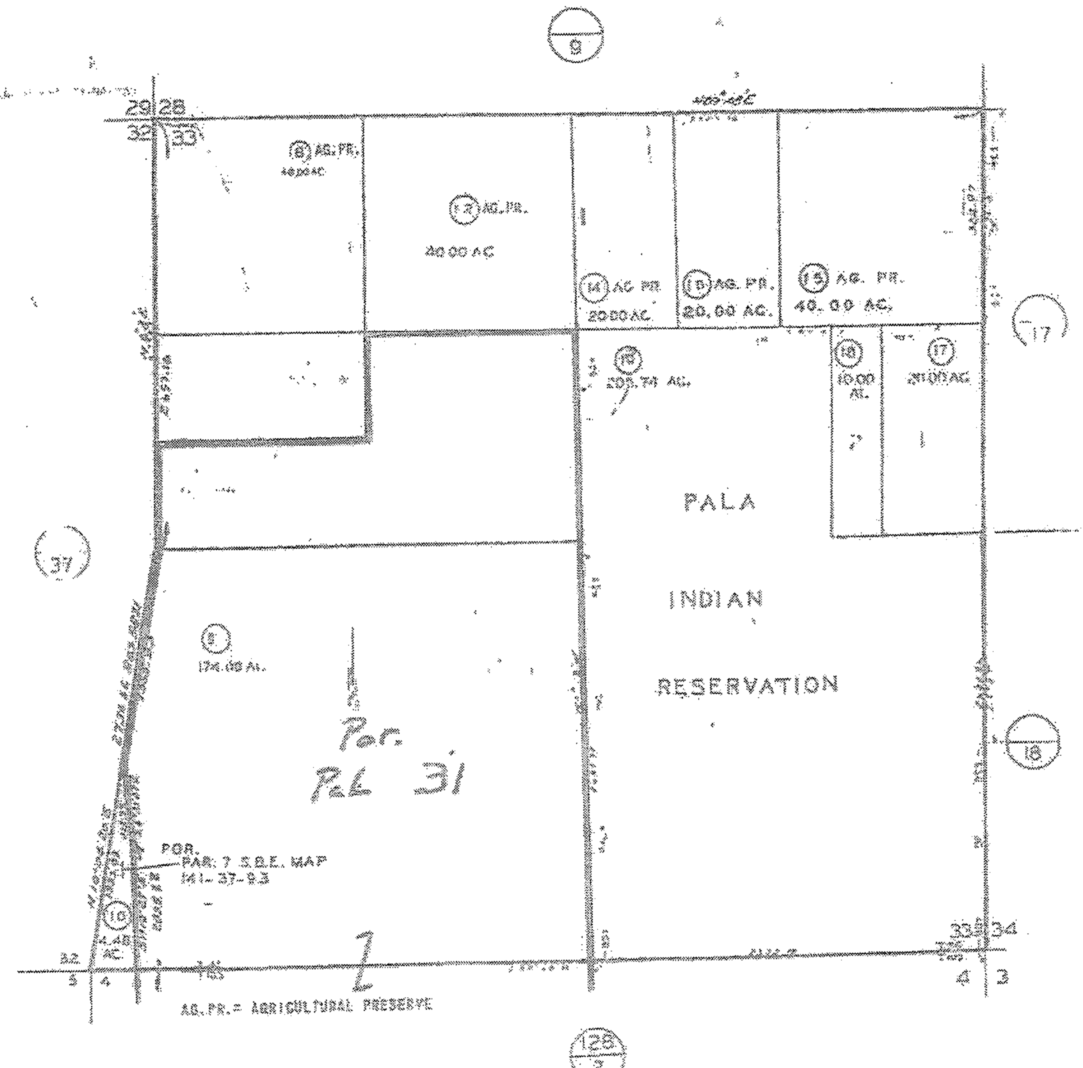
SEC 29 - T9S - R2W
SEC 30 - T9S - R2W - SE 1/4 POR
ROS 8351,8379,14889,15058,15610

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCELS MAY NOT COMPLY WITH LOCAL SUBDIVISION OR BUILDING ORDINANCES.

SAN DIEGO COUNTY
ASSESSOR'S MAP
BOOK 110 PAGE 07 SHT 2 OF 2

"This plat is for your aid in locating your land with reference to streets and other parcels. While this plat is believed to be correct, the Company assumes no liability for any loss occurring by reason of reliance thereon."

85

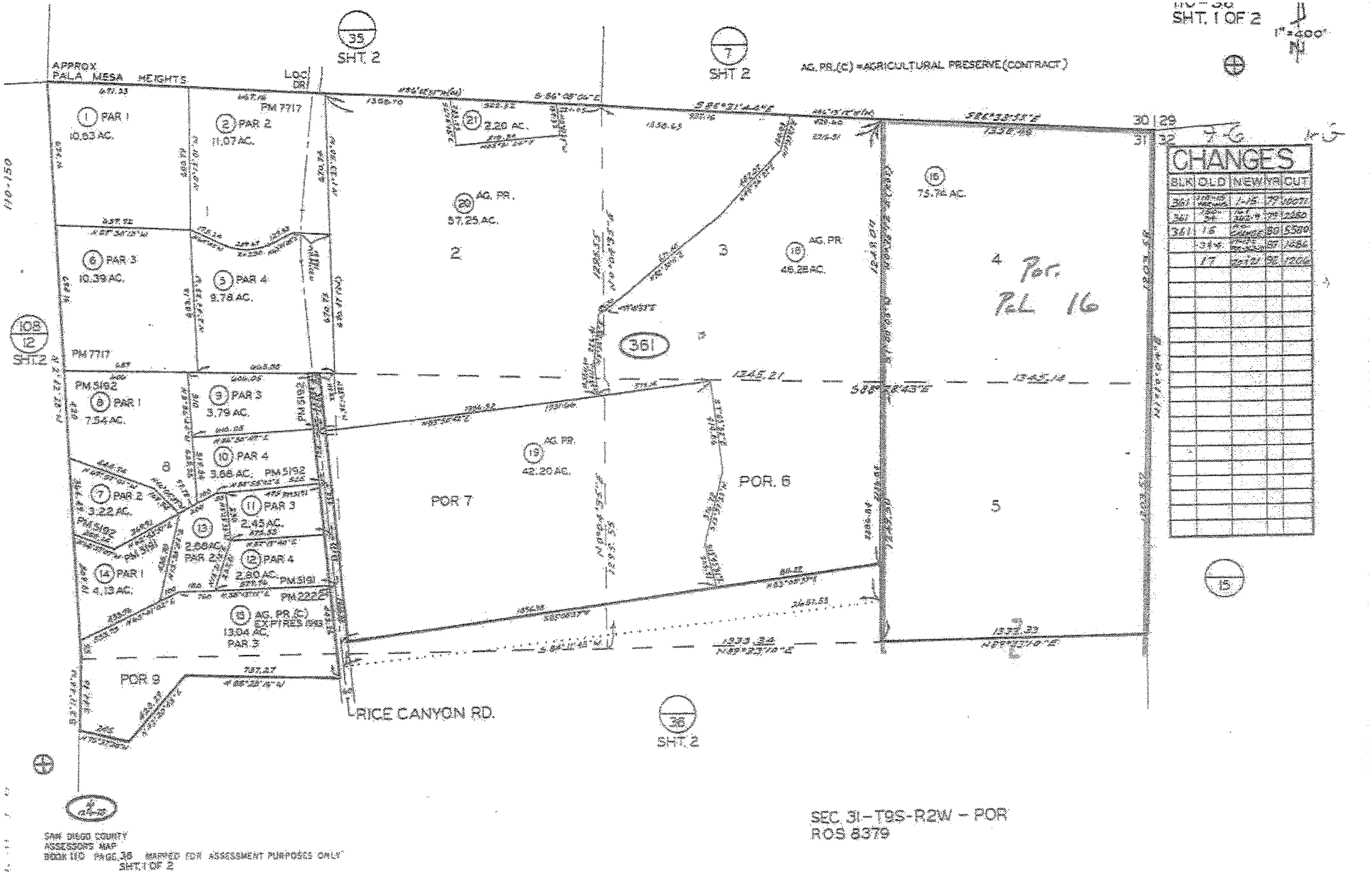


12-7-78

CHANGES				
BLK	OLD	NEW	YR	CUT
	3,6	9,10	71	944
	7	11,12	71	1117
	11	13-14	72	6598
	13	15-16	72	7815
Pick-up		17,18	72	460
Pick-up		19	73	1857

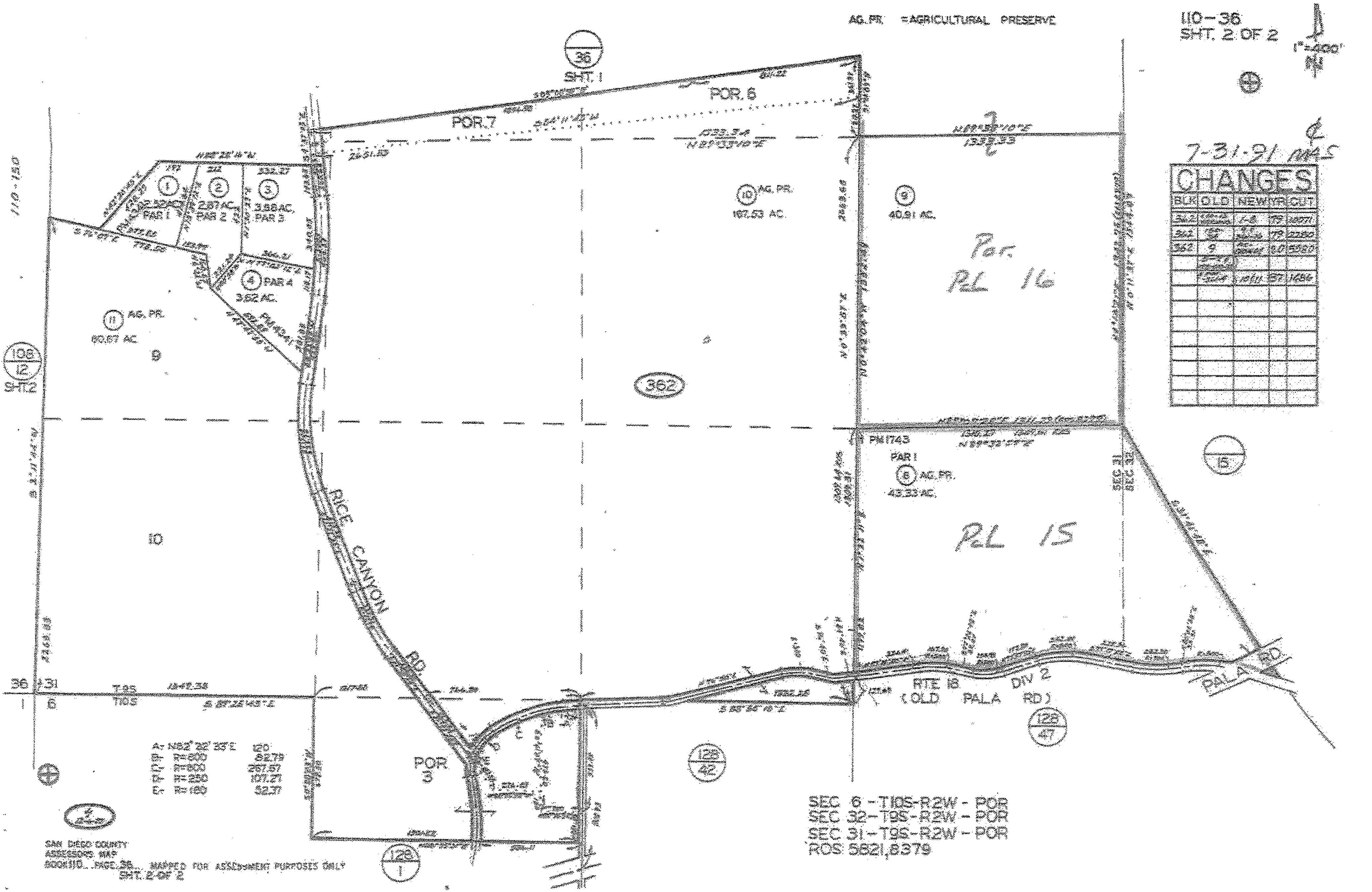
"This plat is for your aid in locating your land with reference to streets and other parcels. While this plat is believed to be correct, the Company assumes no liability for any loss occurring by reason of reliance thereon."

86



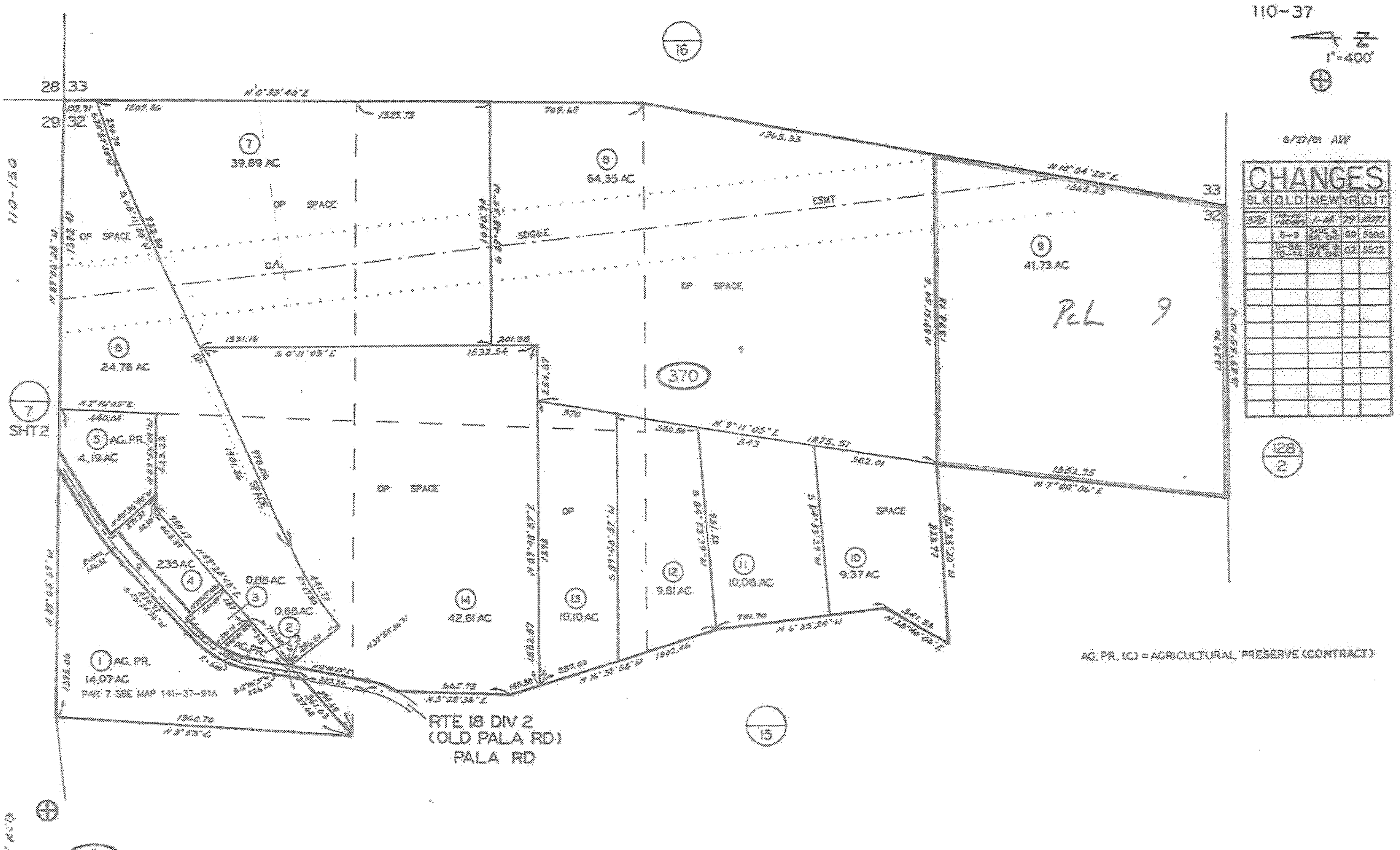
"This plat is for your aid in locating your land with reference to streets and other parcels. While this plat is believed to be correct, the Company assumes no liability for any loss occurring by reason of reliance thereon."

87



"This plat is for your aid in locating your land with reference to streets and other parcels. While this plat is believed to be correct, the Company assumes no liability for any loss occuring by reason of reliance thereon."

88



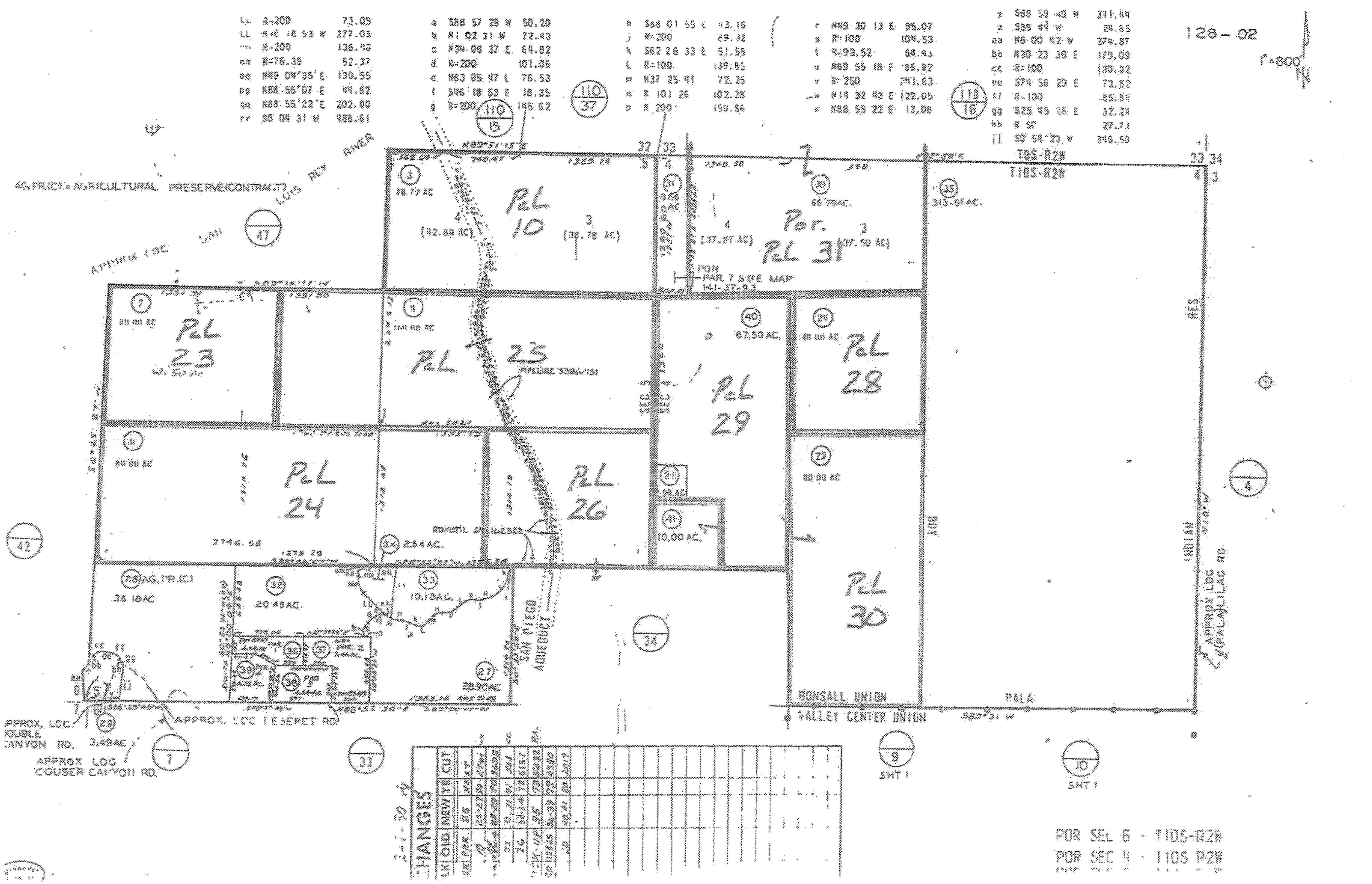
SAN DIEGO COUNTY
ASSESSORS' MAP
BOOK 110, PAGE 32

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCELS MAY NOT COMPLY WITH LOCAL SUBDIVISION OR BUILDING ORDINANCES.

SEC 32 - T9S - R2W - POR
ROS 5821, 15610

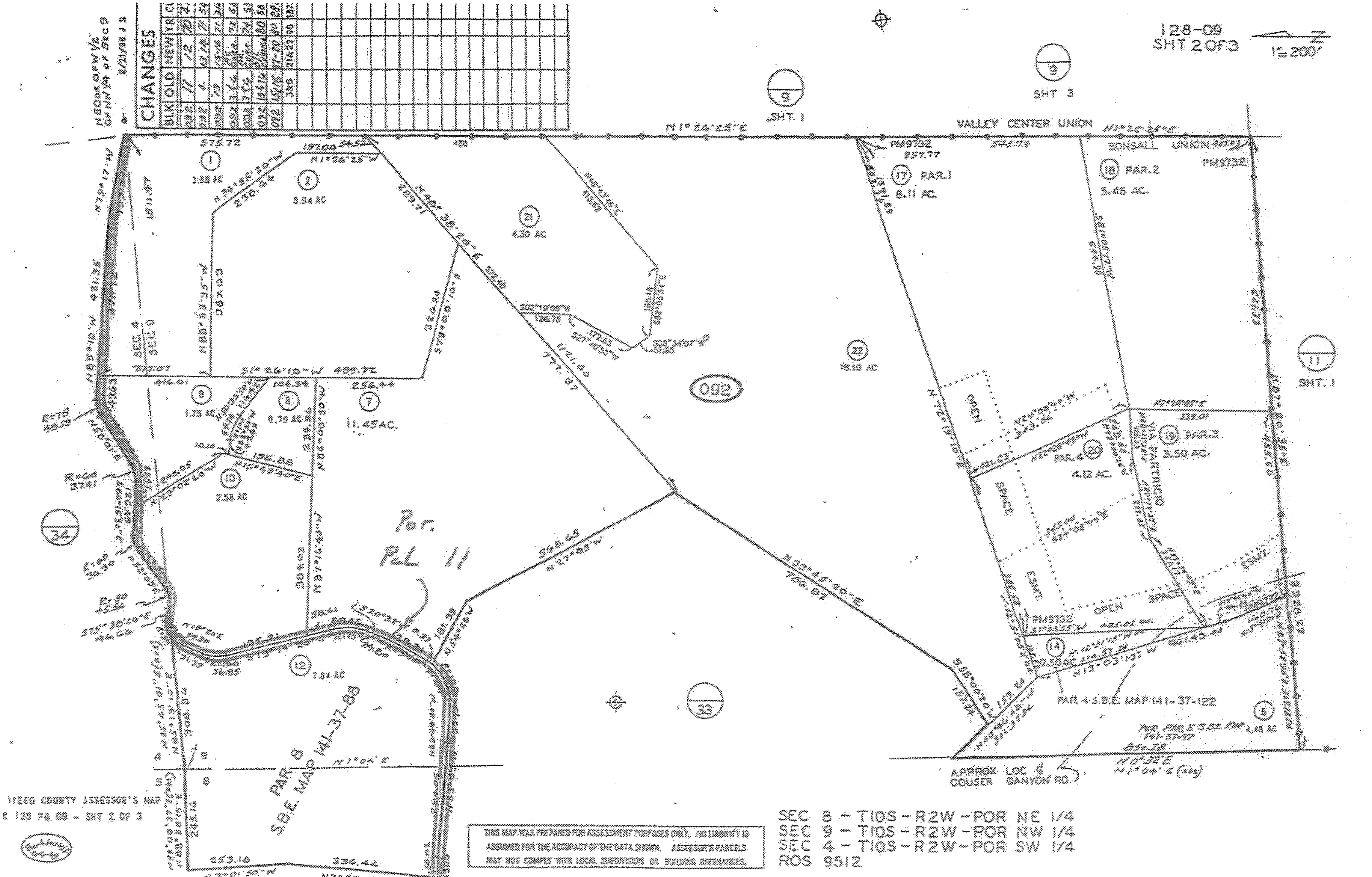
"This plat is for your aid in locating your land with reference to ...

89



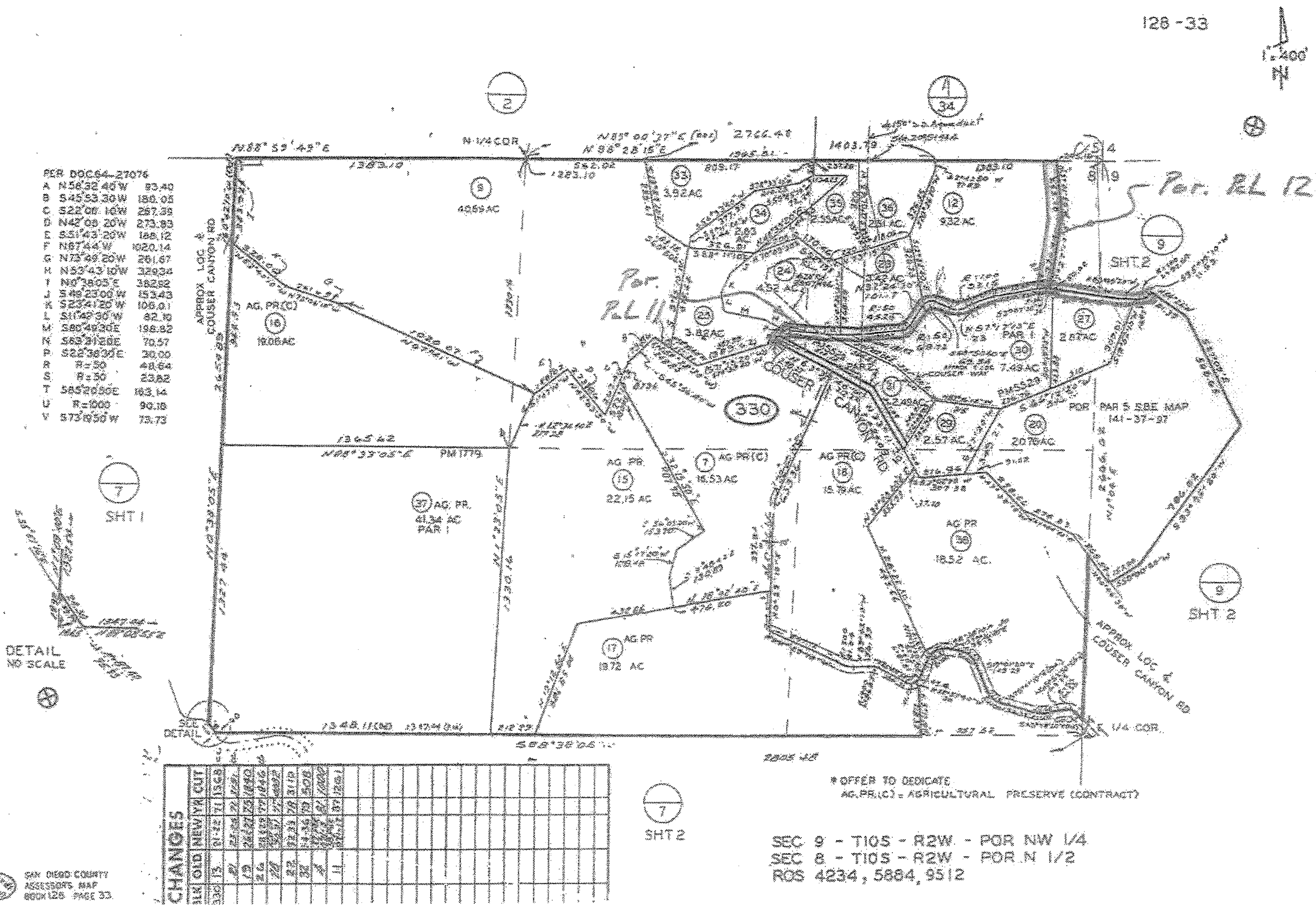
"This plat is for your aid in locating your land with reference to streets and other parcels. While this plat is believed to be correct, the Company assumes no liability for any loss occurring by reason of reliance thereon."

90



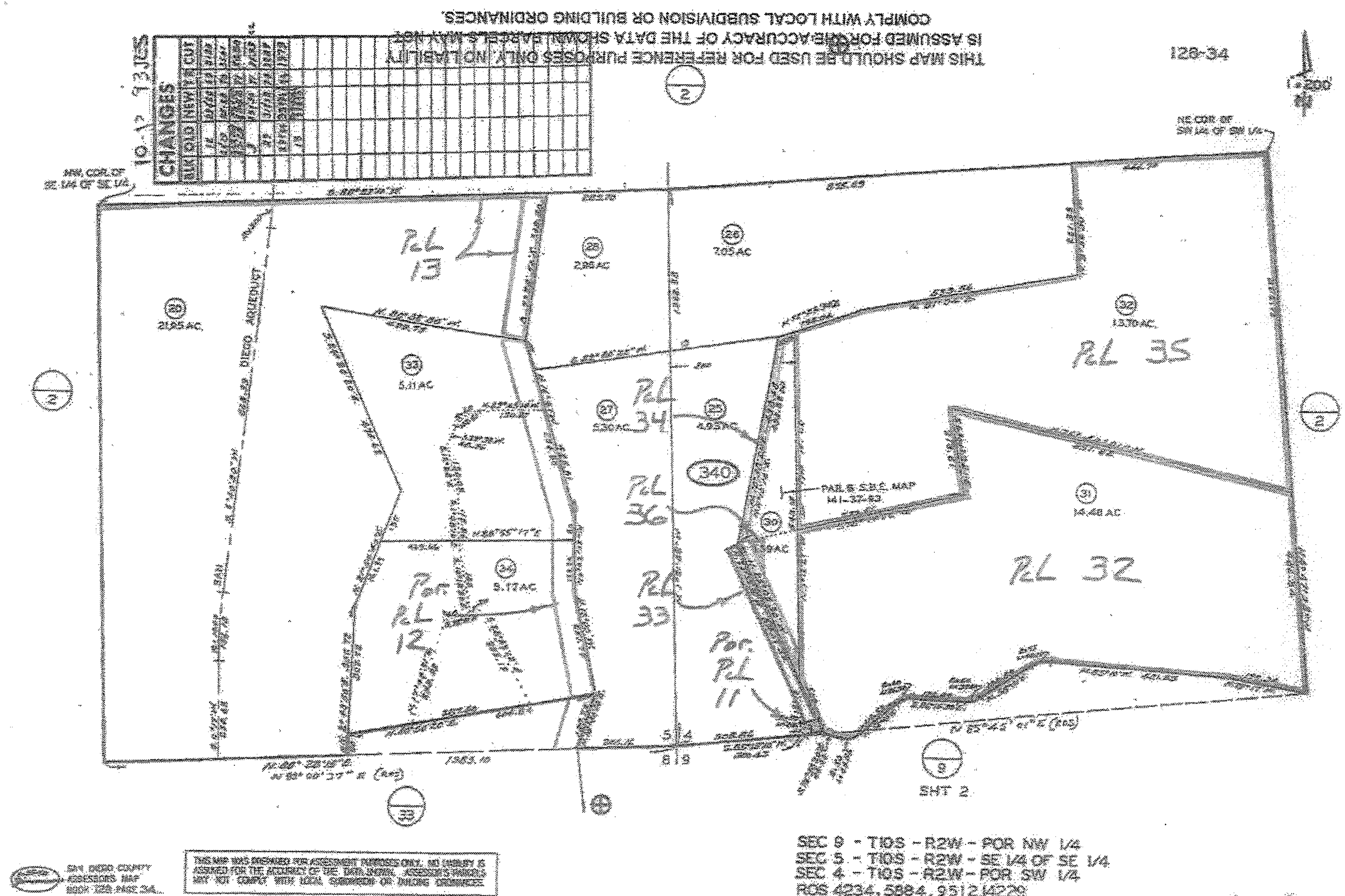
"This plat is for your aid in locating your land with reference to streets and other parcels. While this plat is believed to be correct, the Company assumes no liability for any loss occurring by reason of reliance thereon."

91



"This plat is for your aid in locating your land with reference to streets and other parcels. While this plat is believed to be correct, the Company assumes no liability for any loss occurring by reason of reliance thereon."

92



"This plat is for your aid in locating your land with reference to streets and other parcels. While this plat is believed to be correct, the Company assumes no liability for any loss occurring by reason of reliance thereon."

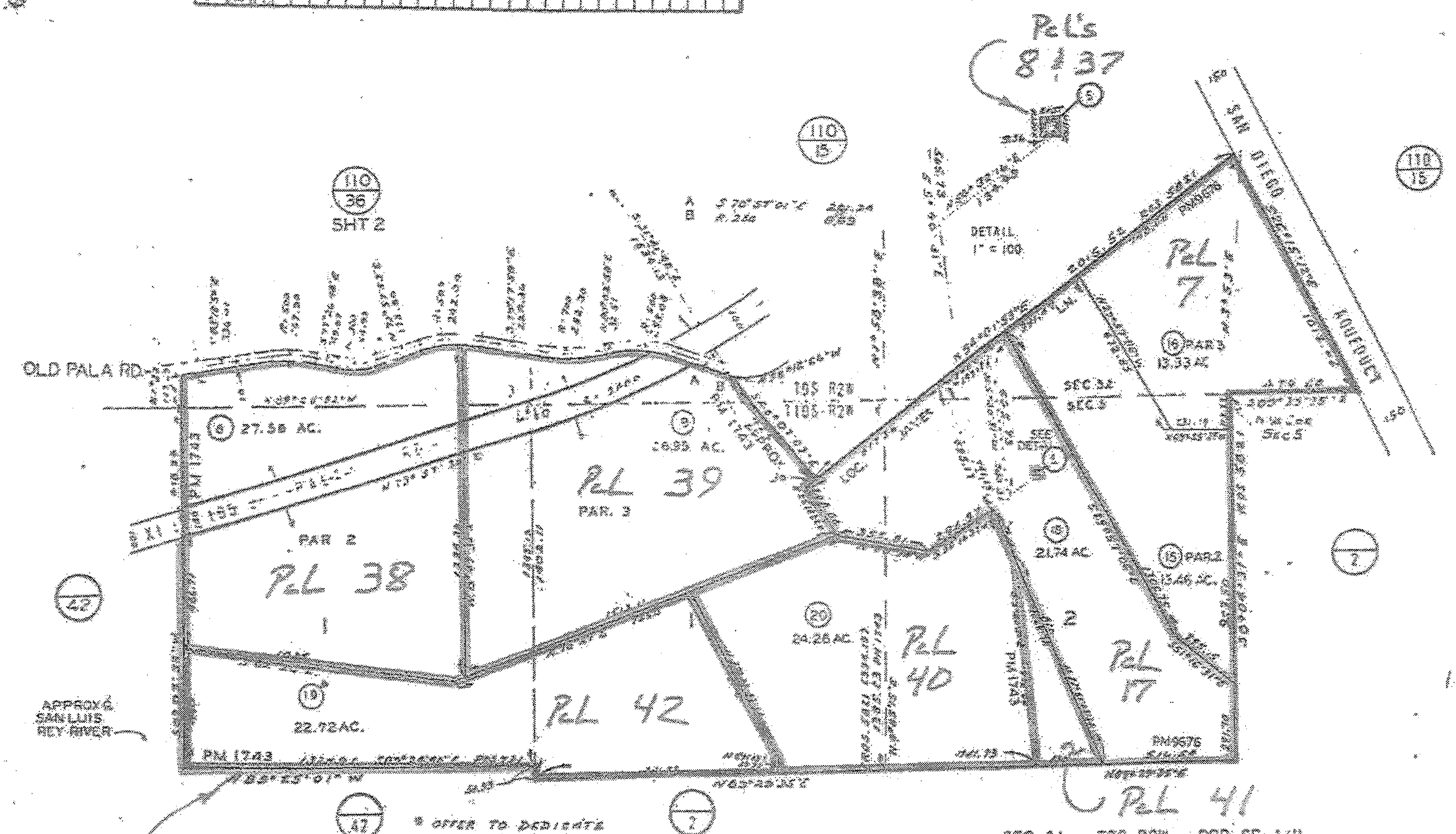
93

Description: San Diego,CA Assessor Map 128.34 Page: 1 of 1
Order: SEAN Comment:

AGRICULTURAL PRESERVE
128—47

CHANGES

BLK	OLD	NEW	YR	CUT



SEC 31 - T9S-R2W - POR SE 1/4
SEC 32 - T9S-R2W - POR S 1/4
SEC 5 - T10S-R2W - POR NW 1/4
SEC 6 - T10S-R2W - POR NE 1/4 - ROS 731, 5821

SAN DIEGO COUNTY ASSESSOR'S MAP BK 128 PG 47 MAPPED FOR ASSESSMENT PURPOSES ONLY

"This plat is for your aid in locating your land with reference to streets and other parcels. While this plat is believed to be correct, the Company assumes no liability for any loss occuring by reason of reliance thereon."

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APPENDIX B-4

REVISED SITING ELEMENT
COUNTY OF SAN DIEGO (2005)

CHAPTER 6
PROPOSED NEW DISPOSAL FACILITIES DESCRIPTION AND LOCATION

Purpose and Requirements

Chapter Six describes and locates each proposed new disposal facility within the county and describes how each facility contributes to the 15 years of permitted disposal capacity. Specific requirements for the content of Chapter Six in the Siting Element are contained in CCR Sections 18755(c) and 18756.1.

Section 18756.3(a) of the California Code of Regulations requires that a resolution, notarized statement or affidavit, regarding land use consistency of any proposed area be obtained from each affected jurisdiction and included in the Siting Element. New facility sites that are not consistent with the applicable general plan may be included in the Siting Element as "tentatively reserved" sites or expansions in Chapter Seven.

When a site proponent wishes to have a site included in the Siting Element or in any future amendments, a proposal must be presented to the local task force, as required under PRC §50001(c). The description shall include the type of facility, location, size, volumetric capacity of the facility expressed in cubic yards and in tons, life expectancy (years), expansions options of the facility, and post-closure uses.

Further Review Process

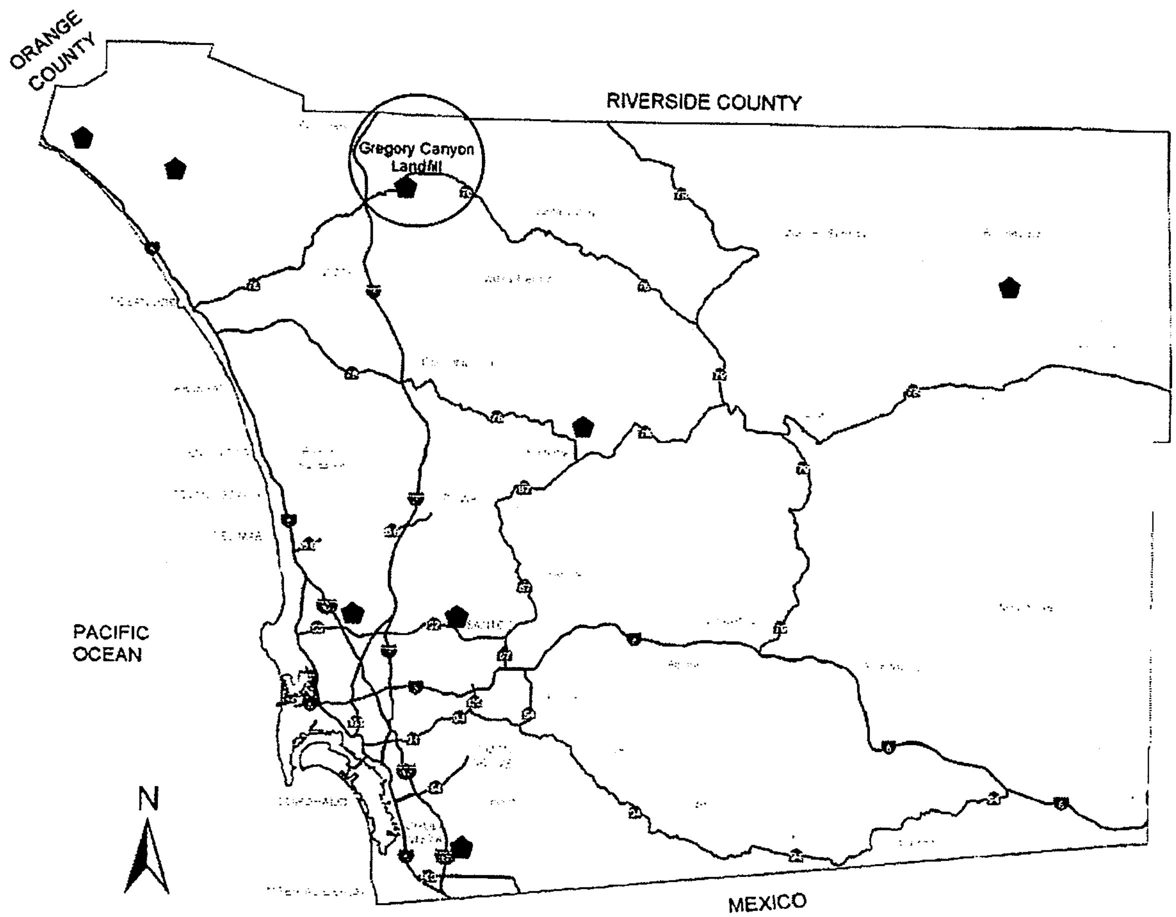
The discussion of proposals in the Countywide Siting Element is only one step in the review and approval process. State and federal environmental review are separate from the Siting Element. The inclusion of a proposed facility in this Element does not substitute for any required review process nor does it guarantee approval of the facility. Each proposed facility in the county is considered individually through the local jurisdiction's land use permitting process, which requires environmental review in accordance with the California Environmental Quality Act (CEQA). Proposed landfills on federal or tribal lands are subject to their own specific permitting procedures.

Proposed New Landfills

At this time, there is one proposed new landfill in San Diego County. Gregory Canyon was a "tentatively reserved " site in the 1997 Siting Element, and is now included as a "proposed" site. Gregory Canyon was incorporated into the County of San Diego's General Plan by a voter initiative on November 8, 1994 as a possible landfill site. It is therefore listed as a proposed site. The County of San Diego's Local Enforcement Agency recently reviewed and certified the Environmental Impact Report. The future date of opening of Gregory Canyon landfill remains uncertain because of opposition to the facility by concerned municipalities, agencies and private parties.

A description and site map for the Gregory Canyon proposal are provided in the following pages.

Figure 6.1
Proposed Landfill Locations in San Diego County



Gregory Canyon Landfill Site Fact Sheet

1. FACILITY INFORMATION

Facility Name	Gregory Landfill
Facility Owner	Richard Chase 991 C-404 Lomas Santa Fe Dr. Solana Beach, CA 92075
Facility Operator	Gregory Canyon Ltd. 3 Embarcadero Center Ste 2360 San Francisco, CA 94111
Facility Location	Approximately 3.5 miles east of Interstate 15 in Northern San Diego County

2. PERMIT INFORMATION

Solid Waste Facility	37-AA-032
Date of Permit Issue	17-Dec-40
Permitted Remaining Capacity	49.5 million cubic yards
Permitted Remaining Capacity	33.4 million tons
Estimate of Site Life Expectancy	30 years

3. MAXIMUM PERMITTED RATE OF DISPOSAL

Daily	3,200 tons
Daily Peak	5,000 tons

4. AVERAGE RATE OF DAILY WASTE RECEIPT

Tons	1,950
Cubic yards	2,889

5. PERMITTED WASTE TYPES

Class III Landfill

In addition, a recyclable goods center is planned at the site.

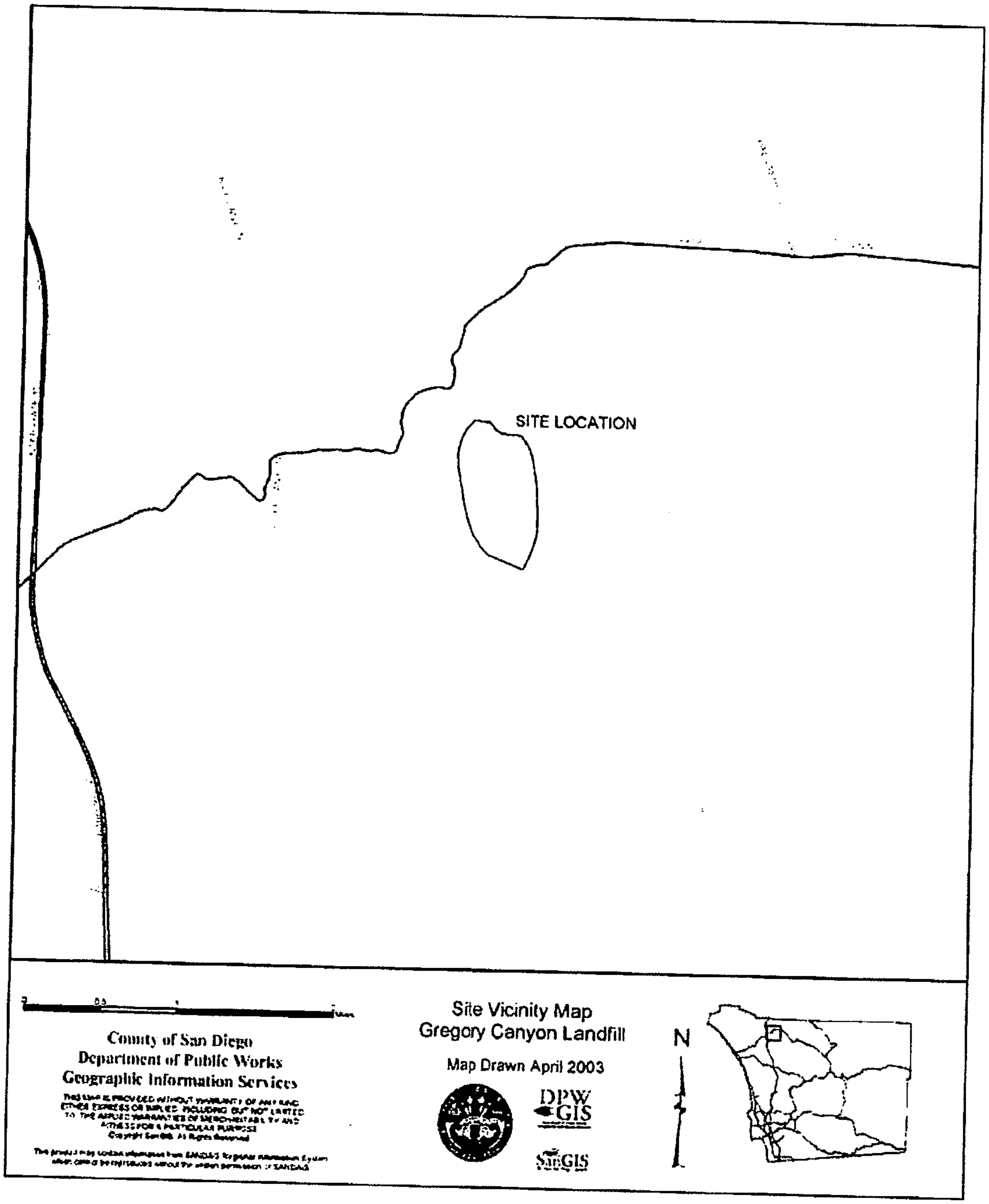
6. FUTURE LAND USE

Open Space

7. GENERAL DESCRIPTION

Approximately 196 acres refuse area footprint for disposal with a total of approximately 308 acres occupied by the landfill and recycling center. There would be 87 acres for soil stockpile and borrow areas and 25 acres for the main access roads and bridge, desilting basins, stockpile borrow area haul road and ancillary facilities. The total acreage of the site is estimated at 1770 acres.

Figure 6.2
Gregory Canyon Landfill Vicinity Map



APPENDIX C

GEOLOGIC, HYDROGEOLOGIC AND GEOTECHNICAL INVESTIGATIONS REPORT

GEOLOGIC, HYDROGEOLOGIC AND GEOTECHNICAL INVESTIGATIONS REPORT

PROPOSED GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

MAY 2003
Revision 1: November 2003

Prepared For:

Gregory Canyon Ltd.
3 Embarcadero Center, Suite 2360
San Francisco, California 94111

Prepared By:

GEOLOGIC ASSOCIATES
16885 West Bernardo Drive, Suite 305
San Diego, California 92127
(858) 451-1136

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GEOLOGIC, HYDROGEOLOGIC AND GEOTECHNICAL INVESTIGATIONS REPORT
GREGORY CANYON LANDFILL

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SECTION 3.0

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SECTION 2.0

SECTION 3.0

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ATTACHMENTS

PREFACE

This report was prepared at the request of the Regional Water Quality Control Board - San Diego Region (RWQCB) to address the elements of the proposed Gregory Canyon Landfill (GCLF) project. It was developed through discussions with, and in response to comments received from the RWQCB with regard to the project Joint Technical Document, which was originally submitted in January 2001. This report incorporates technical data, and provides the analyses and conclusions for the project and incorporated the data from more than six phases of geologic and hydrogeologic characterization.

Initial site characterization was completed by Geotechnical Consultants, Inc. (GCI) for the County of San Diego and the U.S. Department of Interior (GCI, 1989). The second and third phases were completed by Geraghty and Miller (G&M, 1988, 1990). The fourth phase included the work of Woodward-Clyde Consultants completed in 1991 and reported in 1995 (WCC, 1995). The fifth phase included a hydrogeologic study completed by GeoLogic Associates (GLA, 1997), and the sixth phase addressed geotechnical issues (GLA, 1998 and 1999). In support of the EIR for the GCLF project, or in response to comments received on the draft EIR, GLA has also completed additional supplemental studies and reports. The major project reports are provided below.

1. Geotechnical Consultants, 1989, Preliminary assessment of geologic and hydrogeologic conditions, Gregory Canyon site: Draft Environmental Impact Report, Environmental Impact Statement for the North County Class III Landfill, San Diego County, California.

2. Geraghty & Miller, 1988, Phase I hydrogeologic investigation - Proposed North County Landfill, San Diego, California: Consultant's report to Waste Management of North America, Western Region.

3. Geraghty & Miller, 1990, Phase II investigation - Proposed Gregory Canyon Class III Landfill, San Diego County, California: Consultant's report to Waste Management of North America, Western Region.

4. Woodward-Clyde, 1995, Geology and hydrogeology report, Gregory Canyon Landfill, Pala, San Diego County, California: Consultant's report to Gregory Canyon Ltd. (March, 1995).

5. GeoLogic Associates, 1997, Phase 5 - Hydrogeologic investigation for the Gregory Canyon proposed landfill site: Consultant's report to Gregory Canyon Ltd.

6. GeoLogic Associates, 1998, Phase 6 - Geotechnical Investigation for the Gregory Canyon proposed landfill site: Consultant's report to Gregory Canyon Ltd.

7. GeoLogic Associates, 1998, Geophysical Study of Potential Borrow Areas, Proposed Gregory Canyon Landfill, September.

8. GeoLogic Associates, 1998, Leachate Generation Analysis, Proposed Gregory Canyon Landfill, December.

9. GeoLogic Associates, 1999, Technical Memorandum, Geology and Soils, Proposed Gregory Canyon Landfill, November.

10. GeoLogic Associates, 2001, Phase 5 Supplemental Investigation, Results of Pumping Tests, January.

11. GeoLogic Associates, 2001, Addendum to Geotechnical Investigation of the Proposed Access Road and Bridge over San Luis Rey River, April.

12. GeoLogic Associates, 2001, Addendum, Settlement Analyses, Proposed Gregory Canyon Landfill, September.

13. GeoLogic Associates, 2001, Addendum, Leachate Generation Analysis, Proposed Gregory Canyon Landfill, September.

During the course of the investigations completed by GLA, consideration was given to the prescriptive standard design as well as an engineered alternative that would maximize the capacity of the site. As initially designed, the engineered alternative placed the base of the landfill within fractured bedrock below the piezometric surface. The geotechnical investigation (References 5, 6, 9 and 10) addressed the engineered alternative and its design was included in the EIR as the preferred option for the proposed project.

In February 2001, following submittal of the Joint Technical Document (Bryan A. Stirrat & Associates, January 2001), and further discussions with the RWQCB and local enforcement agency (LEA), Gregory Canyon Ltd. (GCL) determined that the prescriptive standard design configuration would be required to move the project forward. In this design configuration, the landfill base grade is above the piezometric surface.

A revised Joint Technical Document was prepared to address the prescriptive standard design in July 2001 (BAS, 2001). In August 2001, following additional discussions with the RWQCB and LEA, GCL agreed to further revise the proposed landfill by incorporating a double composite liner system to provide additional assurance of the long-term protection of groundwater and surface water in the vicinity of the site. In March 2004, following further discussions with the RWQCB, the liner design was enhanced to encapsulate the geocomposite clay liner layer (e.g., the geocomposite clay liner is sandwiched between an upper 80-mil high density polyethylene [HDPE] geomembrane and a lower 60-mil HDPE geomembrane) overlying a drainage layer consisting of a minimum nine-inch thick gravel or equivalent material placed on a 60-mil HDPE liner. As shown on Figure 3-2, these additional layers rest on the existing two-foot thick low-permeability soil layer.

This Geologic, Hydrogeologic and Geotechnical Investigations Report has been prepared at the request of the RWQCB to provide the results of the technical evaluations completed for the project with analyses and conclusions specific to the proposed prescriptive design alternative including the construction of a composite liner system.

The pertinent information in this project-specific document is divided into three chapters. Chapter 1 provides the geologic information for the Gregory Canyon project site, Chapter 2 describes the hydrogeologic conditions of the site and region, and provides the basis for a proposed monitoring and reporting program for the GCLF, and Chapter 3 provides the results of geotechnical analyses conducted in support of the proposed project.

SECTION 1.0

GEOLOGY

1.0 GEOLOGY

This section presents a compilation of geologic data obtained during various investigative phases conducted for construction and operation of a Class III solid waste landfill on the Gregory Canyon property (the Gregory Canyon Landfill).

1.1 INTRODUCTION

The main objectives of the geologic phase of the investigation were to define the site setting and geologic units, review the seismic setting of the site, and evaluate potential geologic hazards associated with siting a landfill in Gregory Canyon. This information provides the basis for the landfill design and construction as discussed later.

Location and Topography

The site is located in the central portion of the Peninsular Ranges province, which is characterized by northwesterly trending mountains and intervening valleys. This geomorphic province extends from the Los Angeles Basin into Baja California, Mexico. Major drainage systems generally traverse the province in a westerly direction and in northern San Diego County include, from north to south, the Santa Margarita, San Luis Rey and San Dieguito rivers. The proposed landfill site is located in Gregory Canyon, a north-draining tributary canyon south of the tributary to San Luis Rey River valley.

For the last 20 million years, the tectonic "grain" of the Peninsular Ranges province has been dominated by strike-slip faulting along northwest-trending faults like the San Andreas, San Jacinto, Elsinore, and Rose Canyon faults. The Elsinore fault zone is located about six miles northeast of Gregory Canyon, and is thus the closest of these large structural discontinuities to the site (Figure 1-1). Like the rest of these faults, the Elsinore fault zone is the result of the right-lateral slip between the North American and Pacific plates, though individual fault strands within the Elsinore fault zone may have strike-slip, normal or thrust fault motions due to complex local fault geometries (Lamar and Rockwell, 1986). The northwest-trending fabric of the fault zone results in distinctive structural features, including large-scale structural depressions like the Elsinore Trough, and structural highs such as the Agua Tibia Mountains.

Regional topography in the Peninsular Range is characterized by considerable relief with relatively moderate to steep slopes. Most of the area is undergoing erosion and mass wasting, but the major river valleys have thick accumulations of sediments, technically referred to as alluvium. The alluvium undergoes cycles of deposition and erosion, depending on the water flow in the drainage system. Typically, the rivers are at low flows during the summer months and have variable flows during the winter rainy season.

The proposed landfill site is located in Gregory Canyon, a north-draining tributary canyon to the San Luis Rey River valley (Figure 1-1). The thalweg of the canyon drops in elevation from about 920 feet amsl at the head of the canyon on the south, to about 320 ft amsl on its northern terminus. East of the Gregory Canyon, Gregory Mountain rises steeply to a maximum elevation of 1844 feet above mean sea level (amsl). The western ridge is less steep, and rises to a maximum elevation of only 940 feet amsl.

Gregory Canyon side slopes are about 5:1 (horizontal:vertical) near the canyon thalweg, become 2:1 at the east edge of the proposed landfill footprint, and are often 1:1 or steeper on the upper part of the eastern slope above the site. The western flank of the canyon is defined by a rounded ridge line, with rather uniform slopes at inclinations of 2:1 to 3:1.

1.2 GEOLOGIC UNITS

The following sections summarize the regional and local geologic units based on a review of literature and site mapping performed at the site, and as presented previously in the Phase 6 Geotechnical Investigation (GLA, 1998).

1.2.1 Regional Stratigraphy

Pre-batholithic, metasedimentary and metavolcanic rocks outcrop throughout the Peninsular Ranges. In San Diego County, outcrops include the Triassic/Jurassic Bedford Canyon sedimentary sequence and the overlying Jurassic Santiago Peak volcanics.

Late Cretaceous sedimentary rocks in the Camp Pendleton area include the largely non-marine Trabuco Formation, and the marine Williams Formation, which in the San Luis Rey and Encinitas areas, are grouped in the Lusardi and Point Loma Formations. Cretaceous rocks are not exposed in the immediate vicinity of the project site.

Post-Cretaceous rocks lie unconformably (i.e., younger strata were deposited after a period of erosion) on either the Cretaceous rocks or the crystalline basement, but are largely confined to coastal margins some distance from the project site.

In many instances, the crystalline rocks are covered by residual soils, or colluvial, and alluvial deposits. The colluvial deposits are typically located along the base of slopes and are formed as a result of the downslope movement of soil and rock by the force of gravity. The alluvial deposits are found to some degree in most drainages, with deposits of considerable thickness present in the major river valleys.

1.2.2 Site Stratigraphy

Several geologic units occur within the project site (Plate 1). In the lower portions of Gregory Canyon, a thin veneer of unconsolidated residual soils, colluvial, and alluvial deposits mantles a substrate of weathered tonalite. The topographic highs bounding the canyon are formed by igneous intrusive and metamorphic rocks with varying degrees of weathering. The following subsections describe in detail the geologic units that are exposed at the site.

Surficial Soils

According to Woodward-Clyde (1995), the topsoil units encountered in the area vary in thickness from about six inches to three feet, and are composed of silty sand, silty sand with clay, and silty sand with cobbles and boulders. In general, it is expected that the steeper, upper slope area of the landfill site include slightly thinner soil accumulations than the intermediate or lower slope areas. Underlying the topsoil are residual soil horizons or weathered bedrock.

Alluvium

Two alluvial units have been mapped at the lower elevations near the mouth of Gregory Canyon. The younger unit, Qal-1 is formed by overbank deposits from the active San Luis Rey river channel, which are interbedded with channel deposits from the Gregory Canyon drainage. These deposits are relatively thin and contain gravels, cobbles and boulders, supported by a sandy silt matrix. The older alluvial subunit, Qal-2, is a terrace remnant of older alluvium from the Gregory Canyon drainage.

The alluvial wedge pinches out to the south, before reaching the footprint of the proposed landfill development. The wedge thickens to the north until eventually it merges with the channel deposits of the San Luis Rey River. Well GMW-2, near the mouth of the canyon, encountered a 50-foot section of alluvial deposits before reaching the underlying bedrock.

Colluvium

Colluvium forms a veneer over most of the surface of the proposed landfill site. In most instances it consists of silty sand with rock clasts that range in size from gravel to very large boulders. Finer-grained deposits, largely devoid of rock clasts, were encountered in test pits located at the southern end of the canyon (Figure 1-2). Older colluvium was also encountered in some of the test pits, and consisted of clayey sand to sandy clay with varying rock content and slight to moderate cementation.

Rock clasts exposed at the surface of the colluvial veneer vary from gravel- to boulder-size material. Boulders of leucogranodiorite, some in excess of 20 feet in maximum dimension, are present along much of the eastern sideslopes. Based on borings drilled during previous investigations, it appears that boulders are extensive in the subsurface (Attachment 1).

The thickness of the colluvial deposits in the landfill site area is highly variable. Cross-section interpretations by Geraghty & Miller (1990) show thickness variations from 2 to 50 feet. The upper slope area is likely to be underlain by thin colluvial deposits and surficial soils formed on highly weathered crystalline rock. Debris chutes and drainage channels may be locally backfilled with colluvium of moderate thickness, but in general, the upper slopes are not likely to be underlain by thick, laterally continuous deposits of colluvium. Lower slope areas are expected to be underlain by much deeper and laterally extensive colluvial deposits consisting of a matrix of silty sand and clay around larger cobbles and boulders.

The current grading plan calls for removal of surficial soil and colluvium over the entire footprint of the landfill.

Bedrock

Larsen (1948) used the term Bonsall Tonalite to describe the rocks underlying the western ridge adjacent to Gregory Canyon, and the term Indian Mountain Leucogranodiorite to describe the light-colored, bold outcrops of granitic rock underlying the eastern ridge of the site area. Larsen (1948) also mapped an intervening band of metamorphic rock along the lower slopes of the eastern ridge, which he correlated with the sedimentary Triassic/Jurassic Bedford Canyon Formation; rocks of this unit have relict volcanic textures, however, and are probably best correlated with the Jurassic Santiago Peak volcanics.

The contacts between all three units are intrusive, albeit different in nature. The main body of the leucogranodiorite is in intrusive contact with the metamorphic band of rocks midway along the easterly slope of Gregory Canyon. The contact zone is narrow and abrupt where it can be observed, and has the characteristic features of sharp intrusive contact,-with apophyses[1] and dikes[2] extending from the leucogranodiorite into the metamorphic rock. No evidence of shearing is observed in outcrop.

The intrusive contact between the tonalite and the metamorphic wedge is somewhat transitional because of the effects of partial melting. Mafic or intermediate magmas (gabbro to tonalite) are emplaced at a relatively high temperature (1,200° to 900° C), so the contacts between them and the host rock tend to be anatectic (i.e., they are accompanied by partial melting of the pre-existing rock). The pre-metamorphic rock fabric can be completely obliterated by migmatization (i.e., development of a banded aspect in the rock as a result of partial melting), so along the contact zone it is not always easy to discriminate between the intrusion and the host rock. The intrusive nature of the contact has been documented at several field locations, however, and is characteristically irregular and intricate. No evidence of shearing is observed in the outcrop and the contact lacks the planar expression expected of a shear zone.

In response to comments received on the draft EIR, GLA prepared a technical memorandum (GLA, 1999) to clarify several issues, including the nature of the metamorphic/igneous rock contact. The following section summarizes the discussion from this technical memorandum, including photographs taken of these contacts provided in Attachment 2. Attachment 2 includes a series of photographs to illustrate the contacts

[1] Apophysis is defined as a branch from a vein or fracture that has been filled by the injection of a larger intrusive body.
[2] Dike is a tabular body of intrusive magma that cuts across the massive rocks.

of the metamorphic rocks with the leucogranodiorite (on the east) and with the tonalite (on the west). In this attachment, the location of each photograph is indicated on Figure 1.

Attachment 2, Figure 2 shows a sharp intrusive contact without evidence of shearing, and an apophysis of the leucogranodiorite "poking" through the amphibolite that forms the metamorphic wedge. Figure 3 shows a sharp but irregular contact, with a pegmatitic dike extending from the leucogranodiorite into a projection of the amphibolite. Figure 4 shows another sharp but irregular contact, with pegmatitic dikes extending into the metamorphic rock. In this photograph the presence of bold outcrops of leucogranodiorite is noted beyond the contact.

The intrusive contact between the tonalite and the metamorphic wedge is shown in Attachment 2, Figures 5 through 7. However, both rocks are very similar in color, so the photographs are not as striking as those described in the previous paragraph. In Attachment 2, Figure 5 shows an irregular intrusive contact, with a "relief" of about 3 feet. Attachment 2, Figure 6 shows a close-up of this contact, which is characteristically irregular and intricate. Attachment 2, Figure 7 shows a different contact between the tonalite and the metamorphic rocks, this time with a "relief" of about 6 feet. The photographs (Attachment 2, Figures 2 through 7) indicate that the contacts between the units are not faults.

Metamorphic rocks (TJm). The metamorphic rocks present along the easterly slopes of Gregory Canyon form a north-south-trending belt of older rock that was intruded by batholithic rocks (Plate 1). Specifically, the tonalite intruded and intermingled with the metamorphic rock, and both units were subsequently intruded by the leucogranodiorite.

The metamorphic rocks include amphibolites and metavolcanic rocks that locally exhibit some migmatitic[3] structure that resembles gneissic banding. The rocks are generally dark blueish gray, hard, and only slightly weathered with aphanitic to porphyroblastic[4] textures. Relict porphyritic textures suggest a volcanic protolith[5] for some of the units.

As indicated above, Larsen (1948) correlated these metamorphic rocks with the Bedford Canyon Formation (a sequence of mildly metamorphosed sedimentary rocks represented by deformed slates, schists, quartzites and localized occurrences of limestone), which is widespread in the Santa Ana Mountains. At Gregory Canyon, however, there are no outcrops of slates, quartzites or marbles, and there is a preponderance of metavolcanic

[3] Migmatitic texture is the name given to alternating dark and light colored bands in a metamorphic rock. The bands are formed in response to partial melting of the rock as it came in contact with magma. In contrast, gneissic banding is formed by segregation of dark and light colored minerals in the absence of partial melting or mixing with a magma. The dark and light bands in these two cases may look alike, but one forms only adjacent to a magma intrusion, whereas the other may be found over a large area.
[4] A rock is said to have aphanitic texture when the crystals that form it are too small to be observed by the naked eye. In contrast, the term porphyroblastic texture is applied to metamorphic rocks when a few large crystals, easily recognized by the naked eye, are set in a finely crystalline matrix. The same kind of texture in a volcanic rock is called porphyritic.
[5] A protolith is a parent rock from which a given metamorphic rock was formed by metamorphism.

rocks. It seems more reasonable to correlate the Gregory Canyon sequence with the Jurassic Santiago Peak volcanics, a unit composed of metavolcanic and metasedimentary rocks exposed elsewhere in San Diego County.

Of the 196 acres of the proposed landfill footprint, approximately 12 acres along the eastern side encroach over the outcrop of metamorphic rocks.

Tonalite (Kt). The tonalite that underlies the western slopes and the central portion of the Gregory Canyon area is an extensive rock unit in the area (Plate 1). Larsen (1948) referred to this rock unit as the Bonsall Tonalite. The tonalite is a dark gray rock, with medium to coarse crystallinity that includes a variety of related rock types such as gabbro. Other common variations noted in the tonalite are the locally veined and streaked appearance and the migmatitic fabric that is observed near the contact with the metamorphic rocks. The rock is also characterized by rare inclusions of the metamorphic rocks, and by numerous leucogranodiorite dikes that include fine-grained aplites[6] and coarse-grained pegmatites.

The tonalite is moderately to intensely weathered in most outcrops, although small cores of only slightly weathered tonalite form boulder knobs in the western flank of Gregory Canyon. Moderately weathered tonalite still preserves its phaneritic texture, but the weathered rock is less cohesive than the pristine rock, and the constituent minerals are slightly altered to oxides and clays, particularly along the edges. The intensely weathered tonalite has a granular texture that only vaguely recalls the original phaneritic texture, and is oxidized throughout. The constituent minerals are partially altered to oxides and clays, and disaggregate easily under pressure. Depth of weathering, as determined from exploratory drilling by Geraghty & Miller (1990), ranges between 65 feet (GMP-3) and 95 feet (GMW-2) (Attachment 1).

The tonalite comes in contact with the metamorphic rock along the easterly side slopes of Gregory Canyon, although the contact is typically covered by colluvium or obscured by surficial soils. Based on its map position, as inferred from isolated outcrops of both rock types, the contact appears to dip to the east at angles of 20° to 25°.

Leucogranodiorite (Klgd). The leucogranodiorite map unit is a light-colored, biotite-bearing granodiorite that forms the prominent mountain flanking the eastern side of Gregory Canyon (Plate 1). This prominent mountain is referred to as Gregory Mountain, but Larsen (1948) referred to it as Indian Mountain and to the light-colored rock as the Indian Mountain Leucogranodiorite. In hand specimen, the rock has a phaneritic texture with medium- to coarse-crystallinity, is light gray to buff, and has less than 5% dark minerals (biotite and iron-titanium oxides). Quartz, plagioclase, and potassium feldspar are the dominant felsic minerals.

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[6] An aplite is a type of intrusive rock characterized by light color, abundance of quartz and potassium feldspar, and a fine granular texture that resembles the texture of sugar. Aplite is generally found forming dikes.

Besides forming the core of Gregory Mountain, the leucogranodiorite also forms dikes that cut older units. The dikes vary in thickness from less than an inch up to five feet, and in most instances are pegmatitic. The degree of weathering of the leucogranodiorite is generally slight, as can be inferred from the bold outcrops of Gregory Mountain. The dikes, on the other hand, vary in degree of weathering from low to moderate. Moderately weathered dikes are pervasively oxidized and have "cloudy" feldspars, but still preserve their phaneritic texture.

The main body of the leucogranodiorite is in intrusive contact with the metamorphic band of rocks midway along the easterly side slope of Gregory Canyon. As shown in photographs included as Figures 2 through 4 of Attachment 2, the contact zone is narrow and abrupt where it can be observed, but is generally buried under talus. Based on its map position, as inferred from the abrupt change in topography, the contact is nearly vertical.

1.2.3 Soil Resources and Engineering Properties

The soils on the site are alluvial and colluvial, or generated from in-place weathering of the bedrock (residual soils). Based on mapping performed by the U.S. Soil Conservation Service (SCS, 1973), acid igneous rock (AcG) is generally exposed along the easterly slope of the site and soil, if present, generally consists of silty coarse sand (Figure 1-3). Since this soil type is generally composed of large boulders and rock outcrops, it is likely to have a high runoff potential. Erodibility will vary with soil development but is likely to be high to very high.

Two upland residual soils, Las Posas stony fine sandy loam (LrG) and Cieneba coarse sandy loam (ClG2), are exposed on the westerly slope of the canyon. Runoff in these areas can be rapid to very rapid, and the erosion potential can be high to very high. Sandy loam of the Fallbrook series (FaD2) has been mapped at the north end of the canyon. The runoff in this area is medium, and the erosion hazard moderate.

Cieneba very coarse sandy loam (CmrG) is mapped on the steeper slopes of the site, primarily north of SR 76. Runoff in this area is rapid to very rapid and the erosion hazard is high to very high. The Tujunga sand (TuB) is exposed below these slopes and is characterized by very slow to slow runoff and only a slight erosion hazard. Riverwash (Rm) is exposed in the San Luis Rey River stream channel and it is typically composed of sandy, gravelly and cobbly materials. Thin slivers of Visalia sandy loam (VaA and VaD) are mapped on the southwest portion of the site. The VaA soil occurs on nearly level terrain, while the VaD soil occurs on moderate slopes. As a result, runoff for the nearly flat-lying VaA soils is very slow and the erosion hazard is slight. The steeper VaD runoff potential is medium with a moderate erosion hazard.

Laboratory testing was performed by WCC (1995) on soil samples obtained from test pits excavated at the site. A summary of the classification tests performed on the samples from the test pits shown on Figure 1-2 is presented in Table 1-1. Compaction tests, performed in accordance with ASTM D-1557 on material that was finer than the No. 4 sieve, were also completed and a summary of these test results is presented in Table 1-2.

Strength tests were performed on samples remolded to approximately 90 percent of their maximum dry density and a summary of these test results is presented in Table 1-3. The results of consolidation testing are presented in Table 1-4. Finally, laboratory permeability tests were also performed and these results are presented in Table 1-5.

1.2.4 Mineral Resources

San Diego County has a wide variety of mineral resources. Some of these, such as sand, gravel, and dimension stone, are essential to the construction industry and the region's economy. Sand and crushed rock are used as aggregate in Portland cement concrete and asphaltic concrete for construction. Blocks of granite rock (dimension stone) are quarried for decorative rock, monuments, and surface plaster. Of the rock products utilized in San Diego County, concrete-quality sand is in the shortest supply. The major river valleys are by far the most important source of sand in this area. Roughly two-thirds of available sand is in the San Luis Rey River. The San Luis Rey River through the project site is designated as a Mineral Resource Zone-2 (MRZ-2) by the California Department of Conservation, Division of Mines and Geology. The riverbed contains deposits of sand and gravel. The MRZ-2 zone is intended to preserve valuable mineral resources. However, it does not permit extraction of these resources without a major use permit. The MRZ-2 designation, which is an area containing potentially significant mineral resources, is confined to the bed of the San Luis Rey River.

The site is located 2.5 miles southwest of the Pala pegmatite district, which is a widely known source of gems (e.g., tourmaline, beryl and spodumene) and lithium minerals.

The district has an area of about 13 square miles and is underlain by granodiorite, tonalite, and gabbro of the Southern California batholith. The pegmatites themselves are most abundant in the gabbroic rocks, which are known collectively as the San Marcos gabbro, but are also present in reduced amounts in the granodiorites and tonalites. Most of the pegmatite occurs as tabular masses that trend north to north-northwest, and dip gently to moderately westward. They may have strike lengths of as much as a mile, and range from thin stringers (e.g., a small crack filling) to large dikes with bulges nearly 100 feet thick.

The bedrock substrate of Gregory Canyon is formed by rocks similar to those of the Pala district, and pegmatite dikes, albeit rare, have been identified in the course of geologic mapping. There is, therefore, a small possibility that lithium minerals might be found in the bedrock of the site. The probability of this occurrence is small, since 100 years of mineral exploration in and around the Pala district have not yielded mineral prospects in or near Gregory Canyon.

1.3 STRUCTURAL GEOLOGY

The tectonic regime of the region has changed significantly between the time of emplacement of the intrusions of the Bonsall Tonalite and the Indian Mountain Leucogranodiorite and the present. During the Mesozoic, a subduction zone was active off the coast of California, which led to magma generation and intrusion to form these units. Tectonic conditions changed during the Cenozoic, when subduction ceased, and transform faulting began on what is now identified as the San Andreas fault system (i.e., the underthrust of the Pacific plate was replaced by lateral shear between the plates). Horizontal motion started between 25 and 20 million years ago in the San Diego region (Atwater, 1970), and since then the tectonic "grain" of the Peninsular Ranges province has been dominated by strike-slip faulting along northwest-trending faults like the San Andreas, San Jacinto, Elsinore, and Rose Canyon faults.

The Elsinore fault zone is located approximately 6 miles northeast of Gregory Canyon, and is the closest of these large fault systems to the site. Like the rest of the regional faults, it is the result of the right-lateral strike-slip motion between the North American and Pacific plates, although the individual fault strands within the Elsinore fault zone may have strike-slip, normal, or thrust fault motions[7] as a result of complex local fault geometries (Lamar and Rockwell, 1986). The northwest-trending fabric of the fault zone also results in distinctive structural features, including large-scale structural depressions like the Elsinore Trough, and structural highs such as the Agua Tibia Mountains.

Of more immediate interest to the structural setting of Gregory Canyon is the fact that the "block" between the Elsinore fault zone to the northeast and the Rose Canyon fault zone to the southwest is under a shear stress regime (Figure 1-1). In effect, the area between both fault zones is being "wrenched" clockwise by the relative motion along these faults. Under these conditions, north-oriented extensional fractures form. This is the most likely explanation for the predominance of north-striking fractures on the site, and for the dominant orientation of topographic lineaments in the region.

1.3.1 Regional Faults

Several active faults exist within 60 miles of the proposed Gregory Canyon landfill site. These include the San Andreas, San Jacinto, and Elsinore fault zones, as well as the offshore portions of the Rose Canyon fault zone (Figure 1-1). These fault zones have an overall trend to the northwest, and right-lateral, strike-slip sense of movement. The closest approaches of the different faults to the site are 54 miles for the San Andreas fault, 30 miles for the San Jacinto fault, 6 miles for the Elsinore fault, and 25 miles for the Rose Canyon fault.

<u>San Andreas fault.</u> Based on the large number of historic earthquakes generated along the San Andreas fault, Wallace (1970) estimated that in any given year there is a 20% probability that an earthquake of magnitude (M) 6 would occur somewhere along the 600 miles of the San Andreas fault, and that there is a 1% probability that a magnitude 8 earthquake would be generated in any given year (in 1857, movement along the right-lateral, strike-slip San Andreas fault generated an earthquake with an estimated

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[7] Faults are classified in three types according to the tectonic stress that formed them. Faults formed by the lateral shear of one rock mass against another are called strike-slip faults. Faults formed under an extensional tectonic regime, and showing surficial displacements, are called normal faults. Finally, those formed under a compressional regime, and showing surficial displacements, are called reverse faults.

momentum magnitude larger than 8.0 in the Fort Tejon area). In contrast, the trenching and geochronometric studies of Sieh (1978) in Pallett Creek suggest annual probabilities of 0.005 to 0.003 for magnitude 8 earthquakes.

For the purpose of evaluating seismic hazard, the California Division of Mines and Geology (CDMG) has estimated the Maximum Credible Earthquake (MCE) of earthquakes along the San Andreas fault – Southern Segment to be M7.4 (CDMG, 1996).

San Jacinto fault. The San Jacinto fault extends more than 120 miles from northwest of El Centro to northwest of San Bernardino. This fault has been the source of numerous micro-seismic events in modern history. At Superstition Hill, just north of the international border, a M6.6 event occurred in November 1987. Another recent rupture zone, as suggested by aligned fault scarps, extends across Borrego Mountain (San Diego County) and was the source of a magnitude 6.8 seismic event in 1968. The Anza section of the fault extends northwestward from the Borrego Mountain section and generated a magnitude 6.8 event in 1918. Finally, there was an 1890 event along the San Bernardino Valley section of the fault, in which surface lateral displacement was estimated at 1.4 + 0.4 m. Blake (1993) estimated the long-term slip rate of the Lytle Creek section of the fault at 10 mm/yr.

For the purpose of evaluating seismic hazard, the MCE value for earthquakes along the San Jacinto-Anza fault segment (the highest magnitude segment near the site) was estimated to be M7.2 (CDMG, 1996).

Elsinore fault. The Elsinore fault extends 150 miles from the Mexican border to the northern edge of the Santa Ana Mountains. Five earthquakes of magnitude greater than 5 have been generated along this fault during the last 100 years, three of which had epicenters near Lake Elsinore. According to Durham and Yerkes (1964), the Whittier section of this fault may have been active since Miocene time, as evidenced by the thickness and distribution of Cenozoic strata. According to Blake (1993), the long-term recurrence interval for magnitude 7 events is estimated at 100 years, from which an annual probability of occurrence of 1% can be calculated. Lamer and Rockwell (1986) estimated the long-term slip rate at 6 mm/yr.

For the purpose of evaluating seismic hazard, the CDMG has estimated the MCE of earthquakes along the Elsinore-Temecula and Elsinore-Julian fault segments were estimated to be M6.8 and M7.1, respectively (CDMG, 1996).

Rose Canyon/Newport-Inglewood fault. The offshore Rose Canyon/Newport-Inglewood fault zone extends more than 150 miles from the international border to Newport Beach and includes a 1,000 to 15,000-foot wide zone of strike-slip faults, folds, and related thrust faults. Of immediate interest for the project is the Del Mar segment, which extends from the latitude of Carlsbad to the latitude of La Jolla.

With respect to historical seismic activity, rupture along the northernmost segment of the fault (the South Los Angeles segment), resulted in the 1933 magnitude 6.3 Long Beach earthquake. In addition, where on shore, the fault zone has significant micro-seismic activity, while offshore seismicity south of Newport Beach decreases by an order of magnitude. For the purpose of evaluating seismic hazard, the MCE value for earthquakes along the Rose Canyon fault was estimated to be M6.9 (CDMG, 1996).

1.3.2 Local Structural Geology

Lineament Analysis

GLA (1997) inspected historical aerial photographs in order to identify potential structural discontinuities in the area of the proposed GCLF. Six sets of aerial photographs were used in the lineament analysis of the site.

The large-scale lineaments identified on and around the proposed footprint of the landfill are shown on Plate 1. On this map, lineaments have been defined by 1) single stretches of a ravine, and accordingly many of them are simple "shortest and steepest" paths for surface water drainage; 2) on the base of geomorphology (e.g., alignment of topographic saddles, linear cliff scarps) or tonal differences; or 3) well defined fractures (as in Gregory Mountain), or dikes.

In the small-scale photographs (1:42,500 to 1:65,000), Gregory Canyon seems to be straight, but in the large-scale photographs it does not appear to be truly "linear". At the large scale, as shown on Plate 1, a very short linear segment is identified near the head of the canyon (A on Plate 1), a tonal lineament off the thalweg of the canyon to the west (B), and a longer linear segment near the mouth of the canyon (C). There is also a set of three lineaments that are subparallel to the canyon, off the thalweg to the east (D).

Perpendicular to the length of the canyon, on the north are the geomorphologic lineaments defined by the cut of the San Luis Rey River (E), and a tonal lineament defined by the transition from grass to scrub vegetation (F). Toward the middle of the canyon, on the west flank, there are four steep ravines (G through J), but they do not seem to have corresponding lineaments east of the thalweg.

The leucogranodiorite, which crops out along the eastern portion of Gregory Canyon, is criss-crossed by joints, but in this area no lineaments were identified in the photographs that might suggest that the joints extend into the metamorphic wedge or the weathered tonalite to the west.

Aerial photograph review also included inspection of lineaments outside of Gregory Canyon. However, the lineament analysis did not disclose regional, through-going discontinuities across the footprint of the site. Other lineaments (e.g., D) appear to converge toward the Gregory Canyon alignment, and no lineaments have been identified that diverge from it.

Discontinuities at outcrop level

Inspection of the limited bedrock exposures indicates that structural discontinuities (joints, dikes) are common in the rocks that form the substrate of the canyon. In order to evaluate orientation, type, and characteristic spacing of these discontinuities, three "lines" were cleared of vegetation and cover soil (Plate 1), and the structural attitude of all observed discontinuities along them was measured. Line 1 was exposed along the floor of the north-trending road that runs mid-slope along the west flank of the canyon, and had a total length of 530 feet. Line 2 was excavated along the wall of the east-trending road that descends in a straight line from the western flank into the thalweg of the canyon; the wall could not be properly cleaned and this 75-foot line is thus of limited use in characterizing spacing. Line 3 was cleared along the floor of the same road, and had a total length of 220 feet.

An interpretation of structural orientations was performed using stereographic projections, to represent and analyze the three-dimensional data in two dimensions. The stereographic plots of the fracture data taken from 424 measurements in outcrop are provided in the Phase 5 - Hydrogeologic Report (1997). In summary, the combined structural data suggests the existence of four directions of preferred orientation:

	Dip direction	Strike direction	Dip angle	Dominant feature
Direction 1	270°	360°	65°	Fractures
Direction 2	90°	360°	80°	Fractures
Direction 3	255°	345°	60°	Dikes
Direction 4	330°	60°	65°	Dikes

If the structural attitudes of fractures and dikes are plotted separately, the stereonet plot for the fractures has primary maxima that correspond to Directions 1 and 2 in the table above, whereas the plot for dikes has maxima that correspond to Directions 3 and 4.

Spacing between discontinuities, and patterns of spatial distribution, can be characterized through the use of standard statistical techniques, and the discontinuity data of Gregory Canyon were tested for randomness and uniformity.

Results of the randomness analysis indicated that the data from Line 1, which has a general north-south orientation, appear to be randomly distributed, while the data from east-trending Line 3, do not fit the random distribution. The difference may be related to the orientation of the lines, the general dominance of north-trending discontinuities, and the fact that the east-trending Line 3 had a better chance of intersecting the more abundant north-trending discontinuities than Line 1.

Spacing between discontinuities in Lines 1 and 3 was also evaluated. In the case of Line 1, 57% of the spacings are less than or equal to 2 feet, and 9% of the spacings are larger than or equal to 9 feet. For Line 3, in contrast, 91% of the spacings are less than or equal to 2 feet.

The intersection of each pair of planes defines a line in 3-dimensional space, whose orientation can be expressed in terms of plunge direction (the azimuth of the projection of the line on the horizontal plane) and plunge angle (the vertical angle of the line with respect to the horizontal), as follows:

	Plunge direction	Plunge angle	Formed by the intersection of:
Intersection line A	180°	0°	Direction 1 and Direction 2
Intersection line B	222°	55°	Direction 1 and Direction 3
Intersection line C	300°	62°	Direction 1 and Direction 4
Intersection line E	176°	19°	Direction 2 and Direction 3
Intersection line F	16°	56°	Direction 2 and Direction 4
Intersection line I	286°	57°	Direction 3 and Direction 4

The outcrop fracture data summarized above indicates the apparent predominance of north-striking discontinuities, and the relative paucity of east-striking discontinuities. The presence of a significant number of discontinuities with other orientations would enhance interconnection of the fractures.

1.3.3 Local Faults

Faulting was evaluated by WCC (1995) for the project site and surrounding area based on a review of geologic literature, large- and small-scale stereo aerial photographs, and field reconnaissance. The closest mapped faults to the site are an east-northeast-trending fault first located by Jahns and Wright (1951), and a shear zone described by WCC (1995) (Figure 1-1). The Jahns and Wright (1951) fault is the only nearby fault depicted in the 1994 Fault Activity Map of California (Jennings, 1994), and it shows no evidence for Cenozoic displacement (i.e., it is an inactive fault).

With respect to the potential shear zone located across SR 76, WCC (1995) noted that there is no evidence to support continuity of the high-angle shear feature (such as lineations or similar exposures) along its general strike to the north or south. From this they inferred it to be a localized feature. GLA (1999) inspected this outcrop, collected six selected samples for thin-section petrography, and carefully inspected its possible extensions to the north and south (on the flank of Gregory Mountain across the San Luis Rey River). As a result of these analyses, it was concluded that the so-called shear zone is actually a steep planar contact between metamorphic rocks and hydrothermally-altered gabbro. The gabbro is brecciated (i.e., the rock is not homogeneous, but rather it is formed by an agglomeration of angular blocks), but the fragments do not show tectonic shearing, alignment, or fault gouge between them (photographs of this outcrop are provided in Figures 9 and 10 of Attachment 2). A couple of hundred feet east of the contact the rock becomes progressively less brecciated and hydrothermally altered.

The 200-foot zone of brecciated gabbro does not have the characteristic features of a fault zone. Since such a thick "fault zone" would be indicative of a major fault, shearing should be pervasive. However, since there are no prominent shear planes in this portion of the outcrop a fault origin is not interpreted. In addition to the general lack of shearing, careful inspection of the ravines to the north of the outcrop did not disclose continuation of the breccia, and GLA (1999) concluded that it has the shape of a vertical chimney, rather than a planar feature. The limited extent of the breccia zone in the strike direction is uncharacteristic of a major fault zone. In contrast, intrusive breccia chimneys or pipes are common in shallow plutons (e.g., Norton and Cathles, 1974), and characteristically show the effects of hydrothermal alteration.

To confirm this interpretation GLA (1999) made a careful inspection of the north flank of Gregory Mountain, where the contact would be reasonably expected to project if it were an extensive planar feature (Figure 11 of Attachment 2). This inspection identified only non-brecciated tonalite/gabbro along the northern flank of Gregory Mountain, thus confirming that the gabbroic breccia does not extend across the San Luis Rey River.

Finally, GLA performed a careful inspection of the outcrops created by SR 76. These outcrops are in direct alignment with Gregory Canyon itself, and expose a continuous non-brecciated and non-faulted section of weathered tonalite/gabbro. This continuous section is further evidence that a major fault zone does not extend along the axis of Gregory Canyon.

1.4 GEOLOGIC HAZARDS

The following sections provide a summary of the geologic hazards that might be associated with surficial processes including landslides, rockfalls and debris flows. In addition, geologic hazards associated with deep-seated processes from faults and seismic hazards are also discussed below.

1.4.1 Landslides

The potential for landsliding was evaluated by WCC (1995) based on review of stereo aerial photographs and field reconnaissance study. Geologic or geomorphic features characteristic of landslides were not observed, and given the crystalline nature of the underlying bedrock materials, landsliding is not expected to create a significant hazard at this site.

1.4.2 Rockfalls

Rockfalls are abrupt movements of independent blocks of rock that become detached from steep slopes. Falling rocks can reach the base of a slope by free-falling, bouncing, rolling down the slope surface, or by some combination of the above. There is clear evidence that rockfalls have occurred at the site during mass wasting of Gregory Mountain located east of the site.

1.4.3 Debris Flows

Earth, mud, and debris flows form when a mass of unconsolidated sediment is mobilized by sudden ground vibration (e.g., an earthquake) or by a sudden increase in weight and pore water pressure (e.g., after soaking of the soil by heavy rains). The initial movement of a flow is enhanced by steep topography and deforestation, but once mobilized, flows can spread over gently sloping terrain.

Debris flows cannot be forecasted, but the susceptibility for formation of debris flows on any given site can be estimated by looking for evidence of previous flow events. GLA (1998) reviewed aerial photographs of the site, and concluded that there is a mappable deposit of poorly-sorted colluvium material that could have been formed as a debris flow deposit (Qco [Plate 1]). The deposit forms a landform with a rough lobate (e.g., rounded) shape and comparatively steep boundaries, but lacks levees or pressure ridges, and so could also have been formed by erosion of an older colluvial fan.

1.4.4 Faults

As stated in Section 1.3.3 above, there are no active faults in the immediate area of the Gregory Canyon site. In addition, there is no evidence of a major fault zone extending along the axis of Gregory Canyon.

The Elsinore fault zone, located approximately six miles from the site, is the most likely source of strong seismic motion in the area of the proposed Gregory Canyon landfill site. The Elsinore fault extends 150 miles from the Mexican border to the northern edge of the Santa Ana Mountains. Five earthquakes of magnitude greater than 5 have been generated along this fault during the last 100 years, three of which had epicenters near Lake Elsinore.

As stated above, to apply an additional margin of safety, the site was designed for the Maximum Credible Earthquake (MCE). An MCE event of M7.1 was used for the Elsinore-Julian Fault and M6.8 was used for the Elsinore-Temecula Fault (CDMG, 1996). For this analysis, a deterministic estimation of the peak horizontal acceleration was calculated for the MCE using the computer program EQFAULT (Blake, 2000). A series of attenuation relationships, based on published seismological papers, were used to produce the range of peak horizontal accelerations presented below.

Maximum Credible Earthquake

Fault Scenario	Range	Mean/Average
Elsinore-Temecula fault M6.8 earthquake 5.5 miles (8.8 km) from the site	0.2g to 0.39g	0.34g
Elsinore-Julian fault M7.1 earthquake 6.0 miles (9.6 km) from the site	0.22g to 0.40g	0.35g
San Andreas fault-Southern Segment M7.4 earthquake 47.7 miles (76.7 km) from the site	0.04g to 0.07g	0.06g
San Jacinto-Anza fault M7.2 earthquake 28.1miles (45.3 km) from the site	0.08g to 0.11g	0.09g
Newport- Inglewood/Rose Canyon fault M6.9 earthquake 22.6 (36.4 km) from the site	0.08g to 0.12g	0.09g

From these estimates, assuming a MCE event, it appears that the area of the Gregory Canyon proposed landfill site expansion is likely to experience short-period peak horizontal accelerations between 0.2g and 0.4g for a near-field earthquake and about 0.1g for a far-field earthquake.

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SECTION 1.0

TABLES

TABLE 1-1
SUMMARY OF SOIL CLASSIFICATION TESTS

SUMMARY OF SOIL CLASSIFICATION TESTS SAMPLE NUMBER	SAMPLE DEPTH (ft)	SOIL CLASSIFICATION	GEOLOGIC UNIT	MOISTURE CONTENT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	NO. 200 SIEVE (%)
TP1-2	2-3	Fine sandy lean clay (CL)	Older colluvium	10	30	17	53
TP2-1	0-1	Clayey fine sand (SC)	Topsoil	3	28	15	38
TP2-4	3-5	Clayey fine sand (SC)	Highly weathered metamorphic rock		29	15	44
TP3-1	1-2	Fine sandy lean clay (CL)	Residual soil		32	18	56
TP4-2	3-4	Fine sandy lean clay (CL)	Residual soil	8	24	10	61
TP4-3	6-7	Silty medium to coarse sand (SM)	Highly weathered tonalite				
TP4-4	1-4	Fine sandy lean clay (CL)	Residual soil		23	10	58
TP4-5	4-7	Silty sand (SM)	Highly weathered tonalite			NP	18
TP5-1	2	Fine sandy lean clay (CL)	Residual soil	10	39	26	56
TP5-2	4-5	Silty sand with clay (SM)	Highly weathered metamorphic rock				
TP5-3	3-5	Silty fine sand (SM)	Highly weathered metamorphic rock			NP	42
TP6-1	0-1	Silty fine sand (SM)	Topsoil	2		NP	33
TP6-2	2.2-5	Silty fine sand (SM)	Colluvium	6		NP	31
TP7-2	2.2-5	Clayey fine sand (SC)	Older colluvium	8	28	12	31
TP8-1	1-2	Silty fine sand (SM)	Colluvium			NP	26
TP9-1	1-3	Silty fine sand (SM)	Colluvium			NP	43
TP9-2	3-6	Silty fine sand (SM)	Highly weathered metamorphic rock			NP	21
TP10-1	1-4	Silty fine sand (SM)	Colluvium			NP	34
TP10-2	4-7	Silty fine sand (SM)	Colluvium			NP	32

Source: Woodward-Clyde, 1995

TABLE 1-2
SUMMARY OF LABORATORY COMPACTION TEST RESULTS

SAMPLE NUMBER	SOIL DESCRIPTION	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT (%)
TP2-4	Clayey fine sand (SC)	129.5	10.5
TP3-1	Fine sandy lean clay (CL)	128.0	10.5
TP4-4	Fine sandy lean clay (CL)	131.0	10.0
TP4-5	Silty sand (SM)	131.0	8.5
TP5-3	Silty fine sand (SM)	121.0	12.5
TP8-1	Silty fine sand (SM)	129.5	8.5
TP9-1	Silty fine sand (SM)	132.0	9.5
TP9-2	Silty fine sand (SM)	127.0	10.0
TP10-1	Silty fine sand (SM)	133.5	8.5
TP10-2	Silty fine sand (SM)	133.0	9.0

Source: Woodward-Clyde, 1995

TABLE 1-3
SUMMARY OF STRENGTH TEST RESULTS

SAMPLE NUMBER	SAMPLE DEPTH (FT)	SOIL CLASSIFICATION	GEOLOGIC UNIT	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	NORMAL STRESS	COHESION (PSF)	FRICTION ANGLE (DEGREES)
TP2-4	3-5	Clayey fine sand (SC)	Highly weathered granite	11	116	Low	440	28
TP3-1	1-2	Fine sandy lean clay (CL)	Residual soil	11	114	Low	240	28
TP4-5	4-7	Silty sand (SM)	Highly weathered tonalite	9	119	Low	500	47
TP5-3	3-5	Silty fine sand (SM)	Highly weathered tonalite	13	108	Low	720	32
TP5-3	3-5	Silty fine sand (SM)	Highly weathered tonalite	13	109	High	1500	30
TP8-1	1-2	Silty fine sand (SM)	Colluvium	9	117	Low	650	39
TP9-1	1-3	Silty fine sand (SM)	Colluvium	10	121	Low	770	30
TP9-2	3-6	Silty fine sand (SM)	Highly weathered granite	10	114	Low	660	41
TP10-1	1-4	Silty fine sand (SM)	Colluvium	9	120	Low	680	33
TP10-1	1-4	Silty fine sand (SM)	Colluvium	9	120	High	1120	33
TP10-2	4-7	Silty fine sand (SM)	Older colluvium	9	120	Low	610	33
TP10-2	4-7	Silty fine sand (SM)	Older colluvium	9	120	High	150	35

Source: Woodward-Clyde, 1995

TABLE 1-4
SUMMARY OF CONSOLIDATION TESTS

SAMPLE NUMBER	DEPTH (FT)	SOIL DESCRIPTION	LIQUID LIMIT	PLASTICITY LIMIT	VIRGIN COMPRESSION INDEX
TP2-4	3 to 5	Clayey sand (SC)	29	14	12.4
TP4-4	1 to 5	Fine sandy lean clay (CL)	23	13	16.8
TP9-1	1 to 3	Silty sand (SM)	--	NP	11.3

NP = Non-plastic
All samples inundated with water at 2 ksf.
Source: Woodward-Clyde, 1995

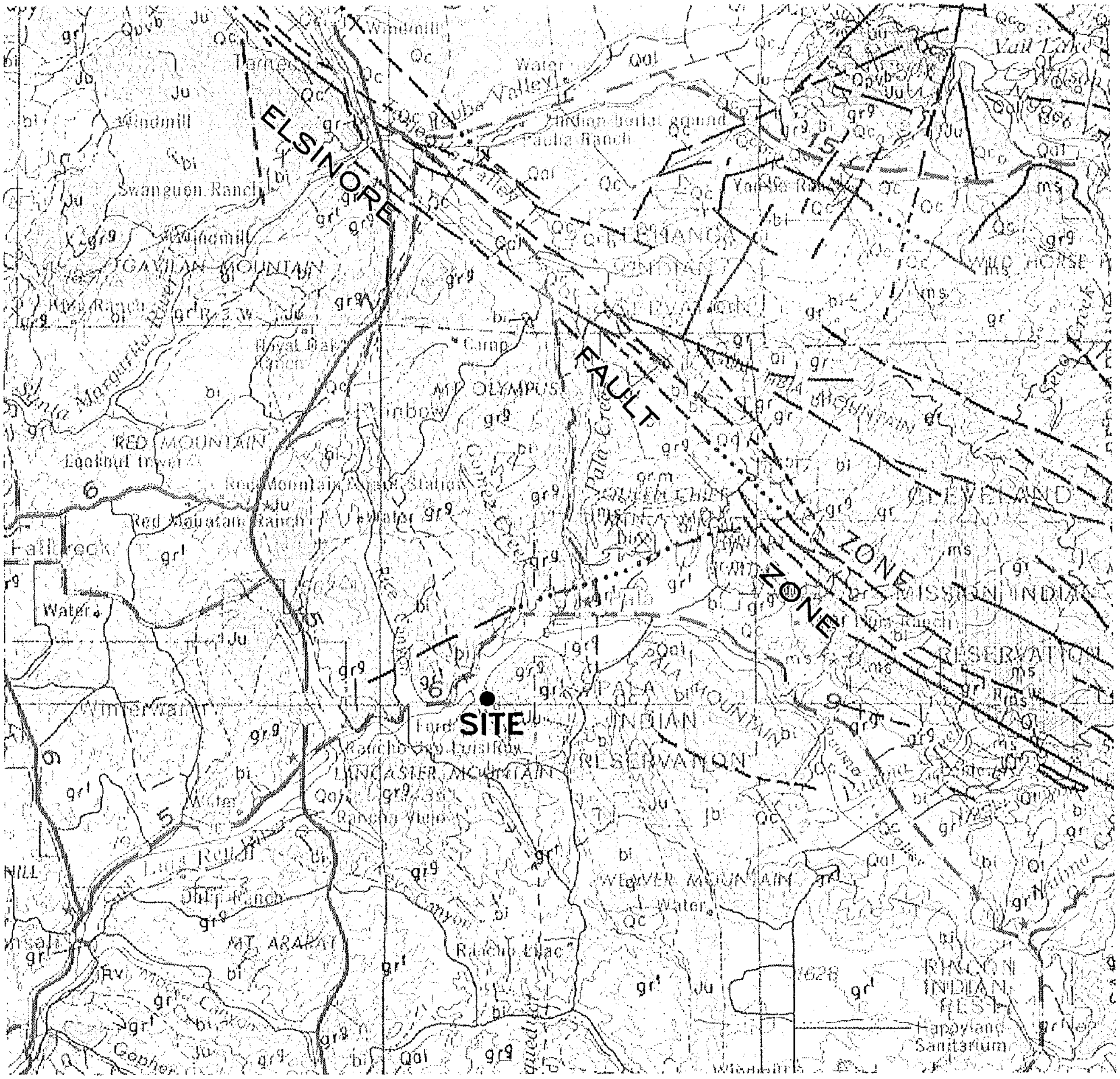
TABLE 1-5
SUMMARY OF LABORATORY PERMEABILITY TEST RESULTS

SAMPLE NUMBER	SOIL DESCRIPTION	DRY DENSITY (PCF)	NO. 200 SIEVE (%)	HYDRAULIC CONDUCTIVITY[a] (CM/SEC)
TP2-4	Clayey fine sand (SC)	116	44	3.7×10^{-6}
TP3-1	Fine sandy lean clay (CL)	115	56	3.8×10^{-7}
TP4-4	Fine sandy lean clay (CL)	118	58	7.3×10^{-7}
TP4-5	Silty sand (SM)	118	18	3.5×10^{-4}
TP5-3	Silty fine sand (SM)	109	42	1.1×10^{-6}
TP8-1	Silty fine sand (SM)	116	26	7.4×10^{-7}
TP9-1	Silty fine sand (SM)	119	43	7.3×10^{-7}
TP9-2	Silty fine sand (SM)	114	21	1.6×10^{-4}
TP10-1	Silty fine sand (SM)	120	34	7.8×10^{-6}
TP10-2	Silty fine sand (SM)	120	32	7.6×10^{-6}

[a] Samples remolded to 90 percent relative compaction (maximum density per ASTM D-1557) at optimum moisture content.
Source: Woodward-Clyde Consultants, 1995

SECTION 1.0

FIGURES



REFERENCE: CDMG, GEOLOGIC MAP OF CALIFORNIA, SANTA ANA SHEET (1965)

APPROXIMATE SCALE: 1" = 14,000'

N

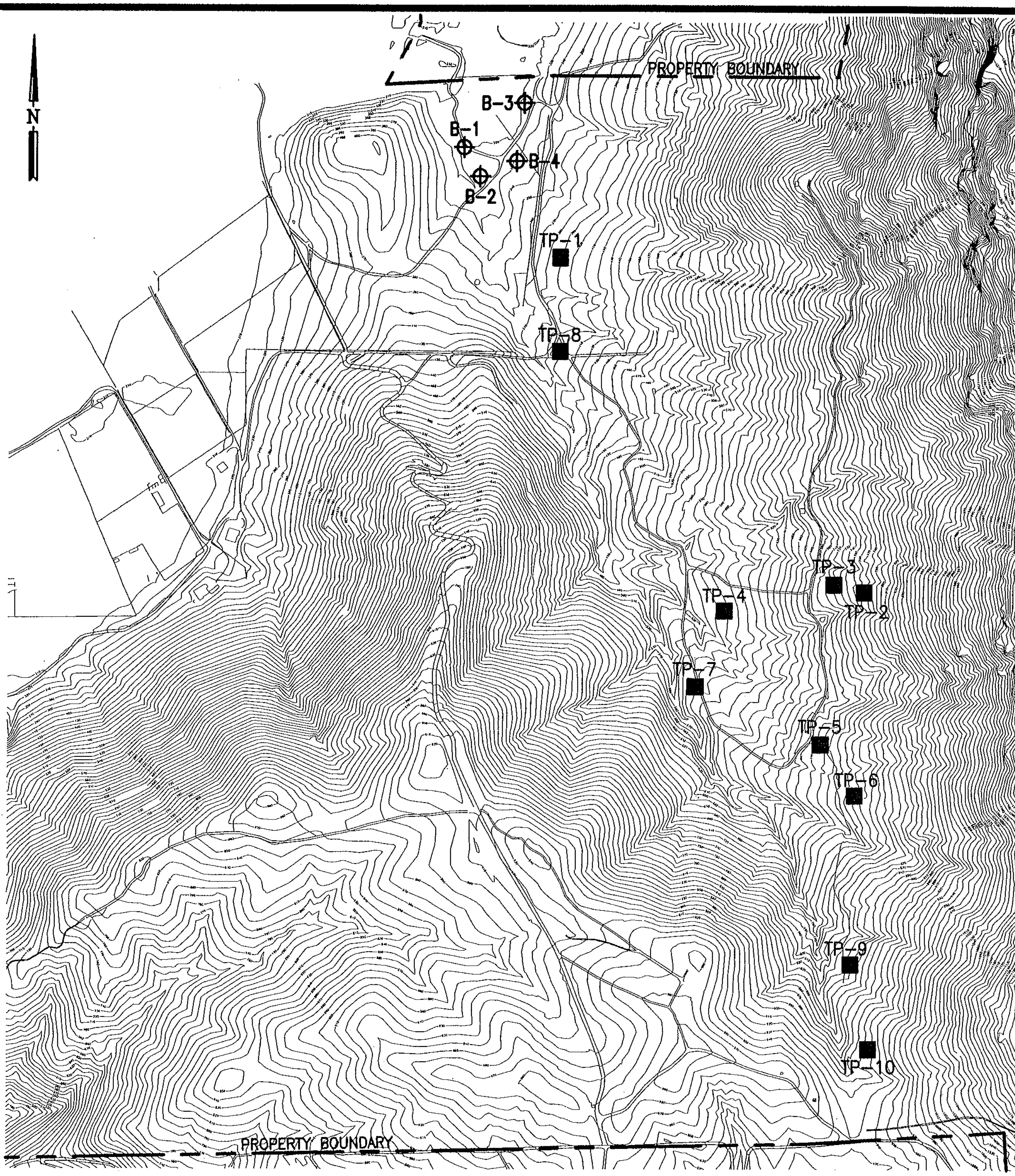
FIGURE 1-1

TECTONIC FRAMEWORK

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	MAY 2003	9539



EXPLANATION:

■ TEST PITS EXCAVATED BY WOODWARD CLYDE CONSULTANTS (1995)

⊕ GEOTECHNICAL BORINGS (GLA, 1998)

FIGURE 1-2

TEST PIT AND LIQUEFACTION BORING LOCATION MAP

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	MAY 2003	9539

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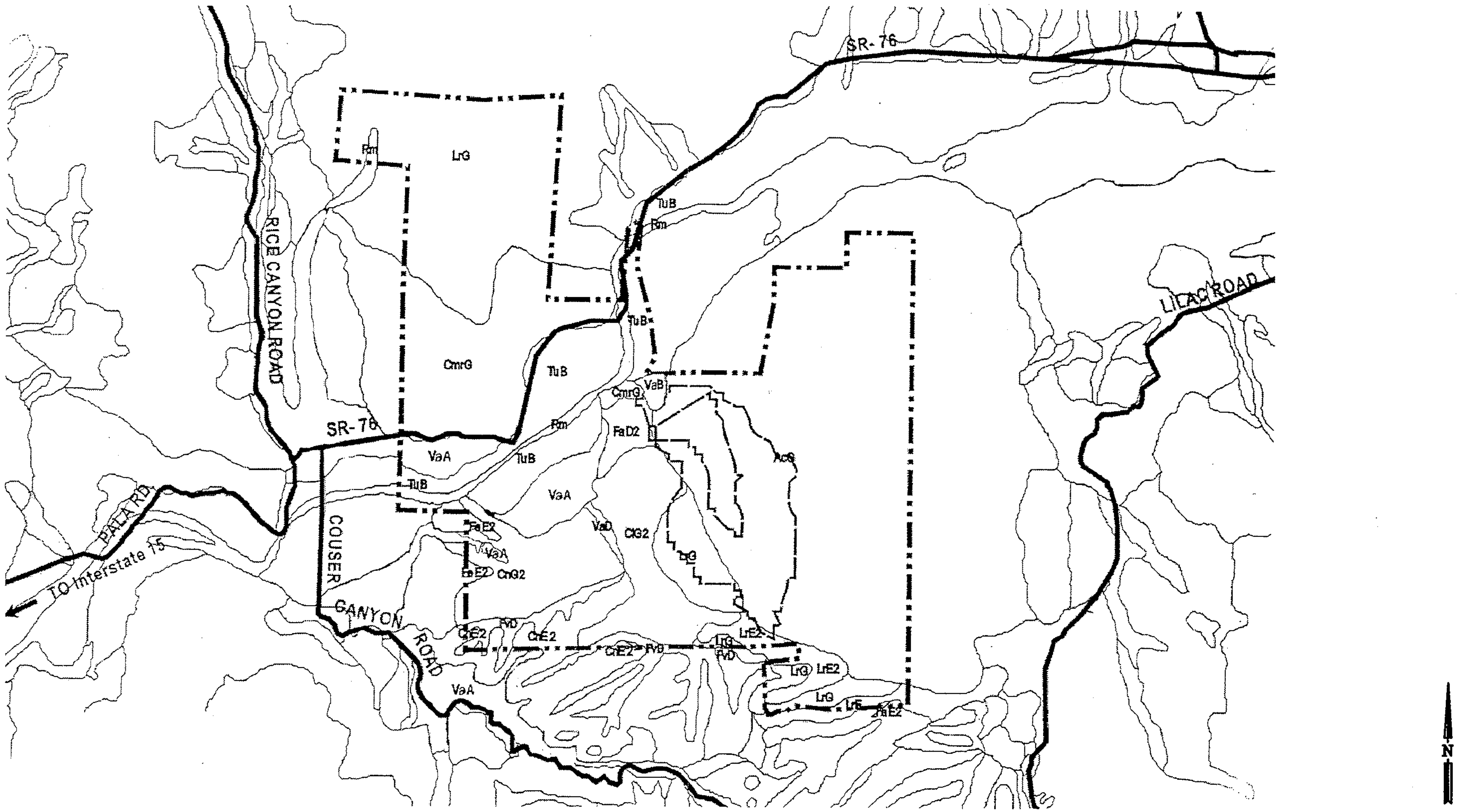

APPROXIMATE SCALE: 1" = 2800'

NOTE: SEE THE TEXT FOR INFORMATION ABOUT THE SOILS TYPES SHOWN ON THE MAP.

FIGURE 1–3

SOILS MAP FOR PROJECT SITE

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	MAY 2003	9539

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SECTION 2.0

HYDROGEOLOGY

2.0 HYDROGEOLOGY

Hydrogeologic investigation and studies of Gregory Canyon and the surrounding area were performed to:

- provide an understanding of the water-bearing zones within the limited alluvial section and underlying bedrock,
- define the piezometeric surface and groundwater flow,
- establish existing water quality,
- establish the monitorability of the groundwater system, and
- generate an effective water quality monitoring network for the proposed landfill design.

This section provides a summary of the regional and local hydrogeology developed from geologic and hydrogeologic characterization studies completed on the site for the GCLF project.

2.1 HYDROGEOLOGIC SETTING

Gregory Canyon is located in an area dominated by crystalline rocks with intervening alluvial valleys. Limited groundwater exists in the fractures within the crystalline rocks compared with the groundwater stored in alluvial sediments. Provided herein is a discussion of the hydrogeologic characteristics in the region surrounding Gregory Canyon.

2.1.1 Regional Hydrogeologic Setting

The Gregory Canyon watershed is tributary to the San Luis Rey River and is part of the San Luis Rey Hydrologic Unit (Figure 2-1). This hydrologic unit encompasses a semi-rectangular area of about 565 square miles. The San Luis Rey River occupies a narrow valley in the basin that is filled with water-bearing alluvial sediments bounded by sedimentary rocks in the lower reach of the basin, and igneous and metamorphic rocks in the middle and upper reaches. The alluvial deposits along the San Luis Rey River form narrow elongated groundwater basins. The San Luis Rey Hydrologic Unit has been subdivided into three hydrologic areas from east to west, which include the Warner, Monserate and Lower San Luis (Mission). The Monserate Hydrologic Area occupies approximately the middle one-third of the San Luis Rey Hydrologic Unit and is the closest to the proposed landfill. The Monserate Hydrologic Area is further subdivided into three hydrologic subareas which include from east to west, the La Jolla Amago, Pauma and Pala Hydrologic Subareas (RWQCB 1994). In this area of the site, groundwater moves from east to west, down gradient from the Pauma Basin to the Pala Basin and then to the Bonsall Basin of the Lower San Luis Hydrologic Area. The boundaries of each basin are drawn where the basement complex (hard crystalline rock) is exposed at the surface and where distinct bedrock constrictions in the San Luis Rey Valley segment the valley fill. The alluvial and colluvial deposits of the San Luis Rey River and tributary canyons, are composed mainly of coarse granular materials overlying variably weathered bedrock.

Because groundwater recharge is seasonal and inconsistent, groundwater levels in the valley fluctuate. Historical depth-to-water measurements from the period between 1965 to 1990 for the alluvial aquifer indicate depth to groundwater ranges from the ground surface to approximately 25 feet below ground surface (bgs) [California Department of Water Resources (CDWR) 1971; U.S. Geological Survey (USGS) 1990].

The GCLF site is located to the south and adjacent to the Pala Basin boundary (Figure 2-2). The Pala Basin covers approximately 4,500 acres, being nearly eight miles long and averaging about 0.5 miles in width (NBS Lowry, 1995). Total thickness of the alluvial sediments in the Pala Basin ranges from zero at the basin margins to in excess of 165 feet, over the proposed GCLF bridge crossing (GLA, 2000). A study by the USGS (Moreland, 1974) estimated the maximum depth of the alluvium in the Pala Basin at 244 feet (in one well 9S/2W-26G1 located in the far upper reach of the Pala Basin), and an average depth of 150 feet. At well GMW-2 (Figure 2-3), located near the southern edge of the Pala Basin at the mouth of Gregory Canyon, the thickness of alluvium is only about 50 feet (G&M 1990).

Due to an abundance of coarse sand and gravel deposits and minimal clay, the best recharge areas are located in the central and west-central portions of the basin (NBS Lowry, 1995). Reported well yields for alluvium in the Pala Basin from a study by NBS Lowry (1995) indicate rates of production range from 300 gpm to 1600 gpm. Specific capacities for alluvium along the axis of the basin range from 13 gallons per minute per foot (gpm/ft) to greater than 115 gpm/ft of drawdown (Moreland 1974). Hydraulic conductivities range from 750 gpd/ft^2 to 1000 gpd/ft^2.

Granitic and metamorphic crystalline rocks underlie the valley fill and adjacent slopes. Groundwater occurrence and movement in the bedrock medium depends upon fracture size, frequency density and interconnection, rather than matrix properties as in alluvial soils. Though it is common usage to speak of a bedrock "aquifer" (as distinct from the alluvial aquifer), wells penetrating fractures containing groundwater are not typically a dependable source of water for large-scale agricultural, municipal or industrial uses. Highly productive wells completed in bedrock are generally those located within alluvial valleys, which store groundwater that is in hydraulic connection with the underlying fracture system (San Diego County Water Authority [SDCWA], 1997). Wells within valleys and canyons where surficial deposits are absent or minimal generally yield only small quantities of groundwater and here the bedrock aquifer may be more important for recharge to downstream alluvial aquifers.

The distinction, in terms of well yields, between alluvial and bedrock aquifers is illustrated in the histograms shown on Figure 2-4. The histograms are developed from well data presented in Table 2-1 and portray frequency of occurrence verses well yield from wells in the vicinity of Gregory Canyon. Well yields from alluvial wells follow a normal distribution about a mean yield of 300 gpm, whereas those from bedrock wells follow a log-normal distribution with a mode between 5 and 20 gpm. These results are proportional to the relative porosity of the two media (25-50% for alluvium, and 0-10% for fractured crystalline rock). The statistical distributions provide an empirical context for distinguishing between the two types of groundwater occurrence.

Although it is a source of recharge to the alluvial aquifer, there has been little attempt to quantify the properties of the bedrock flow system regionally. In fact, the Pala Basin as defined by the CDWR (1971) does not include the adjacent bedrock aquifer. The study of Lee Valley (located in the southern portion of San Diego County) by Kaehler and Hsieh (1994) is the only known comprehensive investigation of a local bedrock aquifer. It is pertinent to Gregory Canyon because of the similarity in the magnitude and distribution of bedrock well yields obtained from Lee Valley, which are included on Figure 2-4.

2.1.2 Surrounding Water Uses

Existing Groundwater Wells. Traditionally Pala Basin groundwater has been used for agricultural and livestock purposes, although more recently a few commercial materials companies have been established in the basin. The basin groundwater provides nearly all of the potable water supply for the Pala Indian Reservation, the San Luis Rey Municipal Water District (SLRMWD), and for other municipal and agricultural purposes in the basin (NBS Lowry, 1995). It is anticipated that in the future the Pala Basin groundwater within a mile of the site will be used for municipal and agricultural purposes. The USEPA has not designated the Pala Basin as a sole source aquifer.

The locations of known off-site wells within about one mile of Gregory Canyon are shown on Figure 2-2. To develop this map, water well Drillers Reports were obtained from the State Department of Water Resources. Table 2-1 provides a summary of the well information for these wells. Though, it should be noted that field verification was not performed as part of this well search. On this figure, the largest concentration of wells is in the alluvial basin of the San Luis Rey River, with a few additional domestic wells serving dwellings in Couser Canyon. It should also be noted that according to the operators of orchards south of Gregory Canyon interviewed as part of an earlier well reconnaissance, irrigation water for these orchards is derived from the First San Diego Aqueduct and not from wells.

Beneficial Uses. The Porter-Cologne Water Quality Control Act and the Federal Water Pollution Control Act Amendments of 1972 require that Water Quality Control Plans (Basin Plans) be prepared for the nine state-designated hydrologic basins in the State of California. The State Water Resources Control Board (SWRCB) approved the San Diego Region Basin Plan (Basin Plan) on March 20, 1975 and an update to the Basin Plan was drafted in 1994 (RWQCB 1994). The purpose of the San Diego Region Basin Plan is to identify beneficial water uses, establish water quality objectives, implement a program to meet these objectives, and establish a surveillance program to monitor the effectiveness of the plan.

Existing beneficial uses and water quality objectives have been established by the RWQCB for groundwater in the Pala Hydrologic Subarea to include municipal, agricultural, and industrial purposes. Because groundwater in the Pala Hydrologic Subarea is designated for use as domestic or municipal supply, chemical constituents in groundwater must not exceed the maximum contaminant levels (MCLs) as specified by both state and federal regulations. The primary standards are provided in California Code of Regulations, Title 22 (CCR 22), Chapter 15, Article 4, §64431 and 64444, Tables 64431-A and 64444-A and the Code of Federal Regulation, Title

40, part 141 (40 CFR 141). The primary standards are threshold concentrations for specific minerals and chemicals to protect human health.

The state has also developed secondary standards for constituents that may adversely affect the taste, odor or appearance of the water. These secondary MCLs are provided in the CCR 22, Chapter 15, Article 4, §64449, Tables 64449-A and -B. Groundwater in the Pala Hydrologic Subarea is also designated for use as an agricultural supply, and it should not contain concentrations of chemical constituents above these secondary standards.

Water Resources. The San Diego County Water Authority (SDCWA) is a public agency that was founded in 1944 to supplement existing supplies by importing water into the San Diego Region. In response to continued demand for water and the decreased reliability of imported water sources, recently SDCWA has been evaluating the potential to develop additional local water supplies and water storage. SDCWA is considering water conservation, water transfers, water reclamation and purification, and groundwater resource development and management. SDCWA has developed a Groundwater Resource Development Report (June 1997) to assist in developing a Groundwater Implementation Plan and to serve as a reference and resource document to be updated periodically. In this report, the Mission, Bonsall, Pala and Pauma basins within the San Luis Rey River Basin, were considered (among others) as productive shallow alluvial aquifers within the SDCWA service area.

Several SDCWA member agencies and other water agencies have either implemented groundwater projects or are planning or evaluating potential projects to develop potable water supply. Within the Lower San Luis Rey River Hydrologic Area, the City of Oceanside is extracting 2,200 acre-feet per year (AFY) of groundwater from the Mission Basin and that project is being expanded to include an additional 4,900 AFY of potable water supply. A conceptual project has also been identified by the City of Oceanside to expand groundwater development in the Mission basin by an additional 15,300 AFY of supply. The Rainbow Municipal Water District is evaluating the development of 3,000 AFY of potable supply from the Bonsall basin. For the Monserate Hydrologic Area, in which Gregory Canyon is located, the Yuima Municipal Water District is pumping up to 2,700 AFY from the Pauma basin.

SDCWA assigned a high score to the Pala/Pauma Basins, along with several other groundwater basins and surface reservoirs, during its initial "Regional Screening of New Sources of Water." Accordingly, these basins were targeted for further analysis under the "Analysis of Alternatives". The resulting analysis of alternatives ranked the groundwater basins including the Pala/Pauma groundwater basins in a lower group (less attractive), and therefore they were not considered further as a viable new source of water. The primary reasons for the low ranking included very low groundwater elevations that would require extensive pumping facilities for water conveyance, relatively little emergency storage capacity, and the need for extensive infrastructure including wells and connecting pipelines throughout the basin.

2.2 SITE HYDROGEOLOGY

As stated above, the area surrounding the project site is mixed use, with a predominantly rural character. Agricultural uses are located on the floor of the San Luis Rey drainage. Pala Rey

Ranch is located to the west of the site, Hanson Aggregates (Hanson), a sand and gravel mining operation with a concrete batch plant, is located to the northeast, lower Rice Canyon is located to the northwest, Couser Canyon is to the south, and the Pala Indian Reservation, which includes a portion of Gregory Mountain, is located to the east. The abandoned Lucio Family Dairy, which closed in 1986, is located north of the San Luis Rey River, and south of SR 76. The abandoned Pete Verboom Dairy exists to the west of the Lucio Dairy and is adjacent to and south of SR 76.

Agricultural land refers to areas supporting active agricultural cultivation or cattle grazing. About 97 acres of agricultural land, primarily grazing areas, exist on the project site. The dairies on the project site, which are also considered agricultural lands, were mapped as a combination of agricultural land and developed land and occupy 88.3 acres. Existing land uses within the general area include a pear orchard, pastures, various farm outbuildings, and dirt access roads along fields. Pastures and a hay shed are situated on the valley floor on the south side of the river. The Hanson's sand and gravel mining operation and concrete batch plant is located approximately 1,200 feet upstream of the existing First San Diego Aqueduct crossing of the San Luis Rey River.

2.2.1 Local Hydrogeology

Gregory Mountain is an elongated, relatively flat-topped prominence, drained to the east, north and west (into Gregory Canyon) by steep, rocky secondary canyons. The potential catchment area of the mountain is large and it clearly dominates recharge to Gregory Canyon. Recharge to Gregory Canyon from the west ridgeline and southern drainage divide is believed to be relatively minimal. Though no permanent springs have been identified in Gregory Canyon, the vigorous development of riparian vegetation along the thalweg of the canyon, and its tributaries, suggests that the piezometric level of the underlying aquifer is close to the surface along the lowest points of the canyon. Studies by GLA, and others including the drilling and construction of groundwater monitoring wells, have assisted in evaluating groundwater flow within the project area.

There are two distinct groundwater zones within Gregory Canyon. An alluvial aquifer hosted by the sediment wedge at the mouth of the canyon, and a bedrock aquifer hosted by the fractured tonalite that forms the substrate of the canyon. The general direction of groundwater movement in both aquifers is northerly, toward the alluvial aquifer of the San Luis Rey River (Figures 2-3A and 2-3B; Plate 2).

Alluvial Aquifer. An alluvial wedge occupies the lower reaches of Gregory Canyon. Figure 2-3A shows a contour map of the water table in the alluvial aquifer based on data collected on December 16, 1996 (the most recent time when significant groundwater was measured in the on-site alluvial wells). It pinches out to the south (as indicated by dry wells MW-4, WCC-1, WCC-2, and MW-5) before reaching the proposed landfill footprint. WCC (1995) concluded that groundwater within the alluvium forms an unconfined aquifer recharged by direct infiltration from precipitation or runoff from the bedrock ridges east and west of the canyon, and by underflow through weathered bedrock. The available data suggest groundwater flow is to the north, under a gradient of about 0.045 ft/ft.

As stated above, the reported hydraulic conductivities for alluvium in the Pala Basin range from 750 to 1,000 gpd/ft^2 (Moreland 1974). In contrast to the more coarse-grained sediment typical of the Pala Basin as a whole, WCC (1995) estimated that the hydraulic conductivity of alluvial and colluvial materials in Gregory Canyon ranges between 0.9 and 16 gpd/ft^2. Supporting this lower local value, Geraghty & Miller (1990) performed a pumping test in well GMW-3 and estimated the transmissivity of the alluvial aquifer using the Cooper-Jacob method, at 700 gpd/ft, and from this value the hydraulic conductivity was estimated to be approximately 1.47 ft/day (11 gpd/ft^2).

Bedrock Aquifer. There are 19 bedrock monitoring wells within the proposed landfill footprint and along the periphery of the site, constructed during various investigative phases of the project (Figure 2-3B). Studies conducted to date indicate that groundwater in Gregory Canyon can be characterized as a fracture-controlled, interconnected flow system. This fracture-controlled groundwater communicates with, and recharges the alluvial water in the San Luis Rey River valley (Pala Basin). The fractured bedrock flow system can be differentiated into an upper zone of active flow through a network of interconnected fractures and weathered rock, and a deeper zone of relatively low flow through more widely spaced fractures. Boreholes drilled within the canyon itself encountered tonalite with various degrees of hydrothermal alteration, and significant fracturing in the upper 50 to 100 feet. Water-bearing fractures become sparse at depths greater than 100 feet. A synopsis of the results of studies performed by GLA supporting these conclusions is provided below.

Wells accessing the water-bearing fractures register water levels defining a systematic piezometric surface (Figure 2-3B; Plate 2). The piezometric surface reflects the main elements of the topography and illustrates the role of Gregory Mountain as the principal recharge area of Gregory Canyon. Derivation of a piezometric surface from wells isolated from one another by non-water bearing rock attests to the hydraulic interconnection of the fracture system.

2.2.2 Hydrophysical Logging Results

As shown on Plate 2, site groundwater investigation wells include thirteen wells and piezometers installed into alluvium and/or bedrock by previous consultants, an initial nine bedrock borings drilled by GLA (GLA-1 through -5 and GLA-7 through -10; proposed well GLA-6 was found to be an undrillable location), and an additional six alluvial and/or bedrock groundwater monitoring wells to further characterize the site and supplement the proposed groundwater monitoring system. The initial nine GLA borehole locations were selected based on geophysical very low frequency (VLF) anomalies, inferred structural lineaments, prominent geologic or topographic features (GLA, 1997).

Borehole Imaging. Wells that were completed in the crystalline bedrock were completed with an open hole (no filter pack or imported screen) allowing the well to be tested using various geophysical tools. A total of 14 of these boreholes were logged with an optical borehole imaging probe (BIP) by COLOG, Inc of Golden, Colorado. This technique is based on direct optical observation of the wall of the borehole and is recorded on videotape for viewing. Based on inspection of the BIP log each fracture is identified with a depth, orientation, and fracture ranking from 0 to 5, with a 0 indicating a closed feature, and 5 indicating a wide aperture fracture or fracture zone. Most of the fractures rank from 0 to 2, with only 20 cracks ranked at 3 and only two fractures ranked at 4 (GLA, 1997). A well by well summary of the BIP log data is provided in the Hydrogeologic Investigation Report by GLA (1997) along with a discussion of the cumulative results of fracture strike orientation and dip angles plotted for all of the tested wells. Structural orientation and spatial distribution patterns of fractures in boreholes were consistent with the analysis of similar outcrop data (Section 1.3.2).

Despite the relative abundance of fractures observed in boreholes, few were ultimately correlated with groundwater flow (see below). As suggested by the ranking survey noted above, and by close examination of the borehole videotapes, most fractures are closed with no discernible aperture, or they are filled with mineralization. Fractures in the latter category are vein-like features with no apparent porosity. Some small igneous dikes and large mineral veins related to plutonic processes have been counted as fractures in several boreholes. These features are not water bearing, and would not change the results of the borehole survey were they accounted for. Therefore, from the surface and subsurface fracture observations, it is concluded that while fracture density is significantly high in the bedrock, generally secondary porosity in the water-bearing zone is probably very low.

Borehole Dilution Testing. To determine the transmissive intervals within boreholes, COLOG, Inc. (GLA, 1997) adapted the borehole dilution method, using de-ionized water as the tracer and periodic measurements of the ambient temperature and fluid electric conductivity (FEC) as measures of "concentration" of the tracer. Once borehole water has been diluted with the deionized water to reduce the FEC and create thermal equilibrium, changes in the temperature and the FEC assist in locating hydraulically transmissive zones in the bedrock, and calculating the average velocity of the groundwater moving from these zones into the open borehole. The results obtained by COLOG, Inc. after applying this technique in the logging of 11 wells are summarized below.

1. As shown in the following table, in shallow wells (e.g., GMW-1, GMW-4, and GMP-2), and in the shallow portions of wells GLA-5 and GLA-7, the transmissive intervals are broad and continuous, consistent with the deeply weathered nature of the tonalite, which for all practical purposes behaves as a silty sand.

Well	Depth to water (feet)	Depth of transmissive interval (feet)	"Saturated" interval (feet)	Percent of "saturated" interval	Specific discharge (ft/day)
GMW-1	21.89	65-83	68	NA[a]	0.26-0.31
GMW-4	65.72	66-74	50	NA[a]	0.11-0.13
GMP-2	69.54	70-86	18	NA[a]	0.14-0.18
GLA-5	42.57	43-66	147	16%	0.05
GLA-7	34.82	35-72	125	30%	0.16-0.24

Note:
a. The "saturated" section of this borehole is within heavily weathered tonalite, and is too short to allow for a meaningful percentage comparison with deeper, unweathered tonalite.

2. As shown in the following table, in the deeper portion of the GLA wells, where the tonalite is less weathered, there are very few transmissive intervals. They range in thickness between 2 and 8 feet, and represent between 1% and 5% of the total length of the bedrock section. These results are indicative of fracture flow.

Well	Depth to water (feet)	Depth of transmissive interval (feet)	"Saturated" interval (feet)	Percent of "saturated" interval	Specific discharge (ft/day)
GLA-1	37.10	ND	263	NA	ND
GLA-2	69.73	83-85	180	1.1%	0.17
GLA-3	23.84	66-70, 82-84	126	3.2%	0.23/ 0.29
GLA-4	68*	70-72, 126-134	172*	1.2%/4.7%	0.03/0.07
GLA-5	42.57	96-99	147	2.0%	0.06
GLA-8	62.40	175-180	238	2.1%	--
GLA-10	22.20	58-64	128	4.6%	0.02

Note:
* The static depth to water was 149.93 feet bgs, but the transmissivity of the well was so low that water added during testing did not drain. Thus, the reported transmissive intervals and specific discharge values are transient.

3. For the deep GLA wells, in all but one instance the intervals of groundwater flow are within 60 feet of the piezometric surface. Groundwater flow is largely concentrated in discrete shallow fracture zones. Deeper fractures possess lower transmissivity, apparently as a result of more complete mineralization.

Assuming that the porosity of the deeper intervals is 1% and that specific discharge values calculated for the deeper transmissive intervals range between 0.02 and 0.3 ft/day, the equivalent specific discharge would be between 0.0002 and 0.003 ft/day. Using an average groundwater gradient value of 0.15 ft/ft, determined from the contour map of the piezometric surface, the hydraulic conductivity would range between 0.0013 and 0.02 ft/day (4.6E-07 cm/sec to 7.1E-06 cm/sec).

Packer testing estimates of the hydraulic conductivity of the deeply weathered bedrock ranged from 0.03 to 0.3 ft/day (10^{-5} to 10^{-4} cm/sec) (Geraghty & Miller, 1990).

<u>Cross-hole aquifer tests.</u> COLOG, Inc. also performed three cross-hole aquifer tests to quantitatively assess the interconnectivity of the bedrock aquifer, using the following well pairs:

Pumping well	Observation well	Distance between wells	General location in the canyon
GMW-1	GLA-3	51 feet N36E	Lower reach
GMP-2	GLA-7	167 feet N56W	Middle reach
GMW-4	GLA-8	30 feet N10E	Upper reach

For cross-hole flow assessment, the formation water in the observation well is replaced with deionized water (DI) while the nearby well is pumped. As pumping continues, a series of FEC and temperature logs are then run in the observation well to identify changes in the fluid conductivity as a result of fluid flow. In effect, formation water coming into the observation well "enriches" the electric conductivity of the DI "tracer" so that inflow velocities can be estimated through the borehole dilution method discussed above.

The hydraulic connection between the pumping and observation wells is estimated by comparing the flow conditions in the observation well under ambient flow conditions (discussed above) and under cross-hole pumping conditions. By comparing the horizontal flow velocities of transmissive intervals under these two different pressure states, a qualitative evaluation of which intervals are hydraulically connected can be achieved. Using this technique, those intervals that display change in flow between the two pressure conditions can be assumed to be hydraulically connected.

For the cross-hole test in which GMW-1 was the pumping well and GLA-3 was the observation well, COLOG concluded that significant change occurred at three distinct depth intervals within GLA-3 – 48 to 56 feet, 66 to 68 feet, and 82 to 84 feet. In effect, these intervals experienced flow created by the stress imposed by pumping. The data yielded a specific discharge in the aquifer of 0.37, 0.28, and 0.50 ft/day, respectively. The interval from 48 to 56 feet had negligible horizontal flow under ambient conditions, and therefore, had the greatest change during cross-hole pumping conditions. The interval of 66 to 68 feet experienced an increase of 22% with respect to the ambient flow condition. Finally, the interval from 82 to 84 feet experienced a 72% increase in the average flow velocity with respect to the ambient flow condition. For this well pair, then, the "capture radius" extends at least 51 feet in the horizontal direction and 60 feet vertically into the aquifer (i.e., the distance between the depth of the piezometric surface [24 feet] and the depth of the 82-84 feet transmissive interval).

For the cross-hole test in which GMP-2 was the pumping well and GLA-7 was the observation well, COLOG concluded that significant change occurred at numerous zones over the interval from 34 to 91 feet. To discretize the specific intervals for horizontal flow analysis, the results of the ambient and cross-hole tests were evaluated in the following discrete intervals between 33 and 94 feet: 33-42 feet, 42-48 feet, 48-52 feet, 52-58 feet, 58-62 feet, 62-69 feet, 69-72 feet, 72-76 feet, 76-79 feet, 79-88 feet, and 88-94 feet. The resulting data yielded specific discharges in the aquifer of 0.24 to 0.42 ft/day. The intervals between 33 and 62 feet experienced increases in horizontal flow velocity of 13% to 79%, while the intervals at 62 to 69 and 69 to 72 feet displayed a 102% and 146% increase, respectively. The intervals between 72 and 94 feet did not display observable horizontal flow under ambient flow conditions, but were "opened" by the stress imposed by pumping. In summary, the data suggest that the intervals from 33 to 72 feet in well GLA-7 have a significant hydraulic connection to pumping well GMP-2. For this well pair, then, the "capture radius" extends at least 167 feet in the horizontal direction and 60 feet vertically into the aquifer (i.e., the distance between the depth of the piezometric surface, 35 feet, and the lower-bound depth of the transmissive interval, 94 feet).

For the cross-hole test in which GMW-4 was the pumping well and GLA-8 was the observation well, COLOG concluded that significant change occurred at numerous zones over the interval from 70 to 90 feet, and at a discrete interval at a depth of 178 to 182 feet. The results of the cross-hole test for the 70 to 90 feet inflow zone were evaluated as four discrete intervals – 70-75, 75-80, 80-85, and 85-90 feet. These data yield a range in specific discharge in the aquifer from 0.27 to 0.29 ft/day (this same interval was a zone of outflow from the borehole under ambient flow conditions, so calculation of a percent increase rate in flow is not meaningful). The inflow at the 178 to 182 feet interval under cross-hole pumping conditions was 19% larger than under ambient flow conditions. These data suggest that the "capture radius" of this well pair extends at least 30 feet in the horizontal direction and 120 feet vertically into the aquifer (i.e., the distance between the depth of the piezometric surface, 62 feet, and the lower-bound depth of the lower transmissive interval, 182 feet).

As stated above, all three cross-hole tests documented hydraulic connectivity between the pumping and the observation wells. Based on the 167-foot capture radius documented by the pair GMP-2/ GLA-7, an initial assumption of monitoring wells spaced at an average spacing of 300 feet may be reasonably expected to detect potential groundwater impacts under the proposed landfill. However, additional cross-hole testing would be performed in the dedicated monitoring wells to confirm the extent of their capture zones, and the spacing between the wells reduced or extended based on the pumping test data.

2.2.3 Groundwater Pumping Tests

To further characterize the hydraulic properties of the bedrock aquifer, GLA conducted two pumping tests in November and December 2000 (GLA, 2001). The first test was performed at the toe of the canyon, pumping in well GLA-3 over a period of 27 hours at a constant rate of 10 gpm, while measuring changes in drawdown in observation wells GMW-1 (51 feet away) and GLA-13 (200 feet away). The second test was conducted further up the canyon in fractured bedrock below the zone of weathering, pumping from well GLA-8 over a period of 24 hours while observing drawdown in well GMW-4, located 21 feet away. A summary of the pumping test results is provided in Table 2-2 and the pumping test data is provided in Attachment 4.

Results from the first pumping test at well GLA-3 indicate that while pumping at 10 gallons per minute (gpm), approximately 9 feet of drawdown was observed in the pumping well GLA-3. Drawdown of nearly 5 feet and 2 feet was measured in the observation wells GMW-1 (at a distance of 51 feet) and GLA-13 (at a distance of 200 feet), respectively. As a result, it is concluded that the wells are in hydraulic communication to a distance of at least 200 feet (to GLA-13), and distance-drawdown analysis indicated an effective radius of influence of approximately 1000 feet from well GLA-3. Average hydraulic conductivities of 2.6E-03 ft/min (1.3E-03 cm/sec) and 4.6E-03 ft/min (2.3E-03 cm/sec) were calculated and used to derive transmissivity values of between 9.5E-02 ft^2/min (1023 gpd/ft) to 2.8E-01 ft^2/min (3016 gpd/ft) from the first pumping test.

Results for the second pumping test at well GLA-8 also showed that these wells are in hydraulic communication through unweathered bedrock. Hydraulic conductivities for well GLA-8 were approximately 6.8E-05 ft/min (3.1E-05 cm/sec) for earlier pumping times and 1.1E-05 ft/min (5.6E-06 cm/sec) for longer times. Similar hydraulic conductivities were calculated for well GWM-4 of 3.4E-04 ft/min (1.7E-04 cm/sec) and 2.1E-04 ft/min (1.07E-04 cm/sec), respectively. Distance-drawdown analysis indicated an effective radius of influence of 250 feet from well GLA-8 when pumping at 2 gpm. Using the calculated hydraulic conductivity values and aquifer thickness estimates, early and late transmissivity values range from 1.2E-02 ft^2/min (129 gpd/ft) to 8.7E-04 ft^2/min (9 gpd/ft).

The lower hydraulic conductivity values obtained from the second pumping test reflect testing within the unweathered, fractured bedrock compared with the first pumping test performed at the toe of the canyon where there is a thicker weathered bedrock below alluvial/colluvial portions of the aquifer that may be recharging the underlying fractured bedrock.

2.3 CONFIGURATION OF THE WATER TABLE (PIEZOMETRIC SURFACE)

Both a water table and a piezometric surface describe the occurrence of groundwater in Gregory Canyon. A piezometric surface represents the hydrostatic pressure head above any point in the subsurface. The 'dry well' shown in Figure 2-5 illustrates the case where no water-bearing fractures are encountered in the screened interval, thus no water is produced in the well, although the well access does lie below the piezometric surface. Therefore, a dry well could indicate that the piezometric level is below the bottom of the well, or it indicates that the borehole did not intersect open fractures (as identified at well GLA-9).

Figure 2-3A shows a contour map of the water table in the alluvial aquifer based on data collected on 12/16/96. This aquifer likely merges with the San Luis Rey alluvial aquifer to the north. Groundwater flow is to the north, under a gradient of about 0.045 ft/ft. Figure 2-3B and Plate 2 present a contour map of the piezometric surface in the bedrock aquifer based on the data from March 2000. Water level measurements recorded for these wells through March 2002 indicate similar configurations of the water table and piezometric surface over time (Table 2-20).

Figure 2-5 presents a qualitative model of the relationship between the alluvial aquifer water table and the bedrock piezometric surface of groundwater flow system; a system in fractured bedrock that is subparellel to the slope gradient. The fracture-controlled groundwater communicates with, and recharges the alluvial water table, which ultimately communicates with the San Luis Rey River valley. The fractured bedrock flow system can be arbitrarily differentiated into an upper zone of flow through a network of interconnected fractures, and a deeper zone of relatively lower flow resulting from more widely spaced fractures.

Using standard contouring and hydrogeologic procedures, the available data suggest northerly groundwater flow dominated by recharge from Gregory Mountain (Figure 2-3B and Plate 2). In the upper reaches of the canyon the gradient is about 0.2 ft/ft to the north. The gradient becomes shallower toward the mouth of the canyon (about 0.1 ft/ft to the north).

Data obtained on September 13, 1999, quarterly in 2000 and monthly in 2001 indicate very little fluctuation in groundwater elevations in wells and as a result, it is concluded that the fractured-rock aquifer piezometric surface is consistent over time and is thus predictable.

Because the landfill excavation will be a minimum of five-feet above the highest anticipated groundwater piezometric surface elevation, the excavation for the landfill will not affect the direction of groundwater flow. Though the landfill is designed above the historical piezometric surface, a subdrain system will still be constructed below the landfill in the unlikely event of a higher than anticipated increase in groundwater elevation. Subdrain design in discussed in more detail in Section 3.1.1, below.

Groundwater recharge could decrease slightly once the landfill is constructed, because the liner system will effectively eliminate infiltration over the footprint area. Assuming a conservative infiltration rate of 1.6 inches per year (about 10 percent of precipitation), it is calculated that this could result in an average decrease in groundwater recharge of 2,960 ft^3/day (about 15 gpm) or 25 acre-feet per year across the site following landfill completion (GLA, 1997).

2.4 GROUNDWATER QUALITY

As described in Section 2.1 above, the project site includes existing agricultural, dairy and cattle grazing uses. Problems associated with dairy operations in the San Diego region include groundwater mineralization, the addition of nitrates to groundwater, surface runoff of biodegradable and suspended material, nuisance odors, the addition of nutrients to adjacent surface water streams and other miscellaneous problems. As a result of historical land uses on the property, agricultural irrigation return water is a major on-site influence on groundwater quality. Agricultural return water is the wastewater which runs off or leaches through an irrigated area and the two major concerns with this water are salt loading and the release of applied chemicals. Since the water supply in the San Diego region is already quite high in salts and the climate is dry, irrigation generally results in salt accumulation in soil. If these salts are not leached out by regularly applying more irrigation water than is needed for evapotranspiration, salts accumulate in the root zone and the land eventually becomes too salty for agriculture. Though saline soils can often be reclaimed by leaching, the percolation of the leach water can result in significant groundwater degradation.

Modern agriculture often relies on extensive use of applied chemicals such as fertilizers, pesticides and herbicides to obtain high crop yields. The release of applied chemicals into surface and groundwater can have adverse effects on the quality of those waters and the beneficial uses supported by them. The application of agricultural chemicals, in some cases, has been linked directly to aquatic toxicity and is suspect in many impaired water bodies. In addition to degradation of the aquatic environment, the contamination of ground and surface waters by pesticides and fertilizers is believed to also pose a threat to human health.

Hanson's sand and gravel quarry is located northeast of the project site. The largest volume of waste from sand and gravel processing operations results from product washing. Many of the sedimentary deposits mined for sand and gravel in the San Diego region contain a high percentage of silt and clay, and extensive washing is required to remove these fine materials. Other waste includes cement truck wash water, sediment separated from the wash water, and rejected product. Recycled wash waters are generally discharged to storage ponds and can contain high concentrations of TDS because of evaporation and leaching from product materials. The percolation of these recycled waters can also adversely affect groundwater quality.

2.4.1 Groundwater Monitoring Results

Initial Water Quality Sampling

In the course of performing the hydrogeologic evaluation for the site, GLA performed a limited water quality evaluation in August 1999. On-site monitoring wells, local residential/production wells and the San Luis Rey River were used to assess the current groundwater quality in the vicinity of the project site. Specifically, samples were obtained from upgradient monitoring wells GLA-4 and GLA-5 and downgradient wells GLA-2, GLA-7 and GLA-10 (Figure 2-3B). Three residential/production wells identified as Residential wells 2, 3 and 4, were also sampled within the San Luis Rey River valley (Figure 2-7). Residential well 2 is located on the west side of the project site near the Verboom residence, Residential well 3 coincides with the SLRMWD well #34, and Residential well 4 (Lucio well #2) is located on the north side of the river on the former Lucio Family Dairy property. The samples were analyzed for the indicator parameters (chloride, nitrate as nitrogen, pH, sulfate, total dissolved solids and volatile organic compounds ([VOCs] by EPA Method 8260). The results of this water quality evaluation are summarized below, and a summary of the water quality analytical data is provided in Table 2-3. Copies of the analytical reports are provided in Attachment 3.

TDS in groundwater samples collected from wells during the August 1999 sampling event ranged from 444 to 992 mg/l. Nitrate as nitrogen concentrations ranged from 0.077 mg/l to 26.2 mg/l. Only the TDS in the groundwater sample from upgradient well GLA-4 (444 mg/l) actually was below the state recommended maximum contaminant level (MCL) of 500 mg/l for drinking water and beneficial groundwater use designation (RWQCB 1994). It should be noted that water delivered by the SDCWA and its member agencies to users throughout the county has typical TDS concentrations ranging between 500 and 700 mg/l, so with respect to this parameter the groundwater resource at Gregory Canyon can be considered typical of San Diego County. Samples collected from upgradient well GLA-5 contained concentrations of nitrate as nitrogen (16.6 mg/l) and sulfate (306 mg/l); both above state recommended MCLs of 10 mg/l and 250 mg/l, respectively (although for sulfate the state provides an upper limit of 500 mg/l under the secondary MCLs). Downgradient well GLA-2 contained the highest concentrations of nitrate as nitrogen (26.2 mg/l) and also exceeded the state and federal MCLs for this constituent. Based on a review of these 1999 groundwater quality data, these results are generally consistent with those obtained from earlier water quality studies (WCC, 1995) and suggest some nitrate impacts locally, likely related to the agricultural/dairy uses of the property.

During the initial August 1999 water quality investigation, a few volatile organic compounds were detected in the water quality samples. The sample from downgradient well GLA-2 contained estimated trace concentrations (i.e., between the laboratory method detection limits and the laboratory reporting limits) of acetone (4.3 micrograms per liter [μg/l]), toluene (0.52 μg/l) and p+m-xylenes (0.69 μg/l). Acetone was also detected in samples from Residential well 4, and the upgradient surface water sample. Acetone is a common solvent used in analytical laboratories and is a likely laboratory contaminant. Toluene and the xylene isomers are commonly associated with gasoline. The measured concentrations of toluene and xylenes are well below state primary MCLs of 150 μg/l and 1750 μg/l, respectively, and although they may suggest low level gasoline impacts, they could also be the result of field- or laboratory-introduced contaminants. Finally, chloroform was measured at a concentration of 1.2 μg/l in the sample from Residential well 4. Since chloroform is used in analytical laboratories and is a common constituent in treated drinking water, it too is a suspected laboratory- or field-introduced contaminant.

Background Water Quality Sampling

In accordance with CCR 27 Section 20415(e)(6), GLA obtained four quarters of groundwater and surface water data from the proposed background monitoring points and wells downgradient of the proposed landfill site to evaluate background water quality values between December 2000 and December 2001. The sampling program included collection of samples from the bedrock aquifer in upgradient (background) wells GLA-4, GLA-5, and GLA-11, and downgradient (point-of-compliance) wells GLA-2, GLA-10, GLA-12, GLA-13, and GLA-14, and from the alluvial aquifer in background (upgradient) well Lucio #2, and downgradient alluvial wells GLA-16, and SLRMWD designated well #34. Samples collected from each of these wells were analyzed for the full suite of constituents of concern (COCs) provided in the Code of Federal Regulations (40 CFR Part 258, Appendix II). Included in this list of compounds are cyanide, sulfide, 20 metals, VOCs, semivolatile organic compounds (SVOCs), chlorinated herbicides, pesticides and polychlorinated biphenyls (PCBs). In addition, samples were submitted for indicator parameters including chloride, nitrate, sulfate, pH, and TDS. Summaries of the analytical results obtained for each groundwater monitoring well are provided on Tables 2-4 through 2-14 and Tables 2-15 and 2-16 present a comparison of the median concentrations of inorganic constituents in groundwater obtained from August 1999 (if available) and the subsequent four sampling rounds. These tables also present the detected organic compounds (averaged when a constituent was detected more than one time) for bedrock aquifer and alluvial aquifer samples, respectively. Copies of the analytical reports are provided in Attachment 3.

In evaluating general water quality, the median values for each constituent were compared with currently established state and federal MCLs and San Diego RWQCB Basin Objectives. Review of the median data indicates similar water quality to the data obtained earlier with concentrations of chloride, TDS and nitrate in some bedrock wells above the upper state MCL, while water quality in the alluvial wells was found to meet state and federal MCLs and the local basin objectives. The following table presents those median concentrations that were found to equal or exceed a currently established state or federal MCL or basin objective.

Bedrock Aquifer Well Exceedances
MCL versus Median Concentration

CONSTITUENT	STANDARD	UPGRADIENT LOCATIONS			DOWNGRADIENT LOCATIONS				
General Chemistry (mg/L):		**GLA-4**	**GLA-5**	**GLA-11**	**GLA-2**	**GLA-10**	**GLA-12**	**GLA-13**	**GLA-14**
Chloride	300(4) / 500(1,3)	NA	NA	NA	450	NA	NA	NA	NA
Nitrate	15(4) / 45(1,3)	NA	18.8	NA	42.9	NA	NA	28.3	15.3
Total Dissolved Solids	900(4) / 1000(2)	NA	1120	NA	1410	NA	NA	1000	NA

NOTES: 1. California Primary Drinking Water Standards.
2. California Secondary Drinking Water Standards – Upper Limit.
3. Federal Maximum Contaminant Levels.
4. Basin Objective – Pala Hydrologic Subarea.
NA – Not Applicable (No exceedance).

In the bedrock aquifer, comparison of the median data across the site indicates that samples from upgradient (background) wells GLA-4 and GLA-11 contained some of the lowest concentrations of most of the general chemistry constituents and several metals. Samples from downgradient well GLA-2 contained several general chemistry and metals at the highest concentrations in the bedrock aquifer wells. The samples from background well GLA-5, located at the head of the canyon, contained elevated concentrations of nitrate and TDS, and the highest concentrations of sulfate and barium compared with the other bedrock aquifer wells. For the alluvial aquifer, the groundwater data is relatively consistent between the three sampled wells, with slightly lower concentrations measured in SLRMWD well #34.

Review of COC data demonstrates that no pesticides or PCBs were detected in groundwater at the Gregory Canyon site, and only one chlorinated herbicide (2,4-D) was identified once and at a trace concentration in the sample from downgradient bedrock well GLA-13. In contrast, several VOCs and SVOCs were detected one or more times in the proposed groundwater monitoring system samples. The majority of the detected VOCs are either common laboratory compounds such as acetone, carbon disulfide, and chloroform, or are constituents in hydrocarbon-based fuel (such as benzene, toluene, ethylbenzene and xylenes). Review of the quality assurance/quality control (QA/QC) blank sample data obtained with the primary samples also indicates measurable VOCs in blank samples including benzene, ethylbenzene, toluene and xylenes in the equipment and field blanks. The majority of the detected SVOCs were phthalates, which are plasticizers commonly attributed to laboratory or field contamination. Because the data obtained to date suggest only sporadic detections of VOCs and SVOCs, those identified are often attributed to laboratory/field-introduced impacts, and there are few on-site sources for these compounds, laboratory or field contamination is suspected. This conclusion will be confirmed during future quarterly sampling events (scheduled to begin following construction and testing of the groundwater monitoring network to be completed in the spring 2004) to obtain a representative database (approximately 16 data points) of background water quality data prior to and during development of the landfill. The monitoring program will include collection of samples from existing bedrock monitoring wells GLA-2, GLA-4, GLA-5, GLA-11, GLA–12, GLA-13, GLA-14, and GWM-1 (also added for additional point of compliance coverage), additional proposed monitoring wells scheduled to be constructed in the spring 2004 (e.g., GLA-A, GLA-B, GLA-C, GLA-D, GLA-3S and GLA-17); existing alluvial well GMW-3, and to be constructed replacement alluvial wells Lucio #2R and SLRMWD#34R; and the surface water sampling points that contain sufficient water. The samples will be tested for the 40 CFR 258 Appendix I list of constituents, excluding metals but including the metal surrogates, calcium, magnesium and sodium. Because the site is located in an agricultural land use area, the samples will also be tested for chlorinated herbicides and pesticides. A discussion of this program is also provided in the Monitoring and Reporting Plan developed specifically for the Gregory Canyon Landfill.

2.4.2 Surface Water Monitoring Results

In addition to groundwater samples, surface water samples were collected in the San Luis Rey River from surface water stations SLRSW-1 (upstream of Gregory Canyon) and SLRSW-2 (downstream of Gregory Canyon). The samples were also analyzed for the full suite of COCs listed within 40 CFR 258, Appendix II, along with the metal surrogates chloride, nitrate, sulfate, pH, and TDS. Summaries of the analytical results obtained for each surface water monitoring station are provided on Tables 2-17 and 2-18. Table 2-19 presents a comparison of the median surface water sample concentrations obtained from August 1999 and four sampling rounds for inorganic constituents and presents the detected organic compounds (averaged when a constituent was detected more than one time). Copies of the analytical reports are provided in Attachment 3.

Comparison of the surface water sample data with currently established state and federal MCLs and surface water basin objectives indicates that only the median TDS concentrations in both surface water samples exceeded the basin objective. Further review of the data indicated very little difference between the median values up and downstream of the canyon. This finding is not surprising considering the relatively undisturbed nature of the area.

2.4.3 Analysis of Potential Impairment to Groundwater

The alluvial valley that forms the Pala groundwater basin has an average width of 2,600 feet and a maximum depth of about 240 feet (average thickness of 150 feet). The groundwater gradient in the basin is approximately 0.004 feet/feet (horizontal displacement of 400 feet to one vertical foot), which is similar to the topographic gradient of the ground surface. Depths to water were estimated to range from less than five feet to approximately 10 feet below ground surface. The average hydraulic conductivity of the alluvial sediments was estimated to be about 80 to 100 feet/day, with higher conductivity materials in the main river channel and lower conductivity materials (8 feet/day) skirting the edges of the valley (Geraghty & Miller, 1988).

The proposed landfill will occupy one of the tributary canyons to the Pala groundwater basin. The western part of the basin is managed by the SLRMWD, which in 1995 requested an assessment of potential impacts of a leachate release from the proposed landfill on the basin. At the request of the SLRMWD, computer model simulations of groundwater flow in the Pala Basin in the vicinity of the proposed landfill were performed and a simulation of the expected groundwater flowpath from the landfill was presented (GLA, 1995). Estimated worst-case leakage from the landfill was modeled as was its affect on identified production wells within the basin. The analysis assumed that the leachate containment systems incorporated in the project design meet the minimum requirements for environmental protection mandated by U.S. and California EPAs.

Using Pala Basin hydrogeologic characterization summary input data, a two-dimensional groundwater flow model was developed using the finite difference computer program Flowpath (Franz and Guiguer, 1992). Constituent transport modeling with the Flowpath computer program is accomplished with the use of particle tracking techniques, which simulate constituents as "particles" that follow the groundwater flowlines. Two conditions were simulated. The first simulated groundwater flow under existing conditions with a worst case leakage through the liner of about 10 gallons per day per acre (1,850 gallons per day for the 185-acre refuse disposal area of the landfill [excluding the transmission pads]) and head conditions in the Pala basin at levels approximately equal to those shown on the Geoscience (1993) hydrogeologic base map. The release is assumed to be a point source and is modeled as an injection well. The second simulation involved a lower groundwater elevation (i.e., a starved basin) approximately 20 feet below ground surface in the southwest corner of the basin, as could happen if increased pumping took place during extended drought periods.

The first model showed that steady-state groundwater flow in the Pala basin can be reasonably assumed to follow the topography, with flow lines following the general trend of the river (Figure 2-6A). Owing to slightly increased recharge in the vicinity of the river, groundwater velocities are slightly higher immediately adjacent to the trace of the river. Figure 2-6A also shows the predicted pathways of particles potentially released from the landfill. As shown, the particle pathways could extend past wells #41 and #42, and at least 2/3 of a mile from the downgradient boundary of the project property, if the release is allowed to continue under steady state conditions. It should be noted that both of these wells are still within the footprint of the property owned by Gregory Canyon Ltd. On a transient simulation, the particles would need approximately 5.5 years to travel the distance of 2,000 feet between the toe of the landfill and wells #41 and #42, at an average flow velocity of approximately one foot per day. From this point, the particle pathways extend along the southern perimeter of the canyon until the particles intercept a point of constriction within the canyon at the base of the bluff where the Verboom homestead is located. At this point the pathway merges with the underflow of the San Luis Rey River, which would conceivably then carry the particles farther downstream, if no source control were introduced.

Figure 2-6B illustrates the second groundwater flow simulation for the case where groundwater head levels have been reduced by 10 feet in the southwest part of the basin to a level approximately 20 feet below ground surface. As a result of the reduced groundwater head levels in the downgradient part of the model, a steeper groundwater gradient is induced, and slightly higher groundwater flow velocities result. Though there is a resulting change in groundwater flow velocity, the change in the trajectories of particles is very small, as demonstrated by the almost identical particle tracks calculated for the second simulation (Figure 2-6B). Under these conditions, the particles would need approximately 4.9 years to travel the 2,000 feet between the toe of the landfill and wells #41 and #42, at an average flow velocity of approximately 1.1 feet per day. This flow path scenario provides a basis for the location of monitoring wells as part of the detection monitoring program for the Gregory Canyon Landfill.

2.5 ADDITIONAL HYDROGEOLOGIC REFERENCES

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SECTION 2.0

TABLES

TABLE 2-1
WATER WELLS WITHIN ONE MILE OF
THE GREGORY CANYON LANDFILL

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TABLE 2-1
WATER WELLS WITHIN ONE MILE OF THE GREGORY CANYON LANDFILL*

Well Location (T/R/Sec.)	Well Owner	Owner Address	Depth (ft.) To		Screened Material	Drilling Method	Well					Name of Driller	Date of Construction	Use of Well
			First Water	Static Water			Casing Diameter	Casing Material	Well Seal	Slot Size	Perforation Interval			
T9S, R2W, Sec 28L2S	Chuck U: Hlein	Pala, CA 92059	NA	12	Alluvium	Rotary	12" (0-77')	Steel	Cement	Mill Slot	27-77'	Fain, Valley Center	9/14/72	Irrigation
T9S, R2W, Sec 28L3S	Norris Patton	Pala, CA 92059	NA	12	Alluvium	Rotary	12" (0-62')	Steel	Cement	Mill Slot	32-62'	Fain, Valley Center	9/18/72	Irrigation
T9S, R2W, Sec. 28N2	James Brackett	Pala, CA 92059	8	8	Alluvium	NA	10" (to 62')	Steel	NA	1/8x1-1/2"	NA	Vaughn Maynard & Sons, Santa Ana	11/28/52	NA
T9S, R2W, Sec. 28	Pala Rey Youth Camp	Bellflower, CA 90706	NA	NA	Alluvium	Rotary	10-3/4" (3-104')	Steel	Cement to 40'	5/32 x 2-1/2"	45-103'	Multi Water Systems, Escondido	12/28/82	Community
T9S, R2W, Sec. 29R1	J.C. Marthen	Pala, CA 92059	6	6	Alluvium	Cable	8" (0-59'), 12" (0-59')	Steel	Neat Cement	1/8 x 2-1/2"	8" (50-59'), 12" (10-46')	Acme, Valley Center	1/9/67	Irr./Dom.
T9S, R2W, Sec. 29	Mordigan Nurseries	Lawndale, CA 92060	30	18	Bedrock	Air	8" (0-20')	Steel	Cement to 20'	None	None	Fain, Valley Center	1/24/81	Irrigation
T9S, R2W, Sec. 29	Roy Goran	Fallbrook CA 92028	125	100+	Bedrock	Air	8" (0-20')	Steel	Cement to 20'	NA	None	Fain, Valley Center	7/10/79	Test
T9S, R2W, Sec. 29	Ben Anderson	Pala CA 92059	NA	17	Alluvium	NA	19.5"(0-20'), 10.25"(20-30'), 10"(30-70')	Steel	Cement to 30'	0.070	30-70	Acme, Escondido	7/17/92	Irrigation
T9S, R2W, Sec. 29	Ben Anderson	Pala CA 92059	NA	15	Alluvium	NA	8.125" (0-20'), 8.249" (20-65')	Steel	Cement to 20'	0.060	25-65	Acme, Escondido	10/17/95	Irrigation
T9S, R2W, Sec. 30	Eden Rose Farms	Fallbrook CA 92028	65	NA	Bedrock	Rotary	8"(1-63'), 6.25" (0-112')	Steel	Sand/Cmt Slurry	NA	NA	3D, Temecula	4/28/92	Irrigation
T9S, R2W, Sec. 30	Stephen Ciko	Huntington Beach CA 92649	35	25	Bedrock	Rotary	10" (0-23'), 8" (0-91')	Steel	Cement to 20'	NA	30-40', 80-90'	Fain, Valley Center	7/27/93	Irrigation
T9S, R2W, Sec. 30	Peter Glusac	Fallbrook CA 92028	NA	85	Bedrock	Air Rotary	8" (0-20')	Steel	Bentonite to 20'	NA	NA	Stehly Bros. Valley Center	8/7/98	Irrigation
T9S, R2W, Sec. 30	Jim Rostvet	Poway, CA 92064	NA	NA	Bedrock	Air	12.75"(0-20')	Steel	Cement to 20'	Open	None	Acme, Escondido	3/5/99	Domestic
T9S, R2W, Sec. 31R01	Bill Verboom	Buena Park, CA	NA	14	Alluvium	Rotary	8" (2-70')	Steel	NA	1/8 x 2"	30-66'	Burt's, El Cajon	8/4/66	Other
T9S, R2W, Sec. 31	Hodge Brothers	Pala CA 92059	NA	NA	Alluvium	Rotary	16" (0-50'), 10.75" (0-101')	Steel	Cement to 50'	see Notes	53-101	American, Aguanga	7/7/78	Ag./Comm.
T9S, R2W, Sec. 31	Hodge Brothers	Pala CA 92059	NA	NA	Bedrock	Air	6-5/8" (0-230')	Steel	Cement to 50'	1/8 x 2-1/2"	65-190, 210-230	American, Aguanga	3/4/81	Irr./ Dairy
T9S, R2W, Sec. 31	Hodge Brothers	Pala CA 92059	NA	NA	Bedrock	Rotary	6-5/8" (0-238')	Steel	Cement to 50'	1/8 x 2-1/2"	70-238	American, Aguanga	3/18/81	Irr./ Dairy
T9S, R2W, Sec. 31	Hodge Brothers	Pala CA 92059	40	25	Bedrock	Rotary	6-5/8" (0-441')	Steel	Cement to 59'	1/8 x 2-1/2"	84-291', 307-330', 350-368'	American, Aguanga	5/6/81	Dom./ Dairy
T9S, R2W, Sec. 31P03	Hodge Brothers	Pala CA 92059	15	20	Bedrock	Air	6-5/8" (0-268')	Steel	Cement to 50'	1/8 x 2-1/2"	105-266	American, Aguanga	1/26/83	Dom./Dairy
T9S, R2W, Sec. 31	Hodge Brothers	Pala CA 92059	NA	NA	Bedrock	Rotary	6-5/8" (0-204')	Steel	Cement to 50'	1/8 x 2-1/2"	62-162	American, Aguanga	2/9/83	Dairy
T9S, R2W, Sec. 31	Harold White	Fallbrook CA 92028	NA	45	Bedrock	Air Rotary	8"(0-20'), 4.5"(0-300')	Steel/PVC	Cement to 20'	0.032	0-300'	Bob Beeman, Ramona	9/25/92	Irrigation
T9S, R2W, Sec. 31	Ron & Linda Williams	Fallbrook CA 92028	NA	30	Bedrock	Air Rotary	8" (0-136')	Steel	Bentonite to 136'	NA	NA	Stehly Bros. Valley Center	8/6/98	Irrigation
T9S, R2W, Sec. 31	Ron & Linda Williams	Fallbrook CA 92028	70	40	Bedrock	Air Rotary	8" (0-141')	Steel	Bentonite to 20'	1/4"	81-141"	Stehly Bros. Valley Center	4/20/99	Irrigation
T9S, R2W, Sec. 32	Pete Verboom	Pala CA 92059	NA	6	Alluvium	Rotary	8" (0-80')	Steel	Cement to 40'	Johnson SS	55-65'	American, Aguanga	7/11/80	Dom./Comm.
T9S, R2W, Sec. 32L1	Joe Lucio Dairy	Pala CA 92059	NA	NA	Alluvium	NA	10" (0-69')	Steel	NA	NA	NA	NA	1959	Domestic
T9S, R2W, Sec. 32M1S	Joe Lucio Dairy	Pala CA 92059	30	13	Alluvium	Cable	10" (0-60')	Steel	Cement	1/4x2", 0.070"	1/4x2" (30-39'),0.070" (60-67')	Acme, Valley Center	1/27/75	Domestic
T9S, R2W, Sec. 32	SDG&E	Pala CA 92059	NA	13	Alluvium	Rotary	23.5"(0-20'), 12"(20-75')	Steel/SS	Cement to 20'	NA	35-75"	Fain, Valley Center	5/2/95	Irrigation
T9S, R2W, Sec. 33	Pala Rey Youth Camp	Bellflower, CA 90706	8	8	Alluvium	Rotary	8-5/8" (0-80')	Steel	Concrete to 40'	1/2 x 3"	40-80	Howard Pump, Inc., Barstow	7/5/78	Youth Camp
T9S, R2W, Sec. 33	Pala Rey Youth Camp	Bellflower, CA 90706	86	NA	Bedrock	Rotary	6" (0-191')	Plastic	Cement to 50'	1/4"	131-191	Multi Water Systems, Escondido	10/24/79	Domestic
T10S, R2W, Sec. 4	R.W. Zarvell	Valley Center, 92082	88	NA	Bedrock	Air Rotary	6-5/8" (2-37')	Steel	Cement to 37"	NA	NA	Multi Water Systems, Escondido	10/30/82	Domestic
T10S, R2W, Sec. 5D01	Bill Verboom	Buena Park, CA	NA	12	Alluvium	Rotary	8" (2-80')	Steel	NA	1/8 x 2"	40-80'	Burt's, El Cajon	8/8/66	Irrigation
T10S, R2W, Sec. 5	Russell Hunt	Valley Center, 92082	92	30	Bedrock	Air	8" (0-22'), 6" (0-50'), 4" (0-350')	Steel/PVC	Cement to 20'	1/8 x 6"	NA	Fain, Valley Center	12/3/77	Domestic
T10S, R2W, Sec. 5	Pioneer Developers	Fallbrook CA 92028	20	12	Alluvium	Rotary	8" (0-107')	Steel	Cement to 20'	3/32 x 2-1/2"	21-61	Fain, Valley Center	12/1/78	Irrigation
T10S, R2W, Sec. 5	Marshall R. Urist, M.D.	Los Angeles, CA 90024	27	6	Bedrock	Air	8" (0-26'), 4" (0-100')	Steel	Cement to 26'	NA	NA	Acme, Escondido	11/6/85	Irrigation
T10S, R2W, Sec. 6A1	Bill Verboom	Pala CA 92059	6	9	Alluvium	Cable	24" (0-51'), 8" (0-67')	Steel	Concrete	0.100"	56-67'	Acme, Valley Center	7/23/69	Domestic
T10S, R2W, Sec. 6B2	Pala Rey Ranch	Pala CA 92059	0	8	Alluvium	Rotary	6" (0-62')	Steel	Cement	0.040 SS-304	40-60'	Fain, Valley Center	9/15/77	Irrigation
T10S, R2W, Sec. 6	Pala Rey Ranch	Pala CA 92059	NA	10	Alluvium	Rotary	20" (0-20'), 10" (0-92')	Steel	Cement	0.050 SS	50-70'	Fain, Valley Center	12/11/78	Irrigation
T10S, R2W, Sec. 6	NPI Calif.	Perris, CA 92370	12	8	Alluv./Bdrk.	Rotary	8" (0-90'), 6" (0-132')	Steel	Cement to 132'	NA	None	Fain, Valley Center	10/17/86	Irrigation
T10S, R2W, Sec. 6	NPI Calif.	Perris, CA 92370	12	10	Alluv./Bdrk.	Rotary	12" (0-115')	Steel	Cement to 115'	NA	None	Fain, Valley Center	11/5/86	Irrigation
T10S, R2W, Sec. 6F6	Robert Pankey	Bonsall, CA 92003	NA	8	Alluvium	Rotary	20" (0-20'), 12" (0-73')	Steel	Cement to 20'	0.050	23-73'	Fain, Valley Center	6/30/78	Irrigation
T10S, R2W, Sec. 7	Isreel J. Kachuck	Santa Ana, CA 92705	10	3	Alluv./Bdrk.	Rotary	12" (0-20'), 8" (0-75')	Steel	Cement to 20'	1/8 x 6"	20-70'	Fain, Valley Center	3/8/85	Irrigation
T10S, R2W, Sec. 8	William J. Nequette	Chatsworth, CA 91311	60	30	Bedrock	Air	7" (0-20')	Steel	Cement to 20'	None	None	Fain, Valley Center	7/31/79	Domestic
T10S, R2W, Sec. 8	George Hamminger	Incline Village, NV 89450	NA	NA	Bedrock	Air Rotary	6" (0-66')	PVC	Cement to 20'	NA	NA	Randazzo, Valley Center	9/28/93	Domestic
T10S, R2W, Sec. 8	Bob Grandon	Valley Center, 92082	NA	10	Bedrock	Air Rotary	8.25" (0-25')	Steel	Cement to 25'	NA	NA	Randazzo, Valley Center	7/26/91	Domestic
T10S, R2W, Sec. 8	Bob Grandon	Valley Center, 92082	NA	100	Bedrock	Air Rotary	6.25" (0-98')	Steel	Cement to 22'	NA	NA	Randazzo, Valley Center	12/13/93	Domestic
T10S, R2W, Sec. 8	Henry Avocado Co.	Escondido, CA 92027	NA	12	Bedrock	Air	12.75"(0-60'), 8.249"(60-123')	Steel	Cement to75'	None	None (open)	Acme, Escondido	5/2/94	Irrigation
T10S, R2W, Sec. 9J1S	Garth Tagge	Pala CA 92059	52	37	Bedrock	Cable	8" (0-79')	Steel	Cement to 20'	6 x 3/16"	48-79'	Acme, Valley Center	6/13/68	Irr./Dom.
T10S, R2W, Sec. 9	Glen L. Oleson	Pala CA 92059	610	500+	Bedrock	Air	8" (0-20')	Steel	Cement to 20'	NA	None	Fain, Valley Center	7/30/80	Irrigation
T10S, R2W, Sec. 9	Dan LaVine	Valley Center, 92082	NA	20	Bedrock	Air Rotary	8" (0-25')	Steel	Cement to 25'	NA	NA	Stehly Bros. Valley Center	12/21/96	Irrigation
T10S, R2W, Sec. 9	Dan LaVine	Valley Center, 92082	NA	20	Bedrock	Air Rotary	8" (0-22')	Steel	Cement to 22'	NA	NA	Stehly Bros. Valley Center	12/27/96	Irrigation
T10S, R2W, Sec. 9	Frank Hill/Kimball Spence	Valley Center, 92082	NA	150	Bedrock	Air Rotary	8" (1-20')	Steel	Cement to 20'	NA	NA	R.R. Beale, Inc., Alpine	1/30/95	Irrigation
T10S, R2W, Sec. 9	John Newhouse	Lake Forrest, IL 60045	60	30	Bedrock	Air	8" (0-30')	Steel	Cement to 30'	NA	None	Fain, Valley Center	2/7/81	Irrigation
T10S, R2W, Sec. 9	John Newhouse	Lake Forrest, IL 60045	52	50	Bedrock	Air	8" (0-85')	Steel	Cement to 20'	1/8 x 6"	50-70	Fain, Valley Center	10/9/82	Irrigation

Notes: *Well locations are presented on Figure 2-2.
NA = Not Available/Not Applicable
Well data provided by State of California Department of Water Resources Water Well Drillers Report

Other Wells - No well log data provided

T9S, R2W, Sec. 28K1S Depth to groundwater - 6 to 29 ft.
T10S, R2W, Sec. 6C2S Depth to groundwater - 5 to 7 ft.
T10S, R2W, Sec. 6F1S Depth to groundwater - 8 to 27 ft.
T10S, R2W, Sec. 6F2S Depth to groundwater - 10 to 58 ft.
T10S, R2W, Sec. 6G1S Depth to groundwater - 5 to 10 ft.

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TABLE 2-2
SUMMARY OF PUMPING TEST RESULTS
GREGORY CANYON LANDFILL

	Well	Distance From Pumping Well (feet)	Aquifer Thickness (feet)	Analytical Method	Data Points	Hydraulic Conductivity (ft/min)	Transmissivity (ft^2/min)	Storativity
Pump Test #1	GLA-3	1	60	Cooper-Jacob, unconfined	late	4.62E-03	2.77E-01	na
		1	na	Cooper-Jacob, confined	late	4.09E-03	2.45E-01	8.87E-08
		1	60	Theis, unconfined	late	2.69E-03	1.61E-01	na
	GMW-1	51	52	Cooper-Jacob, unconfined	late	4.59E-03	2.38E-01	na
		51	na	Cooper-Jacob, confined	late	4.35E-03	2.26E-01	1.28E-04
		51	na	Theis, unconfined	late	4.23E-03	2.20E-01	na
	GLA-13	200	14.5	Cooper-Jacob, unconfined	late	1.33E-02	1.92E-01	na
		200	na	Cooper-Jacob, confined	late	na	1.90E-01	na
		200	14.5	Theis, unconfined	late	1.05E-02	1.52E-01	na
	GLA-3/GMW-1	1, 51	60	Distance-Drawdown, unconfined	t = 1600	3.18E-03	1.91E-01	na
	GLA-3/GLA13	1, 200	60	Distance-Drawdown, unconfined	t = 1600	2.55E-03	1.53E-01	na
	GMW-1/GLA-13	51, 200	52	Distance-Drawdown, unconfined	t = 1600	1.89E-03	9.84E-02	na
	GLA-3, GMW-1, GLA-13	1, 51, 200	60	Distance-Drawdown, unconfined	t = 1600	2.63E-03	1.58E-01	na
Pump Test #2	GLA-8	1	108	Cooper-Jacob, unconfined	late	1.18E-05	1.28E-03	na
		1	na	Cooper-Jacob, confined	late	na	8.68E-04	4.08E-01
		1	108	Cooper-Jacob, unconfined	middle*	6.22E-05	6.72E-03	9.37E-04
		1	na	Cooper-Jacob, confined	middle	na	5.90E-03	7.63E-03
		1	108	Theis, unconfined	mid-late	6.22E-05	6.72E-03	na
	GMW-4	21	46	Cooper-Jacob, unconfined	late	2.06E-04	9.47E-03	na
		21	na	Cooper-Jacob, confined	late	na	8.84E-03	1.00E-03
		21	46	Cooper-Jacob, unconfined	middle	3.41E-04	1.56E-02	na
		21	na	Cooper-Jacob, confined	middle	na	1.62E-02	9.37E-02
		21	46	Theis, unconfined	late	1.46E-04	6.72E-03	na
	GLA-8/GMW-4	1,21	na	Distance-Drawdown, unconfined	t = 600	1.09E-04	1.18E-02	na
	GLA-8/GMW-4	1,21	na	Distance-Drawdown, unconfined	t = 1400	5.72E-05	6.18E-03	na

* Middle data points correspond to early pumping times referred to in text.

Shading indicates values around for MODFLOW analysis.

TABLE 2-3
PROPOSED GREGORY CANYON LANDFILL
DOWNGRADIENT VS. UPGRADIENT MONITORING POINTS
AUGUST 1999

ANALYTE	DOWNGRADIENT LOCATIONS						UPGRADIENT LOCATIONS		SURFACE WATER	
	RES. WELL 2	RES. WELL 3	RES. WELL 4	GLA-2	GLA-7	GLA-10	GLA-4	GLA-5	RIVER UP	RIVER DOWN
GENERAL CHEMISTRY (mg/L):										
Chloride	74	78	91	164	120	120	46	157	86	96
Nitrate (as N)	0.3	**0.077**	0.7	26.2	0.6	7.1	1.0	16.6	**0.098**	0.3
pH (units)	6.98	7.01	6.80	7.10	6.53	6.70	6.42	6.66	7.08	7.40
Sulfate	115	150	168	136	76	63	30	309	84	171
Total Dissolved Solids (TDS)	506	558	671	888	578	608	444	992	585	622
VOLATILE ORGANIC COMPOUNDS (µg/L):										
Acetone	3.0	3.0	**4.9***	**3.0***	3.0	3.0	3.0	3.0	**4.8***	3.0
Chloroform	0.16	0.16	1.2	0.16	0.16	0.16	0.16	0.16	0.16	0.16
p+m-Xylenes	0.30	0.30	0.30	**0.69**	0.30	0.30	0.30	0.30	0.30	0.30
Toluene	0.11	0.11	0.11	**0.52**	0.11	0.11	0.11	0.11	0.11	0.11

NOTES:

Indicates that the analyte was not detected above laboratory practical quantitation limit.
Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

* Suspected laboratory/field contaminant.

TABLE 2-4
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL GLA-2

ANALYTE	UNITS	Aug 1999	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY											
Chloride	mg/L	164	369	450	529	600	450	422	168	164	600
Cyanide	mg/L	NA	0.0063	0.0063	0.0063	0.0006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	26.2	41.8	42.9	42.9	43	42.9	39.4	7.4	26.2	43
pH	units	7.10	7.39	7.37	7.34	7.9	7.37	7.42	0.29	7.10	7.9
Sulfate	mg/L	136	160	150	160	190	160	159	20	136	190
Sulfide	mg/L	NA	0.050	0.050	0.050	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	888	1400	1410	1620	1940	1410	1452	384	888	1940
METALS											
Antimony	mg/L	NA	**0.010**	0.008	0.008	0.00012	NC	NC	NC	NC	NC
Arsénic	mg/L	NA	**0.001**	0.0007	0.0007	**0.0019**	NC	NC	NC	NC	NC
Barium	mg/L	NA	**0.053**	0.0009	0.066	**0.066**	0.07	0.06	0.01	0.053	0.066
Beryllium	mg/L	NA	0.00032	0.00032	0.00032	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	NA	0.004	0.004	0.004	**0.00031**	NC	NC	NC	NC	NC
Calcium	mg/L	NA	120	160	170	180	165	158	26	120	180
Chromium	mg/L	NA	0.004	0.004	0.004	**0.0031**	NC	NC	NC	NC	NC
Cobalt	mg/L	NA	0.002	0.002	0.002	**0.00085**	NC	NC	NC	NC	NC
Copper	mg/L	NA	**0.005**	0.003	0.003	**0.0061**	NC	NC	NC	NC	NC
Lead	mg/L	NA	**0.0004**	**0.0005**	0.004	0.000098	NC	NC	NC	NC	NC
Magnesium	mg/L	NA	71	92	100	96	94	90	13	71	100
Mercury	mg/L	NA	0.00010	0.00010	**0.00013**	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	NA	0.003	0.003	0.003	**0.0066**	NC	NC	NC	NC	NC
Selenium	mg/L	NA	0.003	**0.001**	0.0006	0.012	0.003	0.005	0.006	0.001	0.012
Silver	mg/L	NA	**0.004**	0.003	**0.003**	**0.0018**	0.003	0.0029	0.0011	0.0018	0.004
Sodium	mg/L	NA	200	240	230	240	235	228	19	200	240
Thallium	mg/L	NA	0.020	0.0007	0.0007	0.000063	NC	NC	NC	NC	NC
Tin	mg/L	NA	NA	0.006	0.002	0.000083	NC	NC	NC	NC	NC
Vanadium	mg/L	NA	0.040	0.050	0.040	0.041	0.041	0.043	0.005	0.040	0.050
Zinc	mg/L	NA	0.0085	0.011	**0.0057**	0.022	0.0098	0.0118	0.0071	0.0057	0.022
VOLATILE ORGANIC COMPOUNDS											
Acetone	μg/L	**4.3**[a]	0.5	5.935	5.935	4.2	NC	NC	NC	NC	NC
p+m-Xylenes	μg/L	**0.69**	0.5	NA	NA	0.30	NC	NC	NC	NC	NC
Toluene	μg/L	**0.52**	0.5	0.047	0.047	0.22	NC	NC	NC	NC	NC
Trichlorofluoromethane	μg/L	0.35	0.5	0.13	0.044	0.23	NC	NC	NC	NC	NC
SEMI-VOLATILE ORGANIC COMPOUNDS											
bis(2-Ethylhexyl) Phthalate	μg/L	NA	**1.8**[a]	0.33	NA	2.0	NC	NC	NC	NC	NC
Butylbenzyl Phthalate	μg/L	NA	**0.28**[a]	0.24	NA	2.1	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs (μg/L): ND											

NOTES:

NA = Not Analyzed/Not Applicable

Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

[a] Suspected laboratory/field contaminant.

TABLE 2-5
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL GLA-4

ANALYTE	UNITS	Aug 1999	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY											
Chloride	mg/L	46	68	75	78	78	75	69	13	46	78
Cyanide	mg/L	NA	0.0063	0.0063	0.0063	0.0006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	1.0	1.61	1.50	1.48	1.6	1.50	1.44	0.25	1.0	1.61
pH	units	6.42	7.21	7.22	7.03	7.1	7.1	7.0	0.33	6.42	7.22
Sulfate	mg/L	30	39	38	35	42	38	37	5	30	42
Sulfide	mg/L	NA	0.050	0.050	0.050	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	444	477	453	490	480	477	469	19	444	490
METALS											
Antimony	mg/L	NA	**0.020**	0.008	0.008	**0.00013**	NC	NC	NC	NC	NC
Arsenic	mg/L	NA	0.0007	**0.0009**	0.0007	**0.0012**	NC	NC	NC	NC	NC
Barium	mg/L	NA	**0.030**	0.0009	0.030	**0.028**	0.030	0.029	0.001	0.028	0.030
Beryllium	mg/L	NA	0.00032	0.00032	0.00032	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	NA	0.0004	0.004	0.004	**0.00020**	NC	NC	NC	NC	NC
Calcium	mg/L	NA	58	72	72	71	72	68	7	58	72
Chromium	mg/L	NA	0.0004	0.004	0.004	**0.0071**	NC	NC	NC	NC	NC
Cobalt	mg/L	NA	0.002	0.002	0.002	**0.00044**	NC	NC	NC	NC	NC
Copper	mg/L	NA	**0.008**	0.003	**0.004**	**0.0055**	0.0055	0.0058	0.002	0.004	0.008
Lead	mg/L	NA	**0.0004**	0.0004	0.0004	**0.00019**	NC	NC	NC	NC	NC
Magnesium	mg/L	NA	21	23	22	20	22	22	1	20	23
Mercury	mg/L	NA	0.00010	0.00010	0.00010	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	NA	0.003	0.003	0.020	**0.0047**	NC	NC	NC	NC	NC
Selenium	mg/L	NA	0.0006	**0.0006**	0.0006	**0.0022**	NC	NC	NC	NC	NC
Silver	mg/L	NA	**0.004**	0.003	0.003	0.000098	NC	NC	NC	NC	NC
Sodium	mg/L	NA	68	79	74	77	76	75	5	68	79
Thallium	mg/L	NA	0.020	0.0007	0.0007	0.000063	NC	NC	NC	NC	NC
Tin	mg/L	NA	NA	0.006	0.002	0.000083	NC	NC	NC	NC	NC
Vanadium	mg/L	NA	0.010	0.003	**0.007**	**0.0066**	0.007	0.0079	0.0019	0.0066	0.010
Zinc	mg/L	NA	**0.032**	0.460	0.450	1.200	0.455	0.536	0.486	0.032	1.200
VOLATILE ORGANIC COMPOUNDS											
1,2,4-Trimethylbenzene	µg/L	0.21	0.5	0.078	0.52	NA	NC	NC	NC	NC	NC
1,3,5-Trimethylbenzene	µg/L	0.24	0.5	0.066	**0.21**	NA	NC	NC	NC	NC	NC
Benzene	µg/L	0.25	0.5	0.044	**0.11**	0.18	NC	NC	NC	NC	NC
Ethylbenzene	µg/L	0.17	0.5	0.057	**0.41**	0.18	NC	NC	NC	NC	NC
n-Propylbenzene	µg/L	0.25	0.5	0.053	**0.12**	NA	NC	NC	NC	NC	NC
Naphthalene	µg/L	0.57	0.5	0.094	**0.26**	0.42	NC	NC	NC	NC	NC
tert-Butylbenzene	µg/L	0.16	0.5	0.066	**0.08**	NA	NC	NC	NC	NC	NC
Toluene	µg/L	0.11	0.5	0.047	1.4[a]	0.22	NC	NC	NC	NC	NC
Xylenes (Total)	µg/L	NA	1.0	0.236	2.7	NA	NC	NC	NC	NC	NC
SEMI-VOLATILE ORGANIC COMPOUNDS											
Benzoic Acid	µg/L	NA	0.86	0.86	**2.6**	NA	NC	NC	NC	NC	NC
bis(2-Ethylhexyl) Phthalate	µg/L	NA	**2.4**[a]	0.34	**1.1**[a]	2.0	NC	NC	NC	NC	NC
Butylbenzyl Phthalate	µg/L	NA	0.25	0.25	**0.44**[a]	2.1	NC	NC	NC	NC	NC
Di-n-butyl Phthalate	µg/L	NA	0.25	0.25	**0.36**[a]	2.6	NC	NC	NC	NC	NC
Naphthalene	µg/L	NA	0.25	0.25	**0.29**[a]	3.5	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs (µg/L): ND											

NOTES:

NA = Not Analyzed/Not Applicable

[shaded box] Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

[a] Suspected laboratory/field contaminant.

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TABLE 2-6
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL GLA-5

ANALYTE	UNITS	Aug 1999	Dec 2000	Mar 2001	Jun 2001	Sep 2001	Sep 2001	Dec 2001
GENERAL CHEMISTRY								
Chloride	mg/L	157	156	163	NA	150	150	147
Cyanide	mg/L	NA	0.0063	0.0063	NA	0.0006	0.0006	0.02
Nitrate/Nitrite	mg/L	16.6	18.6	18.8	NA	21	21	NA
Nitrate as Nitrogen	mg/L	NA	NA	NA	NA	NA	NA	1.94
pH	units	6.66	7.09	7.28	NA	6.70	6.7	6.3
Sulfate	mg/L	309	313	317	NA	350	350	203
Sulfide	mg/L	NA	0.050	0.050	NA	0.1	0.1	0.1
Total Dissolved Solids (TDS)	mg/L	992	1030	1000	NA	1120	1130	1650
METALS								
Antimony	mg/L	NA	**0.010**	0.008	NA	0.00012	0.00012	0.01
Arsenic	mg/L	NA	0.0007	0.0007	NA	0.00030	0.00030	0.005
Barium	mg/L	NA	0.150	0.180	NA	0.170	0.170	0.005
Beryllium	mg/L	NA	0.00032	0.00032	NA	0.00042	0.00042	0.002
Cadmium	mg/L	NA	0.004	0.004	NA	0.00012	0.00012	0.04
Calcium	mg/L	NA	93	110	NA	110	100	19.1
Chromium	mg/L	NA	0.004	0.004	NA	**0.0022**	**0.0032**	0.02
Cobalt	mg/L	NA	0.002	0.002	NA	**0.00052**	**0.00051**	NA
Copper	mg/L	NA	0.003	0.003	NA	**0.0022**	**0.0024**	0.005
Lead	mg/L	NA	0.0004	0.0004	NA	**0.00070**	**0.00140**	0.002
Magnesium	mg/L	NA	56	66	NA	58	57	74
Mercury	mg/L	NA	0.00010	0.00010	NA	0.00043	0.00043	0.001
Nickel	mg/L	NA	0.003	0.003	NA	**0.0038**	**0.0039**	0.04
Selenium	mg/L	NA	0.0006	**0.0007**	NA	**0.0016**	**0.0017**	0.005
Silver	mg/L	NA	**0.003**	0.003	NA	**0.00013**	**0.00010**	0.005
Sodium	mg/L	NA	100	120	NA	140	130	165
Thallium	mg/L	NA	0.020	0.0007	NA	0.00063	0.000063	0.01
Tin	mg/L	NA	NA	0.006	NA	0.00083	0.000083	0.05
Vanadium	mg/L	NA	0.020	0.020	NA	0.038	0.038	0.05
Zinc	mg/L	NA	**0.018**	0.089	NA	0.022	0.028	0.01
VOLATILE ORGANIC COMPOUNDS								
Carbon Disulfide	µg/L	0.54	0.5	0.266	0.266	**0.31**[a]	**0.28**[a]	NA
SEMI-VOLATILE ORGANIC COMPOUNDS								
bis(2-Ethylhexyl) Phthalate	µg/L	NA	**1.8**[a]	0.34	NA	2.0	2.0	0.83
HERBICIDES, PESTICIDES, & PCBs (µg/L): ND								

NOTES:
NA = Not Analyzed/Not Applicable
Indicates that the analyte was not detected above laboratory practical quantitation limit.
Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

TABLE 2-6 (CONT'D)
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL GLA-5

ANALYTE	UNITS	Dec 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY							
Chloride	mg/L	150	150	153	6	147	163
Cyanide	mg/L	0.02	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	NA	18.8	19.2	1.9	16.6	21
Nitrate as Nitrogen	mg/L	1.76	NC	NC	NC	NC	NC
pH	units	NA	6.70	6.79	0.35	6.3	7.28
Sulfate	mg/L	179	313	289	69	179	350
Sulfide	mg/L	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	1575	1120	1214	278	992	1650
METALS							
Antimony	mg/L	NA	NC	NC	NC	NC	NC
Arsenic	mg/L	NA	NC	NC	NC	NC	NC
Barium	mg/L	NA	0.170	0.168	0.013	0.150	0.180
Beryllium	mg/L	NA	NC	NC	NC	NC	NC
Cadmium	mg/L	NA	NC	NC	NC	NC	NC
Calcium	mg/L	17.0	97	75	44	17	110
Chromium	mg/L	NA	NC	NC	NC	NC	NC
Cobalt	mg/L	NA	NC	NC	NC	NC	NC
Copper	mg/L	NA	NC	NC	NC	NC	NC
Lead	mg/L	NA	NC	NC	NC	NC	NC
Magnesium	mg/L	68	62	63	7	56	74
Mercury	mg/L	NA	NC	NC	NC	NC	NC
Nickel	mg/L	NA	NC	NC	NC	NC	NC
Selenium	mg/L	NA	0.0016	0.0013	0.0006	0.0007	0.0017
Silver	mg/L	NA	0.0001	0.0011	0.0017	0.000098	0.0030
Sodium	mg/L	158	135	136	24	100	165
Thallium	mg/L	NA	NC	NC	NC	NC	NC
Tin	mg/L	NA	NC	NC	NC	NC	NC
Vanadium	mg/L	NA	0.029	0.029	0.010	0.020	0.038
Zinc	mg/L	NA	0.025	0.039	0.033	0.018	0.089
VOLATILE ORGANIC COMPOUNDS							
Carbon Disulfide	µg/L	NA	NC	NC	NC	NC	NC
SEMI-VOLATILE ORGANIC COMPOUNDS							
bis(2-Ethylhexyl) Phthalate	µg/L	NA	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs (µg/L): ND							

NOTES:

NA = Not Analyzed/Not Applicable

[shaded] Indicates that the analyte was not detected above laboratory practical quantitation limit.
Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

[a] Suspected laboratory/field contaminant.

TABLE 2-7
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL GLA-10

ANALYTE	UNITS	Aug 1999	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY											
Chloride	mg/L	120	142	151	144	140	142	139	12	120	151
Cyanide	mg/L	NA	0.0063	0.0063	0.0063	0.00006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	7.1	6.34	6.59	6.17	5.4	6.34	6.32	0.62	5.4	7.1
pH	units	6.70	7.35	7.30	7.18	7.4	7.30	7.19	0.28	6.70	7.4
Sulfate	mg/L	63	61	62	60	60	61	61	1	60	63
Sulfide	mg/L	NA	0.050	0.050	0.050	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	608	637	587	590	1250	608	734	289	587	1250
METALS											
Antimony	mg/L	NA	**0.009**	0.008	**0.009**	0.00012	NC	NC	NC	NC	NC
Arsenic	mg/L	NA	0.0007	0.0007	0.0007	0.00030	NC	NC	NC	NC	NC
Barium	mg/L	NA	**0.061**	0.0009	0.064	**0.061**	0.061	0.062	0.002	0.061	0.064
Beryllium	mg/L	NA	0.00032	0.00032	0.00032	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	NA	0.004	0.004	0.004	0.00012	NC	NC	NC	NC	NC
Calcium	mg/L	NA	57	68	62	63	63	63	5	57	68
Chromium	mg/L	NA	**0.004**	0.004	0.004	**0.0030**	NC	NC	NC	NC	NC
Cobalt	mg/L	NA	0.002	0.002	0.002	**0.00040**	NC	NC	NC	NC	NC
Copper	mg/L	NA	**0.009**	0.003	0.003	**0.0020**	NC	NC	NC	NC	NC
Lead	mg/L	NA	**0.0006**	0.0004	0.0004	**0.00029**	NC	NC	NC	NC	NC
Magnesium	mg/L	NA	32	39	36	33	35	35	3	32	39
Mercury	mg/L	NA	0.00010	0.00010	0.00010	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	NA	**0.004**	0.003	0.003	**0.0033**	NC	NC	NC	NC	NC
Selenium	mg/L	NA	0.0006	0.0006	0.0006	**0.0024**	NC	NC	NC	NC	NC
Silver	mg/L	NA	**0.005**	0.003	0.003	0.000098	NC	NC	NC	NC	NC
Sodium	mg/L	NA	82	98	88	91	90	90	7	82	98
Thallium	mg/L	NA	0.020	0.0007	0.0007	0.000063	NC	NC	NC	NC	NC
Tin	mg/L	NA	NA	0.006	0.002	0.000083	NC	NC	NC	NC	NC
Vanadium	mg/L	NA	0.030	0.040	0.030	0.031	0.031	0.033	0.005	0.030	0.040
Zinc	mg/L	NA	**0.026**	0.270	0.072	0.700	0.171	0.267	0.307	0.026	0.700
VOLATILE ORGANIC COMPOUNDS (μg/L)											
Carbon Disulfide	μg/L	0.54	0.5	0.266	0.266	5.5[a]	NC	NC	NC	NC	NC
Ethylbenzene	μg/L	0.17	0.5	0.057	**0.07**	0.18	NC	NC	NC	NC	NC
SEMI-VOLATILE ORGANIC COMPOUNDS											
bis(2-Ethylhexyl) Phthalate	μg/L	NA	**2.5**[a]	0.34	**0.59**[a]	2.0	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs (μg/L): ND											

NOTES:

NA = Not Analyzed/Not Applicable

Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

[a] Suspected laboratory/field contaminant.

TABLE 2-8
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL GLA-11

ANALYTE	UNITS	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY										
Chloride	mg/L	177	177	184	180	179	180	3	177	184
Cyanide	mg/L	0.0063	0.0063	0.0063	0.0006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	0.020	0.020	0.32	**0.17**	NC	NC	NC	NC	NC
pH	units	7.61	7.74	7.60	7.4	7.61	7.59	0.14	7.4	7.74
Sulfate	mg/L	82	78	85	94	84	85	7	78	94
Sulfide	mg/L	0.050	0.050	0.050	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	763	733	750	750	750	749	12	733	763
METALS										
Antimony	mg/L	0.008	0.008	0.008	**0.00026**	NC	NC	NC	NC	NC
Arsenic	mg/L	0.004	0.006	0.004	0.004	0.004	0.005	0.001	0.004	0.006
Barium	mg/L	**0.002**	0.0009	**0.0060**	**0.0039**	0.00	0.00	0.00	0.002	0.006
Beryllium	mg/L	0.0003	0.0003	0.0003	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	0.004	0.004	0.004	0.00012	NC	NC	NC	NC	NC
Calcium	mg/L	90	100	98	93	96	95	5	90	100
Chromium	mg/L	0.004	0.004	0.004	**0.0087**	NC	NC	NC	NC	NC
Cobalt	mg/L	0.002	0.002	0.002	**0.00045**	NC	NC	NC	NC	NC
Copper	mg/L	**0.004**	0.003	0.003	**0.0039**	NC	NC	NC	NC	NC
Lead	mg/L	**0.0007**	0.0004	0.0004	0.019	NC	NC	NC	NC	NC
Magnesium	mg/L	27	32	32	31	32	31	2	27	32
Mercury	mg/L	0.00010	0.00010	0.00010	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	**0.004**	0.003	0.020	0.013	0.013	0.012	0.008	0.004	0.020
Selenium	mg/L	0.003	0.0006	0.0006	**0.0015**	NC	NC	NC	NC	NC
Silver	mg/L	0.003	0.003	0.003	0.000098	NC	NC	NC	NC	NC
Sodium	mg/L	91	100	110	120	105	105	13	91	120
Thallium	mg/L	**0.030**	0.0007	0.0007	0.000063	NC	NC	NC	NC	NC
Tin	mg/L	NA	0.006	0.006	0.000083	NC	NC	NC	NC	NC
Vanadium	mg/L	0.003	0.003	**0.0060**	**0.0050**	NC	NC	NC	NC	NC
Zinc	mg/L	**0.0091**	0.00089	0.013	0.024	0.013	0.015	0.008	0.009	0.024
VOLATILE ORGANIC COMPOUNDS										
Carbon Disulfide	µg/L	0.5	0.266	0.266	**0.37**[a]	NC	NC	NC	NC	NC
Ethylbenzene	µg/L	0.5	0.057	**0.09**	0.18	NC	NC	NC	NC	NC
Toluene	µg/L	0.5	**0.13**[a]	**0.25**[a]	0.22	NC	NC	NC	NC	NC
SEMI-VOLATILE ORGANIC COMPOUNDS										
bis(2-Ethylhexyl) Phthalate	µg/L	0.33	6.6[a]	**4.2**[a]	2.0	NC	NC	NC	NC	NC
Butylbenzyl Phthalate	µg/L	0.25	0.25	**0.40**[a]	2.1	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs (µg/L): ND										

NOTES:

NA = Not Analyzed/Not Applicable

[shaded] Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

[a] Suspected laboratory/field contaminant.

TABLE 2-9
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL GLA-12

ANALYTE	UNITS	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY										
Chloride	mg/L	115	117	119	120	118	118	2	115	120
Cyanide	mg/L	0.0063	0.0063	0.0063	0.0006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	0.24	0.28	0.28	**0.1**	0.26	0.23	0.09	0.1	0.28
pH	units	7.38	7.42	7.16	6.9	7.27	7.22	0.24	6.9	7.42
Sulfate	mg/L	38	39	38	46	39	40	4	38	46
Sulfide	mg/L	0.050	0.050	0.050	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	517	490	520	510	514	509	14	490	520
METALS										
Antimony	mg/L	**0.020**	0.008	0.008	0.00012	NC	NC	NC	NC	NC
Arsenic	mg/L	0.0007	0.0007	0.0007	**0.00045**	NC	NC	NC	NC	NC
Barium	mg/L	**0.020**	0.0009	0.020	**0.017**	0.020	0.019	0.002	0.017	0.020
Beryllium	mg/L	0.0003	0.0003	0.0003	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	0.004	0.004	0.004	0.00012	NC	NC	NC	NC	NC
Calcium	mg/L	42	47	49	48	48	47	3	42	49
Chromium	mg/L	**0.005**	0.004	0.004	**0.0036**	NC	NC	NC	NC	NC
Cobalt	mg/L	0.002	0.002	0.002	**0.00027**	NC	NC	NC	NC	NC
Copper	mg/L	**0.008**	0.003	0.003	**0.0052**	NC	NC	NC	NC	NC
Lead	mg/L	**0.002**	0.0004	0.0004	**0.00010**	NC	NC	NC	NC	NC
Magnesium	mg/L	26	29	30	27	28	28	2	26	30
Mercury	mg/L	0.00010	0.00010	0.00010	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	**0.004**	0.003	0.003	**0.0025**	NC	NC	NC	NC	NC
Selenium	mg/L	0.0006	**0.0007**	0.0006	**0.0023**	NC	NC	NC	NC	NC
Silver	mg/L	**0.006**	0.003	0.003	0.000098	NC	NC	NC	NC	NC
Sodium	mg/L	74	86	88	86	86	84	6	74	88
Thallium	mg/L	0.020	0.0007	0.0007	0.000063	NC	NC	NC	NC	NC
Tin	mg/L	NA	0.006	0.006	0.000083	NC	NC	NC	NC	NC
Vanadium	mg/L	0.030	0.030	0.030	0.028	0.030	0.030	0.001	0.028	0.030
Zinc	mg/L	**0.016**	0.00089	0.010	**0.0072**	0.010	0.011	0.004	0.007	0.016
VOLATILE ORGANIC COMPOUNDS										
Carbon Disulfide	µg/L	0.5	0.266	0.266	**0.3**[a]	NC	NC	NC	NC	NC
SEMI-VOLATILE ORGANIC COMPOUNDS										
bis(2-Ethylhexyl) Phthalate	µg/L	**0.35**[a]	0.33	**0.79**[a]	2.0	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs (µg/L): ND										

NOTES:
NA = Not Analyzed/Not Applicable
Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.
NC No calculation performed. Requires a minimum of three data entries.
[a] Suspected laboratory/field contaminant.

TABLE 2-10
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL GLA-13

ANALYTE	UNITS	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY										
Chloride	mg/L	127	290	269	260	265	237	74	127	290
Cyanide	mg/L	0.0063	0.0063	0.0063	0.0006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	25.9	28.5	29.3	28	28.3	27.9	1.5	25.9	29.3
pH	units	7.49	7.24	7.19	6.7	7.22	7.16	0.33	6.7	7.49
Sulfate	mg/L	119	129	137	130	130	129	7	119	137
Sulfide	mg/L	0.050	0.050	0.050	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	885	1010	990	1120	1000	1001	96	885	1120
METALS										
Antimony	mg/L	0.008	0.008	**0.010**	0.00012	NC	NC	NC	NC	NC
Arsenic	mg/L	0.002	0.0007	0.0007	**0.00098**	NC	NC	NC	NC	NC
Barium	mg/L	**0.020**	0.0009	0.079	**0.073**	0.073	0.057	0.032	0.020	0.079
Beryllium	mg/L	0.0003	0.0003	0.0003	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	0.004	0.004	0.004	0.00012	NC	NC	NC	NC	NC
Calcium	mg/L	67	100	100	110	100	94	19	67	110
Chromium	mg/L	0.004	0.004	0.004	**0.0056**	NC	NC	NC	NC	NC
Cobalt	mg/L	0.002	0.002	0.002	**0.00055**	NC	NC	NC	NC	NC
Copper	mg/L	0.003	0.003	0.003	**0.0028**	NC	NC	NC	NC	NC
Lead	mg/L	**0.0006**	**0.0004**	0.00040	#######	NC	NC	NC	NC	NC
Magnesium	mg/L	39	65	65	62	64	58	13	39	65
Mercury	mg/L	0.00010	0.00010	0.00010	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	0.003	0.003	**0.0030**	**0.0062**	NC	NC	NC	NC	NC
Selenium	mg/L	0.003	**0.0008**	0.0006	**0.0037**	NC	NC	NC	NC	NC
Silver	mg/L	0.003	0.003	0.003	#######	NC	NC	NC	NC	NC
Sodium	mg/L	110	130	130	140	130	128	13	110	140
Thallium	mg/L	0.020	0.0007	0.0007	#######	NC	NC	NC	NC	NC
Tin	mg/L	NA	0.006	0.006	#######	NC	NC	NC	NC	NC
Vanadium	mg/L	0.020	0.030	0.030	0.032	0.030	0.028	0.005	0.020	0.032
Zinc	mg/L	**0.021**	0.047	0.047	0.053	0.047	0.042	0.014	0.021	0.053
VOLATILE ORGANIC COMPOUNDS										
Carbon Disulfide	μg/L	0.5	0.266	0.266	**0.35**[a]	NC	NC	NC	NC	NC
SEMI-VOLATILE ORGANIC COMPOUNDS										
bis(2-Ethylhexyl) Phthalate	μg/L	**0.99**[a]	0.33	**0.67**[a]	2.0	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs										
2,4-D	μg/L	0.16	0.16	0.16	**0.17**	NC	NC	NC	NC	NC

NOTES:

NA = Not Analyzed/Not Applicable

(shaded) Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

[a] Suspected laboratory/field contaminant.

TABLE 2-11
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL GLA-14

ANALYTE	UNITS	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY										
Chloride	mg/L	159	160	155	160	160	159	2	155	160
Cyanide	mg/L	0.0063	0.0063	0.0063	0.0006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	15.6	15.5	15.1	14	15.3	15.1	0.7	14	15.6
pH	units	7.47	7.56	7.29	6.8	7.38	7.28	0.34	6.8	7.56
Sulfate	mg/L	74	70	75	71	73	73	2	70	75
Sulfide	mg/L	0.050	0.050	0.25	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	697	667	667	730	682	690	30	667	730
METALS										
Antimony	mg/L	**0.010**	0.008	0.008	0.00012	NC	NC	NC	NC	NC
Arsenic	mg/L	0.0007	**0.0009**	0.0007	**0.0014**	NC	NC	NC	NC	NC
Barium	mg/L	**0.096**	0.120	0.130	0.110	0.12	0.11	0.01	0.096	0.13
Beryllium	mg/L	0.0003	0.0003	0.0003	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	0.004	0.004	0.004	0.00012	NC	NC	NC	NC	NC
Calcium	mg/L	69	82	75	73	74	75	5	69	82
Chromium	mg/L	0.004	0.004	0.004	**0.0038**	NC	NC	NC	NC	NC
Cobalt	mg/L	0.002	0.002	0.002	**0.00035**	NC	NC	NC	NC	NC
Copper	mg/L	**0.007**	0.003	0.003	**0.0014**	NC	NC	NC	NC	NC
Lead	mg/L	0.004	**0.0004**	0.004	0.000098	NC	NC	NC	NC	NC
Magnesium	mg/L	39	46	43	38	41	42	4	38	46
Mercury	mg/L	0.00010	0.00010	0.00010	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	0.003	0.003	**0.004**	**0.0067**	NC	NC	NC	NC	NC
Selenium	mg/L	0.0006	**0.0008**	0.0006	**0.0032**	NC	NC	NC	NC	NC
Silver	mg/L	0.003	0.003	0.003	0.000098	NC	NC	NC	NC	NC
Sodium	mg/L	84	100	92	94	93	93	7	84	100
Thallium	mg/L	0.020	0.0007	0.0007	0.000063	NC	NC	NC	NC	NC
Tin	mg/L	NA	0.006	**0.003**	0.000083	NC	NC	NC	NC	NC
Vanadium	mg/L	0.030	0.030	0.030	0.025	0.030	0.029	0.003	0.025	0.030
Zinc	mg/L	**0.012**	0.00089	**0.0092**	**0.0054**	0.0092	0.0089	0.0033	0.0054	0.012
VOLATILE ORGANIC COMPOUNDS										
Carbon Disulfide	μg/L	0.5	0.266	0.266	**0.31**[a]	NC	NC	NC	NC	NC
SEMI-VOLATILE ORGANIC COMPOUNDS										
bis(2-Ethylhexyl) Phthalate	μg/L	0.33	0.33	**1.2**[a]	2.0	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs (μg/L): ND										

NOTES:

NA = Not Analyzed/Not Applicable

[shaded] Indicates that the analyte was not detected above laboratory practical quantitation limit.
Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

TABLE 2-12
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL GLA-16

ANALYTE	UNITS	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY										
Chloride	mg/L	105	104	109	110	107	107	3	104	110
Cyanide	mg/L	0.0063	0.0063	0.0063	0.0006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	6.24	5.90	6.60	7.1	6.42	6.46	0.51	5.90	7.1
pH	units	7.50	7.52	7.49	7.0	7.50	7.38	0.25	7.0	7.52
Sulfate	mg/L	109	98	108	120	109	109	9	98	120
Sulfide	mg/L	0.050	0.050	0.050	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	690	620	683	750	687	686	53	620	750
METALS										
Antimony	mg/L	**0.010**	0.008	0.008	0.00012	NC	NC	NC	NC	NC
Arsenic	mg/L	**0.001**	**0.002**	**0.001**	**0.0014**	0.0012	0.0014	0.0005	0.001	0.002
Barium	mg/L	**0.061**	0.0009	0.081	**0.075**	0.08	0.07	0.01	0.061	0.081
Beryllium	mg/L	0.0003	0.0003	0.0003	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	0.004	0.004	0.004	0.00012	NC	NC	NC	NC	NC
Calcium	mg/L	76	77	85	82	80	80	4	76	85
Chromium	mg/L	**0.0050**	0.004	0.004	**0.0088**	NC	NC	NC	NC	NC
Cobalt	mg/L	0.002	0.002	0.002	**0.00039**	NC	NC	NC	NC	NC
Copper	mg/L	**0.0040**	0.003	0.003	**0.0012**	NC	NC	NC	NC	NC
Lead	mg/L	**0.0005**	**0.0005**	0.00040	0.000098	NC	NC	NC	NC	NC
Magnesium	mg/L	36	37	41	36	37	38	2	36	41
Mercury	mg/L	0.00010	0.00010	0.00010	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	0.003	0.003	0.003	**0.0029**	NC	NC	NC	NC	NC
Selenium	mg/L	0.003	**0.0006**	0.0006	**0.0018**	NC	NC	NC	NC	NC
Silver	mg/L	0.003	0.003	0.003	0.000098	NC	NC	NC	NC	NC
Sodium	mg/L	72	74	81	80	77	77	4	72	81
Thallium	mg/L	**0.020**	0.0007	0.0007	0.000063	NC	NC	NC	NC	NC
Tin	mg/L	NA	0.006	0.006	0.000083	NC	NC	NC	NC	NC
Vanadium	mg/L	0.030	0.030	0.030	0.029	0.030	0.030	0.001	0.029	0.030
Zinc	mg/L	**0.0073**	0.00089	**0.0012**	**0.0044**	0.0044	0.0043	0.0031	0.0012	0.0073
VOLATILE ORGANIC COMPOUNDS										
Carbon Disulfide	µg/L	0.5	0.266	0.266	**0.32**[a]	NC	NC	NC	NC	NC
SEMI-VOLATILE ORGANIC COMPOUNDS										
Acenaphthene	µg/L	0.23	**0.31**	0.36	2.9	NC	NC	NC	NC	NC
bis(2-Ethylhexyl) Phthalate	µg/L	0.33	0.33	**0.81**[a]	2.0	NC	NC	NC	NC	NC
Hexachlorobenzene	µg/L	0.27	**0.67**	0.27	2.4	NC	NC	NC	NC	NC
Pyrene	µg/L	0.23	**0.60**	0.23	1.7	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs										
beta-BHC	µg/L	0.0076	0.0011	0.0011	0.01	NC	NC	NC	NC	NC

NOTES:

NA = Not Analyzed/Not Applicable

(shaded) Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

TABLE 2-13
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL LUCIO-2

ANALYTE	UNITS	Aug 1999	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY											
Chloride	mg/L	91	94	91	103	100	94	96	5	91	103
Cyanide	mg/L	NA	0.0063	0.0063	0.0063	0.0006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	0.7	0.42	1.40	0.57	1.0	0.7	0.82	0.39	0.42	1.40
pH	units	6.80	7.35	7.51	7.35	7.2	7.35	7.24	0.27	6.80	7.51
Sulfate	mg/L	168	147	134	159	160	159	154	13	134	168
Sulfide	mg/L	NA	0.050	0.050	0.050	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	671	657	610	667	680	667	657	28	610	680
METALS											
Antimony	mg/L	NA	0.008	0.008	0.008	0.00012	NC	NC	NC	NC	NC
Arsenic	mg/L	NA	0.007	**0.001**	0.0007	**0.00066**	NC	NC	NC	NC	NC
Barium	mg/L	NA	0.110	0.120	0.110	0.100	0.110	0.110	0.008	0.100	0.120
Beryllium	mg/L	NA	0.0003	0.0003	0.0003	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	NA	0.004	0.004	0.004	0.00012	NC	NC	NC	NC	NC
Calcium	mg/L	NA	86	98	94	97	96	94	5	86	98
Chromium	mg/L	NA	0.004	0.004	**0.0040**	0.00012	NC	NC	NC	NC	NC
Cobalt	mg/L	NA	0.002	0.002	0.002	**0.00059**	NC	NC	NC	NC	NC
Copper	mg/L	NA	**0.007**	0.003	**0.006**	**0.0057**	0.006	0.0062	0.0007	0.0057	0.007
Lead	mg/L	NA	**0.0007**	**0.0006**	**0.0007**	0.000098	0.0007	0.0007	0.0001	0.0006	0.0007
Magnesium	mg/L	NA	30	35	34	32	33	33	2	30	35
Mercury	mg/L	NA	0.00010	0.00010	0.00010	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	NA	0.003	0.003	0.003	**0.0038**	NC	NC	NC	NC	NC
Selenium	mg/L	NA	0.0006	**0.0006**	0.0006	**0.0018**	NC	NC	NC	NC	NC
Silver	mg/L	NA	0.003	0.003	**0.005**	0.000098	NC	NC	NC	NC	NC
Sodium	mg/L	NA	60	68	67	72	68	67	5	60	72
Thallium	mg/L	NA	0.020	0.0007	0.0007	0.000063	NC	NC	NC	NC	NC
Tin	mg/L	NA	NA	0.006	0.006	0.000083	NC	NC	NC	NC	NC
Vanadium	mg/L	NA	0.010	0.010	0.010	0.014	0.010	0.011	0.002	0.010	0.014
Zinc	mg/L	NA	**0.021**	0.0009	**0.0090**	**0.0085**	0.0090	0.0128	0.0071	0.0085	0.021
VOLATILE ORGANIC COMPOUNDS											
Acetone	µg/L	**4.9**[a]	0.5	5.935	5.935	4.2	NC	NC	NC	NC	NC
Chloroform	µg/L	1.2	0.98	0.164	0.164	0.28	NC	NC	NC	NC	NC
SEMI-VOLATILE ORGANIC COMPOUNDS											
bis(2-Ethylhexyl) Phthalate	µg/L	NA	0.33	0.33	**0.62**[a]	2.0	NC	NC	NC	NC	NC
Hexachlorobutadiene	µg/L	NA	**0.64**	0.36	0.36	3.6	NC	NC	NC	NC	NC
Pyrene	µg/L	NA	**0.27**	0.23	0.23	1.7	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs (µg/L): ND											

NOTES:

NA = Not Analyzed/Not Applicable

(shaded) Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

[a] Suspected laboratory/field contaminant.

TABLE 2-14
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - MONITORING WELL MWD-34

ANALYTE	UNITS	Aug 1999	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY											
Chloride	mg/L	78	75	81	78	78	78	78	2	75	81
Cyanide	mg/L	NA	0.0063	0.0063	0.0063	0.0006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	**0.077**	0.020	0.020	0.020	**0.04**	NC	NC	NC	NC	NC
pH	units	7.01	7.64	7.69	7.66	6.3	7.64	7.26	0.61	6.3	7.69
Sulfate	mg/L	150	144	144	140	140	144	144	4	140	150
Sulfide	mg/L	NA	0.050	0.050	0.050	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	558	547	543	560	580	558	558	14	543	580
METALS											
Antimony	mg/L	NA	0.008	0.008	0.008	**0.00013**	NC	NC	NC	NC	NC
Arsenic	mg/L	NA	0.007	**0.001**	0.0007	**0.00052**	NC	NC	NC	NC	NC
Barium	mg/L	NA	**0.100**	0.110	0.100	**0.091**	0.100	0.100	0.008	0.091	0.110
Beryllium	mg/L	NA	0.00032	0.00032	0.00030	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	NA	0.004	0.004	0.004	0.00012	NC	NC	NC	NC	NC
Calcium	mg/L	NA	74	86	79	81	80	80	5	74	86
Chromium	mg/L	NA	**0.004**	0.004	0.004	**0.00072**	NC	NC	NC	NC	NC
Cobalt	mg/L	NA	0.002	0.002	0.002	**0.00042**	NC	NC	NC	NC	NC
Copper	mg/L	NA	**0.006**	0.003	0.003	**0.0008**	NC	NC	NC	NC	NC
Lead	mg/L	NA	0.0004	**0.0005**	0.0004	0.000098	NC	NC	NC	NC	NC
Magnesium	mg/L	NA	26	30	28	27	28	28	2	26	30
Mercury	mg/L	NA	0.00010	0.00010	0.00100	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	NA	0.003	0.003	0.003	**0.0025**	NC	NC	NC	NC	NC
Selenium	mg/L	NA	0.0006	0.0006	0.0006	0.00093	NC	NC	NC	NC	NC
Silver	mg/L	NA	**0.004**	0.003	**0.004**	0.000098	NC	NC	NC	NC	NC
Sodium	mg/L	NA	58	66	61	65	63	63	4	58	66
Thallium	mg/L	NA	0.020	0.0007	0.0007	0.000063	NC	NC	NC	NC	NC
Tin	mg/L	NA	NA	0.006	**0.004**	0.000083	NC	NC	NC	NC	NC
Vanadium	mg/L	NA	0.003	0.003	0.003	**0.0023**	NC	NC	NC	NC	NC
Zinc	mg/L	NA	**0.014**	0.0009	**0.0028**	**0.0055**	0.0055	0.0074	0.0058	0.0028	0.014
VOLATILE ORGANIC COMPOUNDS (μg/L): ND											
SEMI-VOLATILE ORGANIC COMPOUNDS (μg/L): ND											
HERBICIDES, PESTICIDES, & PCBs (μg/L): ND											

NOTES:

NA = Not Analyzed/Not Applicable

[shaded] Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

TABLE 2-15
GREGORY CANYON LANDFILL
BEDROCK AQUIFER COMPARISON DATA
DOWNGRADIENT VS. UPGRADIENT MEDIAN

	DOWNGRADIENT LOCATIONS					UPGRADIENT LOCATIONS				
ANALYTE	GLA-2 MEDIAN	GLA-10 MEDIAN	GLA-12 MEDIAN	GLA-13 MEDIAN	GLA-14 MEDIAN	GLA-4 MEDIAN	GLA-5 MEDIAN	GLA-11 MEDIAN	ARARs	BASIN OBJECTIVES
GENERAL CHEMISTRY (mg/L):										
Chloride	450	142	118	265	160	75	150	179	500 **(2)	300
Cyanide	NC	NC	NC	NC	NC	NC	NC	NC	0.2 (1,3)	NV
Nitrate/Nitrite	42.9	6.34	0.26	28.3	15.3	1.50	18.8	NC	45 (1,3)	15
pH (units)	7.37	7.30	7.27	7.22	7.38	7.1	6.70	7.61	NV	NV
Sulfate	160	61	39	130	73	38	313	84	500 **(2)	500
Sulfide	NC	NC	NC	NC	NC	NC	NC	NC	NV	NV
Total Dissolved Solids (TDS)	1410	608	514	1000	682	477	1120	750	1000 **(2)	900
METALS (mg/L):										
Antimony	NC	NC	NC	NC	NC	NC	NC	NC	0.006 (1,3)	NV
Arsenic	NC	NC	NC	NC	NC	NC	NC	0.004	0.01 (1,3)	0.01
Barium	0.07	0.061	0.020	0.073	0.12	0.030	0.170	0.004	1(1) / 2(3)	1
Beryllium	NC	NC	NC	NC	NC	NC	NC	NC	0.004 (1,3)	NV
Cadmium	NC	NC	NC	NC	NC	NC	NC	NC	0.005 (1,3)	0.005
Calcium	165	63	48	100	74	72	97	96	NV	NV
Chromium-Total	NC	NC	NC	NC	NC	NC	NC	NC	0.05(1) / 0.1(3)	0.05
Cobalt	NC	NC	NC	NC	NC	NC	NC	NC	NV	NV
Copper	NC	NC	NC	NC	NC	0.0055	NC	NC	1.0(2)	1.0
Lead	NC	NC	NC	NC	NC	NC	NC	NC	0.015 (1,3)	0.015
Magnesium	94	35	28	64	41	22	62	32	NV	NV
Mercury	NC	NC	NC	NC	NC	NC	NC	NC	0.002 (1,3)	0.002
Nickel	NC	NC	NC	NC	NC	NC	NC	0.013	0.1 (1)	0.1
Selenium	0.003	NC	NC	NC	NC	NC	0.0016	NC	0.05 (1,3)	0.05
Silver	0.003	NC	NC	NC	NC	NC	0.0001	NC	0.1 (2)	0.1
Sodium	235	90	86	130	93	76	135	105	NV	NV
Thallium	NC	NC	NC	NC	NC	NC	NC	NC	0.002 (1,3)	0.002
Tin	NC	NC	NC	NC	NC	NC	NC	NC	NV	NV
Vanadium	0.041	0.031	0.030	0.030	0.030	0.007	0.029	NC	NV	NV
Zinc	0.0098	0.171	0.010	0.047	0.0092	0.455	0.025	0.013	5.0 (2)	5.0
VOLATILE ORGANIC COMPOUNDS (μg/L):										
Acetone	4.3	ND	ND	ND	ND	ND	ND	ND	NV	NV
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	0.52	ND	ND	NV	NV
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	**0.21**	ND	ND	NV	NV
Benzene	ND	ND	ND	ND	ND	**0.11**	ND	ND	1(1) / 5(3)	1
Carbon Disulfide	ND	5.5	**0.3**	**0.35**	**0.31**	ND	**0.295**	**0.37**	NV	NV
Ethylbenzene	ND	**0.07**	ND	ND	ND	**0.41**	ND	**0.09**	700(1,3)	700
n-Propylbenzene	ND	ND	ND	ND	ND	**0.12**	ND	ND	NV	NV
Naphthalene	ND	ND	ND	ND	ND	**0.26**	ND	ND	NV	NV
tert-Butylbenzene	ND	ND	ND	ND	ND	**0.08**	ND	ND	NV	NV
Toluene	**0.52**	ND	ND	ND	ND	1.4	ND	**0.19**	150 (1)/1000(3)	150
Trichlorofluoromethane	0.13	ND	ND	ND	ND	ND	ND	ND	150(1)	150
p+m-Xylenes	**0.69**	ND	ND	ND	ND	2.7	ND	ND	1750(1)/10,000(3)	1750
SEMI-VOLATILE ORGANIC COMPOUNDS (μg/L):										
Benzoic Acid	ND	ND	ND	ND	ND	**2.6**	ND	ND	NV	NV
bis (2-Ethylhexyl) phthalate	**1.8**	**1.55**	**0.57**	**0.83**	**1.2**	**1.75**	**1.8**	**4.2**	4(1)/6(3)	4
Butylbenzyl phthalate	**0.28**	ND	ND	ND	ND	**0.44**	ND	**0.40**	NV	NV
Di-n-butyl phthalate	ND	ND	ND	ND	ND	**0.36**	ND	ND	NV	NV
Naphthalene	ND	ND	ND	ND	ND	**0.29**	ND	ND	NV	NV
HERBICIDES, PESTICIDES & PCBs (μg/L):										
2,4-D	ND	ND	ND	**0.17**	ND	ND	ND	ND	70(1)	70

NOTES:

NC No calculation performed. Requires a minimum of three data entries.

NV No value available (in ARAR or Basin Objectives column).

ARAR = Applicable or Relevant and Appropriate Requirement.

** Value shown is the upper maximum contaminant limit (MCL).

(1) California Primary Drinking Water Standards.

(2) California Secondary Drinking Water Standards.

(3) Federal Maximum Contaminant Levels (MCLs).

[shaded box] Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

ND Not detected above the method detection limit

TABLE 2-16
GREGORY CANYON LANDFILL
ALLUVIAL AQUIFER COMPARISON DATA
DOWNGRADIENT VS. UPGRADIENT MEDIAN

ANALYTE	DOWNGRADIENT LOCATIONS GLA-16 MEDIAN	DOWNGRADIENT LOCATIONS SLR#34 MEDIAN	UPGRADIENT LOCATION LUCIO #2 MEDIAN	ARARs	BASIN OBJECTIVES
GENERAL CHEMISTRY (mg/L):					
Chloride	107	78	94	500 **(2)	300
Cyanide	NC	NC	NC	0.2 (1,3)	NV
Nitrate/Nitrite	6.42	NC	0.7	45 (1,3)	15
pH (units)	7.50	7.64	7.35	NV	NV
Sulfate	109	144	159	500 **(2)	500
Sulfide	NC	NC	NC	NV	NV
Total Dissolved Solids (TDS)	687	558	667	1000 **(2)	900
METALS (mg/L):					
Antimony	NC	NC	NC	0.006 (1,3)	NV
Arsenic	0.0012	NC	NC	0.01 (1,3)	0.01
Barium	0.08	0.100	0.110	1(1) / 2(3)	1
Beryllium	NC	NC	NC	0.004 (1,3)	NV
Cadmium	NC	NC	NC	0.005 (1,3)	0.005
Calcium	80	80	96	NV	NV
Chromium-Total	NC	NC	NC	0.05(1) / 0.1(3)	0.05
Cobalt	NC	NC	NC	NV	NV
Copper	NC	NC	0.006	1.0(2)	1.0
Lead	NC	NC	0.0007	0.015 (1,3)	0.015
Magnesium	37	28	33	NV	NV
Mercury	NC	NC	NC	0.002 (1,3)	0.002
Nickel	NC	NC	NC	0.1 (1)	0.1
Selenium	NC	NC	NC	0.05 (1,3)	0.05
Silver	NC	NC	NC	0.1 (2)	0.1
Sodium	77	63	68	NV	NV
Thallium	NC	NC	NC	0.002 (1,3)	0.002
Tin	NC	NC	NC	NV	NV
Vanadium	0.030	NC	0.010	NV	NV
Zinc	0.0044	0.0055	0.0090	5.0 (2)	5.0
VOLATILE ORGANIC COMPOUNDS (μg/L):					
Acetone	ND	ND	**4.9**	NV	NV
Carbon Disulfide	**0.32**	ND	ND	NV	NV
Chloroform	ND	ND	1.2	700(1,3)	700
SEMI-VOLATILE ORGANIC COMPOUNDS (μg/L):					
Acenaphthene	**0.31**	ND	ND	NV	NV
bis (2-Ethylhexyl) phthalate	**0.81**	ND	**0.62**	4(1)/6(3)	4
Hexachlorobenzene	**0.67**	ND	ND	1(1,3)	1
Hexachlorobutadiene	ND	ND	**0.64**	NV	NV
Pyrene	**0.60**	ND	**0.27**	NV	NV
HERBICIDES, PESTICIDES & PCBs (μg/L): ND					

NOTES:

NC No calculation performed. Requires a minimum of three data entries.

NV No value available (in ARAR or Basin Objectives column).

ARAR = Applicable or Relevant and Appropriate Requirement.

** Value shown is the upper maximum contaminant limit (MCL).

(1) California Primary Drinking Water Standards.

(2) California Secondary Drinking Water Standards.

(3) Federal Maximum Contaminant Levels (MCLs).

Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

ND Not detected above the method detection limit

TABLE 2-17
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - SURFACE WATER STATION SW-1

ANALYTE	UNITS	Aug 1999	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY											
Chloride	mg/L	86	103	107	113	120	107	106	13	86	120
Cyanide	mg/L	NA	0.0063	0.0063	0.0063	0.0006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	**0.098**	**0.030**	0.020	**0.059**	**0.1**	0.079	0.072	0.034	0.030	0.1
pH	units	7.08	7.92	8.18	7.98	7.2	7.92	7.67	0.50	7.08	8.18
Sulfate	mg/L	84	185	183	204	220	185	175	53	84	220
Sulfide	mg/L	NA	0.43	0.050	0.050	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	585	657	627	703	720	657	658	55	585	720
METALS											
Antimony	mg/L	NA	**0.010**	0.008	0.008	**0.00018**	NC	NC	NC	NC	NC
Arsenic	mg/L	NA	**0.002**	**0.001**	**0.001**	0.002	0.002	0.002	0.001	0.001	0.002
Barium	mg/L	NA	**0.077**	0.0009	0.082	**0.071**	0.077	0.077	0.006	0.071	0.082
Beryllium	mg/L	NA	0.00032	0.00032	0.00032	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	NA	0.004	0.004	0.004	0.00012	NC	NC	NC	NC	NC
Calcium	mg/L	NA	81	98	94	86	90	90	8	81	98
Chromium	mg/L	NA	**0.005**	0.004	0.004	**0.00039**	NC	NC	NC	NC	NC
Cobalt	mg/L	NA	0.002	0.002	0.002	**0.00042**	NC	NC	NC	NC	NC
Copper	mg/L	NA	**0.009**	0.003	0.003	**0.00085**	NC	NC	NC	NC	NC
Lead	mg/L	NA	0.004	0.0004	**0.0007**	0.000098	NC	NC	NC	NC	NC
Magnesium	mg/L	NA	30	34	35	33	34	33	2	30	35
Mercury	mg/L	NA	0.00010	0.00010	0.00010	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	NA	0.003	0.003	0.003	**0.0028**	NC	NC	NC	NC	NC
Selenium	mg/L	NA	0.0006	0.0006	0.0006	**0.0014**	NC	NC	NC	NC	NC
Silver	mg/L	NA	**0.006**	0.003	**0.005**	0.000098	NC	NC	NC	NC	NC
Sodium	mg/L	NA	67	76	73	80	75	74	5	67	80
Thallium	mg/L	NA	0.020	0.0007	0.0007	0.000063	NC	NC	NC	NC	NC
Tin	mg/L	NA	NA	0.006	0.002	0.000083	NC	NC	NC	NC	NC
Vanadium	mg/L	NA	0.010	0.003	0.010	**0.0092**	0.010	0.0097	0.0005	0.0092	0.010
Zinc	mg/L	NA	**0.0066**	**0.0020**	0.0050	**0.0093**	0.0058	0.0057	0.0031	0.0020	0.0093
VOLATILE ORGANIC COMPOUNDS (μg/L): ND											
Acetone	μg/L	**4.8**[a]	0.5	5.935	5.935	4.2	NC	NC	NC	NC	NC
Carbon Disulfide	μg/L	0.54	0.5	6.4[a]	0.266	0.26	NC	NC	NC	NC	NC
Toluene	μg/L	0.11	0.5	0.047	0.047	**0.33**	NC	NC	NC	NC	NC
SEMI-VOLATILE ORGANIC COMPOUNDS											
bis(2-Ethylhexyl) Phthalate	μg/L	NA	**3.2**[a]	0.33	**0.38**[a]	2.0	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs (μg/L): ND											

NOTES:

NA = Not Analyzed/Not Applicable

(shaded) Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

[a] Suspected laboratory/field contaminant.

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TABLE 2-18
GREGORY CANYON LANDFILL
HISTORICAL SUMMARY DATA - SURFACE WATER STATION SW-2

ANALYTE	UNITS	Aug 1999	Dec 2000	Mar 2001	Jun 2001	Sep 2001	MED.	AVG.	STD. DEV.	MIN.	MAX.
GENERAL CHEMISTRY											
Chloride	mg/L	96	105	109	111	120	109	108	9	96	120
Cyanide	mg/L	NA	0.0063	0.0063	0.0063	0.0006	NC	NC	NC	NC	NC
Nitrate/Nitrite	mg/L	0.3	**0.021**	0.020	**0.030**	**0.15**	0.09	0.12525	0.1305	0.021	0.3
pH	units	7.40	7.92	7.96	7.86	6.9	7.86	7.608	0.46	6.9	7.96
Sulfate	mg/L	171	185	184	195	210	185	189	15	171	210
Sulfide	mg/L	NA	0.050	0.050	0.050	0.1	NC	NC	NC	NC	NC
Total Dissolved Solids (TDS)	mg/L	622	660	623	700	730	660	667	48	622	730
METALS											
Antimony	mg/L	NA	**0.020**	0.008	0.008	0.00012	NC	NC	NC	NC	NC
Arsenic	mg/L	NA	**0.0009**	**0.001**	0.0007	**0.0016**	0.001	0.001	0.0004	0.0009	0.0016
Barium	mg/L	NA	**0.080**	0.0009	0.088	**0.082**	0.08	0.08	0.004	0.08	0.088
Beryllium	mg/L	NA	0.00032	0.00032	0.00032	0.00042	NC	NC	NC	NC	NC
Cadmium	mg/L	NA	0.004	0.004	0.004	0.00012	NC	NC	NC	NC	NC
Calcium	mg/L	NA	78	97	96	91	93.5	90.5	8.7	78	97
Chromium	mg/L	NA	0.004	0.004	0.004	0.00012	NC	NC	NC	NC	NC
Cobalt	mg/L	NA	0.002	0.002	0.002	**0.00047**	NC	NC	NC	NC	NC
Copper	mg/L	NA	**0.008**	0.003	0.003	**0.00092**	NC	NC	NC	NC	NC
Lead	mg/L	NA	0.004	0.0004	0.0004	0.000098	NC	NC	NC	NC	NC
Magnesium	mg/L	NA	29	35	36	33	34	33.3	3.1	29	36
Mercury	mg/L	NA	0.00010	0.00010	0.00010	0.00043	NC	NC	NC	NC	NC
Nickel	mg/L	NA	0.003	0.003	0.003	**0.0031**	NC	NC	NC	NC	NC
Selenium	mg/L	NA	0.0006	0.0006	0.0006	**0.0010**	NC	NC	NC	NC	NC
Silver	mg/L	NA	**0.004**	0.003	**0.006**	0.000098	NC	NC	NC	NC	NC
Sodium	mg/L	NA	65	76	75	80	75.5	74	6.4	65	80
Thallium	mg/L	NA	0.020	0.0007	0.0007	0.000063	NC	NC	NC	NC	NC
Tin	mg/L	NA	NA	0.006	0.002	0.000083	NC	NC	NC	NC	NC
Vanadium	mg/L	NA	**0.008**	0.003	**0.008**	**0.0064**	0.008	0.0075	0.0009	0.0064	0.008
Zinc	mg/L	NA	**0.0067**	0.00089	**0.0014**	**0.0074**	0.0067	0.0052	0.0033	0.0014	0.0074
VOLATILE ORGANIC COMPOUNDS (µg/L): ND											
SEMI-VOLATILE ORGANIC COMPOUNDS											
bis(2-Ethylhexyl) Phthalate	µg/L	NA	**0.55**[a]	0.33	NA	2.0	NC	NC	NC	NC	NC
HERBICIDES, PESTICIDES, & PCBs (µg/L): ND											

NOTES:

NA = Not Analyzed/Not Applicable

[shaded] Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

NC No calculation performed. Requires a minimum of three data entries.

[a] Suspected laboratory/field contaminant.

TABLE 2-19
GREGORY CANYON LANDFILL
SURFACE WATER COMPARISON DATA
DOWNSTREAM VS. UPSTREAM MEDIAN

ANALYTE	DOWNSTREAM LOCATION SLRSW-2 MEDIAN	UPSTREAM LOCATION SLRSW-1 MEDIAN	ARARs	BASIN OBJECTIVES
GENERAL CHEMISTRY (mg/L):				
Chloride	109	107	500 **(2)	250
Cyanide	NC	NC	0.2 (1,3)	NV
Nitrate/Nitrite	0.09	0.079	45 (1,3)	NV
pH (units)	7.86	7.92	NV	NV
Sulfate	185	185	500 **(2)	250
Sulfide	NC	NC	NV	NV
Total Dissolved Solids (TDS)	660	657	1000 **(2)	500
METALS (mg/L):				
Antimony	NC	NC	0.006 (1,3)	NV
Arsenic	0.001	0.002	0.01 (1,3)	0.01
Barium	0.08	0.077	1(1) / 2(3)	1
Beryllium	NC	NC	0.004 (1,3)	NV
Cadmium	NC	NC	0.005 (1,3)	0.005
Calcium	93.5	90	NV	NV
Chromium-Total	NC	NC	0.05(1) / 0.1(3)	0.05
Cobalt	NC	NC	NV	NV
Copper	NC	NC	1.0(2)	1.0
Lead	NC	NC	0.015 (1,3)	0.015
Magnesium	34	34	NV	NV
Mercury	NC	NC	0.002 (1,3)	0.002
Nickel	NC	NC	0.1 (1)	0.1
Selenium	NC	NC	0.05 (1,3)	0.05
Silver	NC	NC	0.1 (2)	0.1
Sodium	75.5	75	NV	NV
Thallium	NC	NC	0.002 (1,3)	0.002
Tin	NC	NC	NV	NV
Vanadium	0.008	0.010	NV	NV
Zinc	0.0067	0.0058	5.0 (2)	5.0
VOLATILE ORGANIC COMPOUNDS (µg/L):				
Acetone	ND	**4.8**	NV	NV
Carbon Disulfide	ND	6.4	NV	NV
Toluene	ND	**0.33**	150 (1)/1000(3)	150
SEMI-VOLATILE ORGANIC COMPOUNDS (µg/L):				
bis (2-Ethylhexyl) phthalate	**0.55**	**1.79**	4(1)/6(3)	4
HERBICIDES, PESTICIDES & PCBs (µg/L): ND				

NOTES:

NC No calculation performed. Requires a minimum of three data entries.

NV No value available (in ARAR or Basin Objectives column).
ARAR = Applicable or Relevant and Appropriate Requirement.

** Value shown is the upper maximum contaminant limit (MCL).

(1) California Primary Drinking Water Standards.

(2) California Secondary Drinking Water Standards.

(3) Federal Maximum Contaminant Levels (MCLs).

[shaded box] Indicates that the analyte was not detected above laboratory practical quantitation limit. Value listed is laboratory detection limit or estimated trace (BOLDED) concentration.

ND Not detected above the method detection limit

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TABLE 2-20
SITE MONITORING WELL INFORMATION
GREGORY CANYON LANDFILL

WELL INFORMATION	GLA-1	GLA-2	GLA-3	GLA-4	GLA-5	GLA-7	GLA-8	GLA-9	GLA-10	GLA-11	GLA-12	GLA-13	GLA-14	GLA-16
Elevation of Well (feet MSL):														
Top of Well Casing	343.72	379.45	332.02	904.99	927.92	402.85	633.11	615.61	326.59	777.32	345.79	358.15	334.13	307.54
Total Depth of Well (ft.): At installation	300	250	150	250	195	160	300	300	150.0	243	53	70	56	33.5
Depth of Screened Interval	20-300	10-250	45-150	30-240	30-190	30-160	15-300	20-300	50-150	202.5-242.5	32-52	49.5-69.5	35.5-55.5	9.5-29.5
Depth to Water (from top of well casing (ft.)):														
12/3/96	37.98	69.65	21.81	165.00	41.44	33.46	62.48	-	-	-	-	-	-	-
12/16/96	37.10	69.73	23.84	149.93	42.57	34.82	62.40	Dry	22.20	-	-	-	-	-
9/13/99	39.36	70.58	25.38	70.57	41.22	37.72	64.85	Dry	23.27	-	-	-	-	-
3/14/00	38.05	71.11	23.66	60.39	41.29	39.11	63.70	Dry	22.01	193.36	36.96	49.25	38.18	13.92
11/14-15/00	38.82	72.36	24.80	62.53	39.80	41.58	66.21	Dry	22.66	194.98	38.08	50.52	38.89	15.35
12/5-6/00	-	72.23	-	64.71	40.54	-	-	Dry	23.30	195.30	37.96	50.54	38.73	15.06
1/30/01	40.25	72.99	26.78	76.25	40.55	43.43	67.86	Dry	23.05	195.72	37.98	50.55	38.58	14.91
2/26/01	40.09	72.98	26.74	71.60	41.42	43.72	68.13	Dry	22.93	195.59	37.93	50.52	38.51	14.82
3/12/01	39.99	72.95	26.57	70.50	40.58	43.82	67.50	Dry	22.73	195.57	37.79	50.38	38.41	14.60
4/13/01	40.08	73.08	26.55	148.69	40.28	43.92	67.23	Dry	22.71	195.36	37.83	50.37	38.35	14.62
5/14/01	40.22	73.19	26.78	98.09	40.71	44.18	67.67	Dry	23.01	196.36	37.97	50.57	38.50	14.82
6/20/01	40.62	73.25	27.11	74.50	39.66	44.40	68.57	Dry	23.19	196.25	38.66	50.73	38.66	15.07
7/11/01	40.63	73.43	27.24	128.18	40.10	44.54	68.98	Dry	23.54	196.86	38.40	51.00	38.83	15.31
8/29/01	40.80	73.62	27.56	76.72	41.13	44.95	69.67	Dry	23.68	196.74	38.64	51.24	39.05	15.69
9/5/01	40.72	73.53	26.91	74.25	41.16	44.71	67.95	Dry	22.96	196.63	38.62	51.20	39.05	15.73
10/29/01	40.80	73.90	27.54	75.43	41.43	45.50	70.06	Dry	23.55	196.98	38.73	51.37	39.27	16.03
11/28/01	40.68	73.88	27.5	73.64	42.11	45.77	69.92	Dry	23.36	197.08	38.65	51.36	39.05	15.46
12/11/01	40.55	73.25	27.37	73.06	42.25	45.80	69.80	Dry	22.49	196.62	38.55	51.18	38.89	15.20
3/29/02	40.70	73.98	27.48	70.60	-	46.79	70.96	Dry	23.22	197.14	38.64	51.39	38.75	14.94
Elevation of Water Surface (ft. MSL):														
12/3/96	305.74	309.80	310.21	739.99	886.48	369.39	570.63	Dry	-	-	-	-	-	-
12/16/96	306.62	309.72	308.18	755.06	885.35	368.03	570.71	Dry	304.39	-	-	-	-	-
9/13/99	304.36	308.87	306.64	834.42	886.70	365.13	568.26	Dry	303.32	-	-	-	-	-
3/14/00	305.67	308.34	308.36	844.60	886.63	363.74	569.41	Dry	304.58	583.96	308.83	308.90	295.95	293.62
11/14-15/00	304.90	307.09	307.22	842.46	888.12	361.27	566.90	Dry	303.93	582.34	307.71	307.63	295.24	292.19
12/5-6/00	-	307.22	-	840.28	887.38	-	-	Dry	303.29	582.02	307.83	307.61	295.40	292.48
1/30/01	303.47	306.46	305.24	828.74	887.37	359.42	565.25	Dry	303.54	581.60	307.81	307.60	295.55	292.63
2/26/01	303.63	306.47	305.28	833.39	886.50	359.13	564.98	Dry	303.66	581.73	307.86	307.63	295.62	292.72
3/12/01	303.73	306.50	305.45	834.49	887.34	359.03	565.61	Dry	303.86	581.75	308.00	307.77	295.72	292.94
4/13/01	303.64	306.37	305.47	756.30	887.64	358.93	565.88	Dry	303.88	581.96	307.96	307.78	295.78	292.92
5/14/01	303.50	306.26	305.24	806.90	887.21	358.67	565.44	Dry	303.58	580.96	307.82	307.58	295.63	292.72
6/20/01	303.10	306.20	304.91	830.49	888.26	358.45	564.54	Dry	303.40	581.07	307.13	307.42	295.47	292.47
7/11/01	303.09	306.02	304.78	776.81	887.82	358.31	564.13	Dry	303.05	580.46	307.39	307.15	295.30	292.23
8/29/01	302.92	305.83	304.46	828.27	886.79	357.90	563.44	Dry	302.91	580.58	307.15	306.91	295.08	291.85
9/5/01	303.00	305.92	305.11	830.74	886.76	358.14	565.16	Dry	303.63	580.69	307.17	306.95	295.08	291.81
10/29/01	302.92	305.55	304.48	829.56	886.49	357.35	563.05	Dry	303.04	580.34	307.06	306.78	294.86	291.51
11/28/01	303.04	305.57	304.52	831.35	885.81	357.08	563.19	Dry	303.23	580.24	307.14	306.79	295.08	292.08
12/11/01	303.17	306.20	304.65	831.93	885.67	357.05	563.31	Dry	304.10	580.70	307.24	306.97	295.24	292.34
3/29/02	303.02	305.47	304.54	834.39	-	356.06	562.15	Dry	303.37	580.18	307.15	306.76	295.38	292.60

- Not measured/not applicable.

D:\9539\GCLEV.XLS:5/19/03

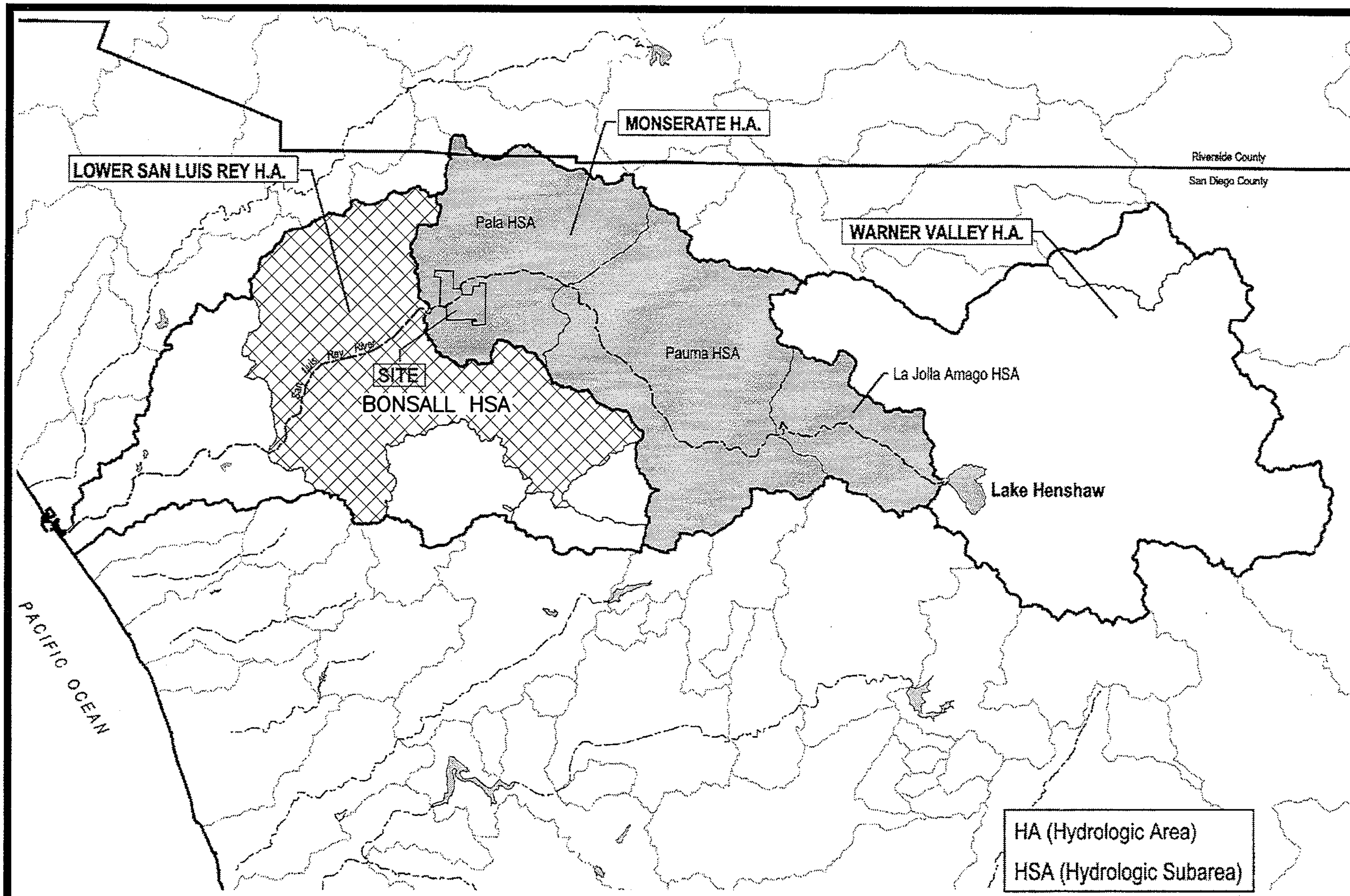
TABLE 2-21
MONITORING WELL CONSTRUCTION DATA
GREGORY CANYON LANDFILL MONITORING WELLS

Well Number	Status	Casing Elevation (feet MSL)	Depth (in feet) To: Bottom of Well	First Water	Static Water	Original Well Construction: Diameter & Material	Filter Pack	Slot Size	Screen Interval	Drilling Method	Aquifer Material
Detection Monitoring Wells											
GMW-1	Compliance	331.36	90.5	21.25	22.48	Open Hole	None	NA	48-90.5	Air Rotary	Bedrock
GLA-4	Background	904.99	250	103	149.93	Open Hole	None	NA	30-240	Dual Wall Rev. - Air	Bedrock
GLA-5	Background	927.92	195	100	42.57	Open Hole	None	NA	30-190	Dual Wall Rev. - Air	Bedrock
GLA-11	Background	777.32	243	231	191.5	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	202.5-242.5	Air Rotary	Bedrock
GLA-12	Compliance	345.79	53	38	36.7	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	32-52	Air Rotary	Bedrock
GLA-13	Compliance	358.15	70	58	49.7	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	49.5-69.5	Air Rotary	Bedrock
GLA-14	Compliance	334.13	56	42	36.5	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	35.5-55.5	Air Rotary	Bedrock
GLA-A (Proposed)	Compliance	370 (est.)	-	-	65 (est.)	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	60-90	Air Rotary	Bedrock
GLA-B (Proposed)	Compliance	345 (est.)	-	-	35 (est.)	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	30-50	Air Rotary	Bedrock
GLA-2R (Proposed)	Compliance	375 (est.)	145	-	70 (est.)	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	80-145	Air Rotary	Bedrock
GLA-2S (Proposed)	Compliance	373 (est.)	75	-	65(est.)	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	50-75	Air Rotary	Bedrock
GLA-3S (Proposed)	Compliance	330 (est.)	45	-	25 (est.)	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	20-45'	Air Rotary	Bedrock
GLA-17(Proposed)	Background	585 (est.)	-	-	-	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	50 feet	Air Rotary	Bedrock
GLA-18(Proposed)	Background	915 (est.)	-	-	-	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	50 feet	Air Rotary	Bedrock
Lucio #2R (Proposed)	Background	305 (est.)	40	-	15 (est.)	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	30 feet	Hollow-Stem Auger	Alluvium
GMW-3	Compliance	320.36	49.5	12.83	12.38	4" Dia. Sch. 40 PVC	2/12 Sand	0.020"	9.5-49.5	Hollow-Stem Auger	Alluvium
GLA-16	Sentry	307.54	33.5	10.6	13	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	9.5-29.5	Air Rotary	Alluvium
SLRMWD #34R (Proposed)	Sentry	310 (est.)	45	-	20 (est.)	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	30 feet	Hollow-Stem Auger	Alluvium
Water Level Measuring Stations (wells GLA-7 and GLA-8 will be abandoned prior to landfilling in that area)											
GLA-1	-	343.72	300	210	37.1	Open Hole	None	NA	20-300	Dual Wall Rev. - Air	Bedrock
GLA-7	-	402.85	160	50	34.82	Open Hole	None	NA	30-160	Dual Wall Rev. - Air	Bedrock
GLA-8	-	633.11	300	86	62.4	Open Hole	None	NA	15-300	Dual Wall Rev. - Air	Bedrock
GLA-10	-	326.59	150	33	22.2	Open Hole	None	NA	50-150	Dual Wall Rev. - Air	Bedrock

Notes: R indicates proposed replacement well to be constructed in vicinity of the existing groundwater monitoring well.
GLA-2 and GLA-3 will be abandoned once their replacement wells are successfully completed and tested.
GLA-7 and GLA-8 will bbe abandoned once landfilling reaches the vicinity of these wells.

SECTION 2.0

FIGURES



SOURCES:
SANDAG GIS DATA, 1997
DAVID EVANS AND ASSOCIATES, INC., 1999
PCR SERVICES CORPORATION, 1999

FIGURE 2–1

SAN LUIS REY HYDROLOGIC UNIT		
GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES GREGORY CANYON LANDFILL SAN DIEGO COUNTY, CALIFORNIA		
GeoLogic Associates — Geologists, Hydrogeologists, and Engineers		
DRAWN BY: VL	DATE: MAY 2003	JOB NO. 9539

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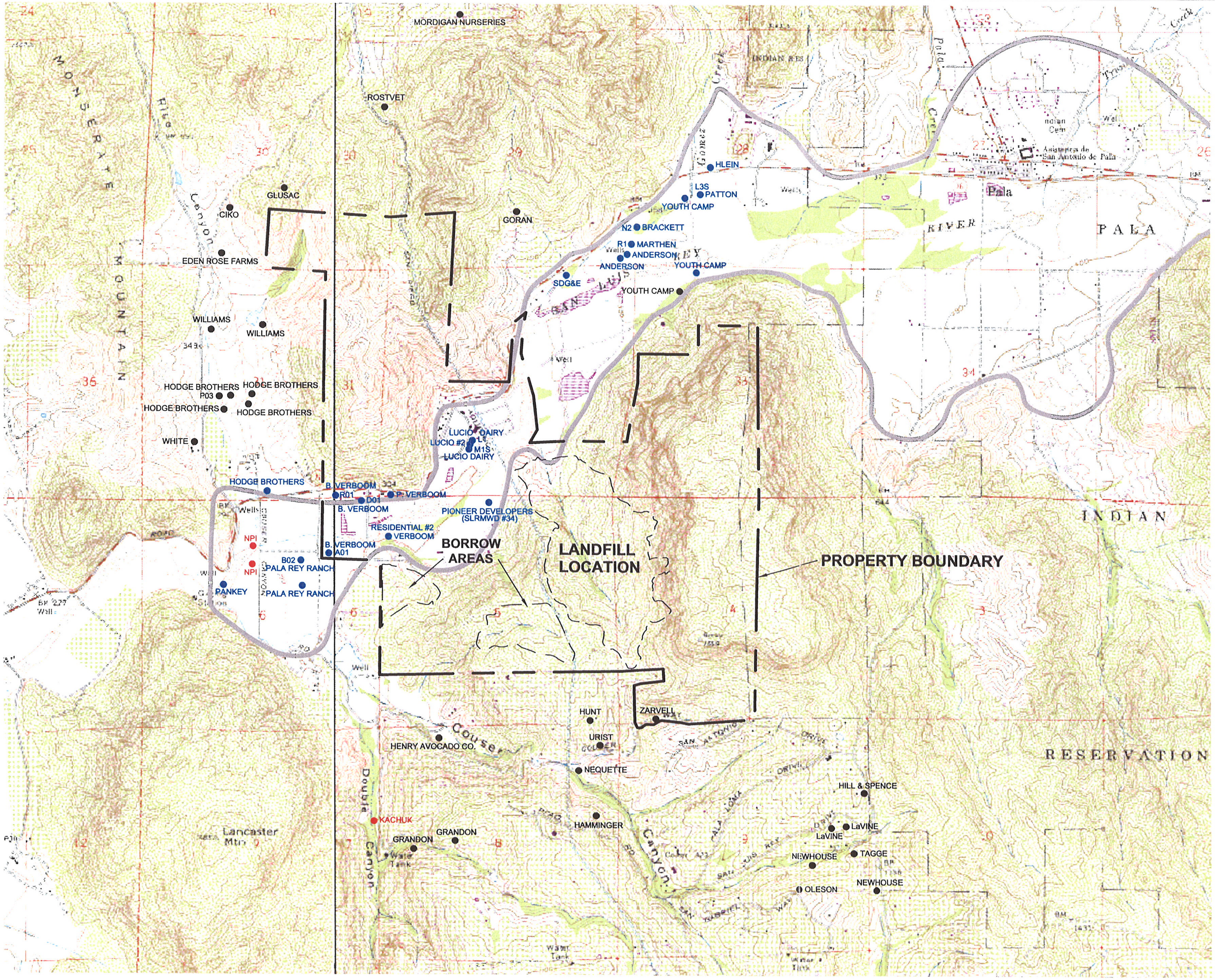

EXPLANATION:

WHITE ● APPROXIMATE LOCATION OF LOCAL GROUNDWATER WELL SCREENED IN BEDROCK (NOT FIELD VERIFIED)

PANKEY ● APPROXIMATE LOCATION OF LOCAL GROUNDWATER WELL SCREENED IN ALLUVIUM (NOT FIELD VERIFIED)

NPI ● APPROXIMATE LOCATION OF LOCAL GROUNDWATER WELL SCREENED IN ALLUVIUM AND BEDROCK (NOT FIELD VERIFIED)

APPROXIMATE LIMIT OF PALA BASIN

REFERENCE:

USGS 7.5 MINUTE PALA (1988) AND BONSALL (1975) CALIFORNIA QUADRANGLES

CALIFORNIA DEPARTMENT OF WATER RESOURCES WATER WELL DRILLERS REPORTS

SAN DIEGO COUNTY WATER AUTHORITY GROUNDWATER REPORT (1997)

N

APPROXIMATE SCALE: 1" = 2300'

FIGURE 2-2

KNOWN WELLS WITHIN 1 MILE RADIUS

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

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VL	MAY 2003	9539

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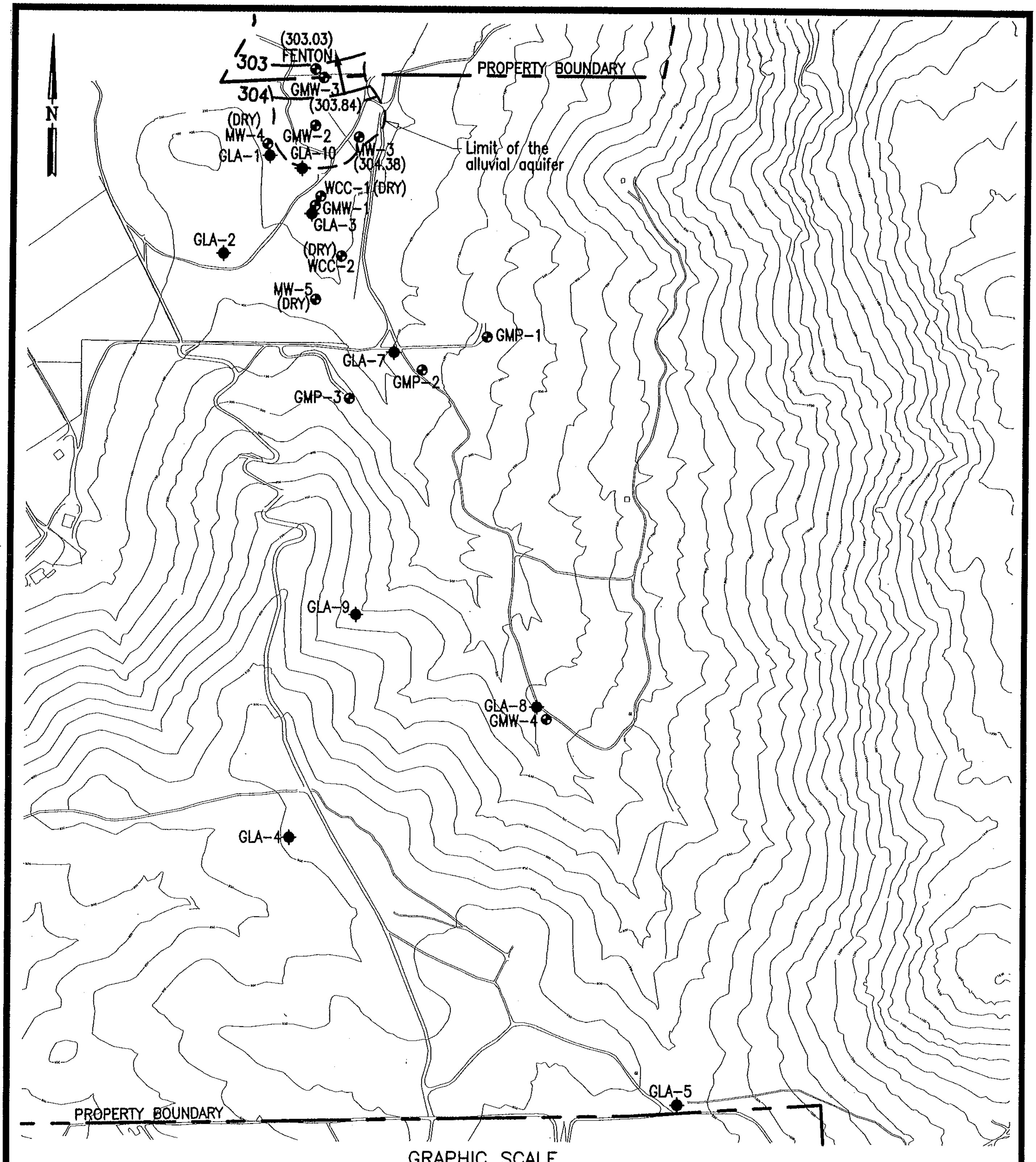

GRAPHIC SCALE

350 0 175 350 700

(in feet)

1 inch = 700 ft.

EXPLANATION:

- MONITORING WELL BY GLA
- MONITORING WELL BY OTHERS
- 304 WATER TABLE ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

FIGURE 2-3A

CONFIGURATION OF THE WATER TABLE IN THE ALLUVIAL AQUIFER ON 12/16/96

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
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VL	MAY 2003	9539

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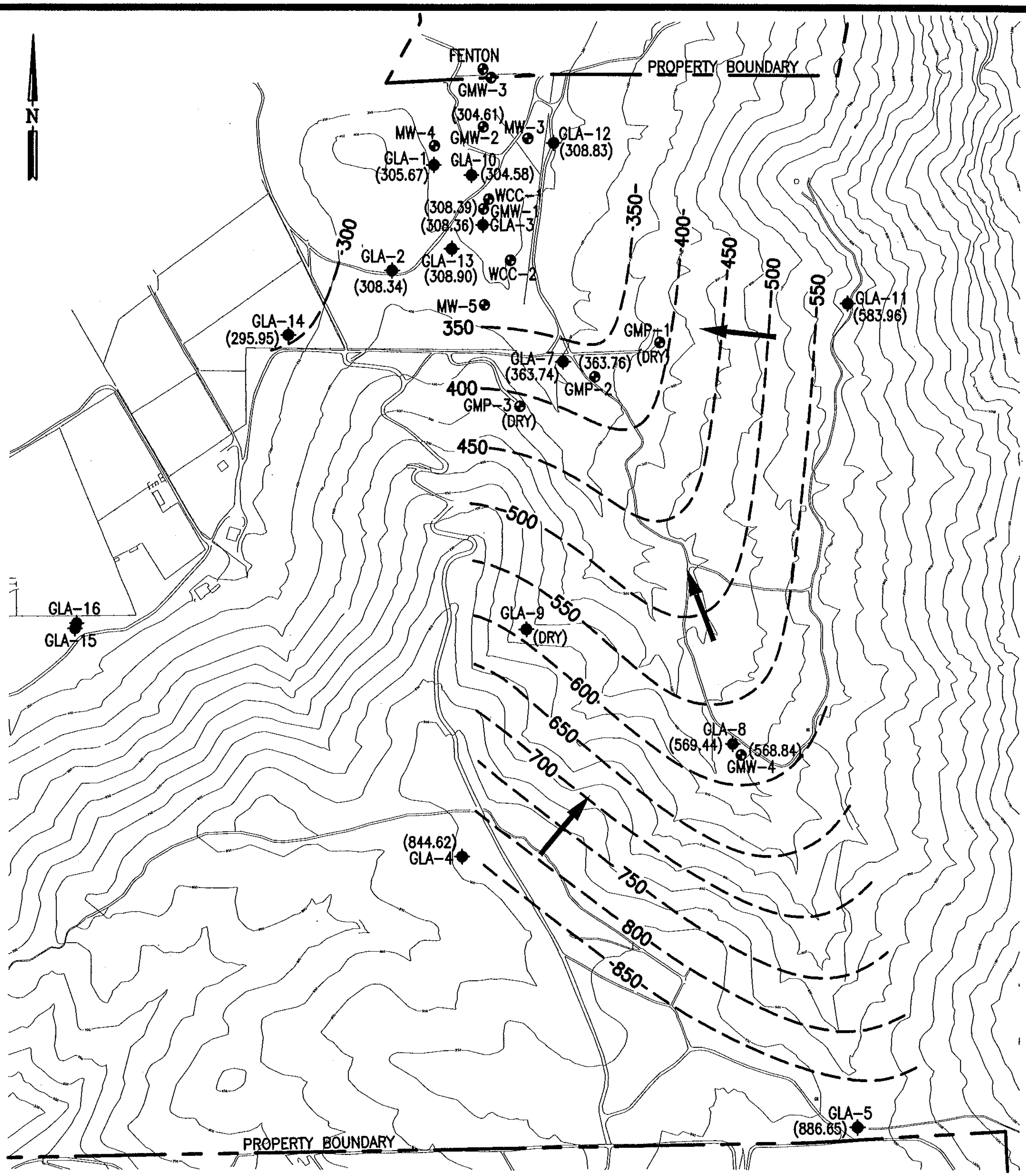

GRAPHIC SCALE

350 0 175 350 700

(in feet)

1 inch = 700 ft.

EXPLANATION:

- MONITORING WELL BY GLA
- MONITORING WELL BY OTHERS
- – –750– – PIEZOMETRIC SURFACE ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION

FIGURE 2-3B

CONFIGURATION OF THE PIEZOMETRIC SURFACE IN THE FRACTURED BEDROCK AQUIFER ON 3/14 & 3/15/00

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

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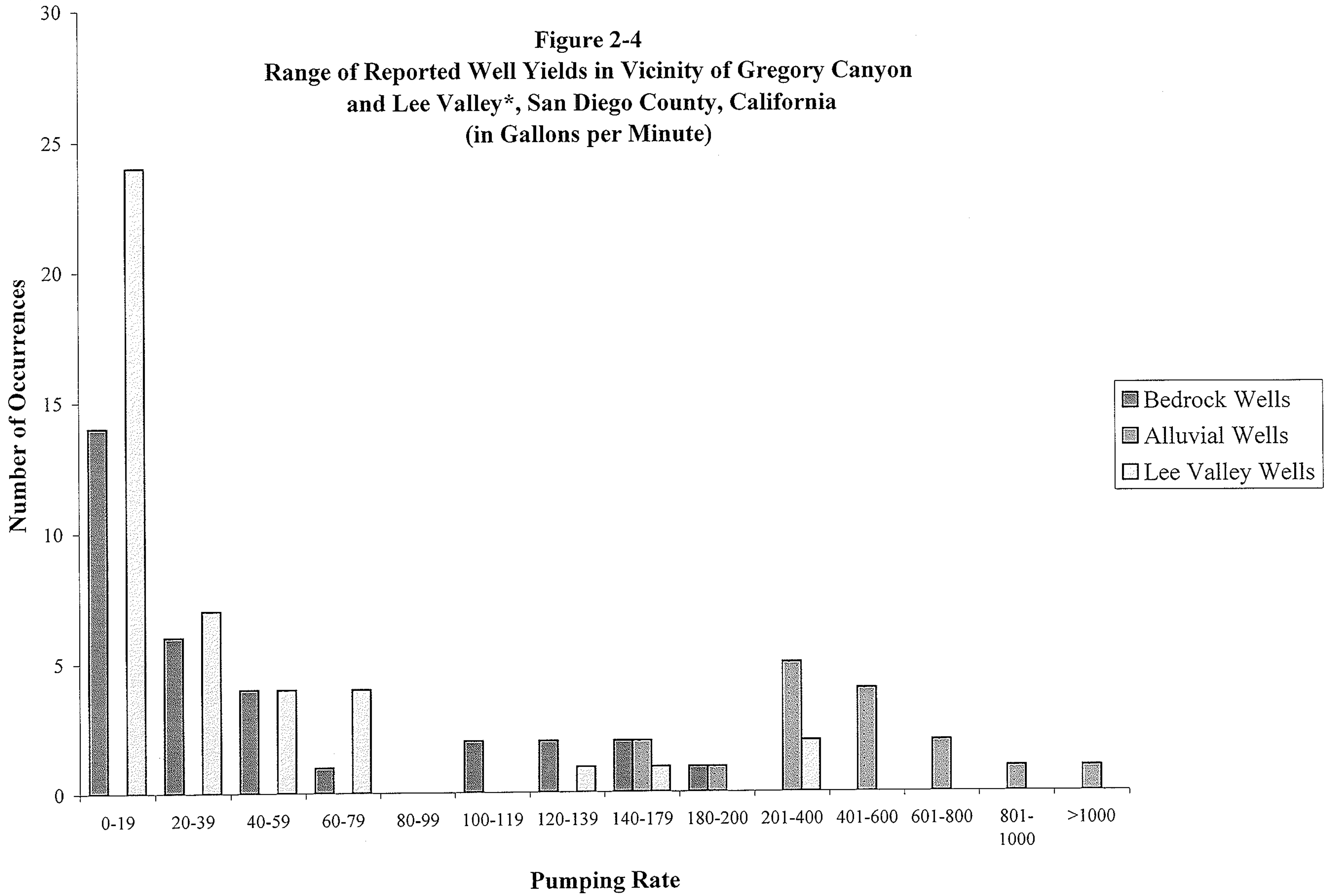
Figure 2-4
Range of Reported Well Yields in Vicinity of Gregory Canyon and Lee Valley*, San Diego County, California (in Gallons per Minute)



*From Kaehler and Hsieh, 1994, USGS Water-Supply Paper 2394.

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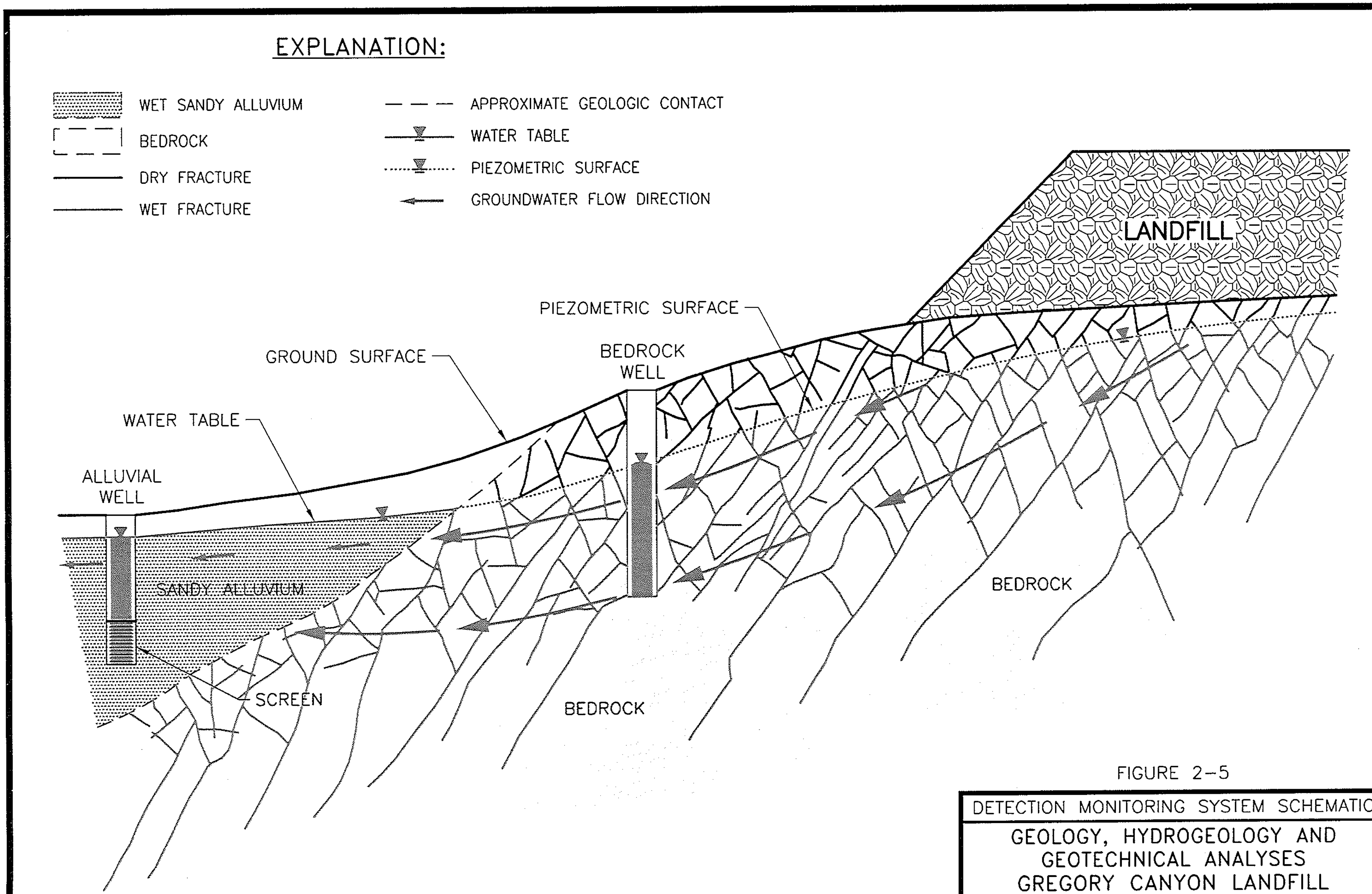

FIGURE 2-5

DETECTION MONITORING SYSTEM SCHEMATIC

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

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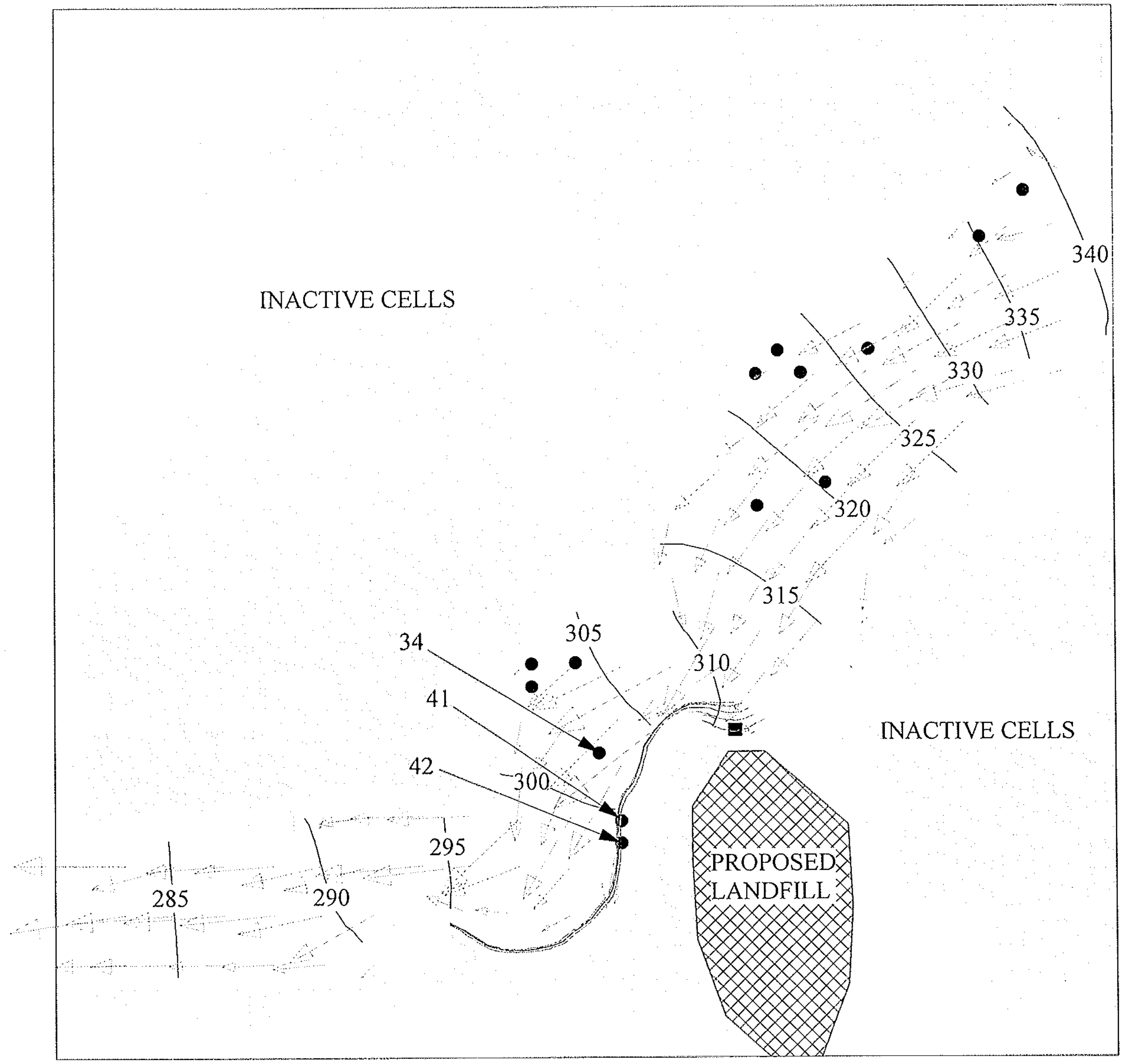

Case 1. Equipotential levels similar to the ones measured currently (approximately 10 feet lower than ground surface)

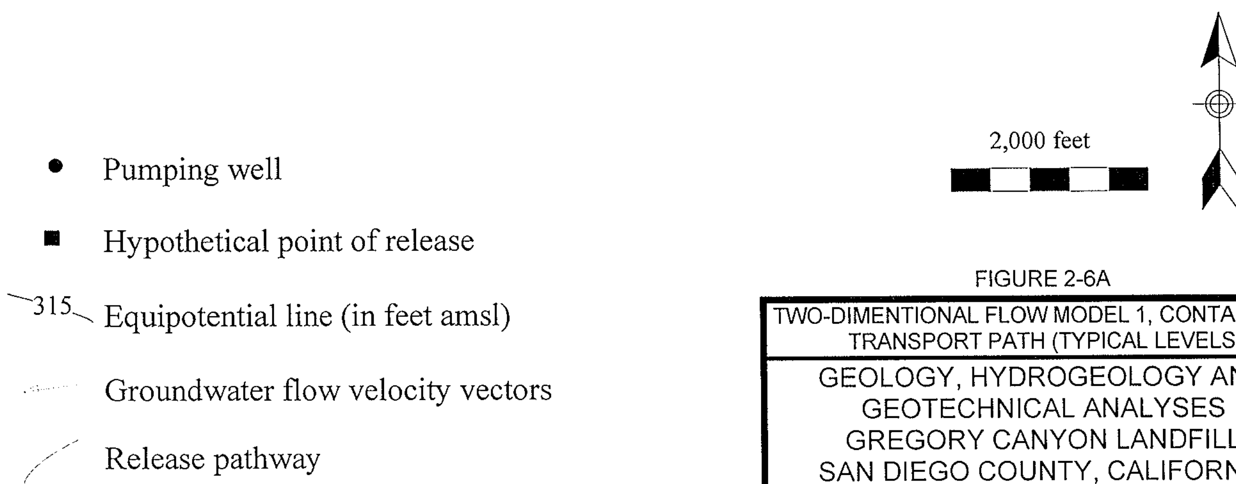

FIGURE 2-6A

TWO-DIMENTIONAL FLOW MODEL 1, CONTAMINANT TRANSPORT PATH (TYPICAL LEVELS)

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

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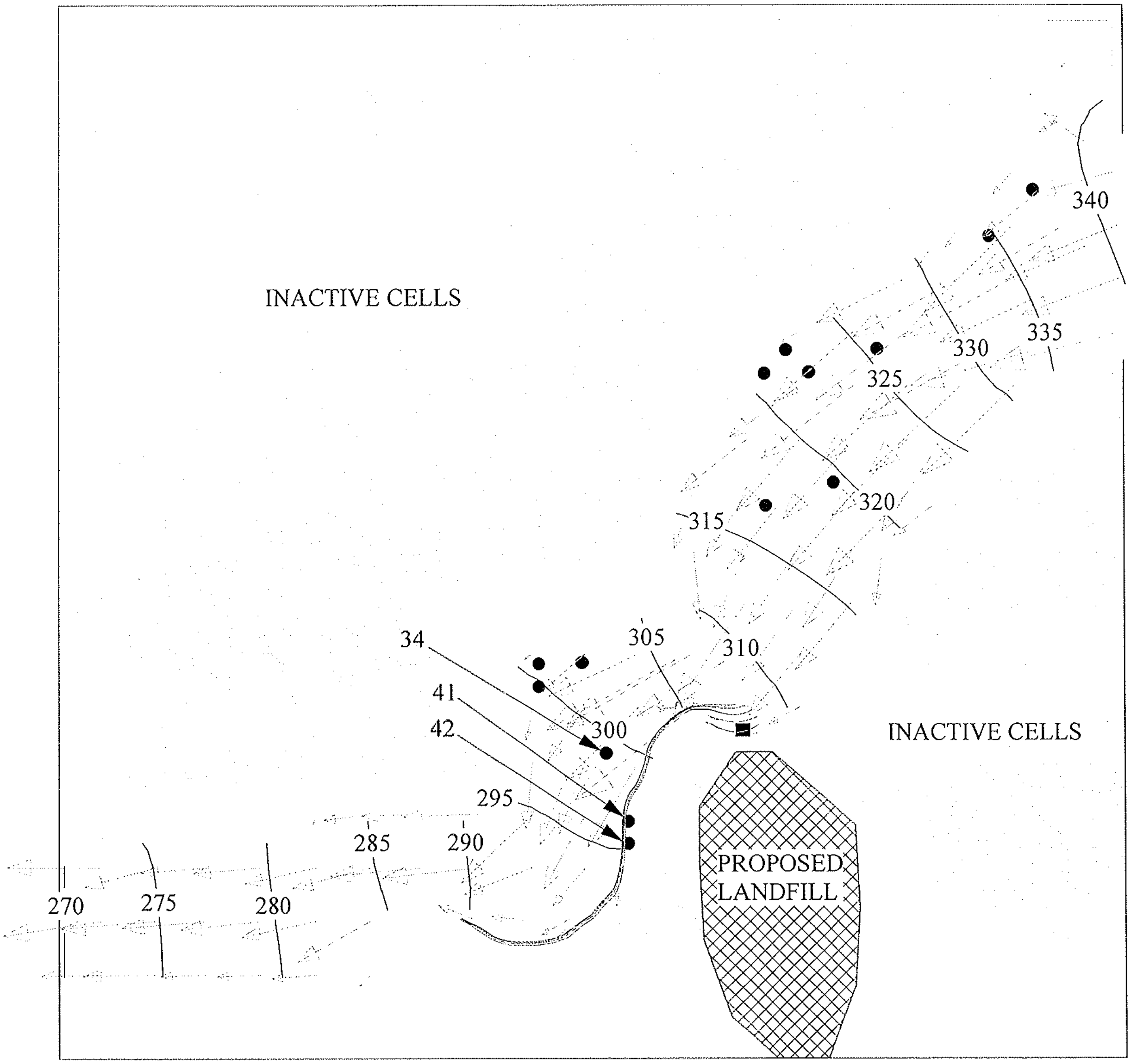

Case 2. Equipotential levels 20 feet lower than ground surface along the western edge of the model

● Pumping well

■ Hypothetical point of release

315 Equipotential line (in feet amsl)

Groundwater flow velocity vectors

Release pathway

FIGURE 2-6B

TWO-DIMENTIONAL FLOW MODEL 2, CONTAMINANT TRANSPORT PATH (10 FEET BELOW TYPICAL LEVELS)

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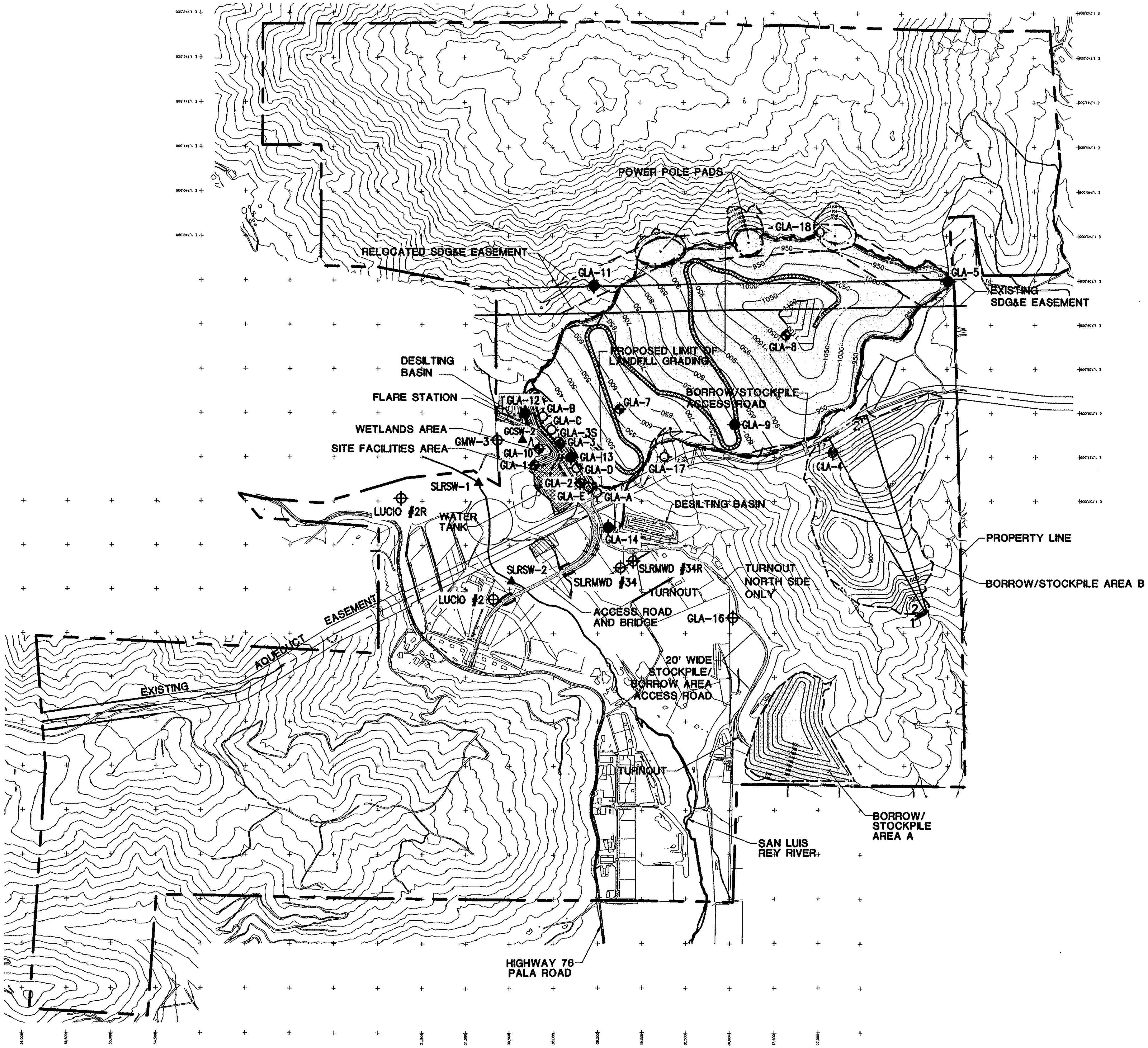

LEGEND

- PROPERTY LINE
- APPROXIMATE LIMIT OF LANDFILL GRADING
- BORROW/STOCKPILE AREA LIMITS
- FINAL CONTOUR
- EXISTING CONTOUR
- ACCESS/HAUL ROAD
- ▲ SURFACE WATER SAMPLING LOCATION
- BEDROCK AQUIFER MONITORING WELL
- WATER LEVEL MEASURING STATION
- ALLUVIAL AQUIFER MONITORING WELL
- MONITORING WELL TO BE CONSTRUCTED
- 1 — 1' SLOPE STABILITY CROSS-SECTION LOCATION

N

GRAPHIC SCALE
600 0 300 600 1200
(in feet)
1 inch = 1200 ft.

FIGURE 2-7

PROPOSED DETECTION MONITORING NETWORK

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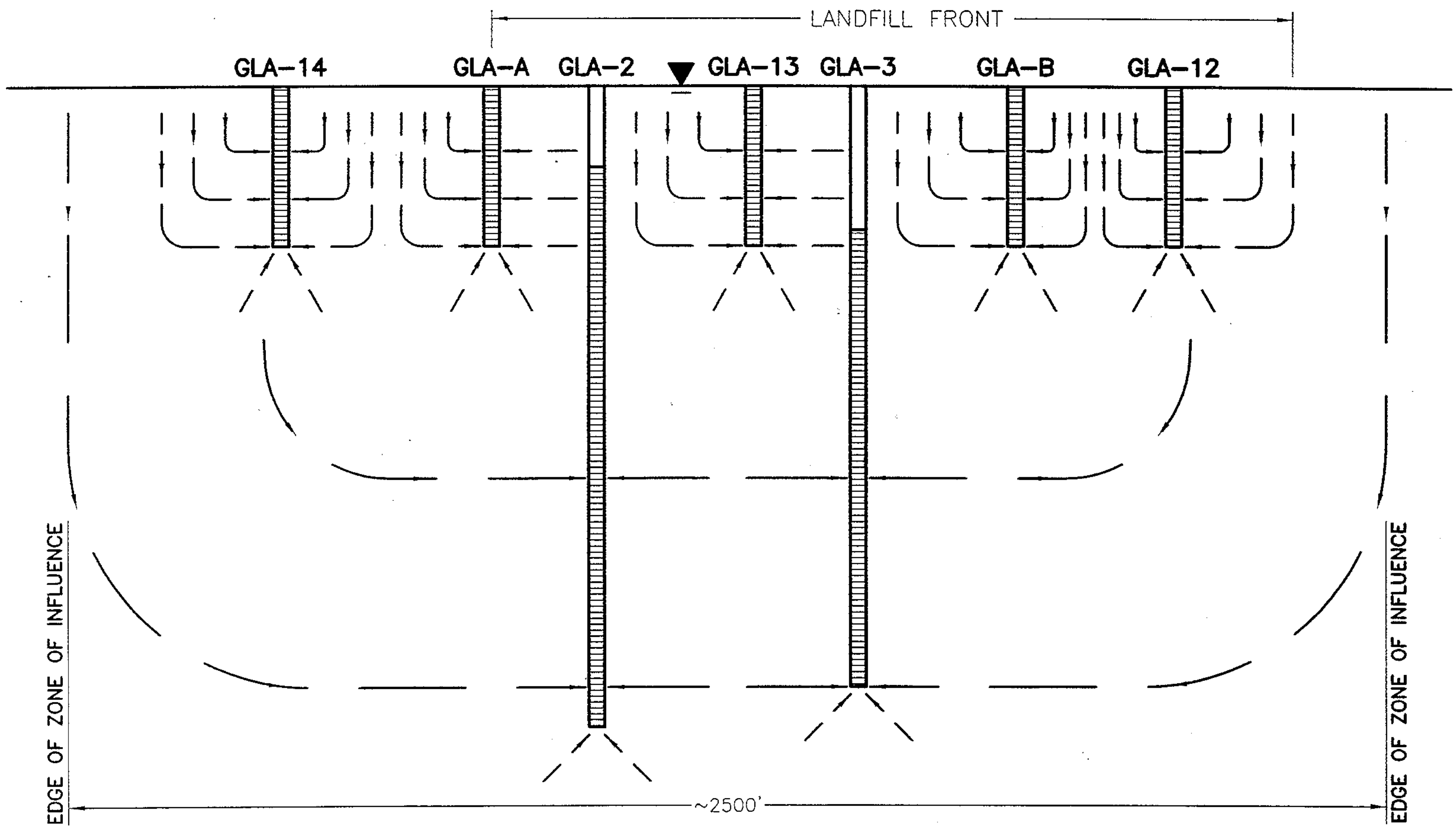

SCHEMATIC DIAGRAM OF FLOW LINES WITHIN THE ZONE OF INFLUENCE OF EACH GROUNDWATER MONITORING WELL

DRAWING SCALES

HORIZ.: 1" = 300'

VERT.: 1" = 20'

EXPLANATION:

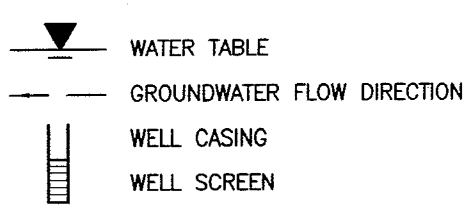

FIGURE 2-8

MONITORING WELL FLOW SYSTEM

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VL	MAY 2003	9539

SECTION 3.0

GEOTECHNICAL ANALYSIS

3.0 GEOTECHNICAL ANALYSIS

This chapter discusses the results of the geologic and hydrogeologic investigations that were incorporated into the various geotechnical analyses required to support the currently proposed prescriptive design for the Gregory Canyon Landfill. Specifically, this section of the report provides the results of static and dynamic slope stability analyses, a discussion of liquefaction analyses for the alluvial material at the toe of the landfill, an assessment of rockfall and debris flows, settlement analysis over a period of 60 years, and model results for the generation of leachate by the landfill.

3.1 LINER SYSTEM DESIGN

The currently proposed landfill design includes the excavation of alluvial and colluvial deposits, and sufficient bedrock materials to create a subgrade at a minimum of 5 feet above the highest anticipated groundwater elevation. As shown on Figure 3-1, the bottom area of the footprint will be graded to drain northerly at a minimum gradient of three percent. The interior side slopes will be cut at a gradient no steeper than 1:1 (horizontal to vertical). The elevations of the finished bottom subgrade or floor area for the refuse footprint range from between approximately 380 feet amsl at the northwestern corner to about 750 feet amsl in the southern portion of the floor area.

The composite liner system proposed for the GCLF will include a GCL (a geocomposite clay liner) sandwiched between an upper 80-mil high density polyethylene (HDPE) geomembrane and a lower 60-mil HDPE geomembrane liner. On the floor areas, the encapsulated GCL will overlie a nine-inch drainage (leak detection) layer over a 60-mil HDPE geomembrane liner, all of which will overlie a compacted low permeability soil layer. As shown on Figure 3-2, from top to bottom, the components for the proposed composite liner system include the following:

- 24-inch-thick protective soil cover
- 12 oz. geotextile (on floor areas only)
- 12-inch thick LCRS gravel layer (on floor areas only)
- 16 oz. cushion geotextile
- 80-mil HDPE geomembrane, textured as required
- Geocomposite Clay Liner (GCL)
- 60 mil HDPE geomembrane textured both sides
- 16 oz. geotextile
- 9-inch minimum thickness gravel or equivalent drainage layer, with a collection pipe (on floor areas only)
- 16 oz. geotextile (on floor areas only)
- 60-mil HDPE geomembrane, textured both sides (on floor areas only)
- 24-inch-thick low permeability soil layer
- 12 oz. geotextile (on floor areas only)
- 12-inch-thick subdrain gravel layer (on floor areas only)

The subdrain system, though not expected to contain groundwater, has been included in the landfill design to collect and control groundwater, if it intersects the subgrade excavation along the bottom. The subdrain system will be placed beneath the composite liner and will consist of a one-foot-thick gravel blanket and gravel-filled trenches with slotted collector pipes in the bottom areas. The subdrain system is a redundant system in which the permeable gravel pack and the pipe can both convey over a million gallons of groundwater per day by gravity flow to the mouth of the canyon where it will be captured in a collection tank. On the side slopes, if a groundwater seep is identified, depending on the measured flows, either a geonet or trench-type collector chimney drain will be constructed, for lower flow seeps, a geonet strip collector will be used . The collector will be placed from the seep to the next lower bench into a section of slotted pipe surrounded with gravel and wrapped in geotextile. The slotted pipe will transition to solid pipe gravity flowing to the bottom subdrain system. For higher flow seeps, a trench collector type chimney drain will be constructed by first cutting a trench into the side slope from the next lower bench up to the seep. The trench will be filled with gravel and wrapped with geotextile. A perforated pipe can also be added for additional flow capacity. The trench size will be dictated by flow rates. The trench collector will connect at the bench and eventually to the bottom subdrain system similar to the geonet collector.

In floor areas, a 12 ounce geotextile layer separates the 12-inch thick subdrain gravel from the 24-inch low-permeability soil layer. The low-permeability soil layer will be compacted to a minimum of 90% relative compaction (per ASTM D1557) and yield a maximum hydraulic conductivity of $1x10^{-7}$ cm/sec.

A 60-mil HDPE geomembrane, textured on both sides, will be placed above the low-permeability soil and provides both a low permeability and high resistance to chemicals. The complementary physical and hydraulic properties associated with the combination of a geomembrane and low permeability soil result in a very low potential for leakage, many times lower than that of either layer alone.

In the floor areas a 16 ounce geotextile overlies a drainage (leak detection) layer, which consists of a nine-inch minimum thickness of gravel or equivalent with a collection pipe to create the drainage (leak detection) layer. The drainage layer will then be overlain by a 16 ounce geotextile and a 60- mil HDPE geomembrane, textured on both sides. The texturing improves the interface shear strength between the geomembrane and the geotextile below and the GCL above. The geomembrane will be constructed so that its liner seams will be offset from the seams in the lowermost geomembrane (below the drainage layer).

A geocomposite liner (GCL) will be placed above the geomembrane. The GCL is a commercially manufactured liner material containing sodium bentonite. It can be attached directly to the geomembrane or be sandwiched between two geotextiles. The hydraulic conductivity of a typical GCL is on the order of $5x10^{-9}$ cm/sec. The GCL is dry when it is placed and therefore, the bentonite in the GCL has the ability to swell and self-heal and can deform and stretch significantly without losing its hydraulic integrity.

An 80-mil HDPE geomemembrane, textured on both sides in the floor areas, will be placed above the GCL. On the slopes, the upper (80 mil) HDPE geomembrane will consist of a single-side textured product placed with the textured side down. As with the HDPE geomembrane beneath the GCL, this geomembrane provides additional protection to the low-permeability GCL by its high resistance to chemicals and lower permeability. The thicker 80-mil HDPE geomembrane liner also provides added resistance to punctures or damage by surface construction activities following its placement. The texturing improves the interface shear strength between the geomembrane and the geotextile above and the GCL below. This uppermost geomembrane will be constructed so that its liner seams will be offset from the seams in the underlying geomembrane (below the GCL). A brief discussion of the performance advantage of the GCL sandwich design is provided in a letter to Gregory Canyon Ltd. (April 2004).

A Leachate Collection and Removal System (LCRS) will be installed over the 80-mil geomembrane liner to collect and convey leachate that may be generated within the refuse prism. In the floor areas, the system will consist of a one-foot thick gravel layer and HDPE pipe over the entire bottom area, while the slope areas will consist of gravel pipe and gravel collectors wrapped with a geotextile fabric placed on the interior benches. The bottom and slope collectors will be interconnected to convey leachate by gravity flow to the mouth of the canyon to be discharged into two double-walled collection tanks. Though the LCRS system has been designed to prevent clogging of gravel and the pipe layer, in the event of system back-up, clean-outs will be available that can be periodically flushed. In the event of pipe failure, the surrounding gravel layer also has the capacity to convey the leachate to an adjacent pipe or outlet system.

A protective soil cover consisting of a minimum two-foot thick soil layer will be placed over the entire liner and/or LCRS. A 12 ounce geotextile will separate the protective cover from the underlying LCRS/liner.

3.2 SUPPORTING FACILITIES/LANDFILL COMPONENTS

The following section provides a description of additional landfill support facilities and components that require geotechnical analyses or evaluation including the ancillary facilities area (liquefaction analysis), borrow/stockpile areas (slope stability), the access roads and bridge (construction considerations).

3.2.1 Ancillary Facilities

The ancillary facilities area will be located at the toe of the landfill and cover an area of about 12 acres. It will include the fee booth and scales, the administrative office building (located adjacent to the fee booths), and an approximately 7,000 square foot maintenance building. A diesel storage tank within a concrete containment wall will be located on the south side of the maintenance building for refueling of equipment. A portable emergency showerhead designated to contain rinse water will also be provided outside the maintenance building.

A recyclable drop-off area is proposed on the east side of the maintenance building with bins for drop-off of source separated recyclable material, such as newsprint, white paper, tin, aluminum, and glass. White goods will also be accepted and stored near the recycled bins area. Although hazardous materials will be prohibited at Gregory Canyon Landfill, a hazardous materials storage area, located in the southeastern portion of the ancillary facilities area, will be maintained for use if such materials are found in loads coming to the landfill.

Two 10,000-gallon leachate holding tanks and one 10,000-gallon subdrain water tank will be located in the southwestern corner of the ancillary facilities area. A 20,000 gallon water tank will also be located just north of the paved area. The water tank will be supplied from on-site groundwater wells.

3.2.2 Borrow/Stockpile Areas

Approximately 87 acres of borrow/stockpile area will be provided at two locations to the west of the proposed landfill footprint (Figure 2-7). Borrow/Stockpile Area A, which is about 22 acres in size, is located west of the landfill footprint adjacent to the western property boundary. The maximum height of Borrow/Stockpile A ranges from about 320 to 500 feet amsl. Borrow/Stockpile Area B, which is about 65 acres in size, is located immediately to the west of the southern portion of the landfill footprint. The maximum height of the Borrow/Stockpile Area B ranges from about 940 to 1,020 feet amsl.

The borrow/stockpile areas will be used to store and/or excavate material that will be needed in the daily operation of the landfill. During the initial excavation of Phase I of the refuse footprint, a portion of the excavated material will be used for the engineered fill necessary to construct the ancillary facilities area. The remainder of the material will be stockpiled in the landfill footprint or Borrow/Stockpile Area A (Figure 2-7). Borrow/ Stockpile Area A will be used for stockpiling only during the initial construction after which the area will be closed and revegetated with native plant species. Area A will not be used again for about 25 years at which time material will be used from Area A for cover. In the interim, material will be stockpiled within the footprint or in Borrow/Stockpile Area B.

A geophysical study of the borrow areas was conducted to evaluate the rippability of the soil for use by the landfill (GLA, 1998). On the basis of these studies, Borrow Area A is considered rippable to an average depth of 80 feet, and Borrow Area B is considered rippable to an average depth of 75 feet. These rippable depths suggest that approximately 1.3 million cubic yards of material can be excavated from Borrow Area A with conventional earth-moving equipment. Borrow Area B is to be excavated to a depth of about 150 feet and is expected to yield up to 3.2 million cubic yards of material. Though the footprint for the maximum depths is relatively small, deep excavation may require the use of explosives.

Proper drainage control will be maintained in the borrow/stockpile areas. Surface water control features will include grading of the flatter deck areas to promote lateral runoff of precipitation into drainage control facilities such as downdrains and bench drains on the slopes. Surface waters will be collected and conveyed from the borrow/stockpile areas and discharged into the existing natural drainage courses. Erosion control measures such as desilting basins, sandbags, straw matting and/or rip-rap will be utilized to reduce downstream siltation potential. Discharge rates will be equal to or less than natural flow conditions.

Borrow/Stockpile Area B will drain to the southwest into a natural drainage course. At the western end of the Borrow/Stockpile Area B, a desilting basin will be constructed to minimize the flow of silt from the borrow/stockpile area. The desilting basin will be designed to accommodate the soil loss from the borrow/stockpile areas. The drainage course for Borrow/Stockpile Area A runs northwesterly. The drainage control facilities will direct the surface runoff into the existing streams.

Interim drainage and erosion control features (e.g., silt fences) will be constructed for the borrow/stockpile areas, as necessary. Construction and operation of all drainage facilities will adhere to the BMPs developed as part of the Storm Water Pollution Prevention Program Plan (SWPPP) in compliance with State and Federal regulations under the National Pollutant Discharge Elimination System (NPDES) program. The pre-developed drainage condition of the area will be reconstructed as closely as possible once operations are discontinued in each of the borrow/stockpile areas. Exposed areas will be revegetated with native plant species to prevent erosion.

3.2.3 Access Roads/Bridge

The proposed access road from SR 76, which will extend through the abandoned Lucio dairy to the ancillary facilities area, will be two to three lanes and will include a bridge over the San Luis Rey River. The access road from SR 76 to the bridge will be about 910 linear feet and will be 32 feet wide, with two twelve-foot travel lanes and a four-foot shoulder on each side. The access road from the bridge into the ancillary facilities area will be about 985 linear feet and will be 36 feet wide, with three lanes (two travel lanes and a center lane) and a four foot shoulder on each side.

The bridge will be approximately 680 feet long, with five 7-foot diameter supporting piers, which will form the base of the structure. The 35.5-foot wide bridge will have two travel lanes and will maintain a 17.5-foot clearance between the proposed finished channel bottom and the underside of the bridge. The side slopes at the bridge abutments will be graded to a maximum 2.5:1 slope gradient and will be stabilized with rip-rap to prevent erosion.

3.3 STABILITY ANALYSES

The following sections provide the results of geotechnical slope stability analyses that were performed for the design of the proposed landfill and key appurtenant facilities of the project, described above. The geotechnical analyses include static stability of the cut slopes and the refuse prism, the dynamic stability of the refuse prism and the potential for rockfall to occur from the surrounding highlands and impact the landfill.

3.3.1 Stability of Cut Slopes

The three most common types of cut-slope failures are block-slip failures, wedge-slip failures, and circular failures. Block-slip failures are most common in slopes that are underlain by bedrock with distinctive partings (e.g., fractures) that dip in the same direction but at a shallower angle than the cut. Wedge-slip failures occur when the bedrock has two or more partings (e.g., a weathered dike and a joint) with orientations such that their line of intersection dips at a shallow angle in the direction of the cut. Finally, circular failures develop where the substrate is loosely consolidated and comparatively homogeneous. Rocks exposed in Gregory Canyon are compact and cohesive, even when weathered, so a circular failure of the cut slopes is unlikely and will not be considered below.

A kinematic analysis of cut slopes for the proposed landfill development was conducted and utilized the fracture data from 424 measurements in bedrock outcrop and bore hole imaging probe data generated from 12 borings (GLA, 1998). The kinematic analysis showed that large-scale block-slip movement and wedge-failure are not likely given the geometry of the dominant directions of discontinuity in Gregory Canyon identified by the geologic investigations. Mapping should be performed and this conclusion reevaluated as the excavation proceeds. It is also possible that small-scale, localized block falls may occur when fractures daylight the cut or where a higher density of fractures are encountered during excavation.

A study conducted by Woodward-Clyde Consultants (1995) concluded that 2:1 slopes on the east-facing slopes adjacent to the aqueduct are appropriate with a factor of safety of at least 1.5 under static conditions. In response to concern about the stability of the first San Diego Aqueduct during an earthquake event, GLA also performed a pseudo-static analysis of the proposed east-facing cut slopes (adjacent to the aqueduct). Static analysis of modeled wedges indicates a factor of safety of 5.9. This means that the forces resisting movement are approximately six times greater than the forces causing movement. When subjected to ground acceleration associated with the Maximum Credible Earthquake (0.4g), the factor of safety also exceeds the prescriptive 1.5 dynamic factor of safety for all landfill foundation and final fill slopes required by 27 CCR.

Borrow/Stockpile Areas. Within the borrow/stockpile areas, block-slip failures, wedge-slip failures, and circular failures were all assessed (GLA, 1998). Based on the kinetic considerations and structural features of the rocks exposed at Gregory Canyon, it was concluded that block failures, wedge-slip failures and circular failures of cut slopes with 2:1 (H:V) slopes are not likely. As a result, cut slopes for borrow excavations, will be made at a maximum gradient of 2:1 (H:V).

3.3.2 Stability of the Stockpile Slopes

Stockpiles will be placed in the borrow areas at a maximum slope gradient of 3:1 (H:V) and a maximum height of no more than 300 feet. The computer program SLOPE/W was used to analyze the static stability for two cross-sections through these slopes (Figure 2-7). Based on the nature of the materials anticipated to be placed in the stockpiles, a unit weight of 120 pcf, a friction angle of 32° and cohesion of 250 psf were considered reasonable and were used in the slope stability analysis. Results of the analysis (Figures 3-3A, and 3-3B) indicated a calculated minimum static factor of safety of 1.9. Based on this evaluation, the stockpile slopes were considered to have adequate stability.

3.3.3 Stability Analysis of the Refuse Slopes

The bottom grade for the liner, the liner system details, and the finished grades were provided and are presented on Figures 3-1 and 3-2 (BAS, 2003). The interface strengths for each of the liner components can be measured and expressed in terms of standard Mohr-Coulomb strength envelopes (stated in terms of an angle of internal friction and cohesion or adhesion). For the purpose of performing slope stability calculations discussed herein, only the weakest or most critical elements of the liner system have been used. For analysis, the critical elements of the refuse slopes and liners are the refuse fill and the interface between the non-woven geotextile and the HDPE membrane. The parameters used in the analyses and derived primarily from published data (e.g., Serrot International) were:

Material	Unit Weight	Friction Angle	Cohesion
Refuse Fill	80 pcf	30°	200 psf
Smooth HDPE/Geotextile	NA	8°	0 psf
Textured HDPE/Geotextile	NA	14°	0 psf

Geometry. Cross section A-A' shows the final grade profile of the GCLF along the approximate center of Gregory Canyon and shows the proposed landfill configuration and incorporates the most critical section with regard to slope stability for the site (Figure 3-4).

Static Analyses

Slope stability analysis was conducted using the computer program SLOPE/W (Geo-Slope, 1995). Analytical methods available in the program include Bishop method for circular failure modes, and Spencer and Morgenstern and Price methods for general failure modes including block and non-circular failure surfaces. The analysis computes the factor of safety against failure using limit equilibrium procedures. Input parameters required for the analysis include the geometry of the slope, the unit weights and shear strengths (angle of internal friction and cohesion) of the various materials and interfaces in the slope and pore water pressure conditions, if appropriate.

Figures 3-5 shows the critical failure plane for section A-A, and the static factor of safety for this configuration is calculated to be greater than 1.50.

Dynamic Analysis

Current practice for evaluating dynamic slope stability under seismic loading conditions involves two steps: (1) pseudo-static analysis; and (2) more detailed analysis, if step (1) indicates a factor of safety less than 1.5.

In the pseudostatic analysis, the dynamic inertial forces induced by the design earthquake are represented by a constant, equivalent static horizontal force, determined by multiplying the weight of the slope by a seismic coefficient (k). This is a simplified representation of a complex dynamic condition (hence the term 'pseudostatic'). It is customary in the practice, to use a seismic coefficient (k) of 0.15 for slope stability analysis.

If the pseudostatic slope stability analysis calculates a factor of safety of 1.5 or more, the slope is considered to have adequate stability under seismic loading conditions. Otherwise, Title 27 requires that further analysis be done, as step (2) to demonstrate that the proposed design will be functional during the design earthquake for the project (the Maximum Credible Earthquake [MCE] for the GCLF). This additional analysis may include determination of seismic-induced permanent displacement.

Pseudostatic analyses for section A-A' indicates a factor of safety of 0.85 with a seismic coefficient of 0.15 (Figure 3-6). Since the calculated factor of safety is less than 1.5, additional pseudostatic analysis was completed and included estimation of the seismic-induced permanent displacement due to the MCE.

In evaluating seismic displacement, the procedure by Bray and Rathje (1998) was used to estimate seismic-induced permanent displacement during the MCE. The procedure is based on the one described by Newmark (1965) for determining displacement of a rigid block resting on a sliding plane subjected to earthquake-type motions. The procedure first requires determination of "yield acceleration" (i.e., the value of seismic coefficient (k_y) that yields a factor of safety of 1.0 in conventional slope stability analysis). This procedure is then based on the premise that the sliding block will undergo displacement only during periods when the maximum ground acceleration (k_{max}) exceeds the yield acceleration (k_y) for the sliding block. As a result, no displacements occur when k_y is greater than k_{max} (i.e., $k_y/k_{max} > 1$). Bray and Rathje refined the procedure for solid waste landfills to incorporate the dynamic response characteristics of the waste fill, and the intensity, frequency content, and duration of ground motion. The Bray and Rathje procedure yields results that are consistent with the observed performance of landfills during recent earthquakes.

The yield acceleration for section A-A is calculated to be 0.10g (Figure 3-7). Based on this yield acceleration, seismic-induced permanent displacement of the landfill slopes was estimated for the peak horizontal acceleration of 0.40g for the MCE event at the site (See Section 1.4.4). The following parameters were used:

- Slope Height - 300 feet
- Average Shear Wave Velocity of Refuse Fill – 1,200 feet/second (Bray and Rathje, 1998)
- MCE - M7.1 event on the Elsinore Fault-Julian Segment a distance of 6 miles from the site
- MCE Site Acceleration – 0.40g
- Mean Period of Shaking – 0.50 seconds (Bray et al, 1998)
- Significant Duration of MCE – 16 seconds (Bray et al, 1998)

Based on the analysis, the displacement calculated to occur to the total refuse prism and liner is approximately 0.1 inches for the prescriptive configuration. This is less than the commonly accepted maximum displacements for liner systems of 6 inches to 12 inches (Seed and Bonaparte, 1992). Attachment 5 provides the calculation used to determine the seismic-induced permanent displacement for the GCLF base liner along cross-section A-A'.

3.3.4 Stability of the Final Cover

In addition to an evaluation of the cut slopes, and refuse prism, stability analyses were performed for the proposed final cover system for closure of the GCLF. The proposed final cover design assumes a prescriptive low-permeability final cover in accordance with CCR 27. It consists of a two-foot foundation soil layer, a synthetic barrier layer, and a two-foot thick vegetative soil layer. The vegetative soil layer was assumed to consist of on-site soils that are silty sand to sandy silt and compacted to a minimum relative compaction of 90 percent. The barrier layer was assumed to consist of a 60-mil thick Linear Low-Density Polyethylene (LLDPE) geomembrane, textured on both sides. The foundation layer was assumed to consist of compacted random soil. The proposed final grading plan will have an overall slope gradient of 4:1 (horizontal: vertical) including roads and benches at approximately 40-foot vertical intervals and a gradient between benches of 3:1 (horizontal: vertical).

For the slope stability analysis, the interface between the LLDPE geomembrane and the overlying vegetative soil cover was considered the critical surface. The following parameters were considered appropriate and used in the analysis:

Thickness of vegetative soil layer	2 feet
Total density of soil in the vegetative layer	100 pcf
Angle of internal friction at the interface between soil and LLDPE geomembrane	27 degrees
Maximum ground acceleration for the postulated maximum credible earthquake (MCE) at the site	0.40g

The slope stability analysis was conducted considering the proposed final cover as a semi-infinite slope with a gradient of 3:1 (horizontal: vertical). For the design parameters listed above, the analysis indicated a static factor of safety of 1.53 if the tensile strength of the geomembrane is ignored, and 1.69 when considering the tensile strength of the LLDPE.

Since the pseudo-static factor of safety was less than 1.5 (see Attachment 5), an additional analysis was made to estimate the seismic induced permanent displacement during the postulated seismic exposure of the site using the procedure described by Makdisi and Seed (1978). The procedure first requires calculation of yield acceleration (k_y), the acceleration value for which a pseudo-static analysis yields a factor of safety of 1.0. K_y was evaluated and found to be equal to 0.185g. The ratio k_y/k_{max}, where k_{max} is the maximum ground acceleration at the site (0.40g), was then calculated. The value of the estimated permanent displacement was then read from a chart developed by Makdisi and Seed normalized for the period of the waste and related to the magnitude of the earthquake event. Using this procedure, the calculated seismic-induced permanent displacement for the final cover during the postulated maximum credible earthquake at the landfill ranges from 1.7 to 5.1 inches (Attachment 5) depending on the thickness of the waste prism. Using the methods of Bray and Rathje (1998), the seismic displacement under the loading of the MCE ranges from 0.5 to 3.7 inches, depending on the waste thickness (Attachment 5). These estimated displacements are less than the commonly acceptable range of seismic displacements of 6 to 12 inches and would not be expected to inhibit the functional integrity of the cover. Damage should be evident during post-earthquake inspection, and can be easily and quickly repaired as a part of post-earthquake maintenance. The seismic-induced permanent displacement calculations are provided in Attachment 5.

3.4 LIQUEFACTION SUSCEPTIBILITY

To aid in assessing the liquefaction potential of the alluvium underlying the site, the alluvial wedge was drilled, sampled and field tested to a depth of 50 feet at four different locations (Figure 1-2). Laboratory tests were then completed on representative samples in order to characterize the grain-size distribution of the alluvial soils (GLA, 1998). On the basis of the testing, it is concluded that the soils are predominantly silty sands and clayey sands with 14% to 45% silt and clay at the tested locations. A detailed discussion of analytical procedures employed in the liquefaction analysis is provided in GLA's geotechnical report (GLA, 1998). The following table summarizes the SPT data from Gregory Canyon, the cyclic stress ratios calculated for each SPT location, and the calculated factors of safety.

Boring Number	Depth in feet	Material	Percent fines	Depth to water table (ft)	C_d First cyclic-stress ratio	C_l Second cyclic-stress ratio	Factor of safety
Boring 1	20	SM	17%	19	0.199	0.300	1.50
	30	SM	19%	19	0.228	0.700	3.07
	40	SM		19	0.230	0.672	2.93
Boring 2	30	SP/SM	14%	25	0.204	0.280	1.37
	40	SM		25	0.211	0.669	3.16
Boring 3	25	SM-SC	45%	24	0.195	0.400	2.06
	35	SM-SC		24	0.211	0.671	3.18
	45	SM		24	0.208	0.357	1.72
	55	SM		24	0.188	0.630	3.34
Boring 4	35	SM-SC	20%	26	0.206	0.269	1.30
	45	SM-SC		26	0.202	0.651	3.22

Notes: C_d – Ratio of cyclic stress induced by the earthquake to effective normal stress
C_l - Ratio of cyclic stress required to induce liquefaction during the earthquake to effective normal stress.

The lowest calculated factor of safety is 1.30 (in Boring 4), and most other values are considerably higher. For liquefaction hazards, factors of safety ranging from 1.25 to 1.5 are generally considered acceptable and within the standard of practice (SCEC, 1999). We conclude that under existing conditions the liquefaction susceptibility of the alluvial wedge at Gregory Canyon is low, and not a significant impact to the project.

3.5 ROCKFALL AND DEBRIS FLOW ASSESSMENT

Rockfall

Rockfalls are abrupt movements of independent rock blocks detached from steep slopes. Falling rocks can reach the base of a slope by free-falling, bouncing, rolling down the slope surface, or by some combination of the above. Such independent rockfall movements differ from sliding failures that form on a slip surface of the rock slope in that they are much more sudden, and because falling rocks may possess a high degree of kinetic energy. If the failure involves a large volume of rocks, debris will cover a very wide area at the base of the slope.

Potential for rockfall was assessed using trajectory analysis of bounding rock fragments under the assumption of ideal elastic behavior for rock slopes. A representative cross-section of the Gregory Canyon from the summit of Gregory Mountain to the thalweg of Gregory Canyon was considered in this evaluation (GLA, 1998). The analyzed profile includes some of the steepest and longest slopes, and is relatively free of transverse features (e.g., ravines) that could otherwise act as catchment basins for rolling fragments. In considering the rockfall hazard, three scenarios were considered: (a) complete dampening of the kinetic energy once the particle landed in the comparatively soft refuse fill; (b) some of the kinetic energy of the falling rock fragments is dampened by impact; and (c) after the impact the fragment starts rolling down the slope (GLA, 1998).

Under the worst-case scenario, the maximum encroachment of a bouncing rock fragment onto the landfill was estimated to be about 300 feet onto the landfill and the travel time was estimated to be 22 seconds. Based on this analysis, construction of a "catching" wall or other diversion structure near the edge of the landfill is recommended to effectively mitigate the risk of rock fragments rolling onto the landfill. Rockfall trajectories can reasonably be expected to be even shallower and shorter for profiles with gentler slopes. The conclusions reached through the analysis of this profile are of general application throughout the eastern slope of the landfill site.

Debris flows

Earth, mud, and debris flows or debris avalanches form when a mass of unconsolidated sediment is mobilized by sudden ground vibration (e.g., an earthquake) or by a sudden increase in weight and pore water pressure (e.g., after soaking of the soil by heavy rain). Steep topography and deforestation enhance the initial movement of a flow, but once mobilized, flows can spread over gently sloping terrain. Johnson (1970) demonstrated that flows move by "plug flow", in which shear deformation is limited largely to the bottom of the moving mass. The bulk of the mass forms a "plug", in which shear stress is less than the shear strength of the sediment/water mixture. As long as the thickness of the zone of no shear is less than the thickness of the flow, movement will occur, with the plug being passively rafted. If for some reason (e.g., dewatering of the soil mass, or decrease in slope) the thickness of the plug equals that of the flow, movement ceases. This sudden "freezing" of a flow explains the lack of internal stratification, poor sorting of the sediment, and the lobate, steep-sided morphology typical of debris flows.

Review of aerial photographs and geologic mapping of the site, indicate that there is a deposit of poorly-sorted colluvium that could have been formed as a debris flow deposit [Qd(?) on Plate 1; GLA (1998)]. The deposit forms a landform with a rough lobate shape and comparatively steep boundaries, but lacks levees or pressure ridges, and so could also have been formed by erosion of an older colluvial fan.

If not simply the result of erosion of an older colluvial fan, recent studies of the classification of flow type landslides suggest that the deposit identified within Gregory Canyon might be more typical of a debris avalanche (Hungr O., et al., 2001). Hungr et al. (2001) define a debris avalanche as being very similar to a debris flow with the exception that in the case of the debris avalanche, the flow is not confined to an established channel. In the case of a debris flow, the established channel is usually characterized by scour features along a gully path and by the presence of a well-defined depositional cone or fan built up by a number of separate events that follow this same path. In contrast, once the debris avalanche has occurred, it will not normally occur repeatedly at the same location, since depletion of material usually occurs.

It is recognized that the circumstances necessary to form a debris flow/avalanche include a source of loose debris that is typically mobilized by a significant water content, such as a saturated basal layer of material that becomes liquefied by over-riding and rapid loading (Hungr, O. et al, 2001). The susceptibility of the site to these mechanisms was estimated by looking for evidence of previous flow events. Characteristically, a bowl-shaped source area leads to a relatively narrow neck with a U-shaped cross-section. The depositional zone may have multiple lobes of debris overlapping one another, low mounds or levees mark lateral shear surfaces, and arcuate pressure ridges are sometimes seen over the surface of the flow. The deposits themselves are characteristically unstratified and poorly sorted. Sources that might have resulted in the formation of a historical debris avalanche could be the three "hanging" basins that drain the western summit of Gregory Mountain. These basins have gentle slope gradients in their head regions, but drain into the steep western flank of Gregory Mountain. A debris flow/avalanche mobilized within any of these basins would thus have moved rapidly down this steep flank, and accumulate at the toe of the slope, as exemplified, perhaps, by basin 1 and deposit Qd(?) (on Plate 1; GLA, 1998). However, these bowls contain no significant surficial soil deposits.

In siting the landfill within Gregory Canyon, the likelihood of future debris flows/avalanches must be evaluated. Today, most commonly debris flows/avalanches are triggered by a significant increase in saturation, which can buoy the debris down the slope and these types of events typically occur from a rapid snow melt, or in the Pacific

Northwest where heavy rains and flooding are more common. Even if there is an increase in annual rainfall within the vicinity of Gregory Canyon, the climatic conditions are not ideal for the development of repetitive debris flows/avalanches.

The most effective "mitigation" measure to minimize the potential debris flow/avalanche hazard is the natural development of vegetation within the drainage basins. In aerial photographs, these basins generally have a modest to dense development of vegetation along their tributaries and special precautions such as diversion structures near the upper reaches would need to be taken if vegetation is destroyed. The diversion structures should be built so as to be permeable, allowing almost free draining of runoff, but should capture high viscosity earth-, mud- or debris.

3.6 SETTLEMENT ANALYSIS

Refuse settlement in sanitary landfills can be a troublesome and unpredictable problem during the post-closure maintenance period. For example, drainage structures incorporated into the final cover design might become inoperative after a few years because settlement has modified or even reversed the drainage slopes. An analysis of potential settlement is thus a valuable planning tool for maintenance engineering. This section describes the landfill settlement that is estimated to occur in the GCLF during the 30-year period following landfill closure. The settlement analysis provided has been revised from an earlier analysis (GLA, February 1999) and reflects the proposed prescriptive landfill configuration for the 30-year post-closure period.

The mechanics of refuse settlement is complex due to the extreme heterogeneity of refuse fill. According to Edil et al. (1990), the main mechanisms involved in refuse settlement are:

- Mechanical distortion (bending, crushing, and reorientation)
- Raveling (movement of fines into large voids)
- Physical-chemical changes (corrosion, oxidation, and combustion)
- Biochemical decomposition (fermentation and decay)

The magnitude of refuse settlement can thus be inferred to be a function of: (1) the initial refuse density or solid/void ratio, (2) the overall density of the refuse prism or ratio of refuse to daily cover soil, (3) the content of decomposable materials in the refuse, (4) the thickness of refuse lifts and total height of the refuse prism, (5) the refuse prism stress history, (6) the time elapsed since each individual lift was placed, and (7) environmental factors such as moisture content, temperature, and gas content.

In our experience, the most consistent refuse settlement estimates are obtained by modeling the refuse prism as a 3-dimensional net, calculating the settlement at each node of the net with a time-dependant exponential decay function, and adding the total settlement for each column of the net at selected time intervals. Based on the work of Huitric (1981), settlement was modeled as an exponential decay function of the form:

$$\text{Remaining settlement} = \mathbf{a}Te^{-bt}$$

where **a** and **b** are constants such that total expected settlement is a proportion (**a**) of the original thickness, (T), of a particular lift of refuse, and settlement occurs at an exponential rate of **bt**, where t is the time (in years elapsed), since the particular lift of refuse was placed. For a municipal solid waste landfill with standard compaction characteristics, **a** varies between 0.2 and 0.35, and **b** varies between 0.10 and 0.11. Since the GCLF master plan calls for a fairly high compaction ratio, a value of 0.25 was used for parameter **a**, and an intermediate value of 0.105 was used for parameter **b** (Figure 3-8).

In estimating post-closure settlement, a two-dimensional grid over the footprint of the refuse prism was established, with a nodal spacing of 250 feet (Figure 3-9; Table 1). The third dimension in the model net was then added to represent the change in elevation between discrete time intervals. As currently constructed, each "layer" of the model represents 3 to 4 years of landfilling (Table 3-1).

Figure 3-10 shows the landfill surface elevations at the time of landfill closure (approximately year 30), and Figures 3-11a through -11c depict the estimated landfill elevations 10, 20 and 30 years after closure, respectively. The calculated values for the nodes used to contour these figures are summarized in Table 3-2.

As shown on Figure 3-11c, total potential settlement during a 30-year post-closure period could be as much as 60 feet in the southern half of the landfill prism. This is less than the 140 feet estimated in the earlier settlement analysis (GLA, February 1999) for two reasons. First, the thickness of refuse has been reduced as the floor of the landfill has been raised; and second, a higher initial compaction has been assumed. In addition, the configuration of the refuse prism changes slightly with the "pyramid" that formed the apex eventually settling into a "deck". Even after 30 years, if proper maintenance is performed, surface grades should be sufficient to facilitate efficient drainage off the site.

3.7 LEACHATE GENERATION ANALYSIS

This section complements GLA's earlier leachate generation analysis report dated December 18, 1998 and includes a discussion of the results following extension of the model from a 20-year post-closure period to a 30-year post-closure period.

Modeling of potential leachate generation was performed using the United States Army Corps of Engineers HELP 3 (Hydrologic Evaluation of Landfill Performance) computer program, which uses representative rainfall and evapo-transpiration data to determine the amounts of leachate that might be generated in municipal solid waste landfills. The program takes into account the total area landfilled, representative precipitation patterns, representative evapo-transpiration, and the hydraulic conductivity of various construction materials to calculate leachate generation and accumulation.

Climate. The initial climate properties were selected from a table of default values included in the HELP 3 model. These default values were selected for the city of San Diego and were corrected for the latitude of the proposed Gregory Canyon Landfill.

Precipitation data were adjusted to a 60-year annual average of 19.3 inches, with a minimum yearly total of 8.36 inches and a maximum yearly total of 34.8 inches (Figure 3-12). In contrast, in the model provided earlier (GLA, 1998), the precipitation data were adjusted to a 50-year annual average of 18 inches, with a minimum yearly total of 4.40 inches and a maximum yearly total of 24.79 inches. The slightly different values arose when a new synthetic precipitation record was generated for this analysis.

Material properties. The engineering and hydraulic properties of materials were determined from HELP3 default values, as follows (from top to bottom):

Layer	USCS	Thickness (inches)	Porosity	Saturated Hydraulic Conductivity (cm/sec)
Vegetative cover	SM	18	0.473	5.20E-04
60 mil LLDPE	--		--	2.00E-13
Foundation layer	SM	24	0.473	5.20E-04
Refuse	--	Variable	0.671	1.00E-03
Operations layer	SM	24	0.473	5.20E-04
LCRS layer	GP	24	0.397	3.00E-02
60 mil HDPE	--		--	2.00E-13
Low permeability layer	CH	24	0.4	7.80E-07

In calculating the potential percolation through the first (upper) liner HDPE and the final cover LLDPE geomembranes, densities of two pinholes per acre and one installation defect per acre were assumed. The hydraulic conductivities and other engineering properties of materials utilized in the analysis are shown in the HELP3 output sheets presented in Attachment 6.

Model configuration. Modeling of the leachate generation for the Gregory Canyon Landfill was performed by subdividing the 186-acre landfill (the approximate area of the landfill excluding the three transmission line pads on the east side of the landfill) into three zones. The first zone encompasses the two portions of the "floor" area that have a slope of 3% (24.6 acres); the second encompasses the intervening portion of the "floor" area that has a slope of 8.5% (16.0 acres); and the third zone encompasses the "slope" areas (145.8 acres).

Leachate drains in the LCRS system were positioned at 500-foot intervals within the bottom LCRS gravel. Along the side slopes, drains were assumed to be positioned at each construction bench (i.e., 100-foot horizontal spacing).

Closure of the proposed Gregory Canyon Landfill was modeled using a prescriptive final cover (CCR Title 27) including a 24-inch foundation layer, a 60-mil linear LLDPE geomembrane, and an upper 24-inch topsoil layer able to support vegetation.

Modeling period. Using the climatic and material values described above, the HELP 3 analysis was performed iteratively for a simulated 31-year post-closure period. Following the practice described by Peyton and Schroeder (1988), the first year (year 30) is used to initialize the model and its results are not reported as part of the simulation.

Results. Based on the HELP3 model data, the total leachate generation and peak daily leachate generation during the 30-year operating life of the landfill is generally low, except for significant "spikes" associated with the heavy precipitation in years 3, 16 and 22 (Figure 3-12). After final cover is placed at the end of year 30, leachate generation becomes very low. During the landfill's operating life, the amount of leachate generated reaches a maximum value in the 16th year, when the projected total leachate generated is estimated at 53,984 ft^3 (403,800 gallons), of which 8,187 ft^3 (61,239 gallons) are generated from the floor area and 45,797 ft^3 (342,561 gallons) are generated from the slope area. The peak daily leachate generation is estimated to be 142 ft^3 (1,062 gallons) for the floor area and 1,094 ft^3 (8,183 gallons) for the slope areas during the 16th year. The peak daily head on the liner reaches 0.25 inches during the 16th year.

For the 30-year post-closure period, the amount of leachate generated peaks 29 year after closure, when the projected total leachate generation is estimated to be 3,381 ft^3 (25,290 gallons) of which 735 ft^3 (5,498 gallons) are generated in floor areas and 2,646 ft^3 (19,792 gallons) are generated is slope areas. The peak daily leachate generation is estimated to be 2.5 ft^3 (19 gallons) in floor areas and 9.7 ft^3 (73 gallons) in slope areas 26 year after closure.

During the post-closure period, the calculated peak daily head on the liner reaches a maximum of 0.03 inches. The peak daily head during the 30-year operating life of the landfill (0.25 inches) and during the 30-year post-closure period (0.03 inches) are well within the 12-inch range allowed by regulations (e.g., 40 CFR, Subpart D, Section 258.40).

The results of the three simulations performed are included in Attachment 6. The results from GREG3FL simulation represent the portions of the floor that have an average floor grade of 3%. The results from GREG3ST simulation represent the portions of the floor that have an average floor grade of 8.5%. Finally, results of GREG3BS simulation represent the back slopes with an average grade of 50%.

3.8 CONCLUSIONS AND RECOMMENDATIONS

Based upon the geotechnical analyses completed in support of the proposed GCLF design, it is concluded that the landfill meets or exceeds all federal and state design criteria. The following findings support this conclusion:

Stability Analyses

- Analysis of the dominant directions of discontinuities in the bedrock within Gregory Canyon indicates that it is not feasible for substantial large-scale, block-slip movement or wedge failure to occur in cut slopes excavated to a maximum gradient of 2:1. It is recommended that cut slopes be mapped as the excavation proceeds and this conclusion be reevaluated during the excavation process. Based on the nature of the bedrock within Gregory Canyon, it is possible that localized, small-scale block falls could occur.

- In addition, because the excavated areas of the site will be underlying by cohesive bedrock, circular failure in the cut slopes is unlikely.

- For the borrow/stockpile areas A and B, stability analyses indicated that based on the proposed design, the stockpiles are considered to have adequate stability.

- Static stability analyses were performed for the GCLF refuse prism along cross-section A-A' extending down the center of the canyon. The results of the stability analysis, using the computer program SLOPE/W (Geo-Slope, 1995), indicate that the static factor of safety for this configuration is calculated to be 1.50, and meets CCR 27 standards.

- Dynamic stability analyses were performed to assess the behavior of the refuse prism under seismic loading. Initially, pseudo-static stability analysis was performed, however, because the refuse prism did not meet the required factor of safety of 1.5, a more rigorous seismic-induced permanent displacement analysis was performed. Results of this analysis employed methods developed by Bray and Rathje (1998) and calculated a displacement of less than one inch under the maximum credible earthquake (MCE) site acceleration of 0.40g. This estimated displacement is less than the currently accepted standard of practice for liner systems of 6 to 12 inches (Seed and Bonaparte, 1992).

- Stability analyses were performed for the proposed final cover system for closure of the GCLF. As with the refuse prism, initially pseudo-static stability analysis was performed, however, because the pseudo-static factor of safety was less than 1.5, a more rigorous additional analysis was performed to estimate the seismic induced permanent displacement during the postulated MCE event at the site. Results of this more rigorous analysis employed methods developed by Makdisi and Seed (1978) and Bray and Rathje (1998) and calculated displacement of less than one inch to 5.1 inches under the maximum credible earthquake (MCE) site acceleration of 0.40g. These estimated displacements are less than the currently accepted standard of practice of 6 to 12 inches and would not be expected to inhibit the functional integrity of the cover.

Liquefaction Susceptibility

- GLA evaluated the liquefaction susceptibility of the loose alluvial sediment at the toe of Gregory Canyon. The results of this analysis indicate that under existing conditions, factors of safety ranging from 1.30 to 3.34. As a results the liquefaction susceptibility of these alluvial sediments are low.

Rockfalls and Debris Flows

- An assessment of rockfall trajectories was completed for the GCLF, using the steepest (eastern) slopes at the site. Under bouncing trajectories calculated assuming some dampening of the kinetic energy by impact, it is calculated that the bouncing particle (rock) will stop within a few feet from the limit of refuse with a travel time of about 23 seconds.

- Another scenario including an assumption that the rock fragment will start to roll down the slope, results in rockfall extending as much as 360 feet onto the landfill.

- Construction of a "catching" wall, or diversion structure is recommended to mitigate the risk of rockfall.

- GLA mapped a lobate shaped, poorly sorted colluvium deposit, which might have formed from a debris flow, or may have formed by erosion of an older colluvial fan. As a conservative measure, an assessment of the occurrence of debris flows was conducted. The likelihood of a debris flow encroaching on the landfill is considered low considering current and forecast climatic conditions in the area.

Settlement Analysis

- A settlement analysis was performed for the proposed GCLF for the 30-year post-closure maintenance period. Results of this analysis indicate a maximum of 60 feet of post-closure settlement in the southern half (thickest portion) of the landfill prism.

- Results of the settlement analysis indicate that although the refuse prism will experience significant settlement, the grades generally appear to remain adequate for site drainage.

Leachate Generation

- During the 30-year operating life of the landfill, leachate generation is generally low, with the exception of significant "spikes" associated with heavy rain in years 3, 16 and 22. Leachate generation becomes even lower following closure of the landfill and placement of the final cover at the end of year 30.

- The model results indicate that the largest amount of leachate generation occurs in year 16 when the projected total leachate generated is estimated at 53,984 ft^3 (403,800 gallons), peak daily leachate generation is estimated to be 1236 ft^3 (9,245 gallons), and the peak daily head on the liner reaches 0.25 inches.

- Following landfill closure, the amount of leachate generated peaks in the 29^{th} year after closure, when the projected total leachate generation is estimated at 3,381 ft^3 (25,290 gallons). Peak daily leachate generation is estimated to be 12.2 ft^3 (92 gallons), 26 years after closure and the peak daily head on the liner over the post-closure period is calculated to be 0.03 inches.

3.9 ADDITIONAL GEOTECHNICAL REFERENCES

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SECTION 3.0

TABLES

Table 3-1
Model Accumulation of Refuse (in feet) Over Time

Year 1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	X	X
2	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	X
4	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X
5	X	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X
6	0	20	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X
7	30	30	15	10	0	0	0	0	0	0	0	0	0	0	X	X	X	X
8	X	30	20	14	0	0	0	0	0	0	0	0	X	X	X	X	X	X
9	X	10	25	18	0	X	X	0	0	0	0	X	X	X	X	X	X	X
10	X	X	28	22	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Year 2

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	X	X
2	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	X
4	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X
5	X	0	0	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X
6	0	40	40	35	20	2	0	0	0	0	0	0	0	0	X	X	X	X
7	30	40	40	40	32	0	0	0	0	0	0	0	0	0	X	X	X	X
8	X	40	40	40	30	0	0	0	0	0	0	0	X	X	X	X	X	X
9	X	0	40	40	0	X	X	0	0	0	0	X	X	X	X	X	X	X
10	X	X	40	40	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Year 5

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	X	X
2	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	X
4	X	X	0	30	0	0	0	0	0	0	0	0	0	0	0	0	X	X
5	X	95	125	150	125	25	0	0	0	0	0	0	0	0	X	X	X	X
6	30	90	130	150	150	95	0	0	0	0	0	0	0	0	X	X	X	X
7	0	45	100	150	130	97	0	0	0	0	0	0	0	0	X	X	X	X
8	X	10	65	105	45	0	0	0	0	0	0	0	X	X	X	X	X	X
9	X	0	30	75	10	X	X	0	0	0	0	X	X	X	X	X	X	X
10	X	X	0	50	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Year 10

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	X	X
2	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	X
4	X	X	0	0	0	0	10	10	5	2	0	0	0	0	0	0	X	X
5	X	0	0	0	0	50	25	15	15	10	0	0	0	0	X	X	X	X
6	0	0	0	0	0	5	55	20	20	5	0	0	0	0	X	X	X	X
7	0	0	0	0	0	5	80	35	10	0	0	0	0	0	X	X	X	X
8	X	0	0	0	5	0	0	0	0	0	0	0	X	X	X	X	X	X
9	X	0	0	0	0	X	X	0	0	0	0	X	X	X	X	X	X	X
10	X	X	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Table 3-1
Model Accumulation of Refuse (in feet) Over Time (cont'd)

Year 14

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	X	X
2	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	X
4	X	X	0	0	50	50	50	50	50	50	25	0	0	0	0	0	X	X
5	X	0	0	0	20	50	50	50	50	50	45	0	0	0	X	X	X	X
6	0	0	0	0	0	50	50	50	50	50	25	0	0	0	X	X	X	X
7	0	0	0	0	0	0	0	25	50	35	0	0	0	0	X	X	X	X
8	X	0	0	0	0	0	0	0	25	0	0	0	X	X	X	X	X	X
9	X	0	0	0	0	X	X	0	0	0	0	X	X	X	X	X	X	X
10	X	X	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Year 17

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	X	X
2	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	X	X	X	X	0	0	0	35	10	0	20	25	0	0	0	0	0	X
4	X	X	30	50	50	50	50	50	50	50	50	50	0	0	0	0	X	X
5	X	0	15	50	50	50	50	50	50	50	50	50	0	0	X	X	X	X
6	0	0	0	45	50	30	0	25	50	50	50	40	0	0	X	X	X	X
7	0	0	0	0	0	0	0	0	50	50	50	0	0	0	X	X	X	X
8	X	0	0	0	0	0	0	0	50	20	0	0	X	X	X	X	X	X
9	X	0	0	0	0	X	X	0	0	0	0	X	X	X	X	X	X	X
10	X	X	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Year 20

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	X	X	X	X	X	0	0	0	0	0	0	0	0	0	0	0	X	X
2	X	X	X	X	0	0	0	10	0	0	5	50	10	0	0	0	0	0
3	X	X	X	X	75	70	100	100	100	95	100	100	100	60	5	0	0	X
4	X	X	0	10	90	100	100	100	100	100	100	100	100	0	0	0	X	X
5	X	0	0	5	75	100	100	100	100	100	100	100	75	0	X	X	X	X
6	0	0	0	0	40	120	150	125	100	100	100	100	55	0	X	X	X	X
7	0	0	0	0	75	165	195	175	100	100	100	45	0	0	X	X	X	X
8	X	0	0	0	120	150	135	175	100	100	75	0	X	X	X	X	X	X
9	X	0	0	0	0	X	X	10	60	25	0	X	X	X	X	X	X	X
10	X	X	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Year 24

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	X	X	X	X	X	0	0	0	0	0	25	25	0	0	0	0	X	X
2	X	X	X	X	15	50	95	100	100	75	100	100	100	90	90	30	0	0
3	X	X	X	X	10	80	100	100	100	100	100	100	100	100	100	75	0	X
4	X	X	0	0	0	60	100	100	100	100	100	100	100	100	0	0	X	X
5	X	0	0	0	0	40	100	100	100	100	100	100	100	50	X	X	X	X
6	0	0	0	0	0	0	45	80	100	100	100	100	100	40	X	X	X	X
7	0	0	0	0	0	0	0	25	80	100	100	100	60	5	X	X	X	X
8	X	0	0	0	0	0	0	0	50	100	100	85	X	X	X	X	X	X
9	X	0	0	0	0	X	X	0	25	60	55	X	X	X	X	X	X	X
10	X	X	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Table 3-1
Model Accumulation of Refuse (in feet) Over Time (cont'd)

Year 28

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	X	X	X	X	X	0	50	98	95	0	100	100	100	65	65	0	X	X
2	X	X	X	X	0	10	75	100	100	100	100	100	100	100	100	100	85	70
3	X	X	X	X	0	0	45	100	100	100	100	100	100	100	100	100	90	X
4	X	X	0	0	0	0	25	85	100	100	100	100	100	100	100	65	X	X
5	X	0	0	0	0	0	0	35	75	100	100	100	100	100	X	X	X	X
6	0	0	0	0	0	0	0	0	15	80	100	100	100	100	X	X	X	X
7	0	0	0	0	0	0	0	0	0	40	100	100	100	100	X	X	X	X
8	X	0	0	0	0	0	0	0	0	0	60	100	X	X	X	X	X	X
9	X	0	0	0	0	X	X	0	0	0	20	X	X	X	X	X	X	X
10	X	X	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Year 30

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	X	X	X	X	X	0	0	0	0	0	20	35	30	20	0	0	X	X
2	X	X	X	X	0	0	0	25	50	35	55	90	95	95	70	45	25	10
3	X	X	X	X	0	0	0	5	70	105	125	150	150	120	95	70	40	X
4	X	X	0	0	0	0	0	0	30	75	120	150	150	90	30	20	X	X
5	X	0	0	0	0	0	0	0	0	20	75	130	130	60	X	X	X	X
6	0	0	0	0	0	0	0	0	0	0	40	100	110	50	X	X	X	X
7	0	0	0	0	0	0	0	0	0	0	0	55	50	30	X	X	X	X
8	X	0	0	0	0	0	0	0	0	0	0	0	X	X	X	X	X	X
9	X	0	0	0	0	X	X	0	0	0	0	X	X	X	X	X	X	X
10	X	X	0	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Note: The values represent thickness of accumulated refuse (in feet) at the nodes of a 2-dimensional grid with cells that are 250 feet by 250 feet. Cell A-10 coincides with the center of the proposed site facilities area.

Table 3-2
Elevation Values Used to Calculate the Maps (Figures 3-10 and 3-11)

X - coordinate	Y - coordinate	Northing	Easting	Elevation in year 31	Elevation in year 40	Elevation in year 50	Elevation in year 60
0	A	250	2750	1150	1150	1150	1150
1	A	250	2500	1000	1000	1000	1000
2	A	250	2250	900	900	900	900
3	A	250	2000	750	750	750	750
4	A	250	1750	655	655	655	655
5	A	250	1500	550	550	550	550
6	A	250	1250	480	479.7	479.6	479.5
7	A	250	1000	440	439.6	439.4	439.3
8	A	250	750	400	400	400	400
9	A	250	500	378	378	378	378
10	A	250	250	370	370	370	370
11	A	250	0	370	370	370	370
0	B	500	2750	1070	1070	1070	1070
1	B	500	2500	910	910	910	910
2	B	500	2250	795	795	795	795
3	B	500	2000	655	655	655	655
4	B	500	1750	615	615	615	615
5	B	500	1500	575	574.0	573.7	573.5
6	B	500	1250	540	538.7	538.1	537.9
7	B	500	1000	495	494.1	493.7	493.5
8	B	500	750	460	459.4	459.2	459.1
9	B	500	500	390	389.9	389.9	389.9
10	B	500	250	380	380	380	380
11	B	500	0	370	370	370	370
0	C	750	2750	1080	1080	1080	1080
1	C	750	2500	925	925	925	925
2	C	750	2250	790	790	790	790
3	C	750	2000	700	700	700	700
4	C	750	1750	630	628.9	628.5	628.4
5	C	750	1500	615	613.2	612.5	612.2
6	C	750	1250	580	578.4	577.7	577.5
7	C	750	1000	550	548.6	548.0	547.8
8	C	750	750	515	513.9	513.5	513.3
9	C	750	500	480	479.2	478.9	478.8
10	C	750	250	450	449.5	449.3	449.3
11	C	750	0	390	390	390	390
0	D	1000	2750	1040	1040	1040	1040
1	D	1000	2500	890	890	890	890
2	D	1000	2250	795	795	795	795
3	D	1000	2000	705	705	705	705
4	D	1000	1750	660	657.5	656.4	656.0
5	D	1000	1500	655	651.5	650.0	649.5
6	D	1000	1250	645	641.7	640.3	639.8
7	D	1000	1000	600	598.1	597.4	597.1
8	D	1000	750	555	553.6	553.0	552.8
9	D	1000	500	525	523.8	523.4	523.2
10	D	1000	250	500	499.1	498.7	498.5
11	D	1000	0	450	450	450	450

Table 3-2 (cont'd)
Elevation Values Used to Calculate the Maps (Figures 3-10 and 3-11)

X - coordinate	Y - coordinate	Northing	Easting	Elevation in year 31	Elevation in year 40	Elevation in year 50	Elevation in year 60
0	E	1250	2750	995	995	995	995
1	E	1250	2500	895	895	895	895
2	E	1250	2250	810	808.9	808.4	808.3
3	E	1250	2000	760	755.6	753.8	753.2
4	E	1250	1750	740	732.6	729.5	728.5
5	E	1250	1500	725	717.9	714.9	713.8
6	E	1250	1250	690	684.7	682.4	681.7
7	E	1250	1000	655	649.8	647.7	647.0
8	E	1250	750	620	613.5	610.7	609.8
9	E	1250	500	500	499.9	499.9	499.8
10	E	1250	250	525	525	525	525
11	E	1250	0	500	500	500	500
0	F	1500	2750	900	900	900	900
1	F	1500	2500	900	900	900	900
2	F	1500	2250	860	855.2	853.2	852.5
3	F	1500	2000	830	820.8	816.9	815.6
4	F	1500	1750	810	797.7	792.6	790.9
5	F	1500	1500	790	778.1	773.2	771.4
6	F	1500	1250	750	740.8	737.0	735.7
7	F	1500	1000	705	696.0	692.2	690.9
8	F	1500	750	650	642.8	639.8	638.7
9	F	1500	500	600	600	600	600
10	F	1500	250	580	580	580	580
11	F	1500	0	590	590	590	590
0	G	1750	2750	955	955	955	955
1	G	1750	2500	905	899.4	897.1	896.3
2	G	1750	2250	925	909.7	903.3	901.1
3	G	1750	2000	895	877.8	870.7	868.2
4	G	1750	1750	875	856.8	849.3	846.7
5	G	1750	1500	850	834.4	827.9	825.6
6	G	1750	1250	795	782.2	777.0	775.1
7	G	1750	1000	735	724.2	719.8	718.2
8	G	1750	750	695	688.5	685.8	684.8
9	G	1750	500	600	600	600	600
10	G	1750	250	700	700	700	700
11	G	1750	0	640	640	640	640
0	H	2000	2750	980	980	980	980
1	H	2000	2500	950	939.1	934.6	933.0
2	H	2000	2250	975	952.6	943.3	940.1
3	H	2000	2000	955	929.8	919.3	915.7
4	H	2000	1750	935	910.2	899.9	896.2
5	H	2000	1500	885	865.6	857.6	854.8
6	H	2000	1250	830	815.6	809.6	807.5
7	H	2000	1000	775	763.5	758.7	757.0
8	H	2000	750	745	736.6	733.1	731.8
9	H	2000	500	710	709.5	709.3	709.2
10	H	2000	250	760	760	760	760
11	H	2000	0	650	650	650	650

Table 3-2 (cont'd)
Elevation Values Used to Calculate the Maps (Figures 3-10 and 3-11)

X - coordinate	Y - coordinate	Northing	Easting	Elevation in year 31	Elevation in year 40	Elevation in year 50	Elevation in year 60
0	I	2250	2750	1000	1000	1000	1000
1	I	2250	2500	950	939.4	935.0	933.5
2	I	2250	2250	1000	974.7	964.1	960.5
3	I	2250	2000	1020	986.7	972.9	968.1
4	I	2250	1750	980	949.4	936.8	932.3
5	I	2250	1500	925	901.2	891.3	887.8
6	I	2250	1250	865	847.8	840.7	838.1
7	I	2250	1000	830	816.1	810.3	808.3
8	I	2250	750	800	789.1	784.6	783.0
9	I	2250	500	775	770.3	768.3	767.6
10	I	2250	250	800	800	800	800
11	I	2250	0	700	700	700	700
0	J	2500	2750	915	915	915	915
1	J	2500	2500	900	900	900	900
2	J	2500	2250	985	963.5	954.7	951.5
3	J	2500	2000	1055	1017.5	1002.0	996.5
4	J	2500	1750	1025	988.3	973.1	967.8
5	J	2500	1500	970	940.7	928.6	924.3
6	J	2500	1250	930	905.8	895.8	892.2
7	J	2500	1000	890	870.7	862.7	859.9
8	J	2500	750	850	837.1	831.8	829.9
9	J	2500	500	810	804.4	802.1	801.3
10	J	2500	250	840	840	840	840
11	J	2500	0	775	775	775	775
0	K	2750	2750	950	950	950	950
1	K	2750	2500	970	954.3	947.8	945.5
2	K	2750	2250	1005	978.7	967.8	964.0
3	K	2750	2000	1075	1033.8	1016.8	1010.8
4	K	2750	1750	1070	1027.8	1010.3	1004.2
5	K	2750	1500	1025	988.5	973.3	968.0
6	K	2750	1250	990	958.8	945.9	941.3
7	K	2750	1000	950	924.9	914.6	910.9
8	K	2750	750	910	892.4	885.1	882.5
9	K	2750	500	870	863.7	861.1	860.2
10	K	2750	250	875	875	875	875
11	K	2750	0	860	860	860	860
0	L	3000	2750	950	950	950	950
1	L	3000	2500	985	967.2	959.8	957.3
2	L	3000	2250	1040	1006.7	993.0	988.1
3	L	3000	2000	1100	1055.2	1036.6	1030.1
4	L	3000	1750	1100	1054.3	1035.4	1028.8
5	L	3000	1500	1080	1037.1	1019.3	1013.0
6	L	3000	1250	1050	1011.6	995.6	990.0
7	L	3000	1000	1005	976.8	965.1	961.0
8	L	3000	750	950	932.6	925.4	922.9
9	L	3000	500	905	905	905	905
10	L	3000	250	900	900	900	900
11	L	3000	0	890	890	890	890

Table 3-2 (cont'd)
Elevation Values Used to Calculate the Maps (Figures 3-10 and 3-11)

X - coordinate	Y - coordinate	Northing	Easting	Elevation in year 31	Elevation in year 40	Elevation in year 50	Elevation in year 60
0	M	3250	2750	950	950	950	950
1	M	3250	2500	980	964.7	958.4	956.2
2	M	3250	2250	1045	1013.0	999.7	995.1
3	M	3250	2000	1100	1056.1	1037.9	1031.5
4	M	3250	1750	1100	1056.1	1037.9	1031.5
5	M	3250	1500	1080	1040.0	1023.5	1017.7
6	M	3250	1250	1060	1023.8	1008.7	1003.5
7	M	3250	1000	1000	977.6	968.3	965.0
8	M	3250	750	950	950	950	950
9	M	3250	500	900	900	900	900
10	M	3250	250	900	900	900	900
11	M	3250	0	880	880	880	880
0	N	3500	2750	970	970	970	970
1	N	3500	2500	970	960.0	955.9	954.4
2	N	3500	2250	1045	1014.2	1001.4	997.0
3	N	3500	2000	1070	1032.1	1016.5	1010.9
4	N	3500	1750	1040	1009.2	996.4	991.9
5	N	3500	1500	1010	986.9	977.4	974.0
6	N	3500	1250	1000	979.1	970.4	967.3
7	N	3500	1000	980	964.4	957.9	955.6
8	N	3500	750	920	920	920	920
9	N	3500	500	915	915	915	915
10	N	3500	250	895	895	895	895
11	N	3500	0	860	860	860	860
0	O	3750	2750	1000	1000	1000	1000
1	O	3750	2500	950	942.8	939.8	938.7
2	O	3750	2250	1020	992.6	981.3	977.3
3	O	3750	2000	1045	1013.2	1000.1	995.4
4	O	3750	1750	980	964.7	958.4	956.2
5	O	3750	1500	950	950	950	950
6	O	3750	1250	950	950	950	950
7	O	3750	1000	940	940	940	940
8	O	3750	750	940	940	940	940
9	O	3750	500	890	890	890	890
10	O	3750	250	860	860	860	860
11	O	3750	0	840	840	840	840
0	P	4000	2750	1050	1050	1050	1050
1	P	4000	2500	950	950	950	950
2	P	4000	2250	995	975.5	967.4	964.5
3	P	4000	2000	1020	993.7	982.9	979.0
4	P	4000	1750	970	960.0	955.9	954.4
5	P	4000	1500	950	950	950	950
6	P	4000	1250	950	950	950	950
7	P	4000	1000	950	950	950	950
8	P	4000	750	920	920	920	920
9	P	4000	500	895	895	895	895
10	P	4000	250	885	885	885	885
11	P	4000	0	870	870	870	870

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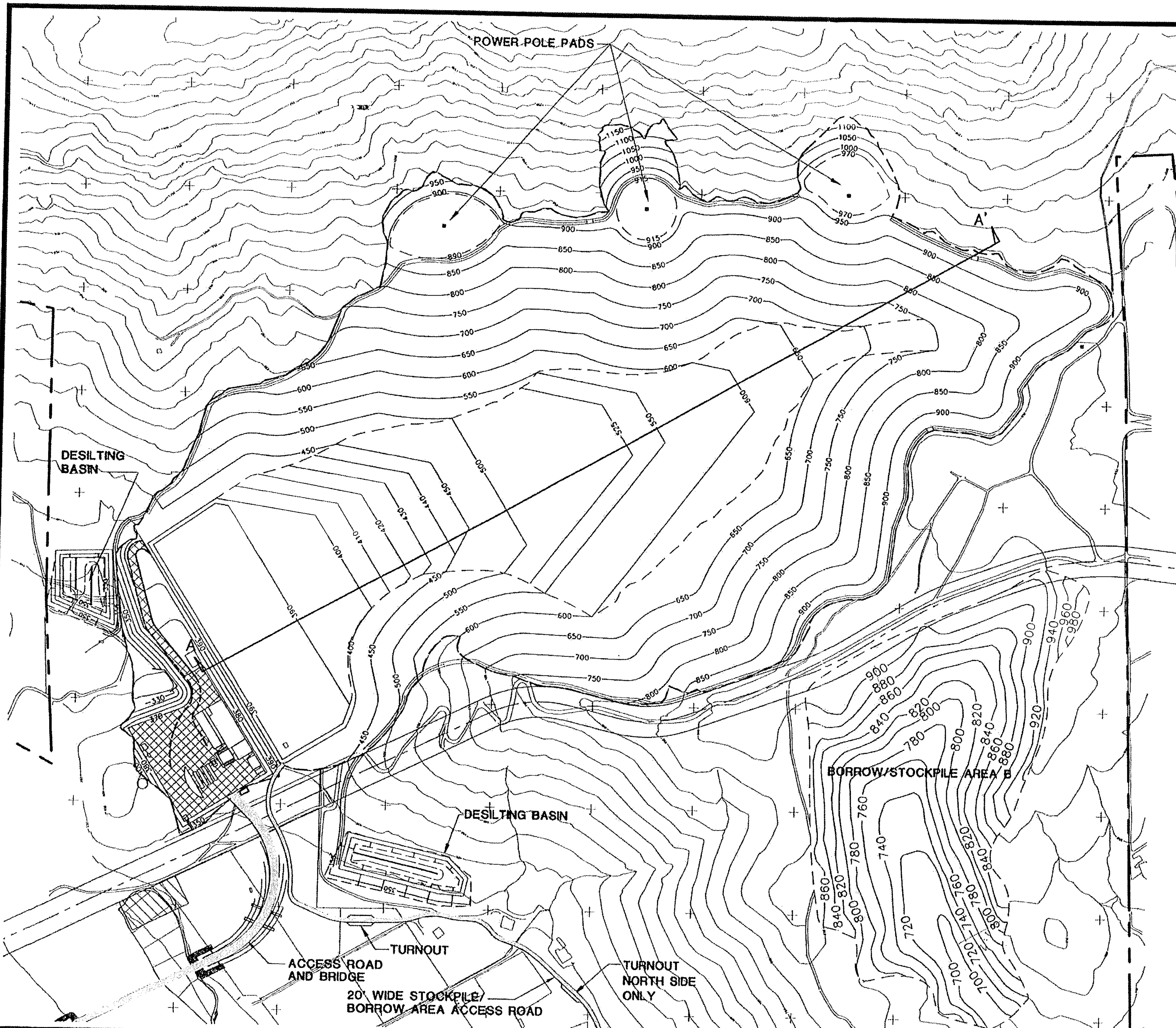
Table 3-2 (cont'd)
Elevation Values Used to Calculate the Maps (Figures 3-10 and 3-11)

X - coordinate	Y - coordinate	Northing	Easting	Elevation in year 31	Elevation in year 40	Elevation in year 50	Elevation in year 60
0	Q	4250	2750	1070	1070	1070	1070
1	Q	4250	2500	960	960	960	960
2	Q	4250	2250	975	962.1	956.7	954.9
3	Q	4250	2000	990	974.5	968.0	965.8
4	Q	4250	1750	950	950	950	950
5	Q	4250	1500	950	950	950	950
6	Q	4250	1250	950	950	950	950
7	Q	4250	1000	945	945	945	945
8	Q	4250	750	930	930	930	930
9	Q	4250	500	950	950	950	950
10	Q	4250	250	915	915	915	915
11	Q	4250	0	920	920	920	920
0	R	4500	2750	1050	1050	1050	1050
1	R	4500	2500	960	960	960	960
2	R	4500	2250	960	950.8	947.0	945.7
3	R	4500	2000	950	950	950	950
4	R	4500	1750	950	950	950	950
5	R	4500	1500	960	960	960	960
6	R	4500	1250	960	960	960	960
7	R	4500	1000	950	950	950	950
8	R	4500	750	955	955	955	955
9	R	4500	500	955	955	955	955
10	R	4500	250	955	955	955	955
11	R	4500	0	945	945	945	945
0	S	4750	2750	1020	1020	1020	1020
1	S	4750	2500	975	975	975	975
2	S	4750	2250	945	945	945	945
3	S	4750	2000	950	950	950	950
4	S	4750	1750	945	945	945	945
5	S	4750	1500	950	950	950	950
6	S	4750	1250	952	952	952	952
7	S	4750	1000	952	952	952	952
8	S	4750	750	952	952	952	952
9	S	4750	500	945	945	945	945
10	S	4750	250	930	930	930	930
11	S	4750	0	910	910	910	910

SECTION 3.0

FIGURES



LEGEND

- PROPERTY LINE
- TOP/TOE OF SLOPE
- PROPOSED GROUND CONTOUR
- EXISTING GROUND CONTOUR
- ACCESS/HAUL ROAD
- A — A' SLOPE STABILITY CROSS-SECTION LOCATION

N

GRAPHIC SCALE
250 0 125 250 500
(in feet)
1 inch = 500 ft.

FIGURE 3-1

MASTER EXCAVATION PLAN

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	NOVEMBER 2003	9539

226

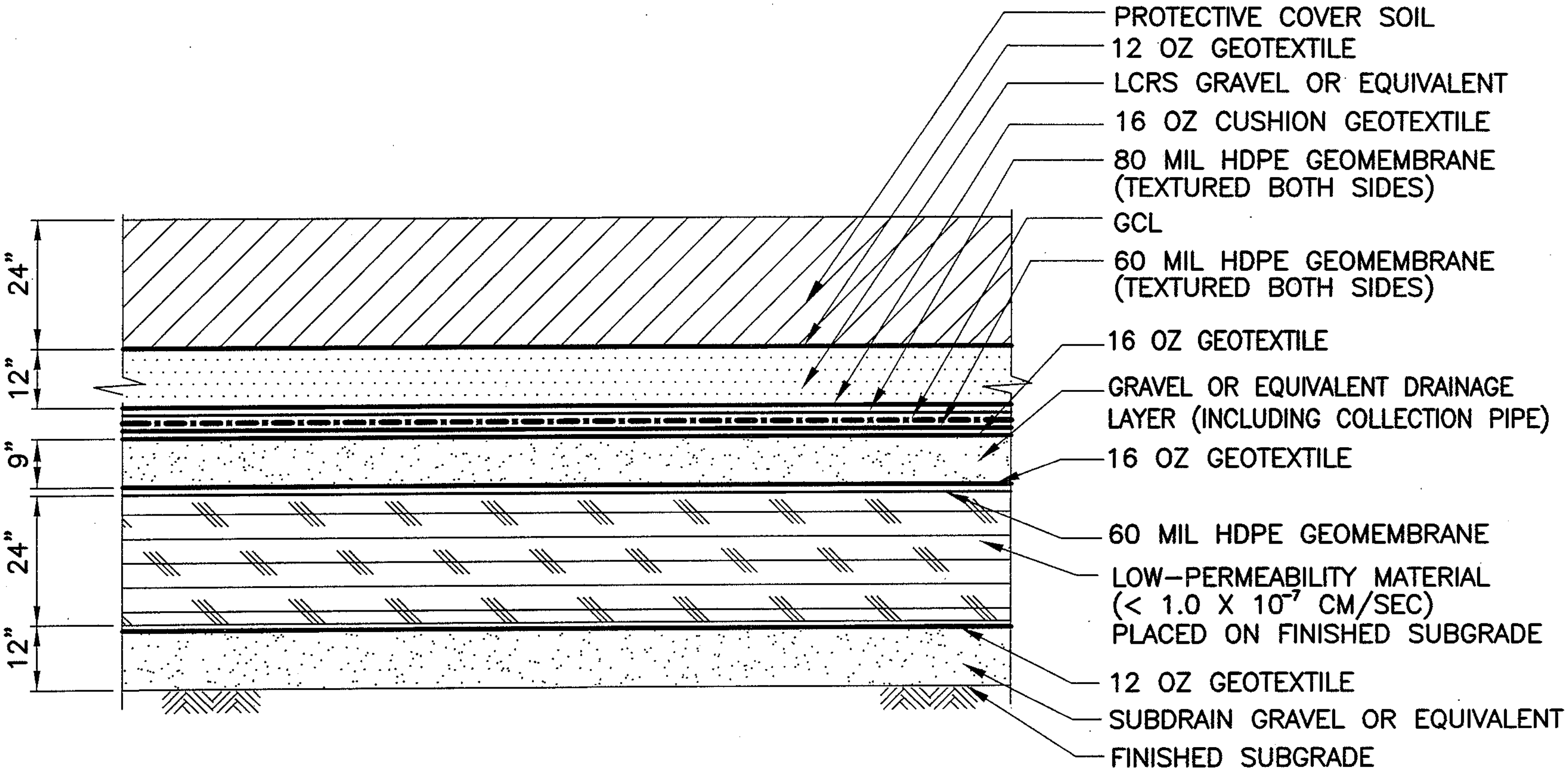


FIGURE 3-2

PROPOSED COMPOSITE LINER SYSTEM DETAIL		
GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES GREGORY CANYON LANDFILL SAN DIEGO COUNTY, CALIFORNIA		
GeoLogic Associates Geologists, Hydrogeologists, and Engineers		
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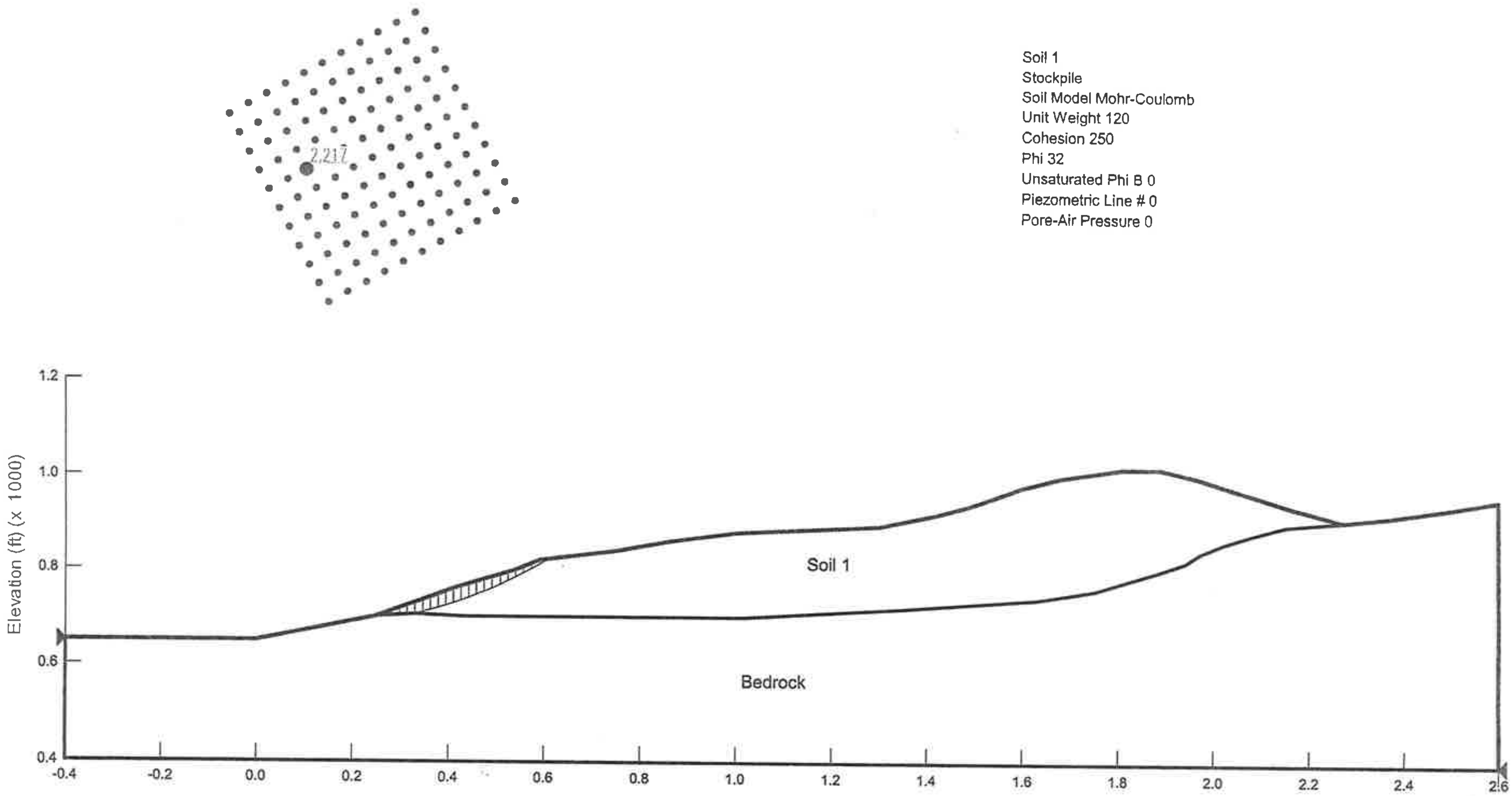

NOTE: SEE FIGURE 2-7 FOR SECTION LOCATION

FIGURE 3-3A

STOCKPILE SLOPE STABILITY
SECTION 1-1' STATIC ANALYSIS

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

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VL	MAY 2003	9539

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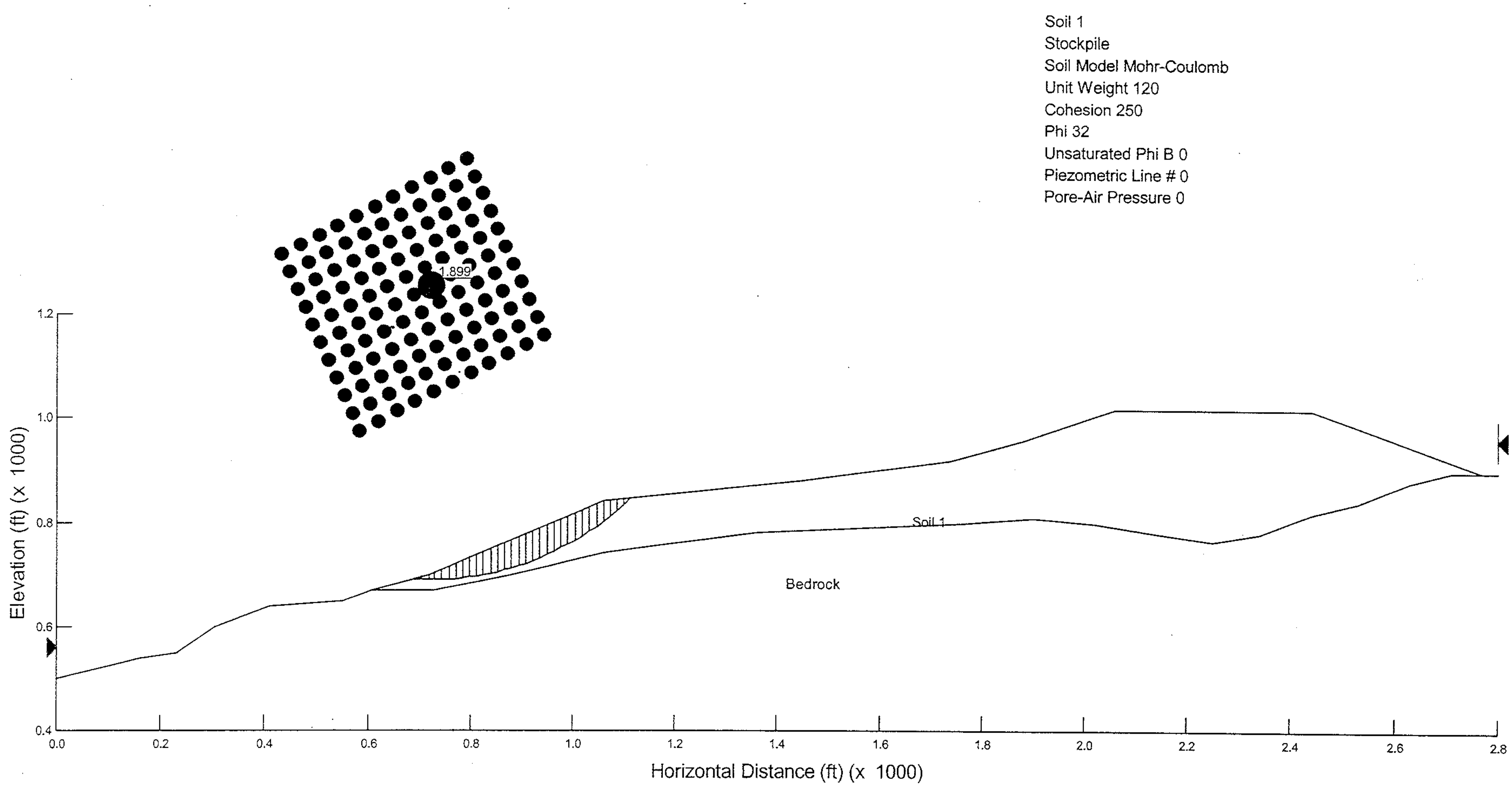

NOTE: SEE FIGURE 2-7 FOR SECTION LOCATION

FIGURE 3-3B

STOCKPILE SLOPE STABILITY
SECTION 2-2' STATIC ANALYSIS

GEOLOGY, HYDROGEOLOGY AND
GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

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VL	MAY 2003	9539

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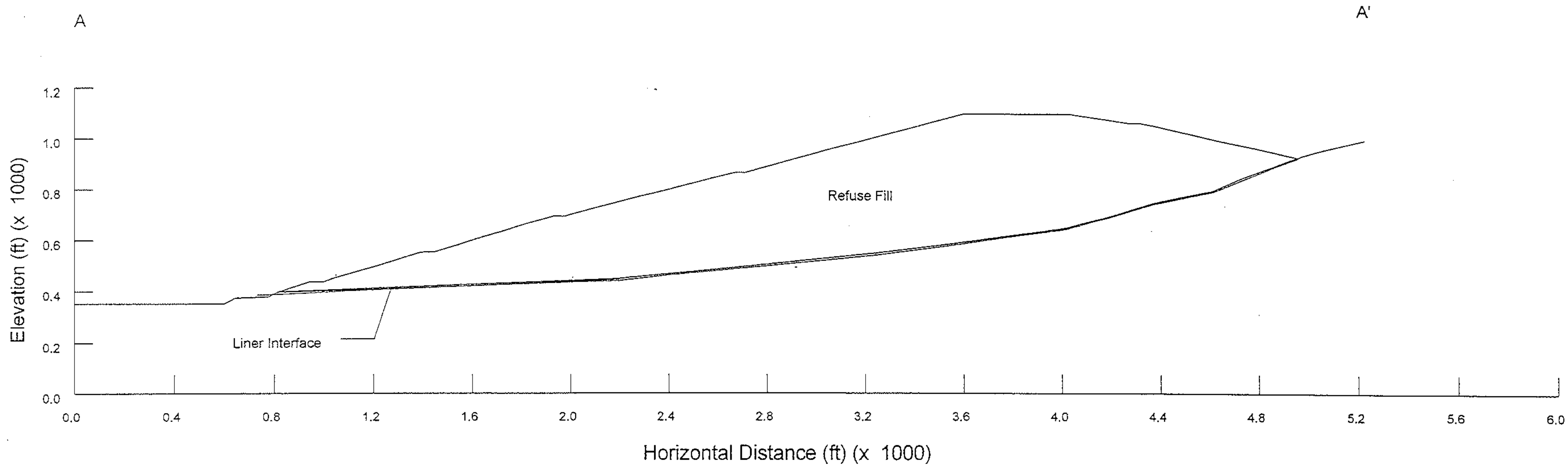


FIGURE 3-4

CROSS-SECTION A-A' FOR SLOPE STABILITY ANALYSIS		
GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES GREGORY CANYON LANDFILL SAN DIEGO COUNTY, CALIFORNIA		
GeoLogic Associates Geologists, Hydrogeologists, and Engineers		
DRAWN BY: VL	DATE: MAY 2003	JOB NO. 9539

230

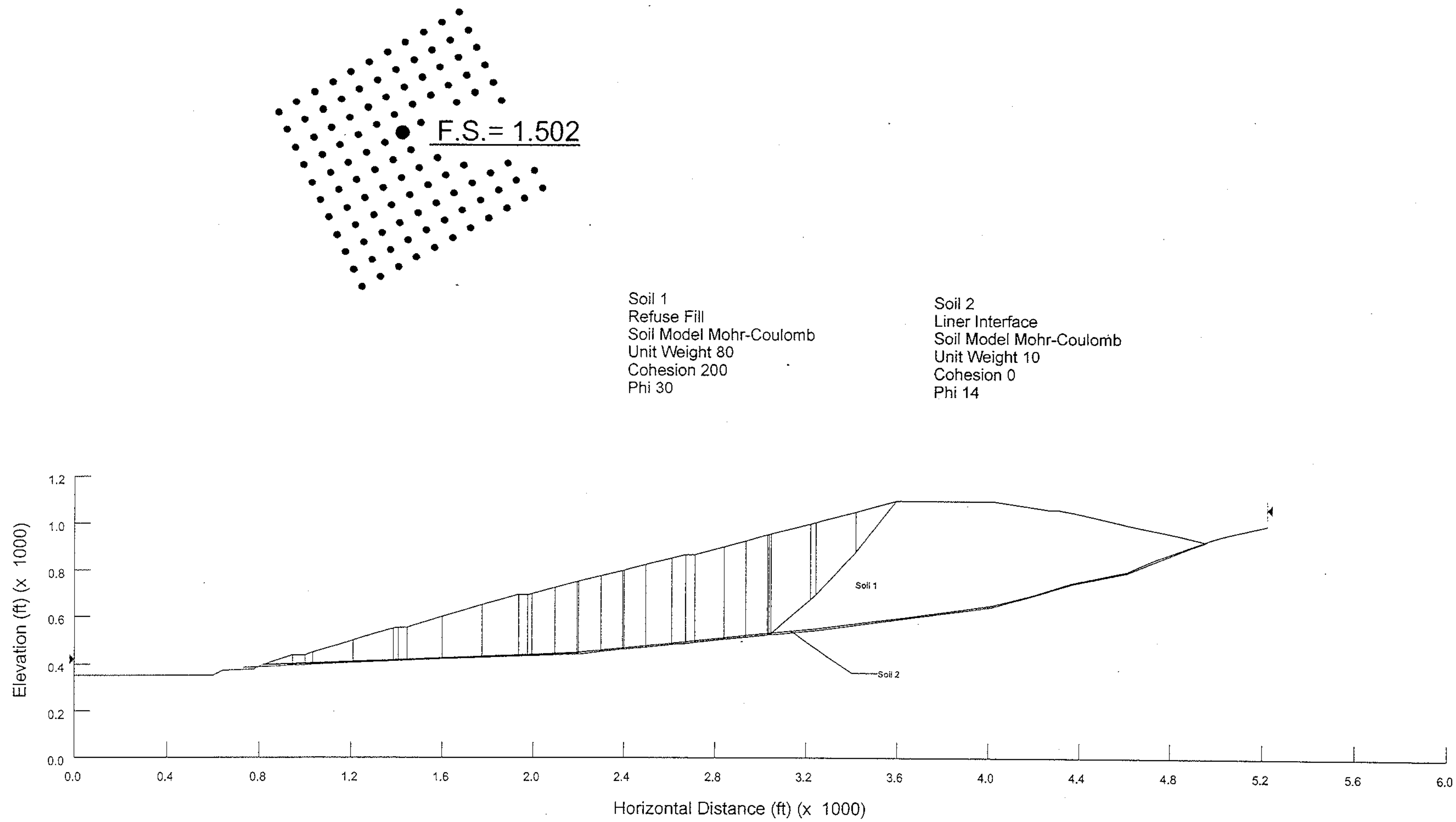


FIGURE 3-5

STATIC ANALYSIS

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	MAY 2003	9539

231

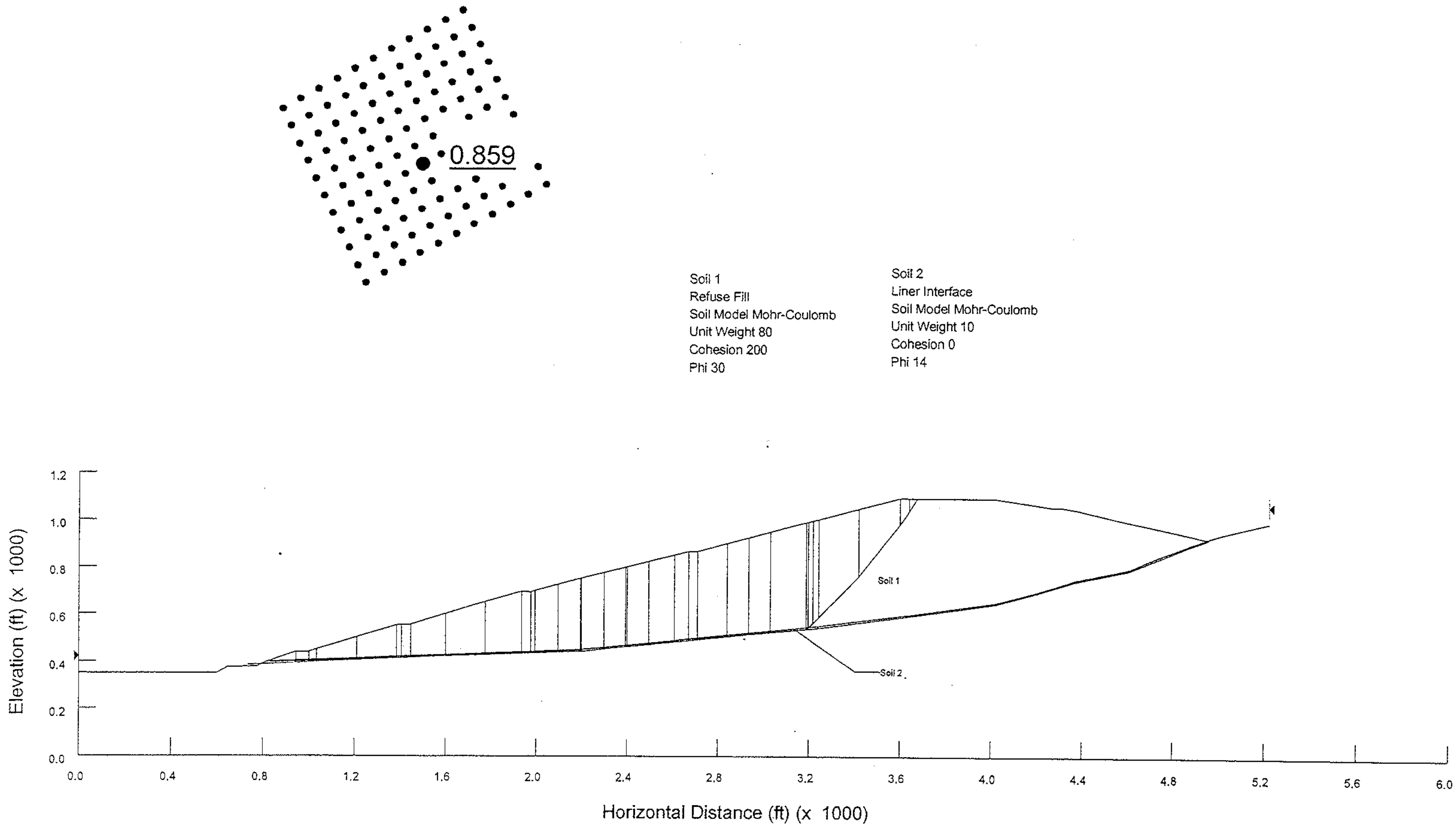
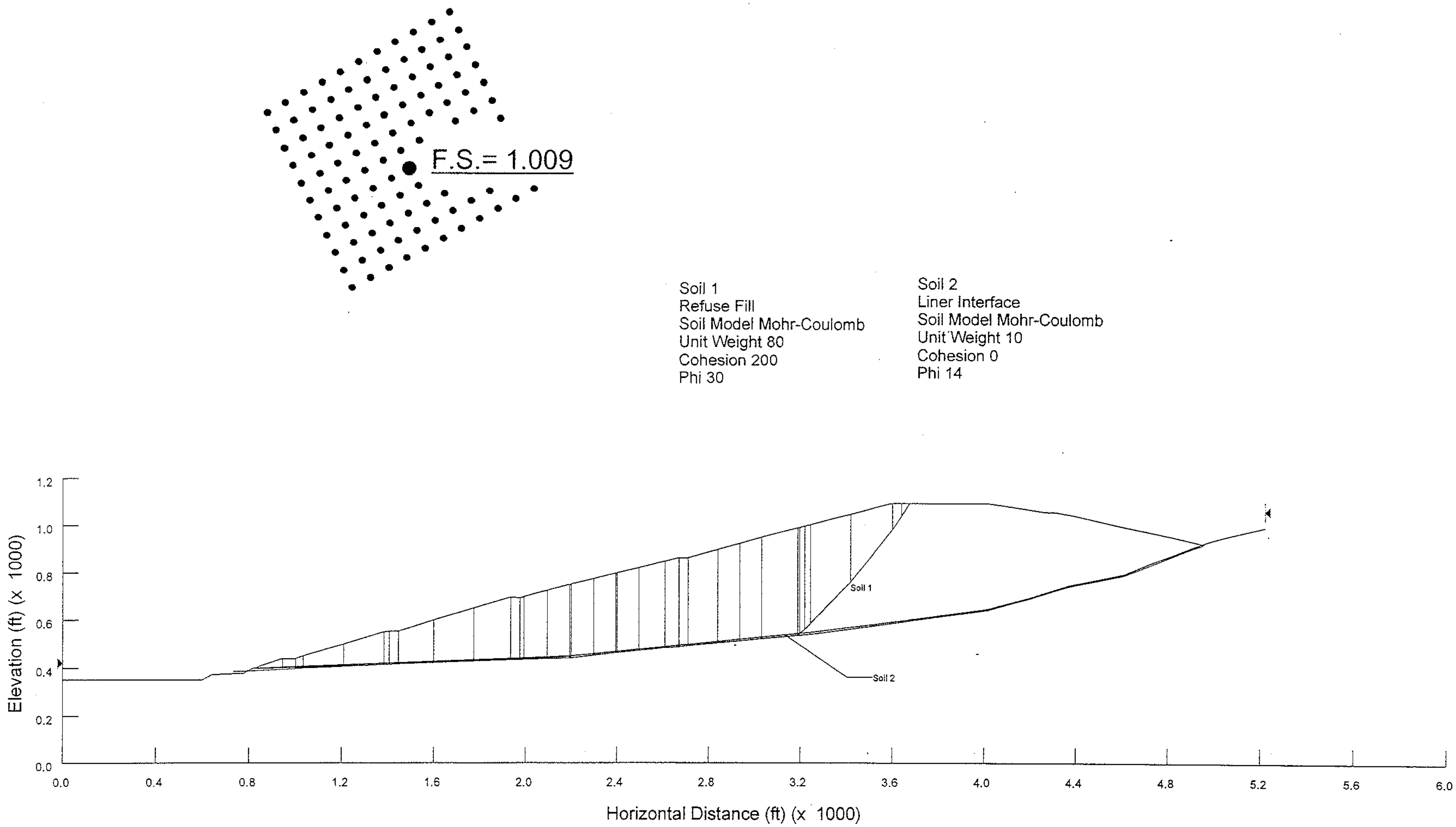


FIGURE 3-6

PSEUDO-STATIC ANALYSIS (USING k=0.15)		
GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES GREGORY CANYON LANDFILL SAN DIEGO COUNTY, CALIFORNIA		
GeoLogic Associates Geologists, Hydrogeologists, and Engineers		
DRAWN BY: VL	DATE: MAY 2003	JOB NO. 9539

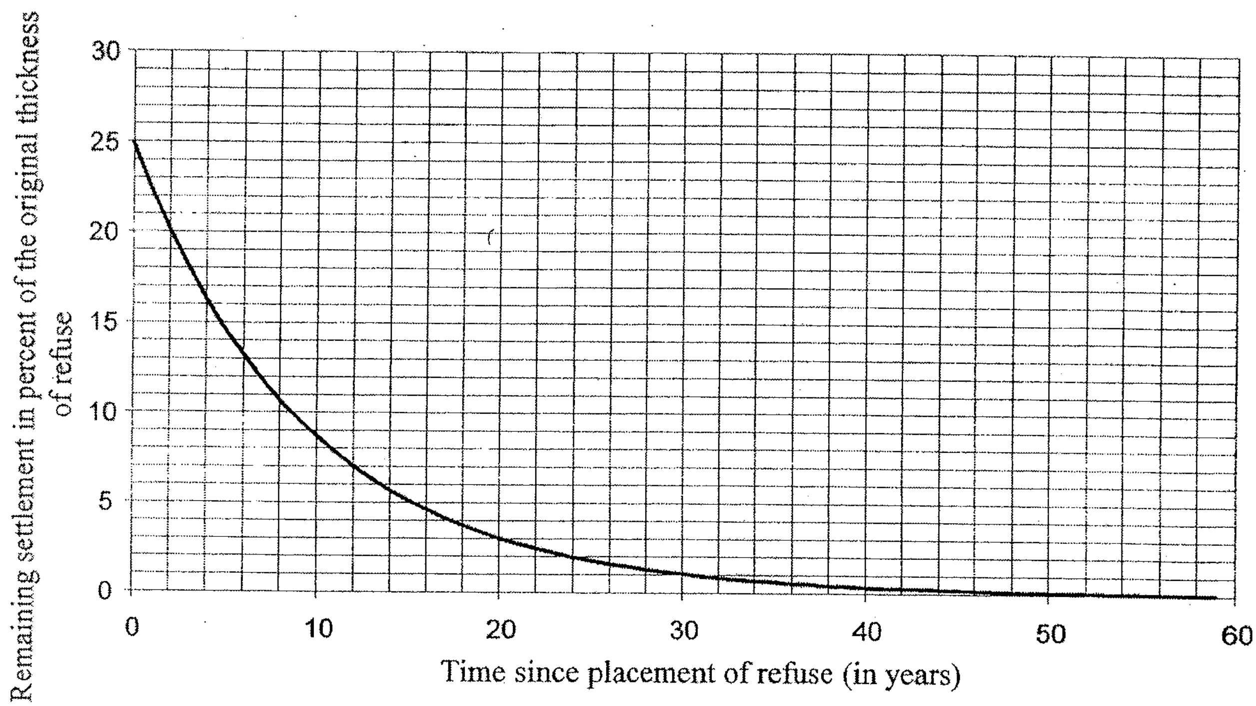
228



YIELD ACCELERATION, ky = 0.10 g

FIGURE 3-7

PSEUDO-STATIC ANALYSIS FOR YIELD ACCELLERATION		
GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES GREGORY CANYON LANDFILL SAN DIEGO COUNTY, CALIFORNIA		
GeoLogic Associates — Geologists, Hydrogeologists, and Engineers		
DRAWN BY: VL	DATE: MAY 2003	JOB NO. 9539

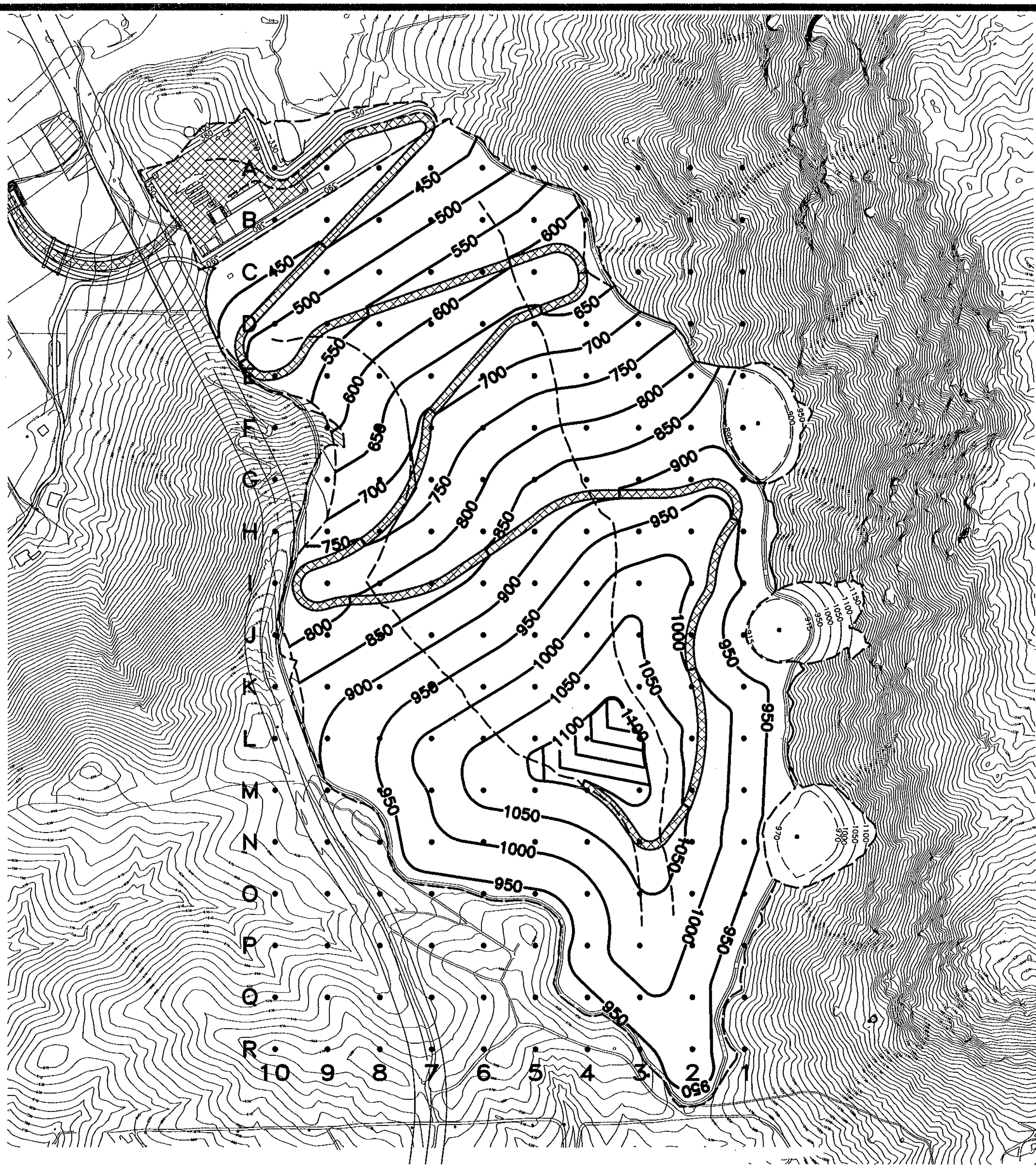


Remaining settlement = $0.25Te^{-0.105t}$

where total expected settlement is 25% of the original thickness, T, of a particular lift of refuse. This equation assumes that settlement decays exponentially with time at a rate of 0.105t, where t is the time in years since the particular lift of refuse was placed.

FIGURE 3–8

SETTLEMENT CURVE		
GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES GREGORY CANYON LANDFILL SAN DIEGO COUNTY, CALIFORNIA		
GeoLogic Associates — Geologists, Hydrogeologists, and Engineers		
DRAWN BY: VL	DATE: MAY 2003	JOB NO. 9539



GRAPHIC SCALE
350 0 175 350 700
(in feet)
1 inch = 700 ft.

N

FIGURE 3–9

NODES USED FOR SETTLEMENT ANALYSIS

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

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VL	NOVEMBER 2003	9539

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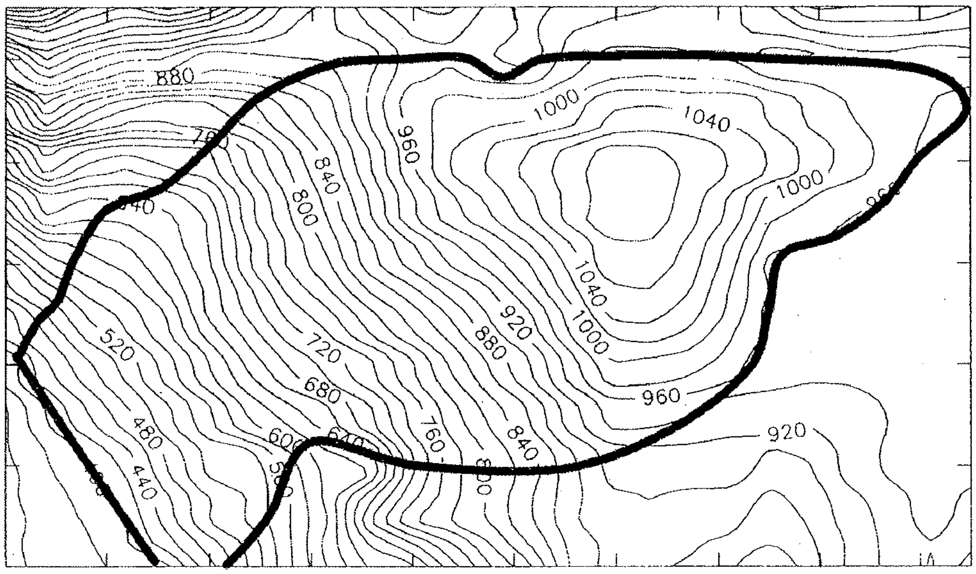
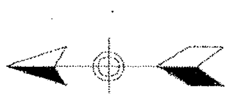


Year 30 - Final closure



2,000 feet

FIGURE 3-10

FINAL CONFIGURATION OF THE LANDFILL AT CLOSURE

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

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VL	MAY 2003	9539

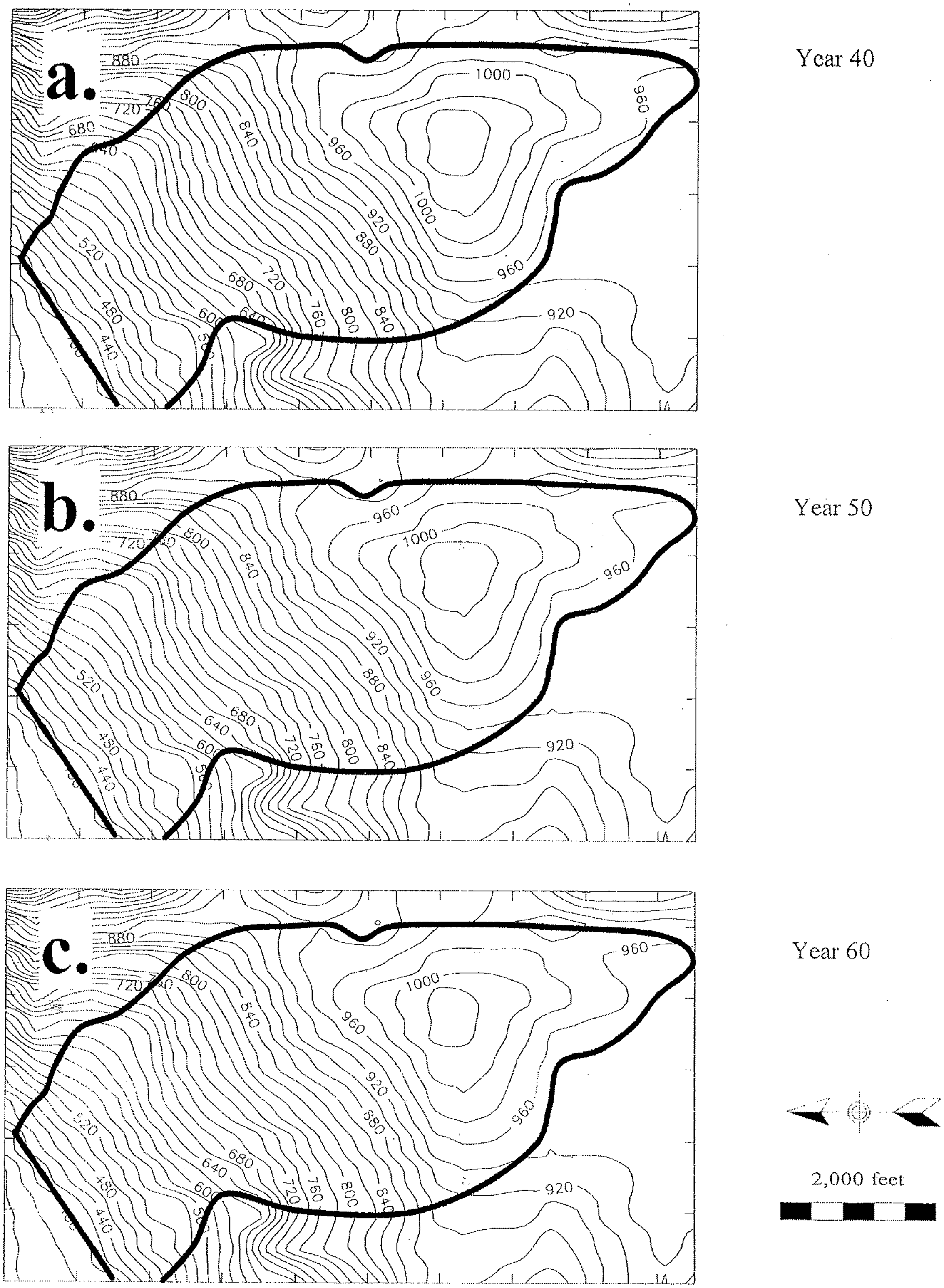

FIGURE 3-11

ESTIMATED CONFIGURATION OF THE LANDFILL DURING THE 30 YEARS FOLLOWING CLOSURE

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	MAY 2003	9539

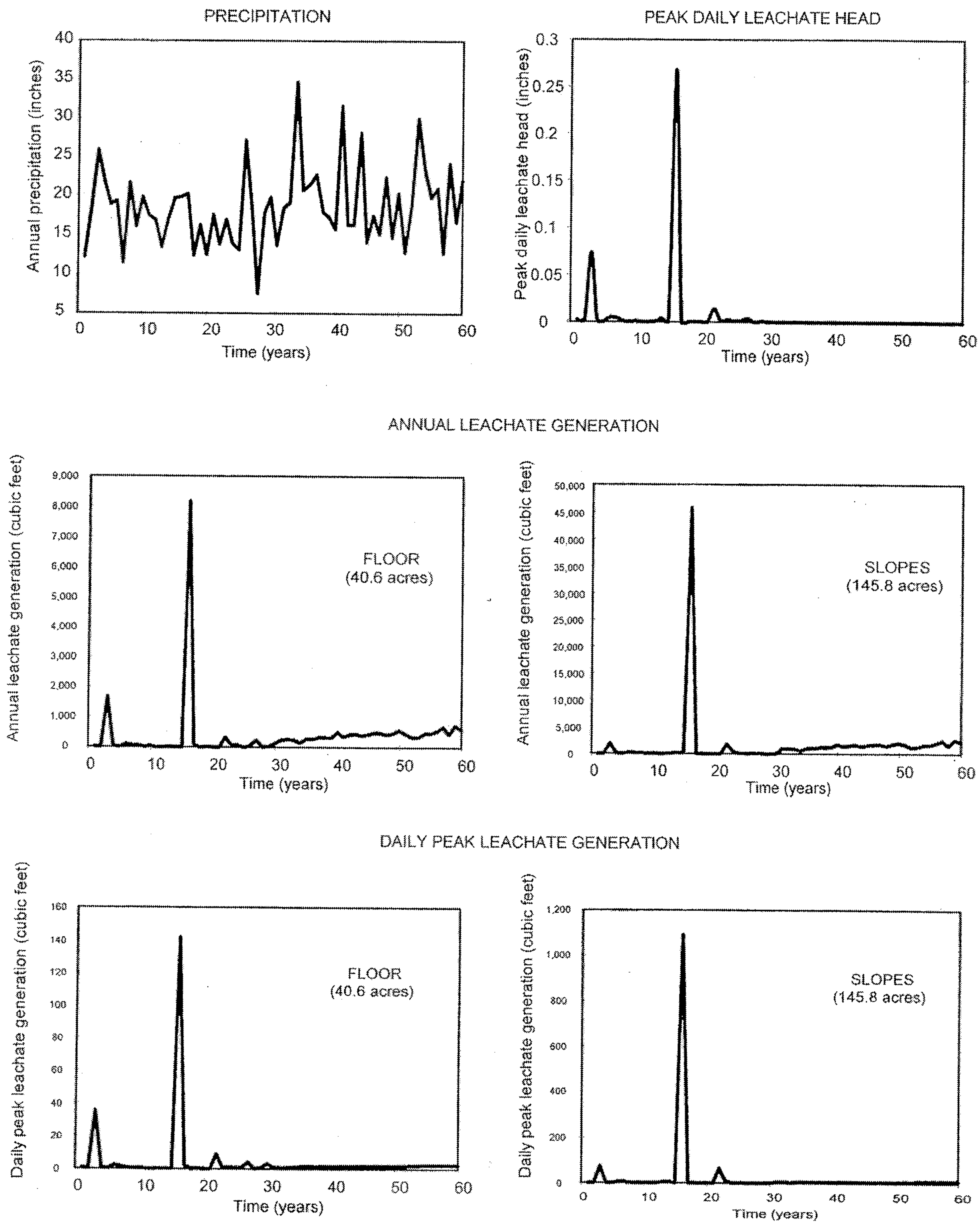

FIGURE 3–12

RESULTS OF LEACHATE GENERATION ANALYSIS

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

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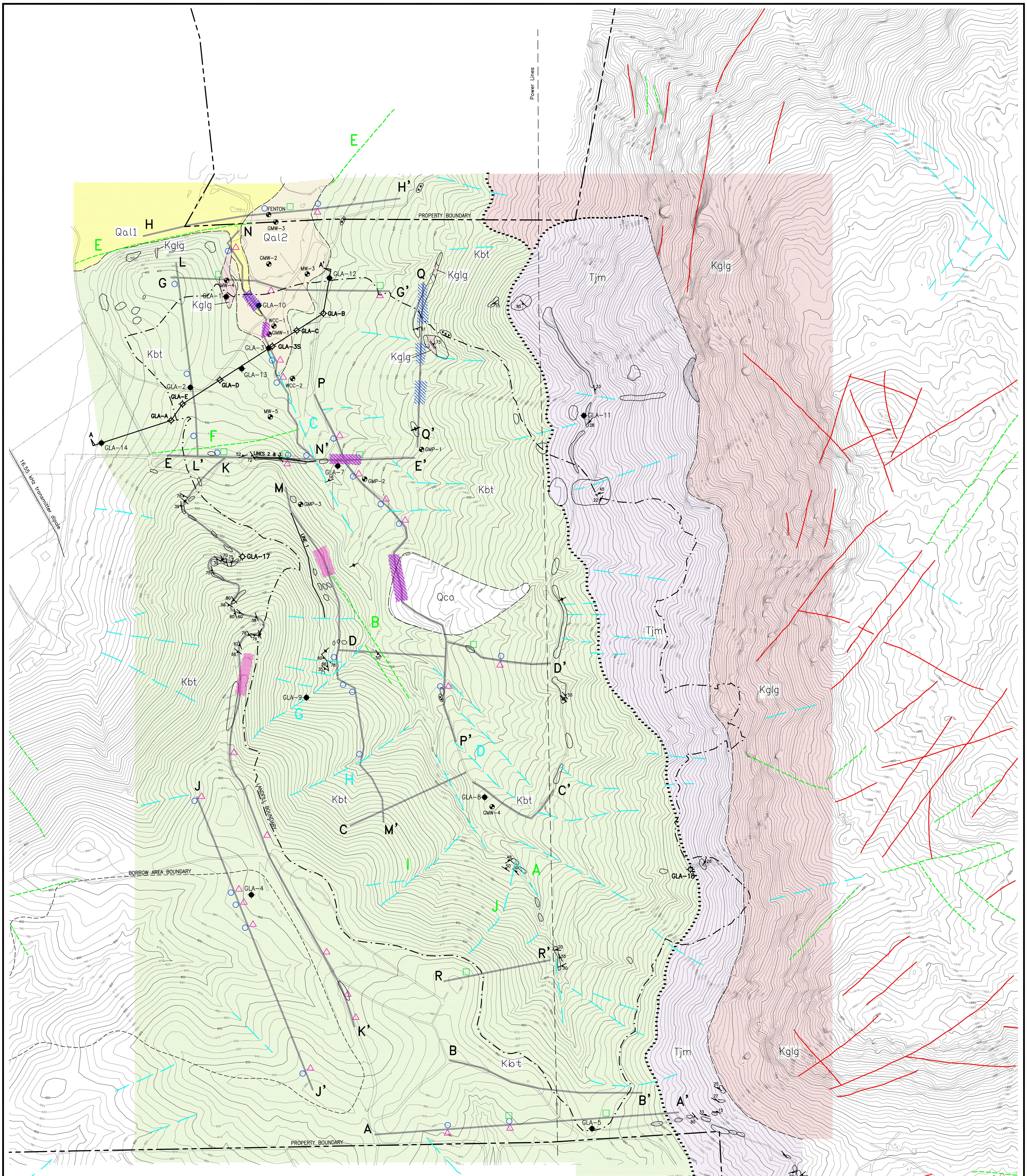
VL	MAY 2003	9539

PLATES



LEGEND:

Qal1	Recent alluvium associated with the San Luis Rey river floodplain. Unconsolidated deposits of sand, silt and gravel with variable amounts of cobbles and boulders.
Qal2	Older alluvium. Remanents of alluvial sediments deposited at the mouth of Gregory Canyon. Weakly stratified silt and sand.
Qco	Colluvium, slope wash, talus and debris flow deposits that form a veneer over most of the area shown in the map. On the east flank of the canyon they comprise cobbles and boulders of leucogranodiorite set in a locally consolidated matrix of sand and silt. On the west flank of the canyon they include mostly sand and silt derived from weathered tonalite. Forms mappable deposit only in central portion of map.
Kglg	Gregory Mountain Leucogranodiorite. Phaneritic texture with medium to coarse crystallinity. Light gray to buff with less than 5% dark minerals. Forms the core of Gregory Mountain, and also forms dikes that cut older units. Outcrops shown by solid outline.
Kbt	Bonsall Tonalite. Phaneritic texture with medium to coarse crystallinity. Dark gray. Typically deeply weathered and friable. Outcrops shown by solid outline.
Tjm	Metamorphic rocks. Amphibolites and metavolcanic rocks, in some locations with migmatitic structure that resembles gneissic banding. Aphanitic to porhyroblastic texture; relict porphyritic textures suggest a volcanic protolith for some of the units. Medium to dark blueish gray. Generally massive and hard.
	Photolineaments defined by single stretches of a drainage,
	Photolineaments defined on the basis of geomorphology (e.g., alignment of topographic saddles, linear cliff scarps) or tonal differences.
	Photolineaments related to recognizable fractures or dikes.
A A'	Location of geologic cross-section.

51	Strike and dip of foliation
	Vertical foliation
15	Strike and dip of joints
73	Strike and dip of dike
	Brecciated bedrock
	Outcrop of bedrock
	Geologic contact
	Geologic contact obscured by surficial deposits
MW-3	Monitoring well by others
GLA-5	Monitoring well by GLA
GLA-18	**Proposed monitoring well**
LINE 1	Survey line mapped for discontinuities

VLF Anomaly Locations:
(Hatchures indicate broad anomalous zones)

- NLK (Jim Creek, WA; 24.8 kHz); includes local transmitter (16.55 kHz) anomalies along line E
- NAA (Cutler, ME; 24.0 kHz)
- NPN (Lualualei, HI; 21.4 kHz)

A A' VLF Traverse

N

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)

1 inch = 200 ft.

PLATE 1

GEOLOGIC MAP

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

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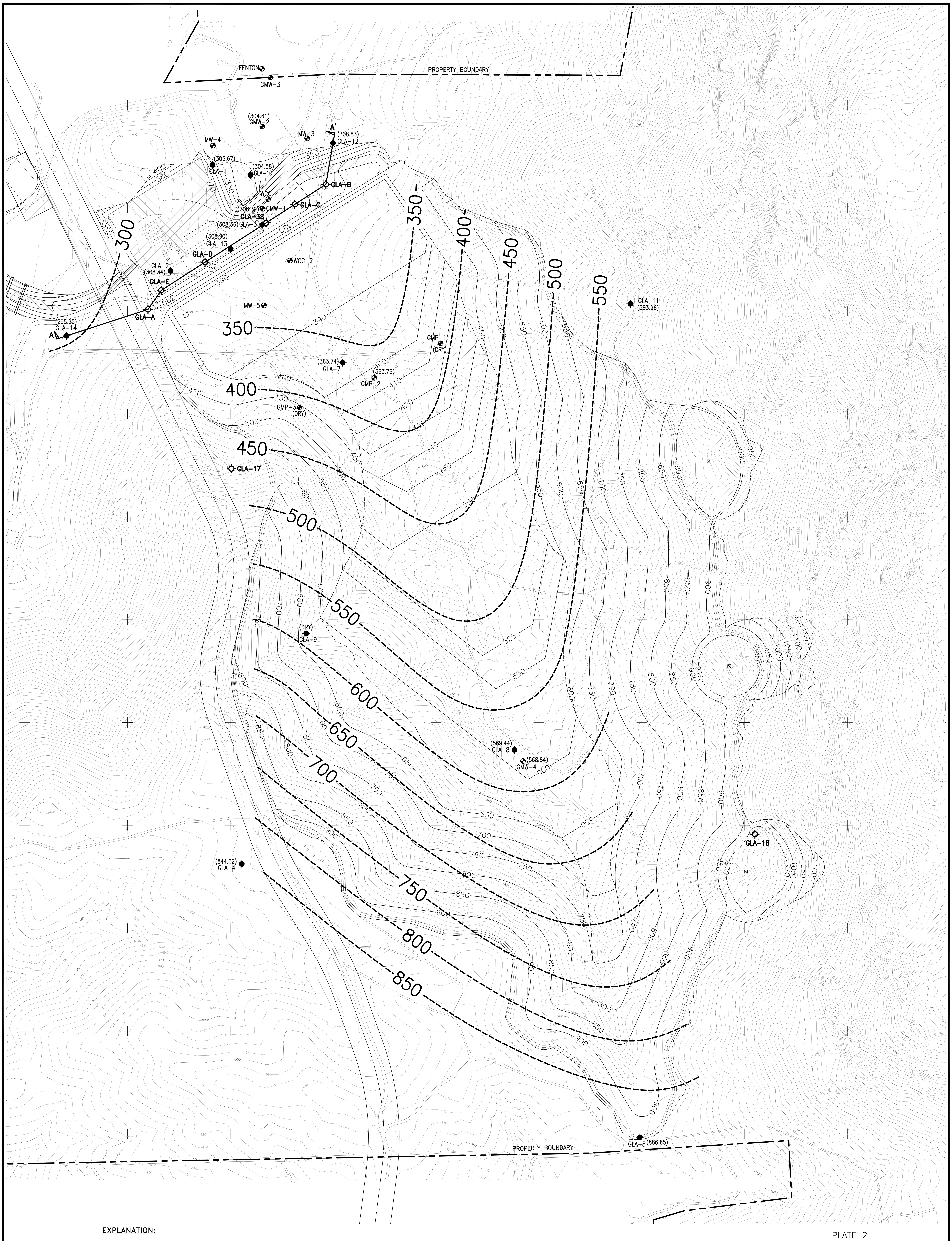

EXPLANATION:

◇	PROPOSED GROUNDWATER MONITORING WELL
◆	GROUNDWATER MONITORING WELL BY GLA
●	GROUNDWATER MONITORING WELL BY OTHERS
(844.62)	GROUNDWATER ELEVATION (MARCH 2000)
—700—	BOTTOM GRADE CONTOURS
---700---	PIEZOMETRIC SURFACE ELEVATION CONTOUR (MARCH 2000)
A — A'	LOCATION OF GEOLOGIC CROSS-SECTION.

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)

1 inch = 200 ft.

N

PLATE 2

HYDROGEOLOGIC CONTOUR MAP WITH LANDFILL EXCAVATION PLAN

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
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VL	MARCH 2004	9539

PROFILE SCALES
HORIZ.: 1" = 60'
VERT.: 1" = 20'

PLATE 3

DETECTION MONITORING PROGRAM
POINT-OF-COMPLIANCE WELLS CROSS-SECTION

GEOLOGY, HYDROGEOLOGY AND GEOTECHNICAL ANALYSES
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	MARCH 2004	9539

ATTACHMENT 1

BORING LOGS AND WELL CONSTRUCTION LOGS

Waste Management, Inc.

ROCK BOREHOLE LOG WELL GMW-1

See Plate 3 for Location	SITE NAME AND LOCATION: Gregory Canyon, near Pala, California	BORING NO. GMW-1
	DRILLING METHOD: Air Rotary/Mud Rotary	SHEET 1 OF 3
	HOLE DIAMETER: 10-inch (0 to 48 feet); 5-inch (48 to 54 feet); 4.25-inch (54 to 90.5 feet)	DRILLING

WATER LEVEL	21.25	22.48			START	FINISH
TIME	———	———			TIME ———	TIME ———
DATE	8-13-90	9-5-90			DATE 8-7-90	DATE 8-10-90
CASING DEPTH	48.0					

DATUM: M.S.L. ELEVATION: 331.36

DRILLING: Mobile B-61XD Rotary w/Christensen Coring

SURFACE CONDITIONS: Soil & Boulders

ANGLE: Vertical

Note: Reference measurement points for lithology from ground surface; water levels from top of casing in feet.

SAMPLE HAMMER TORQUE: Not Applicable

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
0–5	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	**ALLUVIUM** (Qal_3) Contains sand, silt, gravel, and boulder material.		Not Applicable	Cuttings From Mud Circulation	Refer to Well Constuction Summary	Not Applicable
5						**COLLUVIUM** (Qc) Crystalline boulders in silty fine to medium sand matrix, light brown (5yr 5/6), quartzitic with horneblende.					
10						Increasing medium to coarse sand, some wood fragments.					
15						Rig chatter at 15.5, to 16.5 feet.					
20						Becomes medium sand (contains hornblende) with wood fragments. Moderate yellow brown (10yr 5/4).					
25						Some drilling fluid loss at 24.0 feet. Increasing sand and gravel content moderate brown, (5yr 3/4).					

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr CHECKED BY ACW

DATE 10-12-90

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Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMW-1

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

SHEET 2 OF 3

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
30						Crystalline boulders in Silty Sand matrix light brown (5yr 5/6), slighty moist, fine to medium Sand, quartzitic with hornblende.		Not Applicable	Cuttings	Refer To Well Construction Summary	Not Applicable
		1	0	100	0	**BONSALL TONALITE** (Kb), weathered Wet, moderate yellow brown, (5yr 4/4) to dark yellow brown (10yr 4/2) w/gravel fragments; Contains hornblende, plagioclase, biotite;			Christensen Wire Line Coring		
35		2	0	0	0						
40		3	0	20	0	Becomes grayish black (2n2), friable "salt-and-pepper" texture; medium to coarse grained at 40 feet.					
45		—	—	—		Depth of hole miscalculated at 45 feet, actual depth 48 feet.					
50		4	2	100	50	Highly fractured.		N5W;40°E fracture			
55		5	8	100	90	**LEUCOGRANODIORITE** (Klm) Wet, moderate yellow brown (5yr 4/4), porphyritic texture, highly fractured; medium-grained dike Highly weathered.		N5W;20°S weathered surface N5W;60E, 1/10" apeture infilled w/calcite			
60		6	5	100	50	Quartz & Calcite infilling, at 65 feet. Weathered porphyritic dike; with 1.0' chalk-like zone, pinkish gray (5yr 8/1) at 66 feet.		N50W;65W Iron-stained fracture N80E;60°N fracture N5W;82°E fracture N5W;85°W fracture			
65											

DRILLING CONTRACTOR H-F Drilling, Inc.

Fullerton, Ca.

LOGGED BY Amr M. Amr CHECKED BY ACW

DATE 10-12-90

244

Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMW-1

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
		7	6	100	70	Becomes moderately fractured.			Christensen Wire Line Coring	Refer To Well Construction Summary	Not Applicable
70		8	5	100	80	**BONSALL TONALITE** (Kb), weathered Wet, medium dark gray (3n3), highly fractured, contains hornblende, quartz, biotite; some ironstaining along fractures; 1/8" quartz & Hornblende crystals.		N6W;42°E fracture			
75		9	3	100	65	Becomes moderately fractured at 76 feet.					
80		10	3	100	50	Fracture containing quartz and calcite infilling. Friable, gravel & sandy clay material zone at 80 feet.		N5W;60°E fracture			
						LEUCORANODIORITE (Klm) Wet, very light gray (8n8), gneissic texture Moderately fractured, gray with crystals of quartz, plagioclase and some biotite.		N5W;78°E fracture			
85		11	2	100	20.			N80W;72°N fracture			
						BONSALL TONALITE (Kb), unweathered Wet, medium dark gray (3n3)		N80W;80°E fracture			
90						Bottom of hole at 90.5 feet.					
95											
100											

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr CHECKED BY ACW

DATE 10-12-90

245

Waste Management, Inc.

Well No. GMW-1

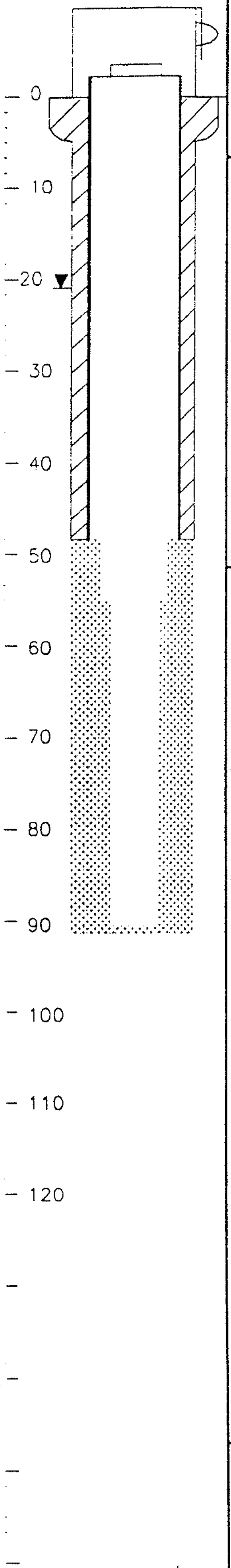
Boring No. X-Ref: –

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: ______

Elevation Ground Level 329.840

Top of Casing 331.360 feet



T.D. 90.5 ft.

Drilling Summary:

Total Depth 90.5 feet

Borehole Diameter 10 Inches

Casing Stic-up Height: 1.50 feet

Driller H-F Drilling
Fullerton, Ca

Rig Mud Rotory/Air Rotory

Bit(s) Tungsten/Diamond

Drilling Fluid: Mud/Air

Protective Casing 5" Steel Conductor

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	7/7/90		7/13/90	
Geophys Logging:				
Casing:				
Filter Placement:				
Cementing:			7/9/90	
Development:			9/5/90	

Well Design & Specifications

Basis: Geologic Log x Geophysical Log

Casing String (s): C=Casing S=Screen

Depth	String(s)	Elevation
+1.50 – 48.0	C1	–
48.0 – 54.0	S1	–
54.0 – 90.5	S2	–
–		–
–		–

Casing: C1 5" Steel Conductor

C2

Screen: S1 5.0" Diam. Open Hole

S2 4.25" Diam. Open Hole

Filter Pack: None–Open hole

Grout Seal: 0–48.0 feet Enviroplug (Bentonite)

Bentonite Seal:

Well Development:

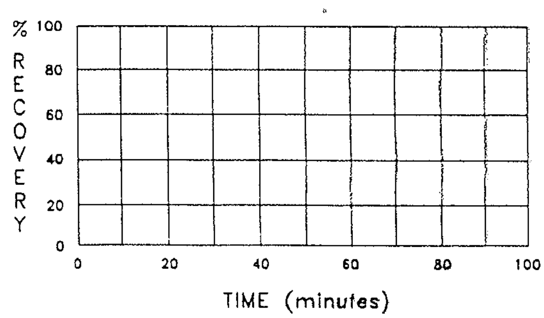
Depth to water 34.25 (8/17/90) erroneous?

Depth to water 22.48 (9/5/90)

Development Data:

Q= So=

Time	pH	Spec. Cond.	Temp (°F)
11:15	7.63	918 UMhos/cm	73.5
11:30	7.51	190 UMhos/cm	71.9
11:45	7.09	910 UMhos/cm	70.8
12:00	7.19	920 UMhos/cm	71.2



Comments: Depth to water after drilling:
21.25" below grade (8/13/90)

INSPECTOR: Amr M. Amr

CHECKED BY: ACW

PROJECT: CA 012004

LOCATION: Gregory Canyon, near Pala, California.

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Waste Management, Inc.

ROCK BOREHOLE LOG WELL GMW-2

See Plate 3 for Location	SITE NAME AND LOCATION: Gregory Canyon, near Pala, California				BORING NO. GMW-2	
	DRILLING METHOD: Mud Rotary & Air Rotary				SHEET 1 OF 4	
	HOLE DIAMETER: 10-inch (0-50 feet) 4.25-inch (50-103 feet) 4-inch (103-106 feet)				DRILLING	
					START	FINISH
	WATER LEVEL	19.50	17.04		TIME	TIME
	TIME	———	———		———	———
	DATE	8-17-90	9-5-90		DATE	DATE
DATUM: M.S.L. ELEVATION: 324.64	CASING DEPTH	50.0			8-13-90	8-17-90

DRILLING: Mobile B-61XD Rotary w/Christensen Coring

SURFACE CONDITIONS: Soil & Surface

ANGLE: Vertical

Note: Reference measurements points for lithology from ground Surface; Water levels from Top of Casing

SAMPLE HAMMER TORQUE: Not Applicable

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
0–27	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	**ALLUVIUM** (Qal_2)		Not Applicable	Cuttings From Mud Circulation	Refer to Well Constuction Summary	Not Applicable
						Silty sand & silt, dark yellow brown (10yr 5/4).					
5											
10						More fine to coarse sand, moderate yellow brown (10yr 5/4) contains quartz, hornblende, plagioclase, at 10 feet.					
15						Medium to coarse sand at 15 feet, more coarse sand sized grains of hornblende.					
20						Fine to medium sand at 20 feet, light brown (5yr 5/6), less hornblende grains.					
						Rig chatter at 22 feet.					
25											

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr CHECKED BY ACW

DATE 10-12-90

247

Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMW-2

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
30–35	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable				Cuttings	Refer to Well Construction Summary	Not Applicable
35–40		1	0	50	0	Clayey sand with gravel sized fragments of quartz slightly micaceous, light brown (5yr 5/6). Clay at 37 feet, moderate brown (5yr 4/4). Clayey sand with fine to coarse quartzitic gravels.			Christensen Wire Line Coring		
40–45		2	0	50	0						
45–50		3	0	20	0	**BONSALL TONALITE** (Kb) weathered. Moist medium gray (5n5), fine to coarse gravel-sized fragments up to 2" in diameter, highly fractured. Phaneritic texture. Missing 3 feet section from 50–53 feet.					
50–55		4	2	33	20						
55–60		5	2	100	50	Becomes dark yellow brown (10yr 4/2), friable at 55 feet. Wet, medium dark gray (4n4); quartz-filled fracture at 57 feet.		N5W;35°E fracture			
60–65		6	0	20	0	Grayish black (2n2), friable gravel-sized fragments up to 1", 3"-wide fracture infilled w/white quartz.					

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr

DATE 10-12-90 CHECKED BY ACW

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Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMW-2

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

DEPTH IN FEET	PERCENT RECOVERY	RUN NO.	NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	RECOVERY	RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	OBSERVED ROCK STRUCTURE(S)
		7	5	100	40	Moist, grayish black (2n2), "salt-and-pepper" texture, medium grained, highly fractured.	
							N30W;45°NE fracture
70							N30W;45°NE fracture
						Becomes very moist, dark gray (3n3), with quartz infilled fractures, iron-stained 68 to 71 feet.	N5W;52°E fracture
		8	4	100	70	Becomes grayish black (2n2), with quartz-infilled fracture, moderate orange pink (5yr 8/4), highly fractured.	
							N40E;40°E fracture
75							
							N80W;62°S iron-stained fracture
		9	4	100	50	0.2" wide iron-stained, quartz-filled fracture at 77 feet.	
						2"-wide gravelly quartz infilled fracture.	N5W;56°S fracture
80							N5W;30°E fracture
						Wet, moderate yellow brown (10yr 5/4), quartz vienlets & silty sand fracture infilling.	
		10	2	70	20	Becomes grayish black (2n2) without quartz veinlets, at 82 feet.	
							N80E;62°S pyrite-bearing fracture
85						Gravel-sized fragments, highly micaceous with biotite flakes.	
		11	3	90	60	Grades into more competent bedrock at 87.0'. Moderate yellow brown (10yr 5/4) to dark gray (4n4).	
						Medium light gray (6n6) "salt-and-pepper" texture, with conchoidal fracturing, moderately fractured.	
90							N80W;80°E fracture
		12	4	100	90	**BONSALL TONALITE** (Kb) unweathered	
						Medium light gray (6n6), aphanitic texture, highly fractured iron-stained with calcite infilling.	N5W;74°W fracture
95							
							N30E;41°W fracture
		13	3	100	95		N5W;85°E fracture
						0.5"-wide quartz-filled fracture.	
100						Pyrite-bearing and iron-stained fracture.	N82°E;42N fracture
						2"-wide filled fracture.	N5W;42°W fracture
		14	4	100	95		

SAMPLER AND BIT: Christensen Wire Line Coring

CASING TYPE: Refer to Well Construction Summary

BLOWS/FOOT ON CASING: Not Applicable

DRILLING CONTRACTOR: H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY: Amr M. Amr CHECKED BY: ACW

DATE: 10-12-90

Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMW-2

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

SHEET 4 OF 4

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
		15	3	100	100			N5W;30°W fracture			
105		16	1	100	100	Medium light gray (6n6), apnanitic texture, moderately fractured at 103.0', iron-stained.		N80E;20N fracture			
						Bottom of hole at 106.0 feet.					

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Co.

LOGGED BY Amr M. Amr

DATE 10-12-90 CHECKED BY ACW

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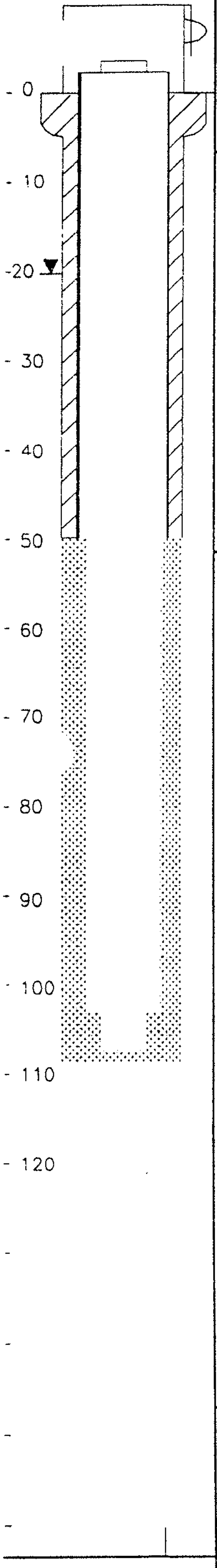
Waste Management, Inc.

Well No. GMW-2

Boring No. X-Ref: –

MONITOR WELL CONSTRUCTION SUMMARY



Survey Coords: ______

Elevation Ground Level 322.56

Top of Casing 324.640 feet

Drilling Summary:

Total Depth 106.0 feet

Borehole Diameter 10 Inches

Casing Stic-up Height: 2.10 feet

Driller A-F Drilling

Fullerton, Ca

Rig Mud Rotory/Air Rotory

Bit(s) Chris. Bit/Diamond Bit

Drilling Fluid: Mud/Air

Protective Casing 5" Steel Conductor

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	8/13/90		8/14/90	
	8/17/90		8/17/90	
Geophys Logging:				
Casing:				
Filter Placement:				
Cementing:			8/13/90	
Development:			9/5/90	

Well Design & Specifications

Basis: Geologic Log x Geophysical Log

Casing String (s): C=Casing S=Screen

Depth	String(s)	Elevation
+ 2.1 – 50.0	C1	–
50.0 – 103.0	S1	–
103.0 – 106.0	S2	–
–		–
–		–

Casing: C1 5" Steel Conductor

C2 ______

Screen: S1 4.25" Diam. Open Hole

S2 4" Diam. Open Hole

Filter Pack: None

Grout Seal: 0–50.0 feet Enviroplug (Bentonite)

Bentonite Seal: ______

Well Development:

DTW 15.50' below grade

8/17/90 prior to drilling

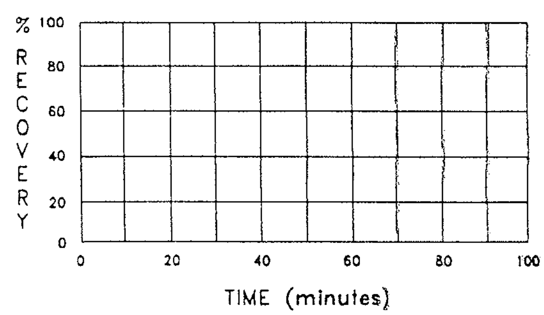
additional 15.0'

Depth to water 17.04 (9/05/90)

Development Data:

Q= S₀=

Time	pH	Spec. Cond.	Temp (°F)
10:00	7.65	930 UMhos/cm	72.2
10:15	7.38	909 UMhos/cm	70.8
10:25	7.37	902 UMhos/cm	70.4
10:30	7.38	903 UMhos/cm	71.1
10:40	7.35	919 UMhos/cm	71.9



Comments: Depth to water after drilling:
19.50' (8/14/90)

INSPECTOR: Amr M. Amr

CHECKED BY: ACW

PROJECT: CA 012004

LOCATION: Gregory Canyon, near Pala, California.

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Waste Management, Inc.

ROCK BOREHOLE LOG WELL GMW-3

See Plate 3 for Location	SITE NAME AND LOCATION: Gregory Canyon, near Pala, California					BORING NO. GMW-3
	DRILLING METHOD: Hollow Stem Auger					SHEET 1 OF 2
	HOLE DIAMETER: 10-inch (0-50 feet)					
						DRILLING
						START / FINISH
	WATER LEVEL	12.33	12.38			TIME / TIME
	TIME	———	———			——— / ———
	DATE	7-23-90	9-5-90			DATE / DATE
DATUM: M.S.L. ELEVATION: 320.36	CASING DEPTH	50.0				7-23-90 / 7-23-90

DRILLING: Failing F-10 WT	SURFACE CONDITIONS: Soil & Boulders
ANGLE: Vertical	Note: Reference measurement points for lithology from
SAMPLE HAMMER TORQUE: Not Applicable	ground surface; water-levels from top of casing in feet.

DEPTH IN FEET	SAMPLE INTERNAL	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
		Not Applicable (0-29)	Not Applicable (0-29)	Not Applicable (0-29)	Not Applicable (0-29)	**ALLUVIUM** (Qal_1) Poorly graded fine to medium, SAND (SP) slightly moist; light brown (5 yr 6/4).		Not Applicable (0-29)	Split Spoon Sampler (0-29)	Refer to Well Constuction Summary (0-29)	Not Applicable (0-29)
5	1										
						SILTY SAND (SM) pale yellowish brown (10yr 6/2), with interbeds of sand.					
10	2										
						GRAVELLY SAND (SW) Fine to coarse sand, little fine gravel; "salt-and-pepper" horneblende & quartz; medium light gray (6n6), wet.					
15	3										
20	4					Gravel (up to 1"-diameter) at 20'. Becomes more cobbly.					
						SAND (SP-SM) with silt					
25	5					Becomes moderate reddish brown (10yr 4/6) to dark gray (3n3) at 24.5'.					

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr CHECKED BY ACW

DATE 10-12-90

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Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMW-3

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

DEPTH IN FEET	SAMPLE INTERNAL	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
30	6	Not Applicable	Not Applicable	Not Applicable	Not Applicable	CLAYEY SAND (SC) w/1"-diameter leucogranodiorite gravel, moderate brown (5yr 4/6). Easier drilling at 30'.		Not Applicable	Split Spoon Sampler	Refer to Well Construction Summary	Not Applicable
35	7					Cobbles & boulders sightly moist; yellowisn gray (5yr 8/1)					
40	8					SAND (SP) 1.0' thick, light brown (5yr 5/6); moist; very micaceous fine sand at 43 feet.					
45	9					CLAYEY SAND (SP) Very difficult drilling at 49 feet.					
50						Bottom of boring at 50.0 feet. (Refusal)					
55											
60											
65											

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr. M. Amr

DATE 10-12-90 CHECKED BY ACW

Waste Management, Inc.

Well No. GMW-3

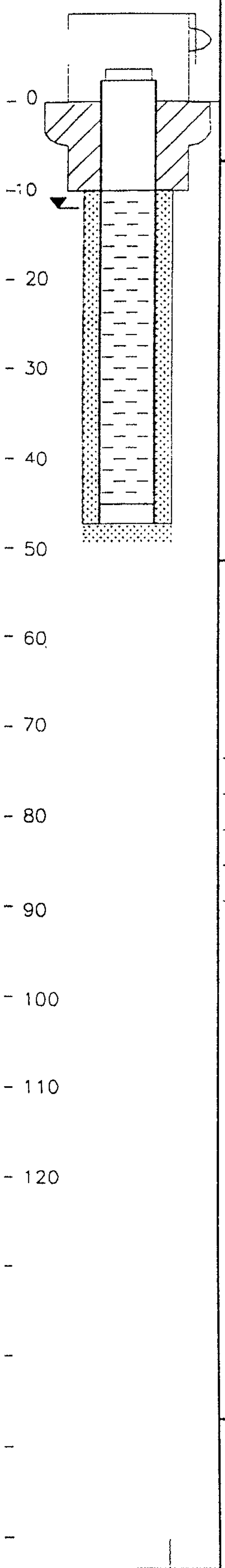
Boring No. X-Ref: –

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: ______

Elevation Ground Level 318.46

Top of Casing 320.360 feet



T.D. 49.5 ft.

Drilling Summary:

Total Depth 49.5 feet

Borehole Diameter 10 Inches

Casing Stic-up Height: 2.50 feet

Driller H-F Drilling
Fullerton, Ca

Rig Hollow Stem Auger

Bit(s)

Drilling Fluid: None

Protective Casing Steel looking well cover

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	7/23/90		7/23/90	
Geophys Logging:				
Casing:				
Filter Placement:				
Cementing:			7/23/90	
Development:			9/5/90	

Well Design & Specifications

Basis: Geologic Log x Geophysical Log

Casing String (s): C=Casing S=Screen

Depth	String(s)	Elevation
+2.25 – 9.5	C1	–
9.50 – 49.5	S1	–

Casing: C1 4" diam. PVC Blank

C2

Screen: S1 4" diam. 0.02 slotted PVC

C2

Filter Pack: 2/12 Sand

Grout Seal: 2.5–6.5 feet Enviroplug (Bentonite)

Bentonite Seal:

Well Development:

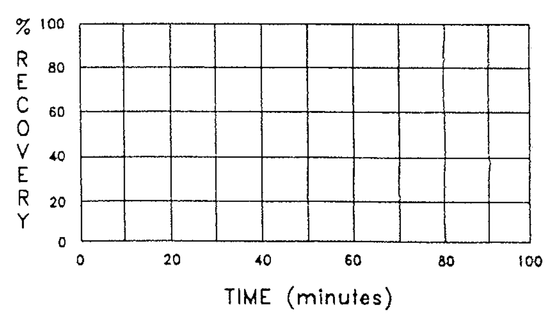
Depth to water 12.60' (8/17/90)

Depth to water 12.38' (9/05/90)

Development data:

Q= S₀=

Time	pH	Spec. Cond.	Temp (°F)
8:30	7.83	1020 UMhos/cm	73.5
8:50	7.69	960 UMhos/cm	69.0
9:10	7.70	970 UMhos/cm	68.0



Comments: Depth to water after drilling: 12.83' (7/23/90)

INSPECTOR: Amr M. Amr

CHECKED BY: ACW

PROJECT: CA 012004

LOCATION: Gregory Canyon, near Pala, California.

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Waste Management, Inc.

ROCK BOREHOLE LOG WELL GMW-4

See Plate 3 for Location	SITE NAME AND LOCATION: Gregory Canyon, near Pala, California	BORING NO. GMW-4
	DRILLING METHOD: Air Rotary	SHEET 1 OF 4
	HOLE DIAMETER: 10-inch (0-55 feet); 4.25-inch (55-98.5 feet); 4-inch (98.5-116 feet)	DRILLING

					START	FINISH
WATER LEVEL	76.0	85.71			TIME	TIME
TIME	———	———			———	———
DATE	8-17-90	9-5-90			DATE	DATE
CASING DEPTH	55.0				8-15-90	8-17-90

DATUM: M.S.L. ELEVATION: 637.530

DRILLING: Mobile B-61XD Rotary w/Christensen Coring

SURFACE CONDITIONS: Soil & Boulders

ANGLE: Vertical

Note: Reference measurement points for lithology from ground surface; water level from top of casing in feet.

SAMPLE HAMMER TORQUE: Not Applicable

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
0–27	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	**COLLUVIUM** (Qc) Crystalline boulders in silty fine to medium sand matrix, moderate brown (5yr 4/4), quartzitic with hornblende		Not Applicable	Cuttings From Air Circulation	Refer to Well Constuction Summary	Not Applicable
						Very fine to fine sand, grayish yellow green (5yr 7/2).					
10						Becomes light olive gray (5yr 5/2) at 10 feet.					
						Little medium sand from 14 feet.					
20						Fine to coarse sand, light olive gray (5yr 5/2) at 20 feet.					
25						Fine to medium sand from 25 feet.					
						(5yr 3/4).					

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr CHECKED BY ACW

DATE 10-12-90

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Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMW-4

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

SHEET 2 OF 4

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
30–55	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Fine sand, moderate olive brown (5yr 4/4), encountered at 35 feet.		Not Applicable	Air Rotary Cuttings	Refer to Well Construction Summary	Not Applicable
40						Fine to medium sand from 40 feet.					
45						Fine sand, light olive gray (5yr 5/2).					
						Difficult drilling from 47.0'.					
50						**BONSALL TONALITE** (Kb) weathered Moist, light brown (5yr 5/6) bedrock, with "salt-and-pepper" texture, highly fractured. Hornblende and quartz crystals.					
55						Iron-stained					
55–60		1	2	100	10	Medium grained crystals of hornblende, biotite and quartz, from 57 feet. Becomes dark yellowish orange (10yr 6/6), friable, grus 0.5" thick, with calcite. Yellow and black mottling.			Christensen Wire Line Coring		
60–65		2	4	100	70	Iron-stained fracture at 65 feet.		N5W;52W iron-stained fracture			
65											

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr CHECKED BY ACW

DATE 10-12-90

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Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMW-4

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

DEPTH IN FEET	PERCENT RECOVERY	RUN NO.	NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	RECOVERY	RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
	Not Applicable	3	4	100	70	Medium gray (5n5), moderately fractured with phaneritic texture, appears iron-stained with silty sand fracture infilling.			Christensen Wire Line Coring	See Well Construction Summary	Not Applicable
70		4	3	100	40	Moist, dark yellow orange (10yr 6/6), very soft calcite zone at 72 feet.		N6W;42°E iron-stained fracture			
75		5	5	100	90	Very moist, pale olive (10yr 6/2), highly fractured with abundant quartz veins, calcite-infilled fractures with solution pitting at 75 feet.					
80		6	5	100	50	Weathered fracture is dark orange brown, near vertical, fracture is weathered at 80 feet. Greenish gray (5yr 6/1), iron-stained fracture with silty sand infilling at 82 feet.		N80E;83°N fracture; N5W;80°W fracture			
85		7	4	100	60	Dark gray (3n3); wet with iron-stained fractures.		N30W;70°W fracture			
90		8	6	100	75	**BONSALL TONALITE** (Kb) unweathered. Fracture infilled, wet, medium gray (3n3), aphanitic texture highly fractured. Quartz dike 0.2"-wide with zoned hornblende and biotite inclusions at 92.0 feet. 1"-wide fracture zone with calcite infilling at 94 feet.		N5W;42°W iron-stained fracture; N5W;55°W fracture; N17W;42°E fracture; N5W;42°W fracture; N80E;64°N fracture			
95		9	4	100	45						
100						0.1"-wide calcite-filled fracture.		N79E;74°N fracture			
		10		100	30						

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr CHECKED BY ACW

DATE 10-12-90

Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMW-4

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
						Wet, medium gray (3n3), aphanitic texture, highly fractured, with calcite infilling fracture.		N50E;49°E fracture	Christensen Wire Line Coring	Refer to Well Construction Summary	Not Applicable
						Ironstained fracture		N80E;52°S fracture			
		11	7	100	90	0.1"-wide Calcite infilled fracture.		N80E;52°S fracture			
105						Conjugate fractures 2" apart.		N5W;45°W fracture			
						1"-wide Calcite filled fracture.		N58E;50°N fracture			
								N8W;60°W fracture			
						1/2"-wide iron-stained fractured infilled with gray flourite & calcite.					
110		12	5	100	95	Iron-stained fracture		N80E;46°S fracture			
								N80E;46°S fracture			
						Dark yellow orange (10yr 6/6) iron-stained, calcite-filled fracture.		N8W;55°E fracture			
		13	5	100	95						
115						Calcite-filled fractures.		N70E;45°S fracture			
								N80W;85°N fracture			
						Bottom of boring at 116.0 feet.					
120											
125											
130											
135											

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr CHECKED BY ACW

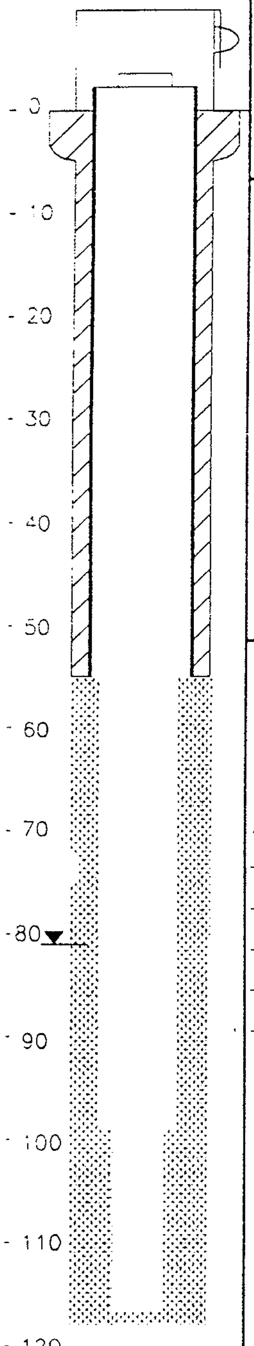
DATE 10-12-90

Waste Management, Inc.

Well No. GMW-4

Boring No. X-Ref: –

MONITOR WELL CONSTRUCTION SUMMARY



Survey Coords: ______

Elevation Ground Level Approximately 635.280

Top of Casing 637.530 feet

Drilling Summary:

Total Depth 116.0 feet

Borehole Diameter 10 inches

Casing Stic-up Height: 2.25 feet

Driller H-F Drilling
Fullerton, Ca

Rig Air Rotary

Bit(s) Christiansen/Bit/Diamond

Drilling Fluid: Air

Protective Casing ______

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	8/15/90		8/17/90	
Geophys Logging:				
Casing:				
Filter Placement:				
Cementing:			8/15/90	
Development:			9/5/90	

Well Design & Specifications

Basis: Geologic Log x Geophysical Log

Casing String (s): C=Casing S=Screen

Depth	String(s)	Elevation
+2.25 – 55.0	C1	–
55 – 98.5	S1	–
98.5 – 116.0	S2	–

Casing: C1 5" Steel Conductor

C2 ______

Screen: S1 4.25" Diam Open Hole

C2 4.00" Diam. Open Hole

Filter Pack: None

Grout Seal: 0–55.0 feet Enviroplug (Bentonite)

Bentonite Seal: ______

Well Development:

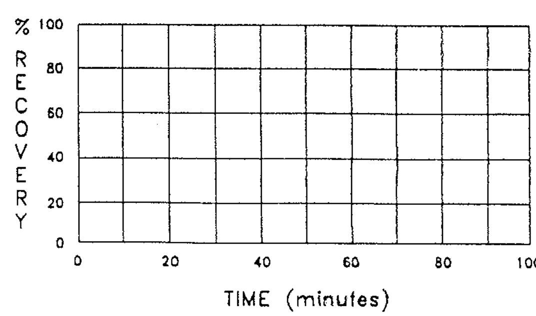
Depth to water 80.75 (8/17/90)

Depth to water 85.71 (9/05/90)

Development Data:

Q= So=

Time	pH	Spec. Cond.	Temp (°F)
12:55	7.61	1042 UMhos/cm	75.5
1:10	7.24	995 UMhos/cm	72.2
1:25	7.46	1027 UMhos/cm	71.6
1:45	7.51	1020 UMhos/cm	70.5



Comments: Depth to water after drilling: 80.75 feet (8-17-90)

T.D. 116.0 ft.

INSPECTOR: Amr M. Amr

CHECKED BY: ACW

PROJECT: CA 012004

LOCATION: Gregory Canyon, near Pala, California.

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Waste Management, Inc.

ROCK BOREHOLE LOG WELL GMP-1

See Plate 3 for Location	SITE NAME AND LOCATION: Gregory Canyon, near Pala, California					BORING NO. GMP-1	
	DRILLING METHOD: Air Rotary & Mud Rotary					SHEET 1 OF 3	
	HOLE DIAMETER: 10-inch (0-41 feet)						
	5-inch (41-81 feet)					DRILLING	
						START	FINISH
	WATER LEVEL	76.0	63.88			TIME	TIME
	TIME	———	———			———	———
	DATE	7-3-90	8-6-90			DATE	DATE
DATUM: M.S.L. ELEVATION: 460.29	CASING DEPTH	48.0				7-31-90	8-2-90

DRILLING: Mobile B-61XD Rotary w/Christensen Coring — SURFACE CONDITIONS: Soil & Boulders

ANGLE: Vertical — Note: Reference measurement points for lithology from ground surface; water levels from top of casing in feet.

SAMPLE HAMMER TORQUE: Not Applicable

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	**COLLUVIUM** (Qc) Crystalline boulders in silty fine to medium sand matrix, light brown (SYR 5/6).		Not Applicable	Cuttings	Refer to Well Constuction Summary	Not Applicable
						Silty sand, yellowish gray (5yr 7/2).					
5											
10						Increasing fine to medium sand, dark gray (3n3), little yellow quartzitic fine to medium gray (5n5) at 12 feet.					
15						Becomes grayish black (2n2), trace yellow quartzitic sand					
20						Becomes coarse sand, medium dark gray (4n4), little quartz fragments, some leaf fragments.					
25						Slow drilling at 26.0 feet.					
						Contains hornblende, plagioclase fragments and biotite flakes.					

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Co.

LOGGED BY Amr M. Amr CHECKED BY ACW

DATE 10-12-90

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Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMP-1

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

SHEET 2 OF 3

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
30	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Matrix becomes medium gray (5n5).			Cuttings	Refer to Well Construction Summary	Not Applicable
35						increasing coarse sand, some small wood fragments.					
40		1	2	66	10	**BONSALL TONALITE** (Kb) weathered Slightly moist, dark yellow brown (10yr 4/2), highly fractured, 0.5-1.0' fracture spacing.			Christensen Wire Line Coring		
45						missing 46-47 feet. Fracture infilling. Silty sand and iron-staining.		N5W,60°E fracture N80E;66°N fracture			
		2	1	80	10						
50						Rock sample collected for thin section analysis at 51 feet. Classified as a Quartz Gabbro, see sample GMP-1-51, in Appendix F.		N5W,62°E fracture			
		3	2	100	15	Medium grained plagioclase crystals w/hornblende & biotite, vein filled w/calcite.					
55						Moderate yellow brown (10yr 5/4), Poikilitic texture at 55 feet. Missing 56-58 feet.		N5W,71°E fracture			
		4	4	60	30						
60						White chalky material in-filling fracture at 60 feet. Moist, medium Gray (5n5), Ironstained. 2"-wide in-filled vein, slightly moist, light brown (5yr 6/4).					
65		5	5	100	80			N5W,80°E fracture			

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr Amr CHECKED BY ACW

DATE 10-12-90

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Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMP-1

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
	Not Applicable	6	5	90	80	Medium gray (5n5), highly fractured. With hornblende, and "salt-and-pepper" texture, dark gray (3n3) at 70 feet. Iron-stained, calcite-infilled fracture, white (9n9).		N80W;45°N fracture; N84E;74°N Ironstained fracture.	Christiensen Wireline	Refer to Well Construction Summary	Not Applicable
70		7	6	100	80			N6W;74°E fracture			
75						Medium grained plagioclase with biotite, 1/8"-wide vein in-filled with white calcite.		N5W;62°E infilled fracture			
		8	5	90	70	Rock sample collected for thin section analysis at 76 feet classified as quartz gabbro, see sample GMP-1-76 in Appendix, F. 1.0'-wide sandy silt in-filled fracture, yellowish groy (5yr 7/2), white (9n9). Vein in-filling. Medium gray (5n5). Very friable.		N6W;72°E fracture			
80											
						Bottom of boring at 81.0 feet.					
85											
90											
95											
100											

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr

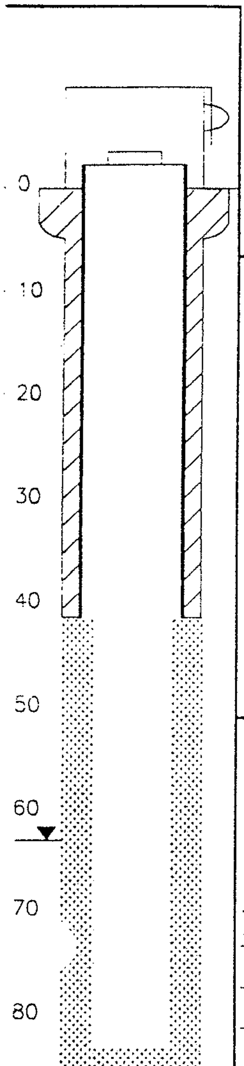
DATE 10-12-90

CHECKED BY ACW

Waste Management, Inc.

Well No. GMP-1

Boring No. X-Ref: –



MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: ____________

Elevation Ground Level: Approximately 459.0

Top of Casing: 460.290 feet

Drilling Summary:

Total Depth: 81.0 feet

Borehole Diameter: 10 Incnes

Casing Stic-up Height: 1.28 feet

Driller: H-F Drilling
Fullerton, Co

Rig: Mud Rotory/Air Rotory

Bit(s): Tungsten Bit.

Drilling Fluid: Mud/Air

Protective Casing: 5" Steel Conductor

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	7/31/90		8/2/90	
Geophys Logging:				
Casing:				
Filter Placement:				
Cementing:			7/31/90	
Development:			____	

Well Design & Specifications

Basis: Geologic Log x Geophysical Log

Casing String (s): C=Casing S=Screen

Depth	String(s)	Elevation
+1.28 – 41.1	C1	–
41.16 – 81.0	S1	–
–		–
–		–
–		–

Casing: C1 5" Steel Conductor

C2 ____________

Screen: S1 5" Diam. Open Hole

S2 ____________

Filter Pack: None

Grout Seal: 0-41.1 feet Enviroplug (Bentonite)

Bentonite Seal: ____________

Well Development:

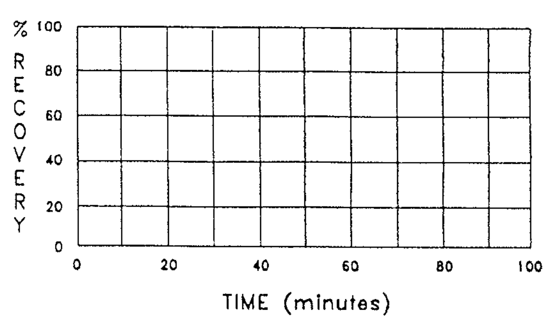
Depth to water 62.32 (8/17/90)

Depth to water 63.88 (9/5/90)

Development Data:

Q= So=

Time	pH	Spec. Cond.	Temp (°C)



Comments: Depth to water after drilling:
69.0' feet below grade. (8/2/90)

T.D. 81.0 ft.

INSPECTOR: Amr M. Amr

CHECKED BY: ACW

PROJECT: CA 012004

LOCATION: Gregory Canyon, near Pala, California.

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Waste Management, Inc.

ROCK BOREHOLE LOG WELL GMP-2

See Plate 3 for Location	SITE NAME AND LOCATION: Gregory Canyon, near Pala, California				BORING NO. GMP-2	
	DRILLING METHOD: Air Rotary				SHEET 1 OF 3	
	HOLE DIAMETER: 10-inch (0-45 feet)					
	5-inch (45-70 feet)				DRILLING	
	4-inch (70-87.5 feet)				START	FINISH
	WATER LEVEL	83.36	83.74		TIME	TIME
	TIME	———	———		———	———
	DATE	7-30-90	9-5-90		DATE	DATE
DATUM: M.S.L. ELEVATION: 437.64	CASING DEPTH	44.8			7-25-90	7-30-90

DRILLING: Mobile B-61XD Rotary w/christensen coring

SURFACE CONDITIONS: Soil & Boulders

ANGLE: Vertical

Note: Reference measurement points for lithology from ground surface; water levels from top of casing in feet.

SAMPLE HAMMER TORQUE: Not Applicable

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
0–27	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	**COLLUVIUM** (Qc) Crystalline boulders in silty fine to medium sand matrix, light brown (5yr 6/4), quarzitic with hornblende.		Not Applicable	Cuttings from mud Circulation	Refer to Well Constuction Summary	Not Applicable
						Rig chatter at ~~8~~ feet.					
10						Fine to medium sand, moderate yellow brown (10yr 5/4).					
15						Increasing coarse sand.					
20						Becomes brownish gray (5yr 4/1). Organic matter with wood fragments.					
25						Fewer wood fragments, grayish black (2n2).					
						Medium grained sand.					

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr CHECKED BY ACW

DATE 10-12-90

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Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMP-2

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

DEPTH IN FEET	PERCENT RECOVERY	RUN NO.	NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	RECOVERY	RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
30	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Becomes brownish gray (5yr 4/1), at 30 feet.		Not Applicable	Cuttings	Refer to Well Construction Summary	Not Applicable
40						Increasing medium to coarse sand at 40 feet.					
45		1	0	0	0				Christensen Wire Line Coring		
						BONSALL TONALITE (Kb) weathered Light gray (5yr 5/2), phaneritic texture, highly fractured with iron-stained fractures.					
50		2	0	0	0						
		3	0	100	0	Missing 52.5 to 56.0 feet.					
55		4	0	0	0						
		5	0	0	0	Missing 56.0 to 60.5 feet. Rock sample collected for thin section analysis at 58 feet. Classified as a Alkali Feldspar Granite Porhyry, See sample GMP-2-58, in Appendix F.					
60		6	0	100	0	Switched to tungsien bit to improve recovery at 60.5. Moderate yellow brown (10yr 5/4), weathered w/1/4"-wide porphyritic dike. Platy weathered abundant biotite Becomes dark gray (3n3) at 63 feet.		N30°W trending dike			
65		7	0	100	0	**LEUCOGRANODIORITE** (Klm) light brown (5yr 6/4) dike material.					

DRILLING CONTRACTOR H-F Drilling, Inc.
Fullerton, Ca.

LOGGED BY Amr M. Amr CHECKED BY ACW

DATE 10-12-90

Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMP-2

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
	Not Applicable	8	0	100	0	**BONSALL TONALITE** (Kb) Moderate yellow brown (10yr 5/4) phaneritic texture, highly fractured, iron-stained fractures.			Christensen Wire Line Coring	Refer to Well Construction Summary	Not Applicable
70		9	2	100	20	**LEUCOGRANODIORITE** (Klm) Light brown (5yr 6/4), porphyritic dike vein, infilled with silty sand. Drilling difficult at 70.5 feet.					
75		10	3	90	25	Porphyritic texture, highly fractured		N15W;62°W fracture			
80						Medium light gray (6n6) aphanitic texture, vertical micro fractures.					
		11	3	75	20	Very light gray (8n8), phaneritic texture					
85		12	3	100	30	Less weathered, fine to medium phaneritic texture.		N20W;51°W fracture			
						Bottom of boring at 87.0 feet.					
90											
95											
100											

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr Amr CHECKED BY ACW

DATE 10-12-90

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Waste Management, inc.

Well No. GMP-2

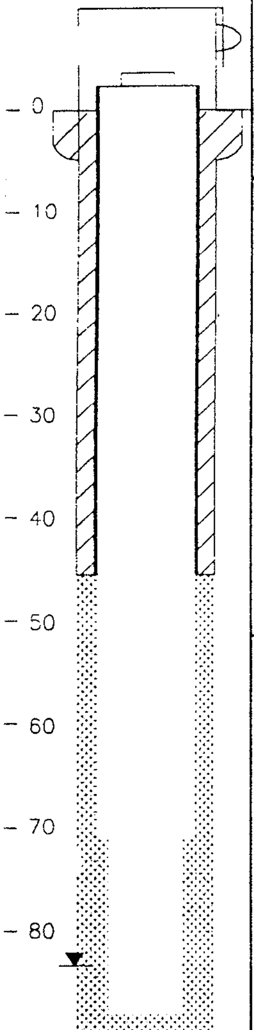
Boring No. X-Ref: –

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: ______

Elevation Ground Level: Approximately 436.52

Top of Casing: 437.640 feet



Drilling Summary:

Total Depth: 87.5 feet
Borehole Diameter: 10 Inches
Casing Stic-up Height: 1.12 feet
Driller: H-F Drilling
Fullerton, Ca
Rig: Mud Rotory/Air Rotory
Bit(s): Diamond/Tungsten
Drilling Fluid: Mud/Air
Protective Casing: 5" Steel Conductor

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	7/25/90		7/30/90	
Geophys Logging:				
Casing:				
Filter Placement:				
Cementing:			7/26/90	
Development:				

Well Design & Specifications

Basis: Geologic Log x Geophysical Log

Casing String (s): C=Casing S=Screen

Depth	String(s)	Elevation
+1.12 – 45.0	C1	–
45.0 – 70.0	S1	–
70.0 – 87.5	S2	–

Casing: C1 5" Steel Conductor
C2

Screen: S1 5" Diam. Open Hole
S2 4" Diam. Open Hole
S3

Filter Pack: None

Grout Seal: 0-45.0 feet Enviroplug (Bentonite)

Bentonite Seal:

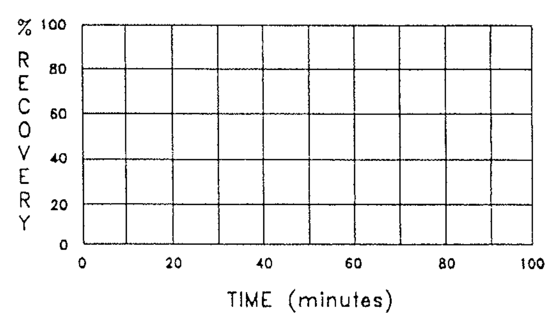
Well Development:

Depth to water 82.24' (8/17/90)
Depth to water 83.74' (9/05/90)

Development Data:

Q= So=

Time	pH	Spec. Cond.	Temp (°C)



Comments: Depth to water after drilling:
83.36' Below Grade (7/30/90)

T.D. 87.5 ft.

INSPECTOR: Amr M. Amr
CHECKED BY: ACW
PROJECT: CA 012004
LOCATION: Gregory Canyon, near Pala, California.

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Waste Management, Inc.

ROCK BOREHOLE LOG WELL GMP-3

See Plate 3 for Location

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California					BORING NO. GMP-3
DRILLING METHOD: Air Rotary					SHEET 1 OF 3
HOLE DIAMETER: 10-inch (0-40 feet); 4.25-inch (40-70 feet); 4-inch (70-81 feet)					DRILLING
WATER LEVEL	76.0'	DRY			START / FINISH
TIME	———	———			TIME: ——— / ———
DATE	8-7-90	9-5-90			DATE: 8-3-90 / 8-7-90
CASING DEPTH	40.0				

DATUM: M.S.L. ELEVATION: 469.26

DRILLING: Mobile B-61XD Rotary w/christensen coring

SURFACE CONDITIONS: Soil & Boulders

ANGLE: Vertical

Note: Reference measurement points for lithology from ground surface; water levels from top of casing in feet.

SAMPLE HAMMER TORQUE: Not Applicable

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr Amr CHECKED BY ACW

DATE 10-12-90

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
0–27	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	**BONSALL TONALITE** (Kb) weathered. Silty sand, very light gray (7n7), Medium grained, phaneritic, texture.		Not Applicable	Cuttings from air Circulation	Refer to Well Constuction Summary	Not Applicable
5						More fine to coarse sand, light brownish gray (5yr 6/1) at 6 feet.					
10						Little fine gravel; medium gray (5n5) at 9 feet.					
15						Increasing fine angular gravel.					
20						Becomes fine to medium sand; pale yellow brown (10yr 6/2) at 20 feet.					
25						Fine to medium sand					

Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMP-3

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	RECOVERY	RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
30	Not Applicable (30–65)	Not Applicable (to 40)	Not Applicable (to 40)	Not Applicable (to 40)	Not Applicable (to 40)	Becomes friable, moderately fractured brownish gray (5yr 4/1).			Cuttings from Air Circulation (to 40)	Refer to Well Construction Summary	Not Applicable
35											
40		1	5	100	60	Becomes medium gray (5n5), moderately fractured from 40–55 feet. Highly fractured with Quartz vein infilling.		N40E;66°S fracture N50W;70°W fracture	Christensen Wire Line Coring (40–65)		
45		2	4	100	75	Becomes highly micaceous, iron-stained at 45 feet. Poikilitic texture with hornblende and feldspar crystals at 47 feet. Becomes medium dark gray (4n4).		N56E;,60°S fracture N62E;60°S 1/8" calcite filled vein			
50		3	3	100	60	Becomes very light gray (8n8), quartz vein with 1/4"-wide biotite flakes. 1/8" hornblende crystals, porphyritic texture.					
55		4	6	100	70	Becomes very friable, medium gray (4n4). Light brown (5yr 5/6), iron-stained highly fractured from 56 to 68 feet. Becomes grayish black (2n2) fracture.		N54E;56°E fracture N60E;66°E fracture			
60		5	5	100	75	Becomes medium dark gray (4n4), coat quartz-filled veinlets.					
65						Very light gray (8n8), porphyritic dike.		N69°E;66°W fracture			

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr Amr CHECKED BY ACW

DATE 10-12-90

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Waste Management, Inc.

ROCK BOREHOLE LOG

BORING NO. GMP-3

SITE NAME AND LOCATION: Gregory Canyon, near Pala, California

SHEET 3 OF 3

DEPTH IN FEET	PERCENT RECOVERY	CORES: RUN NO.	CORES: NO. OF CORE-PIECES LARGER THAN 2X CORED DIAMETER	CORES: RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	OBSERVED ROCK STRUCTURE(S)	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING
	Not Applicable	6	1	100	10	Becomes light gray (8n8), medium grained, highly fractured.			Christensen Wire Line Coring	Refer to Well Construction Summary	Not Applicable
		7	0	100	0	**BONSALL TONALITE** (Kb) unweathered Medium gray (5n5), aphanitic texture, highly fractured. Very hard; light gray (7n7), [illegible]e Very hard. at 70 feet.		N58W;40°W fracture N5W;72°E iron-stained fracture			
70		8	1	100	80			N80E;70°S iron-stained fracture N32°E;68°E iron-stained slightly micaceus fractured			
75		9	2	100	40			N32°E;62°W fracture			
		10	1	25	80	Fractured, iron-stained.		N5W;61°W fracture			
80											
						Bottom of boring at 81.0 feet.					
85											
90											
95											
100											

DRILLING CONTRACTOR H-F Drilling, Inc. Fullerton, Ca.

LOGGED BY Amr M. Amr

DATE 10-12-90 CHECKED BY ACW

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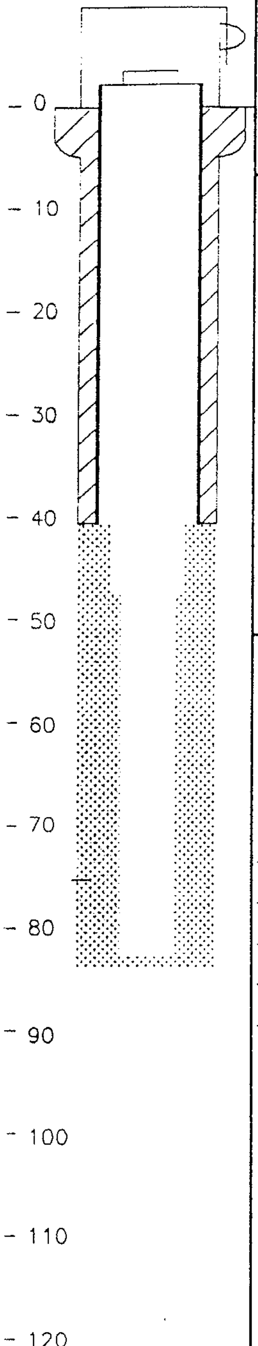
Waste Management, Inc.

Well No. GMP-3

Boring No. X-Ref: –

MONITOR WELL CONSTRUCTION SUMMARY



Survey Coords: ______

Elevation Ground Level: Approximately 467.89

Top of Casing: 469.260 feet

Drilling Summary:

Total Depth: 81.0 feet

Borehole Diameter: 10 inches

Casing Stic-up Height: 1.55 feet

Driller: H-F Drilling, Fullerton, Ca

Rig: Air Rotory

Bit(s): Tungsten Bit/ Diamond

Drilling Fluid: Air

Protective Casing: 5" Steel Conductor

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	8/3/90		8/7/90	
Geophys Logging:				
Casing:				
Filter Placement:				
Cementing:			8/3/90	
Development:			—	

Well Design & Specifications

Basis: Geologic Log x Geophysical Log

Casing String (s): C=Casing S=Screen

Depth		String(s)	Elevation	
+1.55	40.1	C1		
40.16	70.0	S1		
70.0	81.0	S2		

Casing: C1 5" Steel Conductor

C2 ______

Screen: S1 4.25" Diam. Open Hole

S2 4" Diam. Open Hole

Filter Pack: None

Grout Seal: 40.16-0 feet Enviroplug

Bentonite Seal: ______

Well Development:

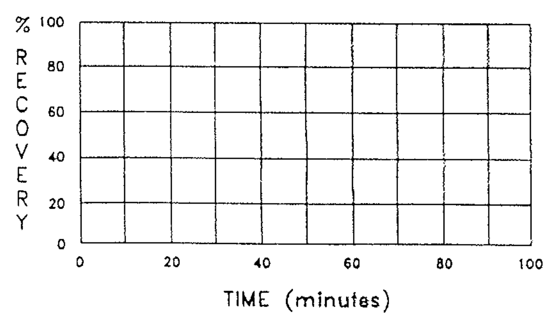
Depth to water: Dry (8/17/90)

Depth to water: Dry (9/5/90)

Development Data:

Q= So=

Time	pH	Spec. Cond.	Temp (°C)



Comments: Depth to water after drilling: 76.0' below grade. (8/7/90)

T.D. 81.0 ft.

INSPECTOR: Amr M. Amr

CHECKED BY: ACW

PROJECT: CA 012004

LOCATION: Gregory Canyon, near Pala, California.

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Project: GREGORY CANYON		KEY TO LOGS		
Logged by:	Checked by:			
Drilling Equipment:		WL Elev:	Date:	Time:
Ground Elev and Datum:		TOC Elev:		Well Cover:
WL Depth ATD:		Well Casing:		Screen:
Date Started:	Date Completed:	Filter Pack:		Seal:

Depth, ft	Geologic Log	Material Description	Well Details	Blow Counts	Sample Type	Sample No.	Notes

Depth scale: 5, 10, 15, 20, 25

Geologic Log

- Fill
- Sand/Sandstone
- Silt
- Clay/Claystone
- Sand/Silt
- Clay/Silt
- Sand/Clay
- Gravels
- Bedrock

Well Details

- Concrete
- Cement/Bentonite Grout
- Blank Casing
- Bentonite
- Well Screen
- Filter Pack
- Slough

Sample Type / Notes

- MOSS CONTINUOUS CORE SAMPLER
  Sample is advanced inside and ahead of the lead auger (2" inside diameter, 2.5" outside diameter, 2.5' length)
- MODIFIED CALIFORNIA SAMPLER
  Sample with recorded blows per foot was obtained with a Modified California drive sampler (2" inside diameter, 2.5" outside diameter) lined with sample tubes. The sampler was driven into the soil at the bottom of the hole with a 140 pound hammer falling 30 inches.
- CALIFORNIA SPLIT SPOON SAMPLER
  Sample with recorded blows per foot was obtained using a California split spoon sampler (2.5" diameter, 18" long, 3 brass tubes, each 6" long)
- NR No Recovery
- Laboratory Sample

Abbreviations
WL - Water level
ATD - At time of drilling
TOC - Top of casing
HSA - Hollow stem auger
CFA - Continuous flight auger
MSL - Mean sea leve
NA - Not applicable

Project No: 90532203-H400	Woodward-Clyde Consultants	Figure: A-2.6

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Project: GREGORY CANYON	Log of Test Boring No: B-1
Logged by: RKS; Checked by: LAN	

Drilling Equipment: Canterra CT 212, Air Rotary, 6.5" Tricone

Ground Elev and Datum: Approximately 369', MSL

WL Depth ATD: None encountered

Date Started: 10-15-91   Date Completed: 10-15-91

Depth, ft	Geologic Log	Material Description	Blow Counts	OVM/OVA (ppm)	Sample Type	Sample No.	Notes
0		**COLLUVIUM** Dry, reddish brown, clayey sand (SC)					No samples retained. Logged using drill cuttings
		Cobbles/gravel					
5							
		Cobbles/gravel					
		Dry, reddish brown, silty, fine-grained sand (SM)					
10							
15							
		Leucogranodiorite boulder					
20		Bottom of boring at 20 feet					
		Boring backfilled with 3/8-inch bentonite chips hydrated during placement					
25							

Project No: 90532203-H400   **Woodward-Clyde Consultants**   Figure: A-2.7

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Project: GREGORY CANYON		Log of Monitoring Well No: WCC-2 (B-2)
Logged by: RKS	Checked by: LAN	

Drilling Equipment: Canterra CT 212, Air Rotary, 6.5" Tricone	WL Elev: Dry Date: 10-17-91 Time: 10:00 am
Ground Elev and Datum: Approximately 344', MSL	TOC Elev: 346.84' Well Cover: Monument
WL Depth ATD: None encountered	Well Casing: 3" diam., Sch 40 PVC Screen: 0.020" slotted
Date Started: 10-16-91 Date Completed: 10-17-91	Filter Pack: #2/16 Lonestar sand Seal: Bentonite chips

Depth, ft	Material Description	Blow Counts	OVM/OVA (ppm)	Sample No.	Notes
0	**COLLUVIUM** Very dense, dry, reddish brown, silty, coarse-grained sand (SM) with occasional fine gravel some mica				
5	Moist	60/ 7"		B2-5.5ft	
	Occasional boulders				
10		113/ 7"		B2-10.5ft	
	Leucogranodiorite boulder(s)				
15		100/ 9"		B2-15.3ft	
	Leucogranodiorite boulder(s)				
20					
	WEATHERED BEDROCK (TONALITE) Very dense, dark-colored plutonic rock composed of quartz and feldspar with abundant biotite and hornblende	60/ 5"		B2-22.9ft	
25					

Project No: 90532203-H400	Woodward-Clyde Consultants	Figure: A-2.8

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Project: GREGORY CANYON	Log of Monitoring Well No. WCC-2 (Cont'd)

Depth, ft	Geologic Log	Material Description	Well Details	Blow Counts	OVM/OVA (ppm)	Sample Type	Sample No.	Notes
		(Continued) very dense, dark-colored plutonic rock composed of quartz and feldspar with abundant biotite and hornblende		60/ 4"				
35				40/ 3"				Hole abandoned at 35'. Sampler dropped into boring. Drill new hole, 10' north, 35' total depth - no samples retained
40				130/ 6"			B2-40ft	
		Becomes more dense						
45				110/ 3"			B2-45ft	
50		Bottom of boring at 50 feet						
55								
60								

Project No: 90532203-H400

Woodward-Clyde Consultants

Figure: A-2.9

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Project: GREGORY CANYON		**Log of Test Boring No: B-3**
Logged by: RKS	Checked by: LAM	

Drilling Equipment: Canterra CT 212, Air Rotary, 6.5" Tricone

Ground Elev and Datum: Approximately 377', MSL

WL Depth ATD: Approximately 33'

Date Started: 10-16-91 Date Completed: 10-16-91

Depth, ft	Geologic Log	Material Description	Blow Counts	OVM/OVA (ppm)	Sample Type	Sample No.	Notes
		COLLUVIUM Dry, reddish brown, silty, fine-grained sand (SM) with cobbles/ boulders					
		Boulder					
5							
10			60/ 3"				Refusal, no sample retained
		WEATHERED BEDROCK (TONALITE) Plutonic rock composed of quartz, feldspar, hornblende and biotite; foliated					
15							
20							
25							

Project: GREGORY CANYON			Log of Boring No.: B-3				
Depth, ft	Geologic Log	Material Description	Blow Counts	OVM/OVA (ppm)	Sample Type	Sample No.	Notes
		(Continued) plutonic rock composed of quartz, feldspar hornblende and biotite; foliated					Drilling harder at 30'
		Becomes wet					Encountered water at 33', boring sloughed 33' to 35'
35		Bottom of Boring at 35 feet Boring backfilled with 3/8-inch bentonite chips hydrated during placement					
40							
45							
50							
55							
60							

Project: GREGORY CANYON		Log of Test Boring No: B-4
Logged by: RKS	Checked by: [illegible]	

Drilling Equipment: Canterra CT 212, Air Rotary, 6.5" Tricone

Ground Elev and Datum: Approximately 361', MSL

WL Depth ATD: None encountered

Date Started: 10-16-91 Date Completed: 10-16-91

Depth, ft	Geologic Log	Material Description	Blow Counts	OVM/OVA (ppm)	Sample Type	Sample No.	Notes
		COLLUVIUM Very dense, dry, reddish brown, silty sand (SM) with cobbles/ boulders, micaceous					
		Boulders					
5							
10		With olive-gray mottling (with metamorphic clasts)	109			B4-10.5ft	
		Becomes pebbly					
15			50			B4-16ft	
		Boulder (decomposed; leucogranodiorite)					
		Boulder (metamorphic?); dark-colored cuttings					
20		Bottom of Boring at 19.5 feet Boring backfilled with 3/8-inch bentonite chips hydrated during placement.					
25							

Project No: 90532203-H400 **Woodward-Clyde Consultants** Figure: A-2.12

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Project: GREGORY CANYON		Log of Test Boring No: B-5
Logged by: RKS	Checked by: *dAM*	

Drilling Equipment: Canterra CT 212, Air Rotary, 6.5" Tricone

Ground Elev and Datum: Approximately 378', MSL

WL Depth ATD: None encountered

Date Started: 10-18-91 Date Completed: 10-18-91

Depth, ft	Geologic Log	Material Description	Blow Counts	OVM/OVA (ppm)	Sample Type	Sample No.	Notes
0–2		**TOPSOIL** Loose, dry to moist, dark reddish brown, silty, fine-grained sand (SM)	NR		RUN 1		60% recovery
2–4		**RESIDUAL SOIL** Dense, moist, reddish brown, clayey sand (SC) with gravels and boulders					
4–5		**OLDER COLLUVIUM**					
5		Very dense, most, reddish brown, silty sand with clay (SM) and gravels	NR		RUN 2		85% recovery
		Fine gravels					
10		Very dense, moist, reddish brown, silty sand (SM), slightly cemented			RUN 3		100% recovery
		WEATHERED BEDROCK (TONALITE) Dark-colored, plutonic rock composed of quartz and feldspar with abundant biotite and hornblende					
15		Becomes moderately weathered	NR		RUN 4		80% recovery
20					RUN 5		100% recovery
		Becomes highly weathered, fractured and oxidized					
25		Bottom of Boring at 25 feet Boring backfilled with 3/8-inch bentonite chips hydrated during placement.					

Project: GREGORY CANYON

Logged by: RKS | Checked by: [signature]

Log of Monitoring Well No: WCC-1 (B-6)

Drilling Equipment: Canterra CT 212, Air Rotary, 6.5" Tricone

Ground Elev and Datum: Approximately 328', MSL

WL Depth ATD: 20 feet

Date Started: 10-18-91 Date Completed: 10-19-91

WL Elev: 309.48' Date: 10-17-91 Time: 10:30 am

TOC Elev: 330.38' Well Cover: Monument

Well Casing: 2" diam., Sch 40 PVC Screen: 0.020" slotted

Filter Pack: #2/16 Lonestar sand Seal: No. 8 Granular Bentonite (Enviroplug)

Depth, ft	Material Description	Blow Counts	Sample Type	Sample No.	Notes
	ALLUVIUM Loose, dry, brown, silty sand (SM) with gravel	NR	RUN 1		0% retained
5	**COLLUVIUM** Moist, reddish orange brown, fine- to medium-grained, silty sand (SM) with gravel and boulders Leucogranodiorite boulder	NR	RUN 2		30% retained
		NR		RUN 3	75% retained
10				RUN 4	
		NR	RUN 5		50% retained
15		NR		RUN 6	50% retained
	Boulder Gravel Boulder	NR	RUN 7		75% retained
20	Wet, orange brown, clayey, medium-grained sand (SC) with gravel	NR	RUN 8		80% retained
25		NR	RUN 9		60% retained
	Bottom of Boring at 30 feet				

OVM/OVA (ppm)

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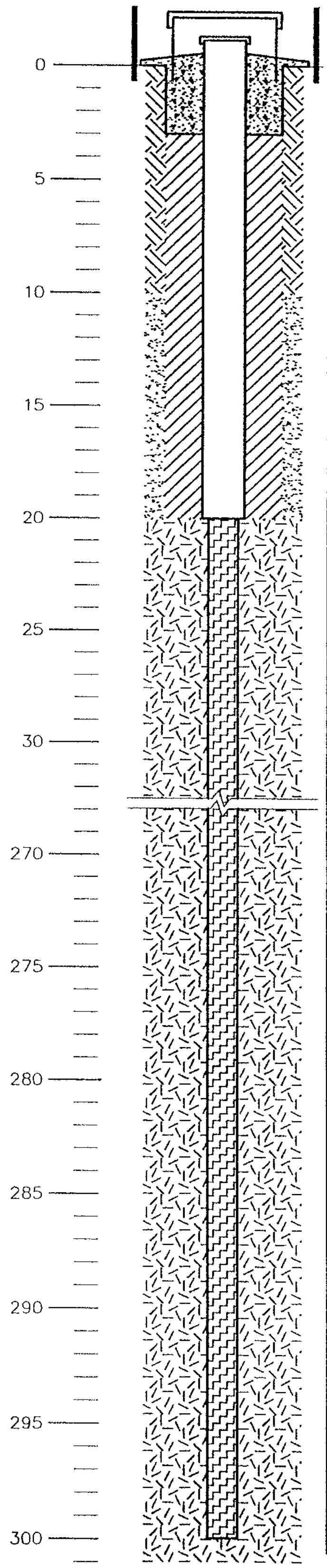
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-1**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: PROPOSED SAN DIEGO COUNTY LANDFILL
LOCATION: GREGORY CANYON, PALA AREA
INSPECTOR: T. REEDER
CHECKED BY: T. REEDER

ELEVATION GROUND LEVEL: 342.5 feet
ELEVATION TOP OF CASING: 343.72 feet
DATE STARTED: 11/19/96
DATE FINISHED: 11/20/96
TOTAL DEPTH: 300 feet



DRILLING SUMMARY:

Total Depth: 300 feet
Borehole diameter: 5.5 inches O.D.
Driller: Layne Cristensen

Rig: DUAL WALL REVERSE
Bit(s): CARBIDE BUTTON BIT

Drilling Fluid: Air

Protective Casing: N/A

WELL CONSTRUCTION DETAILS:

Casing: 6-inch diameter, flush threaded, Schedule 40 PVC (boring reamed to 8-inch diameter prior to placement of casing). (From +1.22 to 20 feet.)

Screen: NONE - OPEN HOLE. (From 20 to 300 feet.)

Bentonite Seal: Bentonite pellets. (From 3 to 20 feet.)

Filter Pack: NONE - FRACTURED ROCK.

Residual Soil. (From 0 to 10 feet.)

DECOMPOSED ROCK. (From 10 to 20 feet.)

Portland Type II cement with bentonite. (From 0 to 3 feet.)

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/19/96	10:12	11/20/96	9:07
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	12/13/96	-	12/13/96	-
Casing Install:	11/19/96	10:36	11/19/96	12:14
Filter Placement:	-	-	-	-
Seal Placement:	-	-	-	-
Seal Placement 2nd:	-	-	-	-

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Air Lift Pumping			
Bail			

Total Gallons Removed:

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
11/20	6:30	99.5'	1.5'	234'	235.5'	TSR
12/16	-	37.1'	1.5'	296.4'	297.9'	LL

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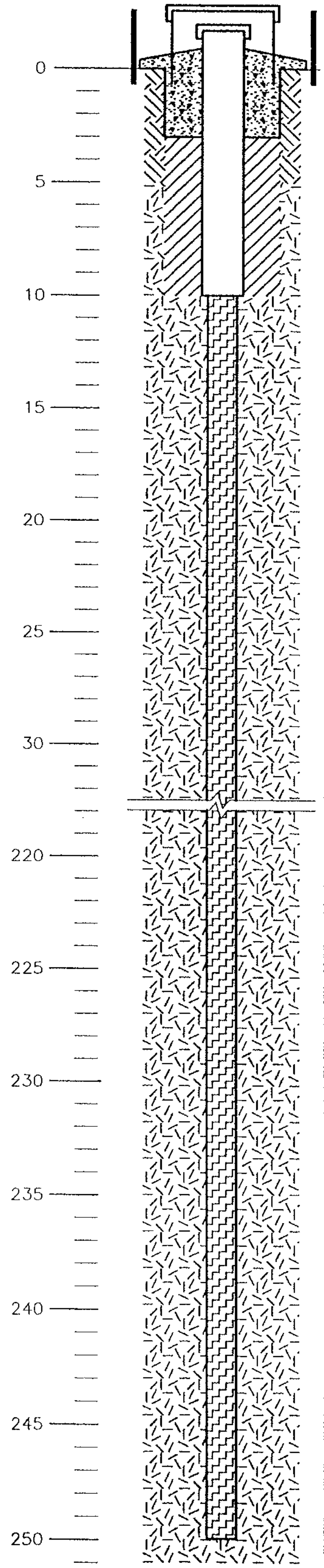
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-2**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: PROPOSED SAN DIEGO COUNTY LANDFILL
LOCATION: GREGORY CANYON, PALA AREA
INSPECTOR: T. REEDER
CHECKED BY: T. REEDER

ELEVATION GROUND LEVEL: 377.1 feet
ELEVATION TOP OF CASING: 379.45 feet
DATE STARTED: 11/18/96
DATE FINISHED: 11/19/96
TOTAL DEPTH: 250 feet



DRILLING SUMMARY:

Total Depth: 250 feet
Borehole diameter: 5.5 inches O.D.
Driller: Layne Cristensen

Rig: DUAL WALL REVERSE
Bit(s): CARBIDE BUTTON BIT

Drilling Fluid: Air

Protective Casing: N/A

WELL CONSTRUCTION DETAILS:

Casing: 6-inch diameter, flush threaded, Schedule 40 PVC (boring reamed to 8-inch diameter prior to placement of casing). (From +2.35 to 10 feet.)

Screen: NONE - OPEN HOLE. (From 10 to 250 feet.)

Bentonite Seal: Bentonite pellets. (From 3 to 10 feet.)

Filter Pack: NONE - FRACTURED ROCK.

Residual Soil. (From 0 to 5 feet.)

Portland Type II cement with bentonite. (From 0 to 3 feet.)

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/18/96	11:20	11/19/96	8:19
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	12/12/96	-	12/12/96	-
Casing Install:	11/18/96	11:50	11/18/96	12:48
Filter Placement:	-	-	-	-
Seal Placement:	-	-	-	-
Seal Placement 2nd:	-	-	-	-

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Air Lift Pumping			
Bail			

Total Gallons Removed:

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
11/19	6:40	127.5'	1.5'	126'	247.5'	TSR
11/19	15:05	105'	1.5'	103.5'	270'	TSR
11/20	10:03	73.8'	1.5'	72.3'	301.2'	TSR
12/16	-	69.73'	1.5'	68.23'	305.27'	LL

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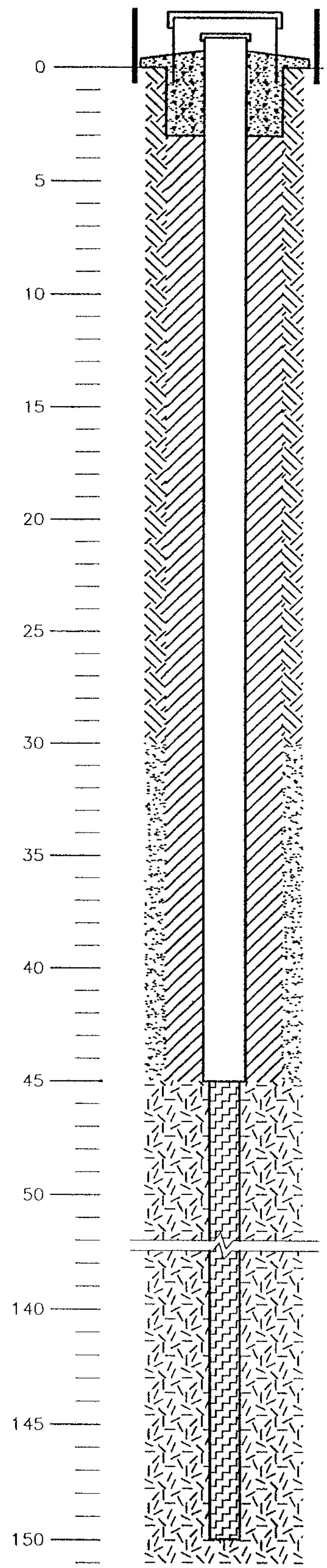
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-3**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: PROPOSED SAN DIEGO COUNTY LANDFILL
LOCATION: GREGORY CANYON, PALA AREA
INSPECTOR: T. REEDER
CHECKED BY: T. REEDER

ELEVATION GROUND LEVEL: 330.6 feet
ELEVATION TOP OF CASING: 332.02 feet
DATE STARTED: 11/25/96
DATE FINISHED: 11/26/96
TOTAL DEPTH: 150 feet



DRILLING SUMMARY:

Total Depth: 150 feet
Borehole diameter: 5.5 inches O.D.
Driller: Layne Cristensen

Rig: DUAL WALL REVERSE
Bit(s): CARBIDE BUTTON BIT

Drilling Fluid: Air

Protective Casing: N/A

WELL CONSTRUCTION DETAILS:

Casing: 6-inch diameter, flush threaded, Schedule 40 PVC (boring reamed to 8-inch diameter prior to placement of casing). (From +1.42 to 45 feet.)

Screen: NONE – OPEN HOLE. (From 45 to 150 feet.)

Bentonite Seal: Bentonite pellets. (From 3 to 45 feet.)

Filter Pack: NONE – FRACTURED ROCK.

ALLUVIUM/COLLUVIUM. (From 0 to 30 feet.)

DECOMPOSED ROCK. (From 30 to 45 feet.)

Portland Type II cement with bentonite. (From 0 to 3 feet.)

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/25/96	12:15	11/26/96	7:31
Coring:	–	–	–	–
Ream:	–	–	–	–
Geophys. Logging:	12/14/96	–	12/14/96	–
Casing Install:	11/25/96	12:45	11/25/96	15:33
Filter Placement:	–	–	–	–
Seal Placement:	–	–	–	–
Seal Placement 2nd:	–	–	–	–

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Air Lift Pumping			
Bail			

Total Gallons Removed:

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
11/26	6:45	21'	1.5'	19.5'	309'	TSR
12/16	–	23.84'	1.5'	22.34'	306.16'	LL

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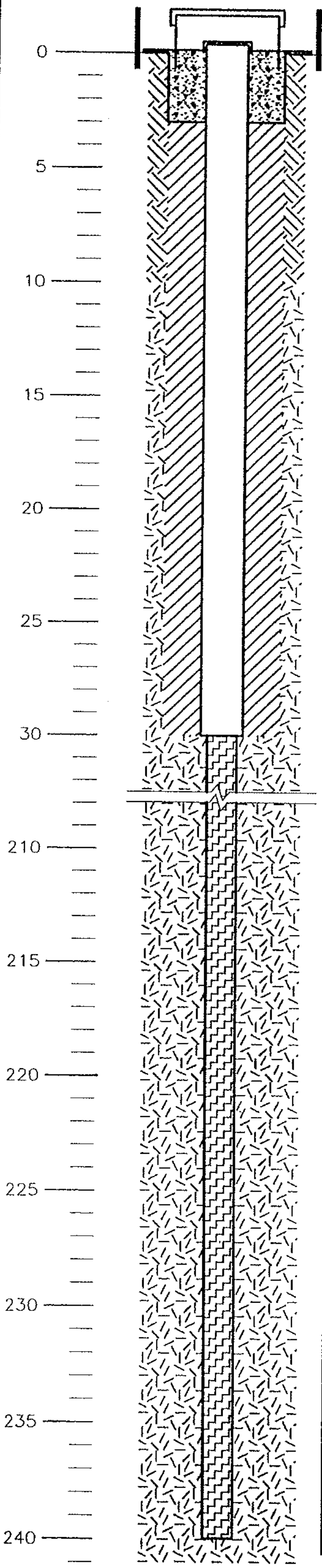
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-4**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: PROPOSED SAN DIEGO COUNTY LANDFILL
LOCATION: GREGORY CANYON, PALA AREA
INSPECTOR: T. REEDER/M. VINCENT
CHECKED BY: T. REEDER

ELEVATION GROUND LEVEL: 904.9 feet
ELEVATION TOP OF CASING: 904.99 feet
DATE STARTED: 11/26/96
DATE FINISHED: 11/27/96
TOTAL DEPTH: 240 feet



DRILLING SUMMARY:

Total Depth: 240 feet
Borehole diameter: 5.5 inches O.D.
Driller: Layne Cristensen

Rig: DUAL WALL REVERSE
Bit(s): CARBIDE BUTTON BIT

Drilling Fluid: Air

Protective Casing: N/A

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/26/96	–	11/27/96	11:08
Coring:	–	–	–	–
Ream:	–	–	–	–
Geophys. Logging:	12/17/96	–	12/17/96	–
Casing Install:	11/26/96	–	11/26/96	–
Filter Placement:	–	–	–	–
Seal Placement:	–	–	–	–
Seal Placement 2nd:	–	–	–	–

WELL CONSTRUCTION DETAILS:

Casing: 6–inch diameter, flush threaded, Schedule 40 PVC (boring reamed to 8–inch diameter prior to placement of casing). (From +0.09 to 30 feet.)

Screen: NONE – OPEN HOLE. (From 30 to 240 feet.)

Bentonite Seal: Bentonite pellets. (From 3 to 30 feet.)

Filter Pack: NONE – FRACTURED ROCK.

Residual Soil. (From 0 to 10 feet.)

Portland Type II cement with bentonite. (From 0 to 3 feet.)

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Air Lift Pumping			
Bail			

Total Gallons Removed:

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
12/02	6:55	103.2'	1.5'	101.7'	801.8'	TSR
12/16	–	149.93'	1.5'	148.43'	755.07'	LL

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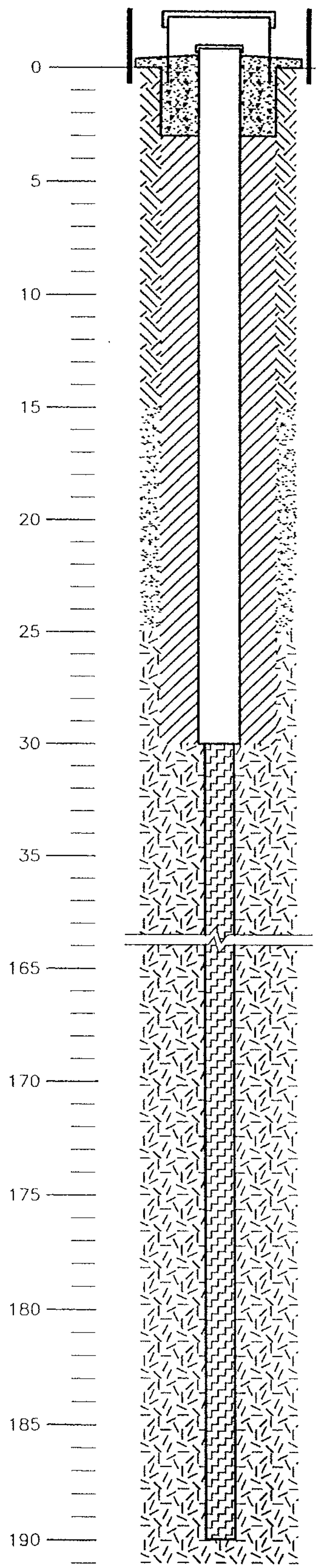
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-5**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: PROPOSED SAN DIEGO COUNTY LANDFILL
LOCATION: GREGORY CANYON, PALA AREA
INSPECTOR: T. REEDER
CHECKED BY: T. REEDER

ELEVATION GROUND LEVEL: 927.1 feet
ELEVATION TOP OF CASING: 927.92 feet
DATE STARTED: 11/20/96
DATE FINISHED: 11/21/96
TOTAL DEPTH: 190 feet



DRILLING SUMMARY:

Total Depth: 190 feet
Borehole diameter: 5.5 inches O.D.
Driller: Layne Cristensen

Rig: DUAL WALL REVERSE
Bit(s): CARBIDE BUTTON BIT

Drilling Fluid: Air

Protective Casing: N/A

WELL CONSTRUCTION DETAILS:

Casing: 6-inch diameter, flush threaded, Schedule 40 PVC (boring reamed to 8-inch diameter prior to placement of casing). (From +0.82 to 30 feet.)

Screen: NONE - OPEN HOLE. (From 30 to 190 feet.)

Bentonite Seal: Bentonite pellets. (From 3 to 30 feet.)

Filter Pack: NONE - FRACTURED ROCK.

COLLUVIUM/Residual Soil. (From 0 to 15 feet.)

DECOMPOSED ROCK. (From 15 to 25 feet.)

Portland Type II cement with bentonite. (From 0 to 3 feet.)

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/20/96	11:20	11/21/96	9:47
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	12/16/96	-	12/16/96	-
Casing Install:	11/20/96	-	11/20/96	15:57
Filter Placement:	-	-	-	-
Seal Placement:	-	-	-	-
Seal Placement 2nd:	-	-	-	-

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Air Lift Pumping			
Bail			

Total Gallons Removed:

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
11/21	6:30	41'	1.5'	39.5'	889'	TSR
12/16	-	42.57'	1.5'	41.07'	887.43'	LL

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GeoLogic Associates

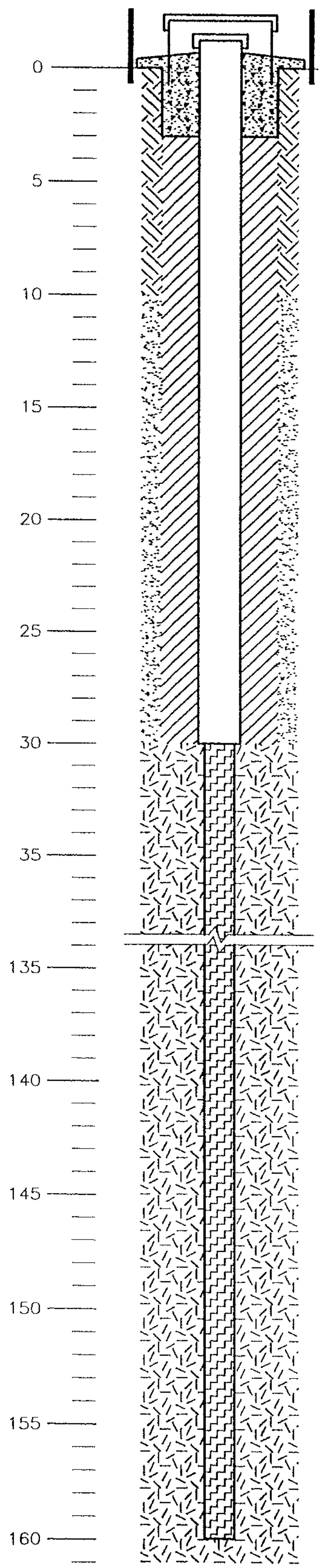
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-7**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: PROPOSED SAN DIEGO COUNTY LANDFILL
LOCATION: GREGORY CANYON, PALA AREA
INSPECTOR: T. REEDER
CHECKED BY: T. REEDER

ELEVATION GROUND LEVEL: 401.6 feet
ELEVATION TOP OF CASING: 402.85 feet
DATE STARTED: 11/21/96
DATE FINISHED: 11/22/96
TOTAL DEPTH: 160 feet



DRILLING SUMMARY:

Total Depth: 160 feet
Borehole diameter: 5.5 inches O.D.
Driller: Layne Cristensen

Rig: DUAL WALL REVERSE
Bit(s): CARBIDE BUTTON BIT

Drilling Fluid: Air

Protective Casing: N/A

WELL CONSTRUCTION DETAILS:

Casing: 6-inch diameter, flush threaded, Schedule 40 PVC (boring reamed to 8-inch diameter prior to placement of casing). (From +1.25 to 30 feet.)

Screen: NONE - OPEN HOLE. (From 30 to 160 feet.)

Bentonite Seal: Bentonite pellets. (From 3 to 30 feet.)

Filter Pack: NONE - FRACTURED ROCK.

COLLUVIUM. (From 0 to 10 feet.)

DECOMPOSED ROCK. (From 10 to 30 feet.)

Portland Type II cement with bentonite. (From 0 to 3 feet.)

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/21/96	13:55	11/22/96	10:21
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	12/19/96	-	12/19/96	-
Casing Install:	11/21/96	-	11/21/96	-
Filter Placement:	-	-	-	-
Seal Placement:	-	-	-	-
Seal Placement 2nd:	-	-	-	-

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Air Lift Pumping			
Bail			

Total Gallons Removed:

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
12/16	-	34.82'	1.5'	33.32'		TSR

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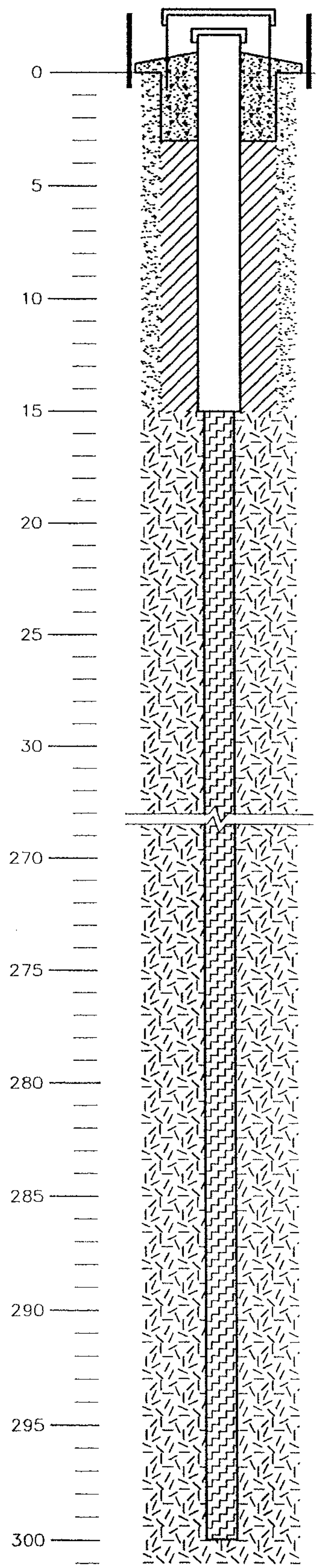
GeoLogic Associates MONITORING WELL COMPLETION SUMMARY	WELL NO.: **GLA-8** PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: PROPOSED SAN DIEGO COUNTY LANDFILL
LOCATION: GREGORY CANYON, PALA AREA
INSPECTOR: M. VINCENT/T. REEDER
CHECKED BY: T. REEDER

ELEVATION GROUND LEVEL: 632.7 feet
ELEVATION TOP OF CASING: 633.11 feet
DATE STARTED: 11/24/96
DATE FINISHED: 11/25/96
TOTAL DEPTH: 300 feet



DRILLING SUMMARY:

Total Depth: 300 feet
Borehole diameter: 5.5 inches O.D.
Driller: Layne Cristensen

Rig: DUAL WALL REVERSE
Bit(s): CARBIDE BUTTON BIT

Drilling Fluid: Air

Protective Casing: N/A

WELL CONSTRUCTION DETAILS:

Casing: 6-inch diameter, flush threaded, Schedule 40 PVC (boring reamed to 8-inch diameter prior to placement of casing). (From +1.41 to 15 feet.)

Screen: NONE – OPEN HOLE. (From 15 to 300 feet.)

Bentonite Seal: Bentonite pellets. (From 3 to 15 feet.)

Filter Pack: NONE – FRACTURED ROCK.

DECOMPOSED ROCK. (From 0 to 15 feet.)

Portland Type II cement with bentonite. (From 0 to 3 feet.)

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/24/96	9:20	11/25/96	11:17
Coring:	–	–	–	–
Ream:	–	–	–	–
Geophys. Logging:	12/18/96	–	12/18/96	–
Casing Install:	11/24/96	–	11/24/96	–
Filter Placement:	–	–	–	–
Seal Placement:	–	–	–	–
Seal Placement 2nd:	–	–	–	–

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Air Lift Pumping			
Bail			

Total Gallons Removed:

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
11/25	6:45	61'	1.5'	59.5'	559'	TSR
12/16	–	62.40'	1.5'	60.9'	557.6'	LL

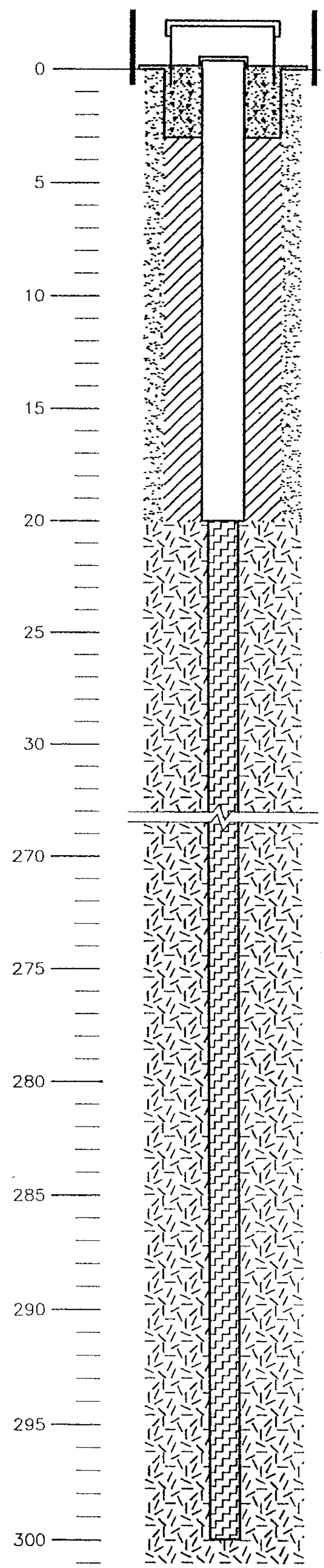
GeoLogic Associates

MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-9**

JOB NO.: 9539
PROJECT: PROPOSED SAN DIEGO COUNTY LANDFILL
LOCATION: GREGORY CANYON, PALA AREA
INSPECTOR: M. VINCENT/T. REEDER
CHECKED BY: T. REEDER

ELEVATION GROUND LEVEL: 615.4 feet
ELEVATION TOP OF CASING: 615.61 feet
DATE STARTED: 12/05/96
DATE FINISHED: 12/07/96
TOTAL DEPTH: 300 feet



DRILLING SUMMARY:

Total Depth: 300 feet
Borehole diameter: 5.5 inches O.D.
Driller: Layne Cristensen

Rig: DUAL WALL REVERSE
Bit(s): CARBIDE BUTTON BIT

Drilling Fluid: Air

Protective Casing: N/A

WELL CONSTRUCTION DETAILS:

Casing: 6-inch diameter, flush threaded, Schedule 40 PVC (boring reamed to 8-inch diameter prior to placement of casing). (From +0.21 to 20 feet.)

Screen: NONE – OPEN HOLE. (From 20 to 300 feet.)

Bentonite Seal: Bentonite pellets. (From 3 to 20 feet.)

Filter Pack: NONE – FRACTURED ROCK.

DECOMPOSED ROCK. (From 0 to 20 feet.)

Portland Type II cement with bentonite. (From 0 to 3 feet.)

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	12/05/96	–	12/07/96	8:57
Coring:	–	–	–	–
Ream:	–	–	–	–
Geophys. Logging:	N/A	–	N/A	–
Casing Install:	–	–	–	–
Filter Placement:	–	–	–	–
Seal Placement:	–	–	–	–
Seal Placement 2nd:	–	–	–	–

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Air Lift Pumping			
Bail			

Total Gallons Removed:

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
12/07	8:57	DRY	1.5'	N/A	N/A	TSR
12/16	–	DRY	1.5'	N/A	N/A	LL

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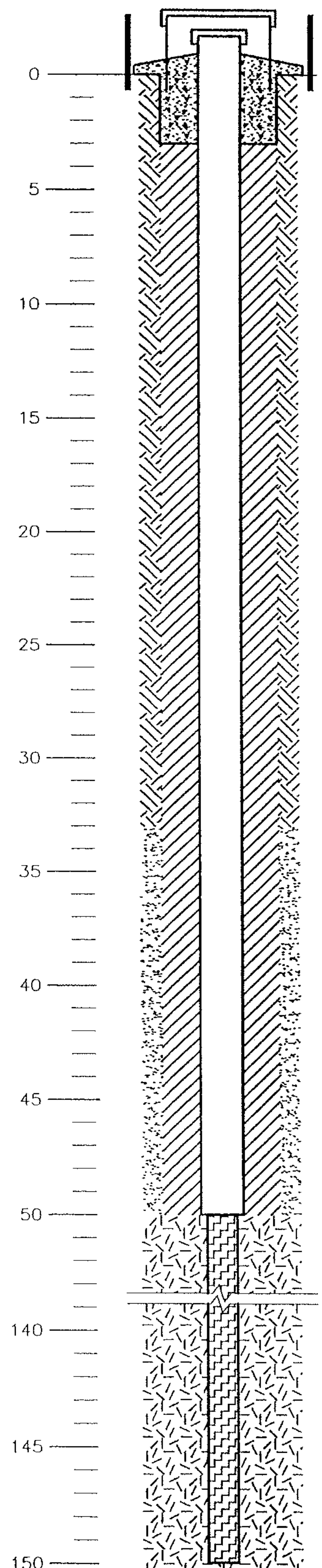
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-10**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: PROPOSED SAN DIEGO COUNTY LANDFILL
LOCATION: GREGORY CANYON, PALA AREA
INSPECTOR: M. VINCENT/T. REEDER
CHECKED BY: T. REEDER

ELEVATION GROUND LEVEL: 324.6 feet
ELEVATION TOP OF CASING: 326.59 feet
DATE STARTED: 12/03/96
DATE FINISHED: 12/05/96
TOTAL DEPTH: 150 feet



DRILLING SUMMARY:

Total Depth: 150 feet
Borehole diameter: 5.5 inches O.D.
Driller: Layne Cristensen

Rig: DUAL WALL REVERSE
Bit(s): CARBIDE BUTTON BIT

Drilling Fluid: Air

Protective Casing: N/A

WELL CONSTRUCTION DETAILS:

Casing: 6-inch diameter, flush threaded, Schedule 40 PVC (boring reamed to 8-inch diameter prior to placement of casing). (From +1.99 to 50 feet.)

Screen: NONE – OPEN HOLE. (From 50 to 150 feet.)

Bentonite Seal: Bentonite pellets. (From 3 to 50 feet.)

Filter Pack: NONE – FRACTURED ROCK.

COLLUVIUM. (From 0 to 33 feet.)

DECOMPOSED ROCK. (From 33 to 50 feet.)

Portland Type II cement with bentonite. (From 0 to 3 feet.)

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	12/03/96	11:57	12/05/96	11:06
Coring:	–	–	–	–
Ream:	–	–	–	–
Geophys. Logging:	12/15/96	–	12/15/96	–
Casing Install:	12/03/96	–	12/03/96	–
Filter Placement:	–	–	–	–
Seal Placement:	–	–	–	–
Seal Placement 2nd:	–	–	–	–

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Air Lift Pumping			
Bail			

Total Gallons Removed:

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
12/03	–	17'	2'	15'	308'	MV
12/16	–	22.2'	2'	20.2'	300.8'	LL

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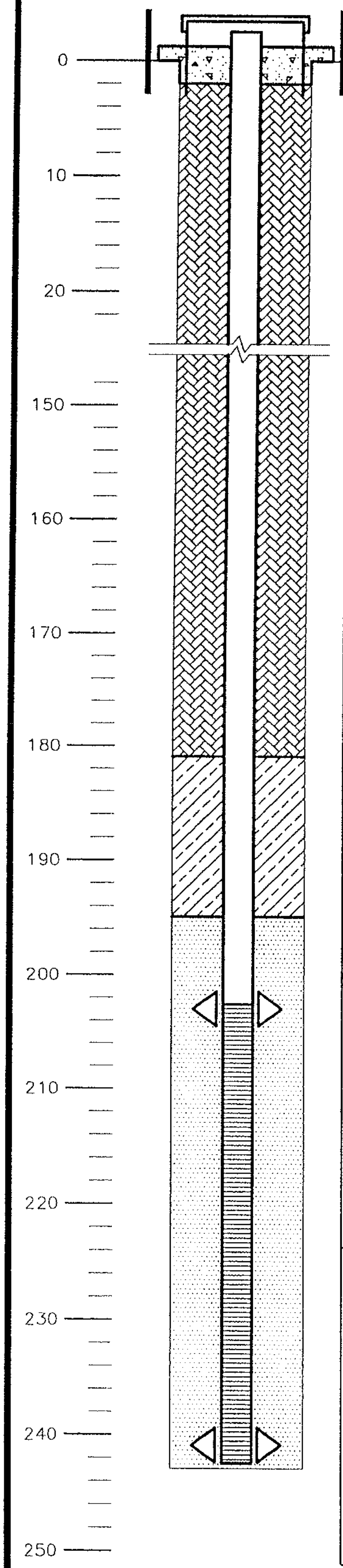
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-11**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: DETECTION MONITORING PROGRAM
LOCATION: GREGORY CANYON LANDFILL
INSPECTOR: W. LOPEZ, CEG
CHECKED BY: S. BATTELLE, CHG

ELEVATION GROUND LEVEL: 775.22
ELEVATION TOP OF CASING: 777.32
DATE STARTED: 11/30/99
DATE FINISHED: 12/02/99
TOTAL DEPTH: 242.5 feet



DRILLING SUMMARY:

Total Depth: 243 feet
Borehole diameter: 6.5"

Driller: Water Development Corporation
Rig: Dresser T-70
Bit(s): Downhole Hammer

Drilling Fluid: Air

Protective Casing: None

WELL CONSTRUCTION DETAILS:

Casing: 2" diameter Sch. 40 PVC with flush threaded joints. (From +2.1 to 202.5 feet.)

Screen: 2" diameter Sch. 40 PVC with 0.020" slots and flush threaded joints. (From 202.5 to 242.5 feet.)

Grout Seal: Portland type I-II neat cement with 5% bentonite. (From 2 to 181.0 feet.)

Bentonite Seal: Medium bentonite chips. (From 181.0 to 195.0 feet.)

Filter Pack: #3 Monterey Sand. (From 195 to 243 feet.)

Centralizer: Stainless steel. (At 202 and 242 feet.)

Concrete

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/30/99	8:20	11/30/99	15:27
Coring:	-	-	-	-
Casing Install:	12/1/99	16:00	12/1/99	16:33
Filter Placement:	12/1/99	16:37	12/1/99	16:44
Seal Placement: (Bentonite Chips)	12/1/99	16:44	12/1/99	16:58
Seal Placement 2nd: (Grout)	12/2/99	10:41	12/2/99	11:10

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	12/7/99	11:10	11:50
Air Lift Pumping			
Other - Bailer	12/7/99	11:50	16:30

Total Gallons Removed: 75

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
11/30/99	16:30			231' bgs		WBL
12/07/99	11:10			191.5' bgs		WBL

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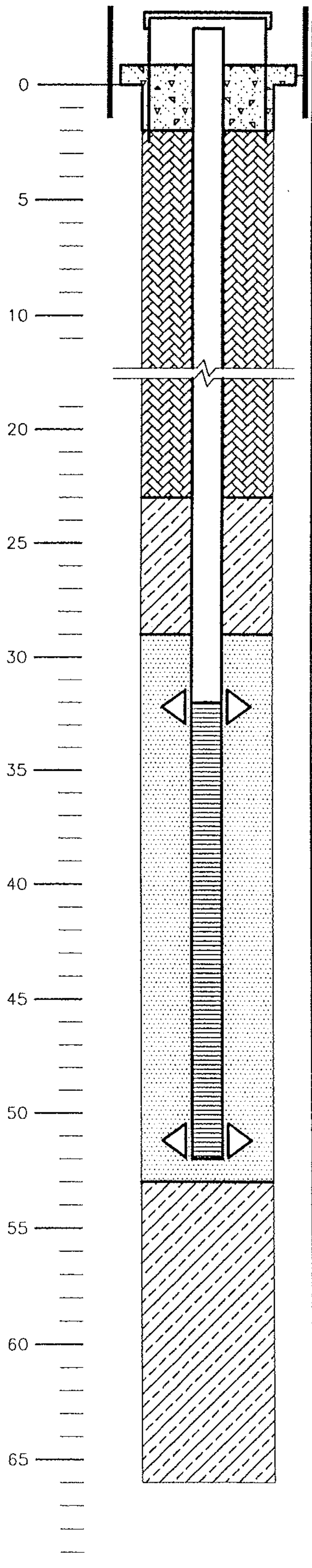
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-12**

JOB NO.: 9539
PROJECT: DETECTION MONITORING PROGRAM
LOCATION: GREGORY CANYON LANDFILL
INSPECTOR: W. LOPEZ, CEG
CHECKED BY: S. BATTELLE, CHG

ELEVATION GROUND LEVEL: 343.91
ELEVATION TOP OF CASING: 345.79
DATE STARTED: 11/24/99
DATE FINISHED: 11/24/99
TOTAL DEPTH: 52 feet



DRILLING SUMMARY:

Total Depth: 66 feet
Borehole diameter: 6-5/8"

Driller: Water Development Corporation
Rig: Dresser T-70
Bit(s): Tri-cone/Downhole Hammer

Drilling Fluid: Air

Protective Casing: 9-7/8" ø steel.

WELL CONSTRUCTION DETAILS:

Casing:	2" diameter Sch. 40 PVC with flush threaded joints. (From +1.88 to 32 feet.)
Screen:	2" diameter Sch. 40 PVC with 0.020" slots and flush threaded joints. (From 32 to 52 feet.)
Grout Seal:	Portland type I-II neat cement with 5% bentonite. (From 2 to 23 feet.)
Bentonite Seal:	Medium bentonite chips. (From 23 to 29 feet and from 53 to 66 feet.)
Filter Pack:	#3 Monterey Sand. (From 29 to 53 feet.)
Centralizer:	Stainless steel. (At 32 and 52 feet.)
Concrete	

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	-	-	-	-
Coring:	-	-	-	-
Casing Install:	11/24/99	15:03	11/24/99	15:09
Filter Placement:	11/24/99	15:10	11/24/99	15:15
Seal Placement: (Bentonite Chips)	11/24/99	14:58 15:15	11/24/99	15:03 15:16
Seal Placement 2nd: (Grout)	11/24/99	15:35	11/24/99	15:40

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	12/7/99	7:20	8:05
Air Lift Pumping			
Other - Bailer	12/7/99	8:05	10:30

Total Gallons Removed: 40

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
11/24/99	13:00			36.7' bgs		WBL
12/07/99	7:20			35.1' bgs		WBL

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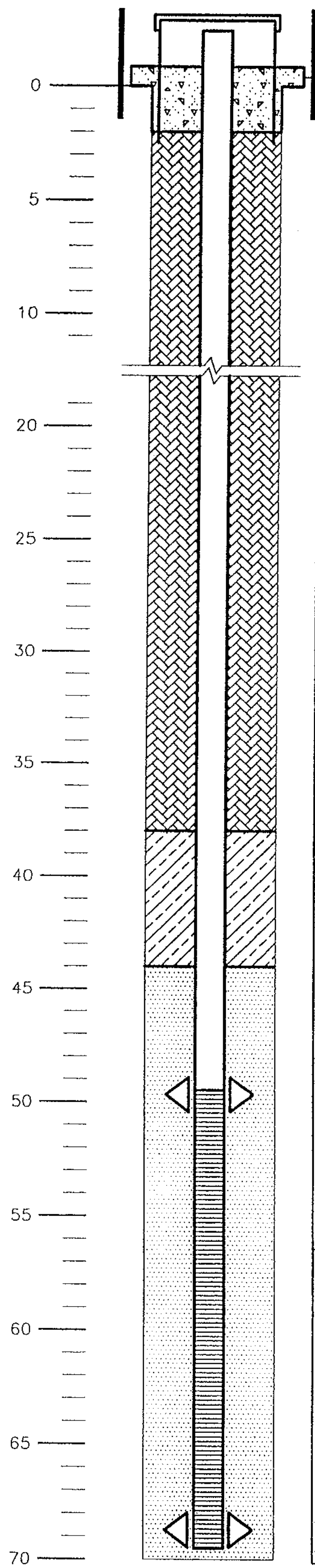
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-13**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: DETECTION MONITORING PROGRAM
LOCATION: GREGORY CANYON LANDFILL
INSPECTOR: W. LOPEZ, CEG
CHECKED BY: S. BATTELLE, CHG

ELEVATION GROUND LEVEL: 355.90
ELEVATION TOP OF CASING: 358.15
DATE STARTED: 11/22/99
DATE FINISHED: 11/23/99
TOTAL DEPTH: 69.5 feet



DRILLING SUMMARY:

Total Depth: 70 feet
Borehole diameter: 6.5"

Driller: Water Development Corporation
Rig: Dresser T-70
Bit(s): Tri-cone

Drilling Fluid: Air

Protective Casing: 9-7/8" ø steel.

WELL CONSTRUCTION DETAILS:

Casing: 2" diameter Sch. 40 PVC with flush threaded joints. (From +2.25 to 49.5 feet.)

Screen: 2" diameter Sch. 40 PVC with 0.020" slots and flush threaded joints. (From 49.5 to 69.5 feet.)

Grout Seal: Portland type I-II neat cement with 5% bentonite. (From 2 to 38 feet.)

Bentonite Seal: Medium bentonite chips. (From 38 to 44 feet.)

Filter Pack: #3 Monterey Sand. (From 44 to 70 feet.)

Centralizer: Stainless steel. (At 49 and 69 feet.)

Concrete

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/22/99	15:00	11/23/99	8:22
Coring:	-	-	-	-
Casing Install:	11/23/99	10:26	11/23/99	10:35
Filter Placement:	11/23/99	10:35	11/23/99	10:39
Seal Placement: (Bentonite Chips)	11/23/99	10:40	11/23/99	10:42
Seal Placement 2nd: (Grout)	11/23/99	10:57	11/23/99	11:13

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	12/6/99	14:00	14:45
Air Lift Pumping			
Other - Bailer	12/6/99	14:45	16:30

Total Gallons Removed: 45

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
11/23/99	7:00			49.7' bgs		WBL
12/06/99	14:18			47.0' bgs		WBL

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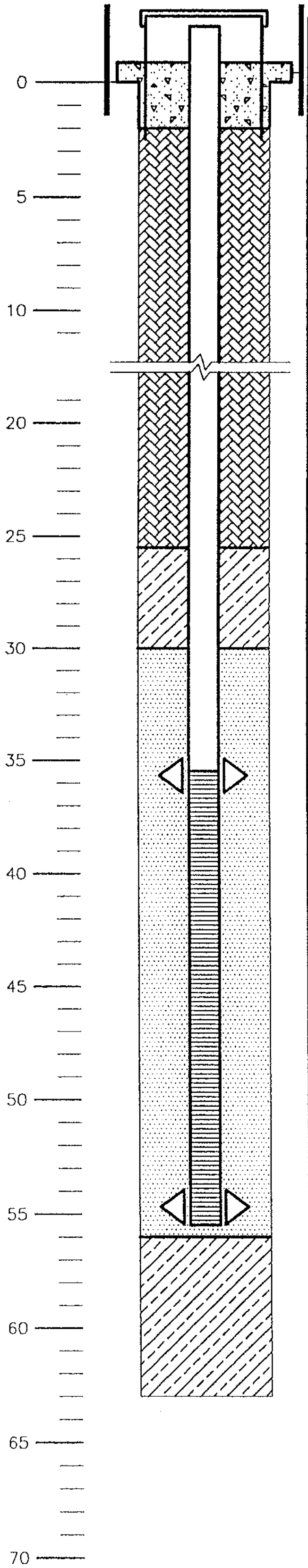
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-14**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: DETECTION MONITORING PROGRAM
LOCATION: GREGORY CANYON LANDFILL
INSPECTOR: W. LOPEZ, CEG
CHECKED BY: S. BATTELLE, CHG

ELEVATION GROUND LEVEL: 332.21
ELEVATION TOP OF CASING: 334.13
DATE STARTED: 11/21/99
DATE FINISHED: 11/22/99
TOTAL DEPTH: 55.5 feet



DRILLING SUMMARY:

Total Depth: 63 feet
Borehole diameter: 9-7/8"

Driller: Water Development Corporation
Rig: Dresser T-70
Bit(s): Tri-cone

Drilling Fluid: Air

Protective Casing: 9-7/8" ø steel.

WELL CONSTRUCTION DETAILS:

Casing: 2" diameter Sch. 40 PVC with flush threaded joints. (From +1.92 to 35.5 feet.)

Screen: 2" diameter Sch. 40 PVC with 0.020" slots and flush threaded joints. (From 35.5 to 55.5 feet.)

Grout Seal: Portland type I-II neat cement with 5% bentonite. (From 2 to 25.5 feet.)

Bentonite Seal: Medium bentonite chips. (From 25.5 to 30 feet and from 56 to 63 feet.)

Filter Pack: #3 Monterey Sand. (From 30 to 56 feet.)

Centralizer: Stainless steel. (At 35 and 55 feet.)

Concrete

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/21/99	7:35	11/21/99	16:15
Coring:	-	-	-	-
Casing Install:	11/22/99	8:23	11/22/99	8:28
Filter Placement:	11/22/99	8:30	11/22/99	8:36
Seal Placement: (Bentonite Chips)	11/22/99	7:52 8:38	11/22/99	7:54 8:40
Seal Placement 2nd: (Grout)	11/22/99	9:05	11/22/99	9:15

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	12/6/99	9:35	10:20
Air Lift Pumping			
Other - Bailer	12/6/99	10:20	12:35

Total Gallons Removed: 45

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
11/22/99	7:00			36.5' bgs		WBL
12/06/99	9:20			36.5' bgs		WBL

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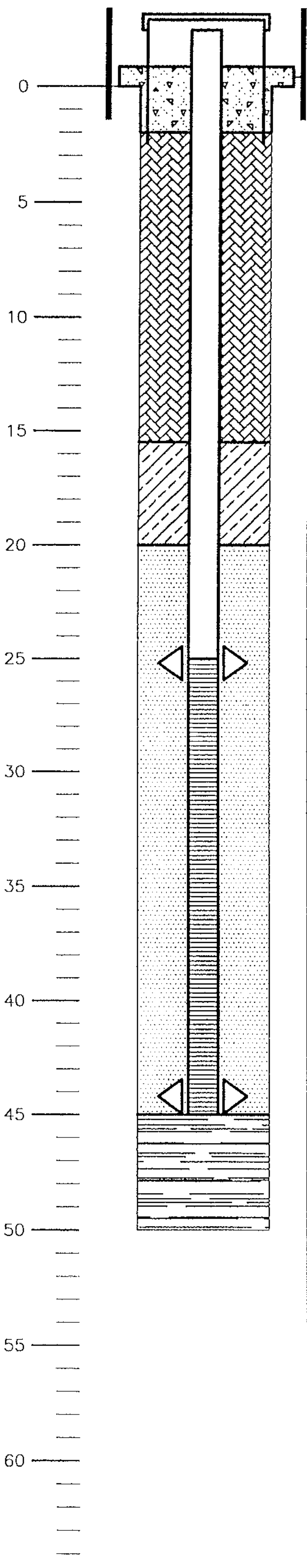
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-15**

JOB NO.: 9539
PROJECT: DETECTION MONITORING PROGRAM
LOCATION: GREGORY CANYON LANDFILL
INSPECTOR: W. LOPEZ, CEG
CHECKED BY: S. BATTELLE, CHG

ELEVATION GROUND LEVEL: 304.82
ELEVATION TOP OF CASING: 306.80
DATE STARTED: 11/19/99
DATE FINISHED: 11/20/99
TOTAL DEPTH: 45 feet



DRILLING SUMMARY:

Total Depth: 50 feet
Borehole diameter: 9-7/8"

Driller: Water Development Corporation
Rig: Dresser T-70
Bit(s): Tri-cone

Drilling Fluid: Air

Protective Casing: 9-7/8" ø steel.

WELL CONSTRUCTION DETAILS:

Casing:	2" diameter Sch. 40 PVC with flush threaded joints. (From +1.98 to 25 feet.)
Screen:	2" diameter Sch. 40 PVC with 0.020" slots and flush threaded joints. (From 25 to 45 feet.)
Grout Seal:	Portland type I-II neat cement with 5% bentonite. (From 2 to 15.5 feet.)
Bentonite Seal:	Medium bentonite chips. (From 15.5 to 20 feet.)
Filter Pack:	#3 Monterey Sand. (From 20 to 45 feet.)
Centralizer:	Stainless steel. (At 25 and 45 feet.)
Concrete	
Slough	

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/19/99	13:10	11/19/99	17:10
Coring:	-	-	-	-
Casing Install:	11/20/99	8:30	11/20/99	8:37
Filter Placement:	11/20/99	8:40	11/20/99	13:00
Seal Placement: (Bentonite Chips)	11/20/99	13:08	11/20/99	13:12
Seal Placement 2nd: (Grout)	11/20/99	14:45	11/20/99	15:20

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Air Lift Pumping			
Other -			

Total Gallons Removed:

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
11/20/99	7:00			25.0' bgs		WBL
11/21/99	8:30			11.7' bgs		WBL
12/08/99	8:50			12.3' bgs		WBL

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MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-16**

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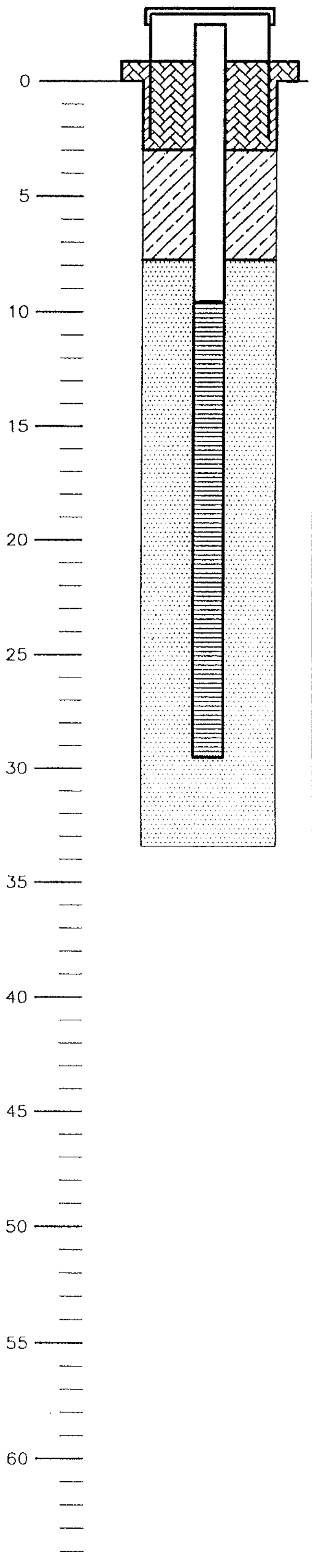
JOB NO.: 9539
PROJECT: DETECTION MONITORING PROGRAM
LOCATION: GREGORY CANYON LANDFILL
INSPECTOR: W. LOPEZ, CEG
CHECKED BY: S. BATTELLE, CHG

ELEVATION GROUND LEVEL: 305.28
ELEVATION TOP OF CASING: 307.54
DATE STARTED: 12/20/99
DATE FINISHED: 12/20/99
TOTAL DEPTH: 29.5 feet



DRILLING SUMMARY:

Total Depth: 33.5 feet
Borehole diameter: 8"

Driller: Water Development Corporation
Rig: CME-95
Bit(s): Hollow Stem Auger

Drilling Fluid: Air

Protective Casing: Hollow Stem Auger

WELL CONSTRUCTION DETAILS:

Casing: 2" diameter Sch. 40 PVC with flush threaded joints. (From +2.26 to 9.5 feet.)

Screen: 2" diameter Sch. 40 PVC with 0.020" slots and flush threaded joints. (From 9.5 to 29.5 feet.)

Grout Seal: Readi-mix concrete. (From 0 to 3 feet.)

Bentonite Seal: Medium bentonite chips. (From 3 to 7.8 feet.)

Filter Pack: #3 Monterey Sand. (From 7.8 to 33.5 feet.)

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	12/20/99	10:00	12/20/99	10:15
Coring:	-	-	-	-
Casing Install:	12/20/99	10:15	12/20/99	10:30
Filter Placement:	12/20/99	10:30	12/20/99	10:55
Seal Placement: (Bentonite Chips)	12/20/99	10:55	12/20/99	11:05
Seal Placement 2nd: (Grout)	12/20/99	11:15	12/20/99	11:30

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	12/23/99	11:40	12:10
Air Lift Pumping			
Other - Bailer	12/23/99	12:10	14:00

Total Gallons Removed: 65

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond.	Temp (°F)

Comments:

WELL MONITORING DATA:

Date	Time	Reading	Corr.	Depth	SWL	By
12/20/99	11:10			10.6' bgs		WBL

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BORING LOG

BORING NO.: GLA-1

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/19/96
DATE FINISHED: 11/20/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 99.5 feet
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
11/19 10:12						0–10			SP GP	RESIDUAL SOIL mixed with decomposed rock. Yellowish brown (10R5/4). Drills as a coarse SAND. Moderately to highly weathered. Dominant lithic fragments are decomposed LEUCOGRANODIORITE with iron oxide staining.	Dry.
						10–15				Decomposed GRANODIORITE with quartz. Light brownish gray (2.5Y6/2) to brown (10YR5/3). Oxidized with altered biotite and some pink (7.5YR7/4) potassium-feldspar. Cut by quartz feldspar dikes.	Damp.
						15–45	12/16/96 (water level ~37')			BONSALL TONALITE. Gray (2.5Y5/1). Drills as a fine to medium sand with some coarse fragments. Highly to moderately weathered; some iron oxide staining; altered micas. ...(20') – slightly less weathered (moderately weathered) and more felsic. ...(30') – TONALITE drills as a fine sand with minor coarse sand – fine gravel size fragments. Color changes to gray (2.5Y6/1).	Damp.
12:14	10:36					~39–40					
		1.17				45–51				GRANODIORITE/TONALITE lithic fragments. Slightly weathered and oxidized. Gray (N6); many fragments display foliation; rare pinkish white (5YR8/2) potassium feldspar, probably as dikes.	
						51–56				GRANODIORITE. Increase in felsic lithic fragments. Gray (10YR6/4) to light gray (10YR7/1). More quartz and feldspar dikes; foliation is less common. Iron oxide staining on quartz and feldspar.	
12:35	12:31					56–63				GRANODIORITE/TONALITE. Less felsic fragments. Color change to gray (5Y5/1 to N5); with very minor pinkish white to reddish yellow (5YR8/2 to 7.5YR7/6) potassium feldspar; very minor iron oxide staining.	

CONTINUED ON NEXT PAGE

GeoLogic Associates

BORING LOG

BORING NO.: GLA-1

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/19/96
DATE FINISHED: 11/20/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 99.5 feet
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
12:35						60				GRANODIORITE/TONALITE. Less felsic fragments. Color change to gray (5Y5/1 to N5); with very minor pinkish white to reddish yellow (5YR8/2 to 7.5YR7/6) potassium feldspar; very minor iron oxide staining.	
						65				TONALITE. Gray (N6). Slightly weathered. Mineralogy is hornblende, pyroxene, feldspar (plagioclase), and minor quartz.	
						70				...(70') - slightly darker; less potassium feldspar.	
						75					
12:59	12:57	0.91				80					...(80') - dry.
						85					
		0.91				90					
						95				...(95') - mixed TONALITE and GRANODIORITE. Darker gray (N5) and light gray (N7) (TONALITE inclusions in GRANODIORITE?).	
13:24	13:21					100					
						105					
		1.05				110				...(110') - less segregated GRANODIORITE/ TONALITE.	
						115				...(115') - slightly more felsic lithic fragments. GRANODIORITE/TONALITE with slightly oxidized quartz/feldspar dikes.	
13:46	13:43					120				...(120') - More uniform appearance. Felsic fragments absent - no dikes.	

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-1

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/19/96
DATE FINISHED: 11/20/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 99.5 feet
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
13:46						120				...(120') - More uniform appearance. Felsic fragments absent - no dikes.	
						125				...(125') - same as above. GRANODIORITE/ TONALITE. Gray (N5). Slight foliation on some fragments.	Dry.
		0.91				130				GRANODIORITE/TONALITE. Gray (N5).	
						135					
14:12	14:08					140					
						145					
						150					
						155					
14:37	14:33	0.95				160				...(160') - slightly more felsic fragments, possibly dikes in the TONALITE.	
						165				...(165') - less felsic fragments; more mafics.	
						170					
						175					
15:25	14:56	1.05				180					

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-1

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/19/96
DATE FINISHED: 11/20/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 99.5 feet
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
15:25						180					
						185					
						190				...(190') – some very minor iron oxide staining along fractured surfaces.	
						195				GRANODIORITE/TONALITE. Gray (N5). Slightly weathered to fresh.	
15:50	15:47	0.91				200					
						205				...(205') – increase in felsic minerals (quartz and feldspar); probably GRANODIORITE dikes in the TONALITE. White (N8) felsic fragments represent approximately 35–40% of material.	
						210	▽				...(210') – dampness on outside of drill stem.
						215				...(215') – felsic fragments increase to 50%.	
16:12	16:09	1.05				220				LEUCOGRANODIORITE. White (N8 to 10YR8/1) with minor inclusions of TONALITE. Slightly weathered; minor iron oxide staining; with pinkish white (5YR8/2) potassium feldspar.	
						225				GRANODIORITE/TONALITE with felsic dikes. Gray (N5) TONALITE with approximately 30% LEUCOGRANODIORITE dikes.	...(223') – damp.
						230				...(230') – 5% felsic fragments.	
						235				...(235') – felsic fragments increase to 40%. LEUCOGRANODIORITE dikes in TONALITE. Light gray (N6). Slightly oxidized.	
11/20 7:35	16:30	1.11				240				...(240') – felsic fragments represent approximately 50% of the material (QUARTZ GRANODIORITE?).	

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-1

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/19/96
DATE FINISHED: 11/20/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 99.5 feet
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
11/20 7:35						240				...(240') - felsic fragments represent approximately 50% of the material (QUARTZ GRANODIORITE?).	
						245				...(245') - felsic fragments less than 5% (GRANODIORITE with 30%+ quartz and feldspar). Light gray (N6); with pink (5Y7/4) potassium feldspar; some epidote and chlorite alteration.	Wet.
	7:47	0.83									
7:41						250				...(250') - no pink potassium feldspar. Increase in GRANODIORITE/TONALITE fragments foliation.	
						255				...(255') - darker. TONALITE with little felsic fragments. Gray (N5). Very minor quartz/feldspar dikes.	Dry.
	7:59	0.56									
8:08						260				TONALITE. Dark gray (N5). Hard; minor foliation of mafic minerals.	
						265					...(265') - enough water flowing into the hole to wet sample when adding rod.
	8:16	1.25									
8:17						270				...(270') - Migmatitic texture on some fragments. GRANODIORITE/TONALITE with minor epidote and chlorite alteration. Slightly more felsic than above.	
						275					
	8:29	0.83									
8:42						280					
						285				...(285') - white zeolite coating on fracture surface on one lithic fragment. Very minor iron oxide staining on some fragments. Minor chlorite and epidote alteration.	Damp.
	8:53	0.91				290				...(290') - very minor pinkish white (5Y8/2) potassium feldspar. ...(295') - no visible potassium feldspar (5YR8/2).	
						295					
	9:07					300					

NOTES:
1. Total depth of borehole 300 feet.
2. Conductor casing set to 20 feet.
3. Open hole interval (exposed bedrock) between 20 and 300 feet below ground surface.
4. Groundwater first encountered between 200 and 220 feet.
5. Depth to water on 12/16/96 measured at 37.10 feet.

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

BORING NO.: GLA-2

JOB NO.:	9539	DATE STARTED:	11/18/96
SITE LOCATION:	GREGORY CANYON	DATE FINISHED:	11/19/96
DRILLING METHOD:	DUAL-WALL REVERSE, AIR	ELEVATION:	375 feet
CONTRACTOR:	LAYNE - ENVIRONMENTAL	NORTHING:	ND
LOGGED BY:	T. REEDER	EASTING:	ND

GW DEPTH: 70 feet
TOTAL DEPTH: 250 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
11/18 11:20						0			SM	RESIDUAL SOIL. Loose, non-cohesive, with coarse SAND to fine GRAVEL-sized rock fragments. Yellowish-brown (10YR5/4).	Dry.
						5				BONSALL TONALITE. Strongly weathered (probably "C" horizon). Brown (10YR5/3). Drills as a fine silty sand.	Damp.
						10				...(10') - becomes coarser with fine sand to medium gravel-sized fragments; coarser fragments are dominantly composed of quartz and feldspar (probably derived from a LEUCOGRANODIORITE dike).	
		0.67				15					
11:42	11:50					20				...(20') - slightly coarser.	Drier.
						25				GRANODIORITE. Gray (2.5Y5/1) to grayish brown (2.5Y5/2). Drills as a loose fine sand with minor coarse sand-size fragments of quartz and feldspar.	Dry.
12:26	12:05	0.87				30				LEUCOGRANODIORITE dike (?). Color changes to light gray (2.5Y7/1) to gray (2.5Y6/1). Drills as a very fine sand; minor coarse sand-size fragments; rare gravel-size fragments. Increase in felsic minerals (quartz and feldspar); decrease in mafics. ...(35'-40') - sample consists only of coarse fragments. Pale red (2.5YR7/2).	Dry. Drilling becomes more difficult from this depth on.
13:25	12:48					40				...(40') - LEUCOGRANODIORITE dike (?). Gray (2.5Y7/1). Very felsic.	Dry.
						45				...(45') - GRANODIORITE. Slightly darker, but still gray (2.5Y7/1).	
						50				...(50') - darker gray (2.5Y6/1. Increase in mafics (biotite).	Dry.
						55				...(55') - slightly darker gray (2.5Y6/1 to 2.5Y5/1). Drills as a very fine sand, with minor coarse sand and medium gravel fragments.	
13:40	13:37	1.67				60				...(60') - iron oxide staining on fragments (probably weathered fracture). Gray (7.5YR5/1).	

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

BORING NO.: GLA-2

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/18/96
DATE FINISHED: 11/19/96
ELEVATION: 375 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 70 feet
TOTAL DEPTH: 250 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
13:40						60				...(60') – iron oxide staining on fragments (probably weathered fracture). Gray (7.5YR5/1).	
						65				GRANODIORITE. Gray (7.5YR5/1). Moderately weathered with iron oxide staining, probably along fractures. Some GRANODIORITE fragments display foliation.	
						70	12/16/96 ▼			...(70') – less oxidation. GRANODIORITE/ TONALITE.	
						75					
14:02	13:58	1.11				80				...(80') – slightly weathered. Very little iron oxide staining. Color change to gray (N6 to N5) with some bluish gray (5B5/1).	
						85				...(85') – less weathered. No iron oxide staining.	
						90					
						95				...(95') – slightly less mafic. Pronounced foliation on many fragments.	
14:24	14:20	1.11				100					
						105					
						110					
						115					
14:44	14:41	1.18				120				GRANODIORITE. Gray (N5). Slightly weathered.	

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-2

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/18/96
DATE FINISHED: 11/19/96
ELEVATION: 375 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 70 feet
TOTAL DEPTH: 250 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
14:44						120				GRANODIORITE. Gray (N5). Slightly weathered.	
						125					
						130				GRANODIORITE with minor quartz feldspar dikes. Gray (N5). Slightly weathered.	
						135				...(135') - lighter color; gray (N6) to light gray (N7). Less mafics; more quartz and feldspar.	
15:02						140					...(140') - damp.
						145					
						150	▽				...(150') - moist.
						155					
15:36	15:25	0.87				160					...(160') - possibly moist; will let hole sit 15 minutes to see if water seeps into the hole.
						165					...(165') - wet.
						170					...(170') - drilling dry again; probably very low seepage into hole.
						175					
16:13	15:59	0.87				180					...(180') - moist; will let hole sit 15 minutes before putting in next stem. Refuel.

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

BORING NO.: **GLA-2**

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/18/96
DATE FINISHED: 11/19/96
ELEVATION: 375 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 70 feet
TOTAL DEPTH: 250 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
16:13						180				...same as above.	...(180') – moist; will let hole sit 15 minutes before putting in next stem. Refuel. ...(181') – wet. ...(185') – damp.
						185					
						190				TONALITE. Darker gray (N5 to N4), with white (N8) fragments mixed in composed of quartz and feldspar (probably derived from quartz/feldspar dikes in TONALITE).	
11/19 6:45						195				TONALITE. Gray (N5) to dark gray (N4), with white (N8) fragments of quartz/feldspar mixed in (<10%) (probably derived from quartz/feldspar dikes in TONALITE).	
6:54						200					
						205					
						210				...(210') – pink (5YR8/3) potassium feldspar fragments present in mix. Increase in felsic fragments up to 15–20% of material (TONALITE with feldspathic dikes). Some chlorite alteration of mafics.	
						215				...(215') – decrease in felsic fragments to approximately 5%. No obvious potassium-feldspar fragments.	
	7:18	0.83									
7:24						220					...(220') – still drilling damp. ...(223') – very minor water in hole when adding rod.
						225					
						230				...(230') – same as above.	Drilling drier to just slightly damp.
						235					...(235') – drilling wet again; driller thinks there is water pressure; material is clogging up cyclone.
	7:50	0.77									
8:04						240				TONALITE/DIORITE. Mafic fragments are dark gray to very dark gray (N4 to N3) when wet. Less than 3% felsic fragments.	

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

BORING NO.: GLA-2

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/18/96
DATE FINISHED: 11/19/96
ELEVATION: 375 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 70 feet
TOTAL DEPTH: 250 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:04						240				TONALITE/DIORITE. Mafic fragments are dark gray to very dark gray (N4 to N3) when wet. Less than 3% felsic fragments.	
						245					
	8:19	0.67				250				...(250') – some epidote alteration of plagioclase; some chlorite alteration of mafics.	
						255				NOTES: 1. Total depth of borehole 250 feet. 2. Conductor casing set to 10 feet. 3. Open hole interval (exposed bedrock) between 10 and 250 feet below ground surface. 4. Groundwater first encountered at 150 feet. 5. Depth to water on 12/16/96 measured at 69.73 feet.	
						260					
						265					
						270					
						275					
						280					
						285					
						290					
						295					
						300					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

BORING NO.: **GLA-3**

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/25/96
DATE FINISHED: 11/26/96
ELEVATION: 330 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 21 feet
TOTAL DEPTH: 150 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
11/25 12:15						0			SM SP	TOPSOIL/COLLUVIUM: SILTY SAND with GRAVEL; sub-angular clasts of TONALITE and LEUCOGRANODIORITE; loose. Dark grayish brown (10YR4/3).	Moist.
						5			SW	ALLUVIUM: SAND, medium- to coarse-grained, minor fines, with fine- to coarse-grained angular gravel-size fragments of mostly LEUCOGRANODIORITE with some TONALITE. Brown (10YR5/3).	...(5') - damp.
						10				SAND with minor fine- to coarse-grained GRAVEL. Light yellowish brown (2.5Y6/4) to very pale brown (2.5Y7/3).	...(10') - damp.
						15					
						20			SW		
						25	12/16/96				
						30				DECOMPOSED LEUCOGRANODIORITE (GRUSS). Light olive brown (2.5Y5/6), highly weathered; Fe-oxide staining. Drills as a fine- to coarse-grained sand/silty sand; soft, loose.	...(30') - damp.
						35				DECOMPOSED LEUCOGRANODIORITE. Olive (5Y5/3) with Fe-oxide staining. Highly weathered and decomposed.	
						40				DECOMPOSED LEUCOGRANODIORITE. Light olive brown (2.5Y5/4). Drills as fine- to coarse-grained sand with minor gravel. Highly weathered and decomposed.	...(40') - damp.
						45				...(45') - color change to olive brown (2.5Y4/4).	
						50				DECOMPOSED LEUCOGRANODIORITE. Pale brown (10YR6/3) to yellowish brown (10YR5/4). Drills as loose, soft, medium- to coarse-grained sand. Potassium feldspar is reddish yellow (7.5YR6/6-6/8) with Fe-oxide staining.	...(50') - damp.
						55				...(60') - cuttings change in color to pale olive (5Y6/3); larger lithic fragments are gray (10YR6/1) to light brownish gray (10YR6/2); decrease in oxidation staining; color intensity of potassium feldspar decreases to pink (7.5YR8/3) to pinkish gray (7.5YR7/2).	
15:33	12:45	2				60					

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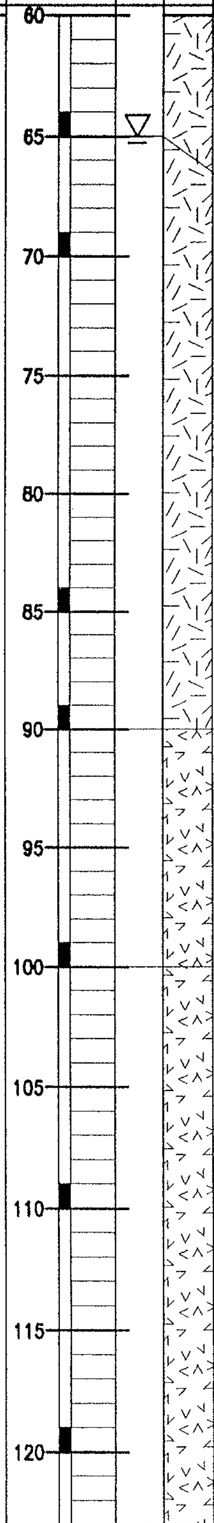
GeoLogic Associates

BORING LOG

BORING NO.: GLA-3

JOB NO.:	9539	DATE STARTED:	11/25/96	GW DEPTH:	21 feet
SITE LOCATION:	GREGORY CANYON	DATE FINISHED:	11/26/96	TOTAL DEPTH:	150 feet
DRILLING METHOD:	DUAL-WALL REVERSE, AIR	ELEVATION:	330 feet		
CONTRACTOR:	LAYNE – ENVIRONMENTAL	NORTHING:	ND		
LOGGED BY:	T. REEDER	EASTING:	ND		



TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
15:33						60				...(60') – cuttings change in color to pale olive (5Y6/3); larger lithic fragments are gray (10YR6/1) to light brownish gray (10YR6/2); decrease in oxidation staining; color intensity of potassium feldspar decreases to pink (7.5YR8/3) to pinkish gray (7.5YR7/2).	
						65	▽			LEUCOGRANODIORITE. Weathered and decomposed. Cuttings are mixed yellow (10YR7/6) and grayish brown (10YR5/2) with minor reddish yellow (7.5YR7/6) potassium feldspar.	...(65') – groundwater first encountered. Moderately wet.
						70				...(70') – cuttings are light olive brown (2.5Y5/4).	...(70') – damp.
						75				...(75') – cuttings are olive brown (2.5Y4/3).	Hole produces water at a rate of about 15 gpm.
						80					
						85				...(85') – slightly darker, more mafic.	
						90				GRANODIORITE/TONALITE. Composed mostly of plagioclase, quartz and mafics. Slightly weathered. Dark greenish gray (5B4/1); larger lithic fragments are gray (N5); potassium feldspar is reddish yellow (7.5YR6/6). Less than 3% Fe-oxide staining on some quartz and feldspar dikes.	...(90') – moist.
						95					
16:03	16:01	1.43				100				TONALITE. Relatively unweathered. Gray (N5) with little Fe-oxide staining.	
						105					
						110					
						115					
11/26	16:31	0.71				120				...(120') – minor (less than 5%) potassium feldspar.	

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-3

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/25/96
DATE FINISHED: 11/26/96
ELEVATION: 330 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 21 feet
TOTAL DEPTH: 150 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
11/26						120				...(120') - minor (less than 5%) potassium feldspar.	
						125					
						130				TONALITE. Gray (N5). Slightly weathered with less than 1% feldspar. Minor quartz/feldspar dikes.	
						135					
7:25	7:19					140				...(140') - color change to dark gray (N4).	
		1.67									
						145					
	7:31					150					
						155				Notes: 1. Total depth of borehole 150 feet. 2. Conductor casing set to 45 feet. 3. Open hole interval (exposed bedrock) between 45 and 150 feet below ground surface. 4. Groundwater first encountered at 65 feet. 5. Depth to water on 12/16/96 measured at 23.84 feet.	

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

BORING NO.: GLA-4

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE – ENVIRONMENTAL
LOGGED BY: T. REEDER / M. VINCENT, CEG

DATE STARTED: 11/26/96
DATE FINISHED: 11/27/96
ELEVATION: 905 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 103.2 feet
TOTAL DEPTH: 240 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
11/26						0			SM/SC	TOPSOIL: SILTY SAND with CLAY to CLAYEY SAND. Reddish brown (5Y3/3) to dark brown (7.5YR3/3), soft, loose. Less than 6" thick.	Moist.
						5			SP	ALLUVIUM: Coarse SAND with fine GRAVEL and angular felsic clasts. Pale yellow (2.5Y7/4) to very pale brown (10YR7/4).	...(0.5') – damp.
						10				TONALITE: Moderately weathered with minor quartz/feldspar dikes.	Damp.
						15				TONALITE with less than 30% of quartz/feldspar dikes. Gray (N5). ...(20') – increase in felsic cuttings to 50%.	
						25				LEUCOGRANODIORITE DIKE. Yellow (10YR7/6) with Fe-oxide staining. Cuttings are approximately 40% TONALITE and 60% LEUCOGRANODIORITE.	Damp.
						30				LEUCOGRANODIORITE DIKE (30–35%) in TONALITE. Weathered potassium feldspar is pink (5Y7/4). Cuttings are somewhat oxidized.	
11/27 6:58						40				TONALITE. Greenish gray (5GY6/1), phaneritic with fine crystallinity and anhedral to subhedral crystals. Moderately weathered and hydrothermally altered. Hornblende and biotite phenocrysts show moderate chlorite-epidote hydrothermal alteration. ...(49') – color change to greenish gray (10BG6/1).	
						55				TONALITE. Bluish gray (10B5/1), phaneritic with fine crystallinity and anhedral to subhedral crystals; biotite- and hornblende-rich. Weak alteration to chlorite-epidote.	
7:27		~0.7				60				...(61') – slightly higher mafic mineral content than above.	

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER / M. VINCENT, CEG

DATE STARTED: 11/26/96
DATE FINISHED: 11/27/96
ELEVATION: 905 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 103.2 feet
TOTAL DEPTH: 240 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
7:27						60				...(61') - Slightly higher content of biotite than above. ...(61'-65') - weak limonite staining on fracture surfaces. Slightly more chloritized biotite than above.	
						65				...(65') - weak foliation as evidenced by preferred orientation of biotite crystals.	
						70				...(72') - slightly more felsic than above, with slight increase in crystal size from fine- to medium-crystallinity feldspar and hornblende phenocrysts.	...(70') - dry.
						75				...(75') - same as above.	
7:51		~0.95				80				...(80') - same as above.	Dry.
						85				...(85') - same as above. ...(86'-92') - fracture zone with minor limonite and pyrolusite mineral coatings on fracture surfaces.	
8:03						90					...(90') - dry.
						95				...(94') - aplite dike(s) consisting mostly of potassium feldspar with minor quartz. ...(95'-100') - minor limonite staining visible on fracture surfaces.	
						100				...(100'-105') - no visible oxidation.	Dry.
8:50						105					...(103.2') - groundwater sounded on 12/02/96.
						110				...(110'-115') light bluish gray (5B8/1), feldspar- and quartz-rich felsic dike(s). ...(116'-120') - no visible dikes. ...(120'-137') - abundant fragments of medium- to coarse-grained potassium-feldspar and minor quartz dike(s). Host rock TONALITE shows evidence of moderate chlorite-epidote hydrothermal alteration. Fractures show possible zeolite veining with minor oxidation staining on non-mineral filled fractures. Host rock TONALITE is bluish gray (5PB5/1), aphanitic to phaneritic (very fine- to fine-crystallinity) with abundant biotite and hornblende.	Dry.
9:22						115					
						120					Dry.

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GeoLogic Associates

BORING LOG

BORING NO.: **GLA-4**

JOB NO.:	9539	DATE STARTED:	11/26/96
SITE LOCATION:	GREGORY CANYON	DATE FINISHED:	11/27/96
DRILLING METHOD:	DUAL-WALL REVERSE, AIR	ELEVATION:	905 feet
CONTRACTOR:	LAYNE - ENVIRONMENTAL	NORTHING:	ND
LOGGED BY:	T. REEDER / M. VINCENT, CEG	EASTING:	ND

GW DEPTH: 103.2 feet
TOTAL DEPTH: 240 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						120				...(120'-137') - abundant fragments of medium- to coarse-grained potassium-feldspar and minor quartz dike(s). Host rock TONALITE shows evidence of moderate chlorite-epidote hydrothermal alteration. Fractures show possible zeolite veining with minor oxidation staining on non-mineral filled fractures. Host rock TONALITE is bluish gray (5PB5/1), aphanitic to phaneritic (very fine- to fine-crystallinity) with abundant biotite and hornblende.	...(120') - dry.
						125					
						130					...(130') - dry. Moderately hard drilling.
						135					Groundwater sounded at 103.2' below ground surface on 12/02/96 at 6:55.
8:08						140					No free groundwater while drilling or stacking rods.
						145					Hard drilling. No free groundwater while drilling or stacking rods.
8:24						150					...(149.93') - groundwater sounded on 12/16/96.
						155				...(154') - color change to bluish gray to dark bluish gray (10B4.5/1) with increase in felsic mineral content and increase in crystal size to fine- to medium-crystallinity; anhedral to subhedral feldspar crystals. Cuttings show a weak foliation as evidenced by the segregation of mafic and felsic minerals, and by the preferred orientation of biotite crystals. No visible oxidation of fractures. Rock is unfractured to weakly fractured. No chlorite-epidote alteration visible.	
8:36						160					Hard to very hard drilling. No free groundwater encountered.
						165					
						170					Hard to very hard drilling. No free groundwater encountered.
						175				...(175') - same as above.	
9:10						180					Hard to very hard drilling. No free groundwater encountered.

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BORING LOG

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER / M. VINCENT, CEG

DATE STARTED: 11/26/96
DATE FINISHED: 11/27/96
ELEVATION: 905 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 103.2 feet
TOTAL DEPTH: 240 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
9:10						180					
						185				...(185') - same as above.	
						190				...(190') - better developed foliation with depth. No visible jointing or fracturing.	Hard to very hard drilling. No free groundwater encountered.
						195				...(195'-240') - same as above.	
9:43						200					Hard to very hard drilling. No free groundwater encountered.
						205					
						210					Hard to very hard drilling. No free groundwater encountered.
						215					
10:23						220					Hard to very hard drilling. No free groundwater encountered.
						225					
						230					Hard to very hard drilling. No free groundwater encountered.
						235					
	11:08					240					

Notes:

1. Total depth of borehole 240 feet.
2. Conductor casing set to 30 feet.
3. Open hole interval (exposed bedrock) between 30 and 240 feet below ground surface.
4. Groundwater first encountered between 103 and 140 feet.
5. Depth to water on 12/16/96 measured at 149.93 feet.

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

BORING NO.: GLA-5

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/20/96
DATE FINISHED: 11/21/96
ELEVATION: 930 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 41 feet
TOTAL DEPTH: 190 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
11/20 11:20						0			SM SP	COLLUVIUM/RESIDUAL SOIL: SILTY SAND with coarse-grained SAND and fine-grained GRAVEL and minor CLAY; sub-angular sand and gravel size clasts of TONALITE and LEUCOGRANODIORITE. Dark reddish brown (5YR3/3).	Damp.
						15				WEATHERED TONALITE. Light olive brown (2.5Y5/3). Drills as a medium- to coarse-grained sand. Minor quartz and feldspar dikes.	Damp. ...(20') – damp.
						25				TONALITE. Gray (2.5Y6/1) to light brownish gray (2.5Y6/2). Moderately weathered. Drills as a fine- to coarse-grained sand with minor fine-grained gravel size fragments. Minor quartz/feldspar dikes.	Less damp.
15:57						40	11/21/96 12/16/96			TONALITE/QUARTZ DIORITE. Olive (5Y5/3) cuttings, with black (N2.5) and dark gray (N4) lithic fragments. More mafic than above. Drills as a fine-grained sand. ...(50'–55') – color change to light brownish gray (2.5Y6/2) to olive gray (5Y6/2).	
						60				TONALITE. Gray (5Y6/1). Moderately weathered. Less mafic than above.	

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-5

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/20/96
DATE FINISHED: 11/21/96
ELEVATION: 930 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 41 feet
TOTAL DEPTH: 190 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						60				TONALITE. Gray (5Y6/1). Moderately weathered. Less mafic than above.	
						65					
						70					
						75				...(75'–80') – slightly more felsic, gray (2.5Y6/1) TONALITE; cuttings are sand-size with quartz/feldspar fragments.	
16:27	16:24					80				TONALITE/QUARTZ DIORITE. Gray (N5) lithic fragments. More mafic than above; chlorite alteration of mafics.	
						85				...(85'–90') – felsic cuttings increase to 20% (probably indicates quartz/potassium feldspar dikes in the TONALITE/QUARTZ DIORITE). Felsic fragments have pink (5YR7/4) potassium feldspar. Chlorite alteration of mafics in the TONALITE.	
						90					...(93'–96') – "soft" drilling.
						95				GRANODIORITE. Bluish gray (5B6/1 to 5/1) with minor reddish yellow (5YR7/6); potassium feldspar and quartz cuttings. GRANODIORITE fragments are chloritized. White coatings on some fractures (zeolite?).	
						100	∇			...(100') – decrease in felsic cuttings to less than 10%. Majority of cuttings are of TONALITE with granodiorite dikes; some feldspar and chlorite alteration of mafics; gray (N5).	...(100') – moist.
11/21						105				TONALITE. Gray (N5). Moderate to slightly weathered and fractured.	...(105') – damp.
						110				...(110') – very minor fragments of quartz/feldspar with minor mafics as veins/dikes in TONALITE.	
						115					
	7:35					120					...(120') – water coming up hole.

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

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GeoLogic Associates

BORING LOG

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/20/96
DATE FINISHED: 11/21/96
ELEVATION: 930 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 41 feet
TOTAL DEPTH: 190 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
7:35						120					...(120') – water coming up hole.
						125					
						130				TONALITE. Gray (N5). Slightly weathered; fractured. Chlorite alteration of mafics. Less than 1% quartz/feldspar fragments from dikes, and a few rare fragments of zeolite(?) from fracture infilling; minor iron oxide staining.	
						135					
						140					
						145					
						150					
						155					
						160					
						165				...(165') – increase in felsic fragments to 40%.	Sample is wet.
	9:07	0.54									
9:08						170				...(170') – increase in quartz/feldspar dikes. Decrease in chlorite alteration.	Drier.
						175				...(175') – decrease in felsic fragments to less than 10%.	
										TONALITE/QUARTZ DIORITE.	
	9:23	0.67									
9:27						180				...(180') – less than 3% felsic fragments.	

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-5

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/20/96
DATE FINISHED: 11/21/96
ELEVATION: 930 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 41 feet
TOTAL DEPTH: 190 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
9:27						180				...(180') - less than 3% felsic fragments.	
						185					
	9:47	0.50				190				...(190') - increase in felsic fragments to 10%.	Lost bit downhole.
						195					
						200					
						205					
						210					
						215					
						220					
						225					
						230					
						235					
						240					

Notes:

1. Total depth of borehole 190 feet.
2. Conductor casing set to 30 feet.
3. Open hole interval (exposed bedrock) between 30 and 190 feet below ground surface.
4. Groundwater first encountered at 100 feet.
5. Depth to water on 12/16/96 measured at 42.57 feet.

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-7

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/21/96
DATE FINISHED: 11/21/96
ELEVATION: 403 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 50 feet
TOTAL DEPTH: 160 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
11/21 13:55						0			SM/SW	COLLUVIUM: SILTY SAND, coarse-grained; contains fine gravel fragments. Yellowish brown (10YR5/7).	Damp.
						5			SW	SAND (DG?). Light yellowish brown (2.5YR6/4). May be boulder of decomposed leucogranodiorite.	
						10				DECOMPOSED ROCK (TONALITE?): Olive (5Y5/3). Drills as a fine- to medium-grained sand. Oxidized fragments of brownish yellow (10YR6/8) quartz/potassium feldspar.	...(10') - damp.
						15					
						20				TONALITE/DIORITE. Very dark gray (5Y3/1). Sub-angular to subrounded oxidized fragments.	
						25				TONALITE. Gray (N5). Highly weathered and decomposed. Drills as an olive (5Y5/3), fine- to coarse-grained sand.	...(25') - damp.
						30					
						35	12/16/96				
						40				...(40') - color change to olive gray (5Y5/2 to 4/2).	
						45					
						50					...(50') - groundwater encountered.
						55					
	14:20										
11/22 8:25						60				TONALITE. Olive (5Y4/3). Highly weathered. Drills as a fine- to coarse-grained sand. Large fragments are gray (N5).	...(60') - abundant water coming out of hole on 11/22/96.

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GeoLogic Associates

BORING LOG

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/21/96
DATE FINISHED: 11/21/96
ELEVATION: 403 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 50 feet
TOTAL DEPTH: 160 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:25						60				TONALITE. Olive (5Y4/3). Highly weathered. Drills as a fine- to coarse-grained sand. Large fragments are gray (N5).	...(60') - abundant water coming out of hole on 11/22/96.
						65				...(65') - moderately weathered TONALITE.	...(65') - damp.
	8:31	1.67									
8:35						70				...(70') - color change to olive gray (5Y4/2). Lithic fragments are larger and appear less weathered.	...(70') - moist.
						75					
						80					
						85				...(85') - approximately 35% of lithic fragments are of white (N8) quartz/feldspar dikes. TONALITE fragments are very dark gray (N3).	...(85') - moist.
						90					
						95					
	8:50	1.33									
8:52						100				...(100') - color of cuttings change to dark gray (N4). Lithic fragments of TONALITE are very dark gray (N3); less than 5% felsic fragments. Slight weathering.	...(100') - wet.
						105					
						110					
						115				...(115') - color of cuttings changes to very dark gray (N3). TONALITE fragments are very mafic with dark gray (N4) plagioclase (borderline GABBRO). Slightly weathered. Tonalite fragments are black (N2.5).	
	9:21	0.69									
9:24						120					...(120') - abundant water in hole.

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-7

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE – ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 11/21/96
DATE FINISHED: 11/21/96
ELEVATION: 403 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 50 feet
TOTAL DEPTH: 160 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
9:24						120				...same as above.	...(120') – abundant water in hole.
						125					
						130					
						135					
9:54	9:49	0.80				140				...(140') – increase in felsics to 40% (probably derived from quartz/feldspar dikes in TONALITE).	
						145				GRANODIORITE. Gray (N6) with pale red (2.5YR7/2) orthoclase feldspars. Olive (5Y4/4) chlorite/epidote alteration of some clasts, particularly along fracture surfaces.	
						150				TONALITE. Dark gray (N4) with less than 5% felsic fragments.	
						155					
	10:21	0.74				160				GRANODIORITE. Gray (N6) with only rare pale red (2.5YR7/2) potassium feldspar.	
						165					

Notes:

1. Total depth of borehole 160 feet.
2. Conductor casing set to 30 feet.
3. Open hole interval (exposed bedrock) between 30 and 160 feet below ground surface.
4. Groundwater first encountered at 50 feet.
5. Depth to water on 12/16/96 measured at 34.82 feet.

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-8

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: M. VINCENT, CEG; T. REEDER

DATE STARTED: 11/24/96
DATE FINISHED: 11/25/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 61 feet
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
11/24 9:20						0				WEATHERED BEDROCK - TONALITE. Light yellowish brown (10YR6/4). Phaneritic with fine-crystallinity, amphibole-rich and biotite-rich. Some hydrothermal alteration to chlorite-epidote facies.	
						5				...(6') - color change to light gray (10YR7/1).	
						10				...(10') - color change to gray (2.5Y6/1). Less oxidation of biotite than above.	
						15					Conductor casing set to 15'. Begin drilling 5-inch diameter with downhole carbide button hammer.
						20					
						25				...(24') - color change to gray (5Y6/1) to light olive gray (5Y6/2). Increase in chlorite-epidote alteration products and minor increase in iron-oxide alteration products.	Slightly damp.
						30					
						35					
11:45						40					
						45				UNWEATHERED BEDROCK - TONALITE. Gray (5Y6/1). Phaneritic with fine-crystallinity, subhedral crystals, biotite and hornblende-rich. Pervasive, moderate to weak chlorite-epidote hydrothermal alteration.	
						50					
						55				...(53'-56') - color change to light brownish gray (2.5Y6/2). Increase in jointing/fracturing as evidenced by increase in oxidation products and weathered feldspar phenocrysts.	
						60	11/25/96 ▼ 12/16/96 ▼				

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

JOB NO.:	9539	DATE STARTED:	11/24/96
SITE LOCATION:	GREGORY CANYON	DATE FINISHED:	11/25/96
DRILLING METHOD:	DUAL-WALL REVERSE, AIR	ELEVATION:	ND
CONTRACTOR:	LAYNE - ENVIRONMENTAL	NORTHING:	ND
LOGGED BY:	M. VINCENT, CEG; T. REEDER	EASTING:	ND

GW DEPTH: 61 feet
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						60	11/25/96				
							12/16/96				
						65				...(64') – color change to light yellowish brown (2.5Y6/3.5).	
						70				...(67'–78') – possible weathered joints as evidenced by alternating zones of light yellowish brown (10YR6/4) weathered rock and greenish gray (10BG5/1) unweathered rock. Contains fragments of dark gray (N4) to greenish gray (10BG5/1), micaceous and amphibole-rich TONALITE with fine- to medium-crystallinity phenocrysts of weak red (10R4/3) feldspar.	
						75					...(75') – slightly damp.
12:08						80				...(78') – color change to greenish gray (5BG5/1).	
	12:28									...(81'–86') – TONALITE to GRANODIORITE. Phaneritic with medium crystallinity; subhedral to euhedral, white to light red (2.5YR6.5/8) potassium feldspar phenocrysts. Minor amounts of white to light red (2.5YR6.5/8) 1/32-inch thick mineral vein infilling (zeolite?) on some fracture surfaces. Mineral veins show some reaction with the host rock, as evidenced by epidote alteration envelopes.	...(83') – larger pieces of sample expelled from the cyclone.
12:53						85				...(86') – groundwater encountered in weathered fracture zone. Weathered rock is pale olive (5Y6/3) in color.	...(85') – stop at 12:28 to trip rods out of hole to repair downhole hammer. ...(86') – groundwater encountered. Mineral vein materials do not appear to react to weak HCl solution.
						90					...(90') – very dry.
						95					
						100				...(98') – decrease in amount of weathered fracture zones. Abundant healed fractures showing shear structures in possible hydrothermal (zeolite) mineral veins approximately 1/2-inch thick.	...(100'–105') – somewhat abundant groundwater.
						105					
						110					
						115					
13:26		1.17				120					

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JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: M. VINCENT, CEG; T. REEDER

DATE STARTED: 11/24/96
DATE FINISHED: 11/25/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 61 feet
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
13:26						120					
						125					
										...(128') - increase in mafic minerals with associated color change to brownish gray (10B5/1).	
13:38						130					
	13:45									...(135'-140') - healed fractures showing shear structures in possible hydrothermal (zeolite) mineral veins approximately 1/2-inch thick. Veins contain 1/32-inch to 1/16-inch diameter TONALITE fragments as inclusions. Vein materials are typically greenish gray (5BG6/1) in color with less than 1/64-inch thick iron-oxide and pyrolusite coatings between the vein material and the host-rock.	
14:25						135					...(135') - stop drilling at 13:45 to trip out rods due to blockage in the downhole hammer. Begin drilling with tri-cone bit.
14:42						140					
	15:10	0.22								...(143') - abundant olive gray to light red (2.5YR5/8), euhedral feldspar phenocrysts. A weak foliation is evidenced by the partial segregation of mafic and felsic minerals and by the preferred orientation of platy feldspar and biotite phenocrysts. No visible signs of mineral veining on fracture surfaces.	
15:32						145					...(145') - stop drilling at 15:10. Trip out rods and replace tri-cone bit with downhole hammer.
						150				...(150') - minor occurrence of mineral veining along fracture surfaces, along with non-mineralized fractures.	
15:44		1.11				155					
						160				...(160') - same as above.	
						165				...(165') - same as above.	
										...(169') - decrease in the amount of feldspar phenocrysts with light red (2.5YR5/8) coloration. Most phenocrysts are white.	
16:01		1.43				170				...(172') - increase in amount of mineral veining with associated increase in chloritization. Possible fracture zone.	
16:10						175				...(177') - most feldspar phenocrysts are colored light red (2.5YR5/8).	
						180				...(180'-185') - decrease in light red colored feldspar phenocrysts and increase in white colored feldspar.	

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GeoLogic Associates

BORING LOG

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: M. VINCENT, CEG; T. REEDER

DATE STARTED: 11/24/96
DATE FINISHED: 11/25/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 61 feet
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						180				...(180'-185') - decrease in light red colored feldspar phenocrysts and increase in white colored feldspar.	
						185					
						190				...(190') - same as above.	
						195				...(195') - same as above.	
						200					
						205				TONALITE - dark gray (N4), weathered, with some epidote alteration of feldspar, quartz and granodiorite veins.	...(205') - wet.
						210				CONTACT ZONE: mixed TONALITE and LEUCOGRANODIORITE - mineralogy includes: greenish gray (5G6/1), altered plagioclase; pale red (2.5YR7/2) to light red (2.5YR7/6) orthoclase; white (N8) quartz and plagioclase; dark gray (N4) to dark greenish gray (5GY4/1) mafics (pyroxene, hornblende and biotite). Quartz-filled veins in some of the cuttings.	
						215				...(215') - increase to 80% of cuttings of LEUCOGRANODIORITE with potassium-feldspar and some mafics.	
						220				...(220') - equal proportions in cuttings of greenish gray (5G6/1) TONALITE(?) to pale red (2.5YR7/2) LEUCOGRANODIORITE.	
						225				...(225') - mix of dark gray (N4) TONALITE and light red (2.5YR7/2) LEUCOGRANODIORITE.	
						230				...(230') - approximately 70% greenish gray (5G6/1), altered TONALITE and 30% pale red (2.5YR7/2) GRANODIORITE.	
						235				...(235') - cuttings become darker due to increase in dark gray (N4) mafics.	
11/25 8:14						240				...(240') - TONALITE is dark gray (N4) with greenish gray (5G6/1), altered plagioclase and dark gray (N4) mafics. Decrease in potassium-feldspar/LEUCOGRANODIORITE fragments to less than 15%.	

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

BORING NO.: GLA-8

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: M. VINCENT, CEG; T. REEDER

DATE STARTED: 11/24/96
DATE FINISHED: 11/25/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 61 feet
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
11/25 8:14						240				...(240') - TONALITE is dark gray (N4) with greenish gray (5G6/1), altered plagioclase and dark gray (N4) mafics. Decrease in potassium-feldspar/LEUCOGRANODIORITE fragments to less than 15%.	
						245				...(245') - increase in LEUCOGRANODIORITE fragments to about 30%; color intensifies to light red (2.5Y7/6).	
						250				...(250') - TONALITE color becomes lighter - gray (N5). Less than 5% LEUCOGRANODIORITE fragments.	
						255				...(255') - same as above, with minor greenish gray (5G6/1 to 5GB6/1), altered (chloritized?) plagioclase. ...(260') - approximately 10% LEUCOGRANODIORITE fragments.	
	8:35	0.95									
8:38						260				TONALITE/GRANODIORITE - gray (N5) to dark gray (N4), with some greenish gray (5G6/1), altered (chloritized?) plagioclase, and LEUCOGRANODIORITE dikes with less than 2% pale red (2.5YR7/2) to light red (2.5YR7/6) orthoclase.	
						265				...(265') - mix of LEUCOGRANODIORITE and GRANODIORITE cuttings. Some greenish gray (5G6/1) altered plagioclase.	
						270					
						275				...(275') - same as above.	
	8:54	1.25									
8:58						280				...(280') - orthoclase feldspar/ leucogranodiorite fragments decrease to less than 5%.	
						285				...(285') - increase in LEUCOGRANODIORITE fragments to approximately 35%.	
						290				...(300') - decrease in orthoclase feldspar to approximately 15%; increase in greenish gray (5G6/1), altered plagioclase.	
						295					
	9:17	1.05				300					

NOTES:
1. Total depth of borehole 300 feet.
2. Conductor casing set to 15 feet.
3. Open hole interval (exposed bedrock) between 15 and 300 feet below ground surface.
4. Groundwater first encountered at 86 feet.
5. Depth to water on 12/16/96 measured at 62.40 feet.

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GeoLogic Associates

BORING LOG

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 12/05/96
DATE FINISHED: 12/07/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: Not encountered
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						0				DECOMPOSED TONALITE. Olive gray (5Y4/2). Highly weathered and decomposed. Drills as a fine-grained sand to silty sand with coarse-grained sand to fine-grained gravel size fragments.	Drilling on cut - all topsoil removed. Damp.
						10				LEUCOGRANODIORITE DIKE. Light yellowish brown (2.5Y6/4) to pale yellow (2.5Y7/4). Highly weathered and decomposed. Fe-oxide staining, and oxidation and chloritization of mafics.	Damp.
						25				TONALITE. Dark gray (5Y4/1) to very dark gray (5Y3/1). Moderately weathered. Minor Fe-oxide staining; some chloritization of mafics. ...(35') - quartz veins in TONALITE.	Damp.
14:00										GRANODIORITE dike in TONALITE (about 60% GRANODIORITE). Light gray (2.5Y7/2) to pale yellow (2.57/3). Oxidized; weathered; some epidote alteration of feldspar and chloritization of mafics.	
										DIORITE/TONALITE. Black (N2.5) to very dark gray (N3). Slightly to moderately weathered. Altered biotite on some fragments; minor epidote alteration of some feldspars. Cuttings include fragments of GRANODIORITE; oxidized with some epidote and chlorite alteration. ...(50') - very minor quartz/feldspar fragments in cuttings.	Damp.
										GRANODIORITE dike in TONALITE. White (N8) and black (N2.5) mafics. Approximately 30% GRANODIORITE and 70% TONALITE.	
14:22	14:20	1								DIORITE/TONALITE. Very dark gray (N3) to black (N2.5) with GRANODIORITE fragments in cuttings. Slightly weathered to fresh. Zeolite(?) and chlorite as fracture infillings; minor disseminated pyrite in veins and in host rock at contact.	

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GeoLogic Associates

BORING LOG

BORING NO.: **GLA-9**

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 12/05/96
DATE FINISHED: 12/07/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: Not encountered
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
14:22						60				DIORITE/TONALITE. Very dark gray (N3) to black (N2.5) with GRANODIORITE fragments in cuttings. Slightly weathered to fresh. Zeolite(?) and chlorite as fracture infillings; minor disseminated pyrite in veins and in host rock.	
						65				DIORITE. Very dark gray (N3) to black (N2.5). Slightly weathered to fresh; minor chloritization. No quartz/feldspar fragments.	...(65') - damp to dry. Hard drilling.
						70					
						75					
	14:43	0.95									
14:46						80					
						85					...(85'-90') - very hard drilling. Broke tooth off bit.
						90					
						95					
	15:19	0.61									
15:24						100				DIORITE. Very dark gray (N3) to black (N2.5) with minor quartz/feldspar veins with some zeolite(?) alteration/infillings along fractures and chloritization.	
						105					
						110					
						115					
						120					

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GeoLogic Associates

BORING LOG

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 12/05/96
DATE FINISHED: 12/07/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: Not encountered
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
14:22						60				DIORITE/TONALITE. Very dark gray (N3) to black (N2.5) with GRANODIORITE fragments in cuttings. Slightly weathered to fresh. Zeolite(?) and chlorite as fracture infillings; minor disseminated pyrite in veins and in host rock.	
						65				DIORITE. Very dark gray (N3) to black (N2.5). Slightly weathered to fresh; minor chloritization. No quartz/feldspar fragments.	...(65') - damp to dry. Hard drilling.
						70					
						75					
	14:43	0.95									
14:46						80					
						85					...(85'-90') - very hard drilling. Broke tooth off bit.
						90					
						95					
	15:19	0.61									
15:24						100				DIORITE. Very dark gray (N3) to black (N2.5) with minor quartz/feldspar veins with some zeolite(?) alteration/infillings along fractures and chloritization.	
						105					
						110					
						115					
						120					

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GeoLogic Associates

BORING LOG

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 12/05/96
DATE FINISHED: 12/07/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: Not encountered
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
16:02	15:58	0.59				120					
						125				...(125') - no apparent quartz/feldspar dikes.	
						130				DIORITE. Very dark gray (N3) to black (N2.5). Fresh; hard. Quartz/feldspar fragments with altered biotite and some epidote alteration of feldspars. Very minor disseminated pyrite.	Rock is fractured, but very hard - breaking buttons off bit. Dry.
						135				...(135') - no apparent quartz/feldspar fragments.	
12/06 8:20						140					
						145					
						150				DIORITE. Very dark gray (N3) to black (N2.5). Fresh; very hard; mostly unaltered. Very minor quartz/feldspar fragments with some chloritized biotite.	
						155					
	8:46	0.77				160					
						165					
						170					
						175				...(175') - DIORITE with GRANODIORITE/ TONALITE dikes. Chlorite alteration, especially along contact of dikes with DIORITE.	
9:20						180				Altered GRANODIORITE and quartz/feldspar dikes in TONALITE. Greenish gray (5G5/1). Chloritization of some fractures, and thin coatings of zeolite(?) along some fracture surfaces.	Dry.

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

BORING NO.: GLA-9

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 12/05/96
DATE FINISHED: 12/07/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: Not encountered
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
9:20						180				Altered GRANODIORITE and quartz/feldspar dikes in TONALITE. Greenish gray (5G5/1). Chloritization of some fractures, and thin coatings of zeolite(?) along some fracture surfaces.	Dry.
						185				...(185') - TONALITE without felsic fragments.	
						190				...(190') - more mafic - DIORITE.	
						195				...(195') - minor quartz/feldspar fragments in cuttings.	
10:22	9:46	0.77				200				...(200') - DIORITE/TONALITE. Dark gray (N4); increase in felsic fragments in cuttings.	Wait 20 minutes for water. No water.
						205					
						210				...(210') - minor quartz/feldspar fragments in cuttings.	
						215				...(215') - some chloritized fragments - look like fracture coatings; very dark gray (N3).	
10:51	10:47	0.80				220				TONALITE/DIORITE. Very dark gray (N3). Hard; fresh. Very minor granodiorite fragments with some disseminated pyrite(?).	
						225				...(225') - some chloritized fragments, dark greenish gray (5G4/1 to 5BG4/1).	
						230				...(230') - DIORITE. Dark gray (N4) to gray (N5). Less mafics.	
						235					
11:20	11:15	0.83				240					

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-9

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: T. REEDER

DATE STARTED: 12/05/96
DATE FINISHED: 12/07/96
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: Not encountered
TOTAL DEPTH: 300 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
11:20						240					
						245					
14:27	11:35	0.67				250				...(250') – cuttings are very dark gray (N3) to gray (N4); minor quartz/feldspar fragments.	Changing bit. Fuel up. Let hole sit over one hour – end of sounder is moist, but no free water in hole.
						255				...(255') – DIORITE with no apparent quartz/feldspar dikes. More mafic; darker.	
14:53	14:48	0.48				260					
						265					
						270				...(270') – very minor quartz/feldspar fragments in cuttings.	
						275					
12/07 8:30	15:50	0.35				280					Change bit.
						285				TONALITE. Minor quartz/feldspar dikes with chloritized mafics along contact with TONALITE.	About 0.5" of water at bottom of hole on 12/07 (condensation?).
						290				TONALITE/GABBRO. Very dark gray (N3). Fresh; hard; tight. Minor quartz/feldspar dikes. Minor chloritization of some mafics.	Used up 4 bits (last one only made it 20 feet) – too many carbide fragments in hole. Rubber fitting on bit broke.
						295					
	8:57	0.74				300					

NOTES:
1. Total depth of borehole 300 feet.
2. Conductor casing set to 30 feet.
3. Open hole interval (exposed bedrock) between 20 and 300 feet below ground surface.
4. No free groundwater encountered.

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GeoLogic Associates

BORING LOG

BORING NO.: GLA-10

JOB NO.:	9539	DATE STARTED:	12/03/96
SITE LOCATION:	GREGORY CANYON	DATE FINISHED:	12/05/96
DRILLING METHOD:	DUAL-WALL REVERSE, AIR	ELEVATION:	325 feet
CONTRACTOR:	LAYNE - ENVIRONMENTAL	NORTHING:	ND
LOGGED BY:	M. VINCENT, CEG / T. REEDER	EASTING:	ND

GW DEPTH: 33 feet
TOTAL DEPTH: 150 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
12/03 11:57						0–22	12/16/96		SW/SM	ALLUVIUM: SAND to SILTY SAND - very fine- to medium-grained with minor coarse sand to pebbles, with boulders of granodiorite and lesser amounts of tonalite. SAND is poorly sorted, micaceous and feldspathic. Dark brown (7.5YR3/3.5). ...(10'-20') - gradational color change to pinkish gray to brown (7.5YR5/2) with associated decrease in silt and micaceous minerals.	Dry to damp. ...(10') - dry to damp. ...(15') - dry to damp. ...(17') - groundwater encountered.
12:35	12:16	1.32				22–33			SW	GRAVELLY SAND - poorly sorted, medium- to very coarse-grained, arkosic. Abundant subrounded to sub-angular, tonalitic and granodioritic GRAVEL to BOULDERS.	...(25') - stop drilling to repair rig at 12:16. Start drilling again at 12:35.
						33–63				WEATHERED BEDROCK - TONALITE: Dark gray (2.5Y4/1) to dark grayish brown (2.5Y4/2). Phaneritic with fine- to medium- crystallinity. Biotite- and hornblende-rich. Weakly weathered with moderate to strong oxidation of biotite and hornblende to chlorite, and with minor alteration of feldspar crystals to clay. ...(45'-50') - predominantly fine-crystallinity. ...(53') - color change to olive gray (5Y5/2).	...(33') - wet. ...(40') - wet. ...(45') - damp. ...(50') - moist to dry. Set conductor casing to 50' below ground surface. ...(55') - dry. ...(60') - dry.

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: M. VINCENT, CEG / T. REEDER

DATE STARTED: 12/03/96
DATE FINISHED: 12/05/96
ELEVATION: 325 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 33 feet
TOTAL DEPTH: 150 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						60					...(60') – dry.
										...(62') – color change to dark greenish gray (10Y4/1).	
						65					
						70				...(70') – color change to pale olive to olive (5Y5.5/3).	
										...(73') – color change to greenish gray (5GY5.5/1).	
						75					
										...(77') – color change to gray (N5).	
	13:04										
12/05 8:54						80					...(80') – stop drilling to set conductor casing to 50' below ground surface.
						85				TONALITE/DIORITE. Very dark gray (N3). Weathered and moderately decomposed. Fe-oxide stained with altered mica and/or pyrite on oxidized pieces; chloritization of some mafics.	...(87') – water production from borehole while drilling approximately 5–6 gpm.
						90				GRANODIORITE dikes in TONALITE. White (N8). Contains black (N2.5) mafic minerals (biotite, hornblende and pyroxene). Very slight chloritization of some mafics (pyroxene) in very dark gray (N3), weathered and moderately decomposed TONALITE.	...(90') – wet.
						95				...(95') – less than 10% GRANODIORITE dike fragments in TONALITE.	
9:27	9:25	0.65				100				...(100') – 40% GRANODIORITE in TONALITE.	
						105				...(105') – dark gray (N4) mixed TONALITE and GRANODIORITE.	Moist.
						110				Gray (N5 to N6) GRANODIORITE.	
						115				Gray (N5 to N6) GRANODIORITE/TONALITE.	...(115') – wet.
10:05	10:02	0.57				120				...(120') – same as above.	Wet.

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates

BORING LOG

BORING NO.: GLA-10

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON
DRILLING METHOD: DUAL-WALL REVERSE, AIR
CONTRACTOR: LAYNE - ENVIRONMENTAL
LOGGED BY: M. VINCENT, CEG / T. REEDER

DATE STARTED: 12/03/96
DATE FINISHED: 12/05/96
ELEVATION: 325 feet
NORTHING: ND
EASTING: ND

GW DEPTH: 33 feet
TOTAL DEPTH: 150 feet

TIME START	TIME STOP	RATE, FT/MIN	WATER SAMPLE INTERVAL	SAMPLE SIZE, INCHES	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
10:05						120				...(120') – same as above.	Wet.
						125				...(125') – less than 5% orthoclase feldspar.	
						130				...(130') – no potassium-feldspar; less than 5% GRANODIORITE dikes in TONALITE.	
						135				...(135') – increase in GRANODIORITE to approximately 50% of cuttings; moderately weathered, with minor pink potassium-feldspar.	
10:47	10:44	0.51				140				...(140') – moderately weathered TONALITE with GRANODIORITE dikes.	
						145				Gray (N6), moderately weathered TONALITE/GRANODIORITE with some epidote/chlorite alteration.	...(145') – wet.
	11:06	0.53				150				...(150') – less than 1% epidote or zeolite alteration and fracture infillings.	
						155					

Notes:
1. Total depth of borehole 150 feet.
2. Conductor casing set to 50 feet.
3. Open hole interval (exposed bedrock) between 50 and 150 feet below ground surface.
4. Groundwater first encountered at 33 feet.
5. Depth to water on 12/16/96 measured at 22.20 feet.

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GeoLogic Associates
Boring Log

BORING NO.: GLA-11

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 11/30/99
DATE FINISHED: 11/30/99
ELEVATION: 775.22
NORTHING: 2070002.607
EASTING: 6300855.954

GW DEPTH: 231 feet
TOTAL DEPTH: 243 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:20						0			SM/ML	SOIL: Strong brown (7.5YR5/6) SILTY SAND to SANDY SILT with CLAY. SAND is fine- to medium-grained and moderately graded.	Dry.
						5				WEATHERED BEDROCK: Olive gray (5Y5/2), phaneritic, fine-grained, moderately weathered and oxidized HORNFELS.	
						10					
						15					
						20					
8:42						25					
8:46										...(28') - color grades to gray 5Y5/1.	
						30					
						35					
						40					
8:55						45					
9:03											
						50				UNWEATHERED BEDROCK: Dark gray (N4), phaneritic, fine-grained, subhedral, hornblend rich HORNFELS.	Dry.

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

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GeoLogic Associates
Boring Log

BORING NO.: GLA-11

JOB NO.:	9539	DATE STARTED:	11/30/99	GW DEPTH:	231 feet
SITE LOCATION:	GREGORY CANYON LANDFILL	DATE FINISHED:	11/30/99	TOTAL DEPTH:	243 feet
DRILLING METHOD:	AIR ROTARY	ELEVATION:	775.22		
CONTRACTOR:	WATER DEVELOPMENT CORPORATION	NORTHING:	2070002.607		
LOGGED BY:	W. LOPEZ, CEG	EASTING:	6300855.954		

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						50				UNWEATHERED BEDROCK: Dark gray (N4), phaneritic, fine-grained, subhedral, hornblend rich HORNFELS.	Dry.
						55					
						60					
9:25						65					
9:29											
						70				...(70'-80') - moderately weathered.	
						75					
						80					
9:50						85					
9:55											
						90					
						95					
						100				Strong brown (7.5YR5/8) to white (7.5YR8/1), phaneritic, fine- to coarse-grained, moderately weathered, subhedral to euhedral GRANODIORITE dikes in HORNFELS with potassium feldspar phenocrysts.	Dry.

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 11/30/99
DATE FINISHED: 11/30/99
ELEVATION: 775.22
NORTHING: 2070002.607
EASTING: 6300855.954

GW DEPTH: 231 feet
TOTAL DEPTH: 243 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						100				Strong brown (7.5YR5/8) to white (7.5YR8/1), phaneritic, fine- to coarse-grained, moderately weathered, subhedral to euhedral GRANODIORITE dikes in HORNFELS with potassium feldspar phenocrysts.	Dry.
10:22						105					
10:28											
						110				HORNFELS with minor GRANODIORITE dikes.	Dry.
						115					
						120					
11:00						125					
11:05											
						130					
						135					
						140				...(141'-144') - GRANODIORITE dike.	
11:37						145					
11:45											
						150				...(150') - predominantly mafic with no dikes.	Dry.

CONTINUED ON NEXT PAGE

GeoLogic Associates
Boring Log

BORING NO.: GLA-11

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 11/30/99
DATE FINISHED: 11/30/99
ELEVATION: 775.22
NORTHING: 2070002.607
EASTING: 6300855.954

GW DEPTH: 231 feet
TOTAL DEPTH: 243 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						150				...(150') – predominantly mafic with no dikes.	Dry.
						155					
						160					
12:22						165					
12:26											
						170					Dry.
						175					
						180					
13:04						185					
13:10											
						190				...(189'–191') – GRANODIORITE dike.	
						195					
						200					Dry.

CONTINUED ON NEXT PAGE

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GeoLogic Associates
Boring Log

BORING NO.: GLA-11

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 11/30/99
DATE FINISHED: 11/30/99
ELEVATION: 775.22
NORTHING: 2070002.607
EASTING: 6300855.954

GW DEPTH: 231 feet
TOTAL DEPTH: 243 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						200				...same as above.	Dry.
13:47						205					
13:51						210					
						215					
						220					Wait 30 minutes. Obstruction encountered at 158'. Tape is wet at 75'. Free groundwater encountered when drilling resumed.
14:28						225					
15:03						230	∇				
						235					
						240					Blow out water. Wait 10 minutes; borehole still produces water.
15:27											
						245				Notes: 1. Total depth of boring 243 feet. 2. Groundwater first encountered at 231 feet. 3. Monitoring well constructed on 12/2/99 (see Monitoring Well Completion Summary).	
						250					

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GeoLogic Associates
Boring Log

BORING NO.: GLA-12

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 11/24/99
DATE FINISHED: 11/24/99
ELEVATION: 343.91
NORTHING: 2070784.338
EASTING: 6299410.816

GW DEPTH: 36.7 feet
TOTAL DEPTH: 66.0 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:16						0			SM/ML	SOIL: Strong brown (7.5YR4/6) SILTY SAND to SANDY SILT with CLAY. SAND is fine-grained and poorly graded.	Dry.
						5				WEATHERED BEDROCK: Strong brown (7.5YR4/4), fine-grained GRANODIORITE (GRUSS) weathered with iron-oxide staining and alteration of feldspar crystals to clay.	Damp.
						10					
						15					
8:38										Yellowish brown (10YR5/4) to brownish yellow (10YR6/6), phaneritic, fine- to medium-grained, moderately weathered and oxidized GRANODIORITE.	Damp. Switched from tri-cone bit to downhole hammer. Conductor casing set to 18'.
8:57						20					
						25				...(23') - gradational color change to pale yellow (5Y7/3).	
						30				UNWEATHERED BEDROCK: Pale yellow (5Y7/3), phaneritic, fine to coarse subhedral to euhedral GRANODIORITE with white to light red (2.5YR7/6) potassium feldspar phenocrysts.	Moist.
						35	▼ ▽				
9:30						40					Wait 45 minutes. Sound for water. Groundwater encountered at 38 feet.
10:18											
						45					Very moist.
						50				...(48') - color change to light olive brown (2.5Y4/3). ...same as above.	Very moist.

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

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GeoLogic Associates
Boring Log

BORING NO.: GLA-12

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 11/24/99
DATE FINISHED: 11/24/99
ELEVATION: 343.91
NORTHING: 2070784.338
EASTING: 6299410.816

GW DEPTH: 36.7 feet
TOTAL DEPTH: 66.0 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						50				...same as above.	Very moist.
						55					
						60					
10:38						65					Wait 2 hours. Sound for water. Groundwater sounded at 36.7 feet.
						70				Notes: 1. Total depth of boring 66 feet. 2. Groundwater first encountered at 38 feet. Static water level measured at 36.7 feet. 3. Monitoring well constructed on 11/24/99 (see Monitoring Well Completion Summary).	
						75					
						80					
						85					
						90					
						95					
						100					

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GeoLogic Associates
Boring Log

BORING NO.: GLA-13

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 11/22/99
DATE FINISHED: 11/23/99
ELEVATION: 355.90
NORTHING: 2070269.329
EASTING: 6298912.906

GW DEPTH: 49.7 feet
TOTAL DEPTH: 69.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
15:00						0			SM/ ML	SOIL: Light yellowish brown (10YR6/4) SILTY SAND to SANDY SILT. SAND is fine-grained and poorly graded.	Dry.
						5				WEATHERED BEDROCK: Strong brown (7.5YR5/8 to 7.5YR4/6), fine-grained TONALITE (GRUSS). Weathered with Fe-oxide staining and alteration of feldspar crystals to clay.	Damp.
						10					
						15					
15:17						20					Switched from tri-cone to button bit.
15:26											
						25				Olive (5Y5/3) to olive gray (5Y5/2), phaneritic, hornblend- and quartz-rich fine- to coarse-grained TONALITE with strong oxidation of hornblend and biotite phenocrysts.	Damp.
						30				...(30') - color grades to gray (5Y6/1).	
						35					
15:43						40					
15:46											
						45					Damp.
						50				UNWEATHERED BEDROCK: Dark gray (5Y4/1) to white (5Y8/1), phaneritic, fine- to coarse-grained TONALITE to GRANODIORITE with abundant felsic minerals with lesser mafic minerals. Shows minor effects of iron-oxide staining.	Moist.

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GeoLogic Associates
Boring Log

BORING NO.: GLA-13

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 11/22/99
DATE FINISHED: 11/23/99
ELEVATION: 355.90
NORTHING: 2070269.329
EASTING: 6298912.906

GW DEPTH: 49.7 feet
TOTAL DEPTH: 69.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						50				UNWEATHERED BEDROCK: Dark gray (5Y4/1) to white (5Y8/1), phaneritic, fine- to coarse-grained TONALITE to GRANODIORITE with abundant felsic minerals with lesser mafic minerals. Shows minor effects of iron-oxide staining.	Moist.
						55					
							∇				Wait 20 minutes. Sound for water. Groundwater encountered at 58 feet and rising.
16:04						60					
11/23 7:46											Very hard drilling. Water enters borehole while drilling.
						65					
8:22											
						70				Notes: 1. Total depth of boring 69.5 feet. 2. Groundwater first encountered at 58 feet. Static water level measured at 49.7 feet. 3. Monitoring well constructed on 11/23/99 (see Monitoring Well Completion Summary).	
						75					
						80					
						85					
						90					
						95					
						100					

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: GLA-14

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 11/21/99
DATE FINISHED: 11/21/99
ELEVATION: 332.21
NORTHING: 2069847.129
EASTING: 6298115.681

GW DEPTH: 36.5 feet
TOTAL DEPTH: 63 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
7:35, 7:47						0			SM/ ML	SOIL: Dark yellowish brown (10YR4/4) SILTY SAND to SANDY SILT with CLAY. SAND is fine-grained and poorly graded.	Dry.
7:53, 8:08						5, 10					
8:13						15				WEATHERED BEDROCK: Strong brown (7.5YR5/8), fine-grained TONALITE (GRUSS) weathered with iron-oxide staining and alteration of feldspar crystals to clay.	Damp.
						20				Light olive gray (5Y6/2) to gray (5Y5/1), phaneritic, fine- to coarse-grained, hornblend and quartz rich TONALITE with oxidation of hornblend and biotite phenocrysts. ...(20'-22') - white (5Y8/1), unweathered GRANODIORITE dike composed of predominantly quartz and feldspar phenocrysts.	Hard drilling.
8:33											
8:48, 10:30						25					
15:00, 15:45						30, 35, 40					Moist.
15:20, 15:26						45					...(42') - groundwater first encountered.
15:52						50				UNWEATHERED BEDROCK: Dark gray (5Y4/1), phaneritic, subhedral, fine-grained, biotite- and hornblend-rich TONALITE.	Groundwater air lifted out of boring while drilling.

CONTINUED ON NEXT PAGE

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GeoLogic Associates
Boring Log

BORING NO.: GLA-14

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 11/21/99
DATE FINISHED: 11/21/99
ELEVATION: 332.21
NORTHING: 2069847.129
EASTING: 6298115.681

GW DEPTH: 36.5 feet
TOTAL DEPTH: 63 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
15:52						50				UNWEATHERED BEDROCK: Dark gray (5Y4/1), phaneritic, subhedral, fine-grained, biotite- and hornblend-rich TONALITE.	Groundwater air lifted out of boring while drilling.
						55					
						60					
16:15											
						65				Notes: 1. Total depth of boring 63 feet. 2. Groundwater first encountered at 42 feet. Static water level measured at 36.5 feet. 3. Monitoring well constructed on 11/22/99 (see Monitoring Well Completion Summary).	
						70					
						75					
						80					
						85					
						90					
						95					
						100					

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The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: GLA-15

PAGE: 1 OF 1

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 11/19/99
DATE FINISHED: 11/19/99
ELEVATION: 304.82
NORTHING: 2068403.283
EASTING: 6297080.768

GW DEPTH: 12 feet
TOTAL DEPTH: 50 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
13:10						0			SM/ML	ALLUVIUM: Light olive brown (2.5Y5/3) SILTY SAND to SANDY SILT. SAND is very fine-grained, poorly graded and micaceous.	Dry.
13:20						5			SM	Dark grayish brown (2.5Y4/2), poorly graded, fine- with trace of medium-grained, micaceous SILTY SAND.	Moist.
13:34						10					Very moist.
						15				...(15') – SAND grades to fine- to medium-grained.	Slightly wet.
13:47											
13:53						20					
						25					...(25') – groundwater first encountered.
						30					Slightly wet.
14:15						35				...(35') – contains trace amounts of coarse-grained SAND and GRAVEL.	Groundwater air lifted out of borehole while drilling.
16:50						40					
						45					
17:10						50					

Notes:
1. Total depth of boring 50 feet.
2. Groundwater first encountered at 25 feet. Static water level measured at 12 feet.
3. Monitoring well constructed on 11/20/99 (see Monitoring Well Completion Summary).

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GeoLogic Associates
Boring Log

BORING NO.: GLA-16

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: HOLLOW STEM AUGER – 8"ø
CONTRACTOR: WATER DEVELOPMENT CORPORATION
LOGGED BY: W. LOPEZ, CEG

DATE STARTED: 12/20/99
DATE FINISHED: 12/20/99
ELEVATION: 305.28
NORTHING: 2068429.193
EASTING: 6297089.329

GW DEPTH: 10.6 feet
TOTAL DEPTH: 33.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
10:00						0			SM/ML	ALLUVIUM: Light olive brown (2.5Y5/3) SILTY SAND to SANDY SILT. SAND is very fine-grained, poorly graded and micaceous.	Dry.
						5			SM	Dark grayish brown (2.5Y4/2), poorly graded, fine- with trace of medium-grained, micaceous SILTY SAND.	Moist.
						10	▽				Slightly wet. ...(10.6') – groundwater first encountered.
						15					
						20					
						25					
						30					
10:15											
						35				Notes: 1. Total depth of boring 33.5 feet. 2. Groundwater first encountered at 10.6 feet. 3. Monitoring well constructed on 12/20/99 (see Monitoring Well Completion Summary).	
						40					
						45					
						50					

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ATTACHMENT 2

PHOTO LOG OF GEOLOGIC CONTACTS

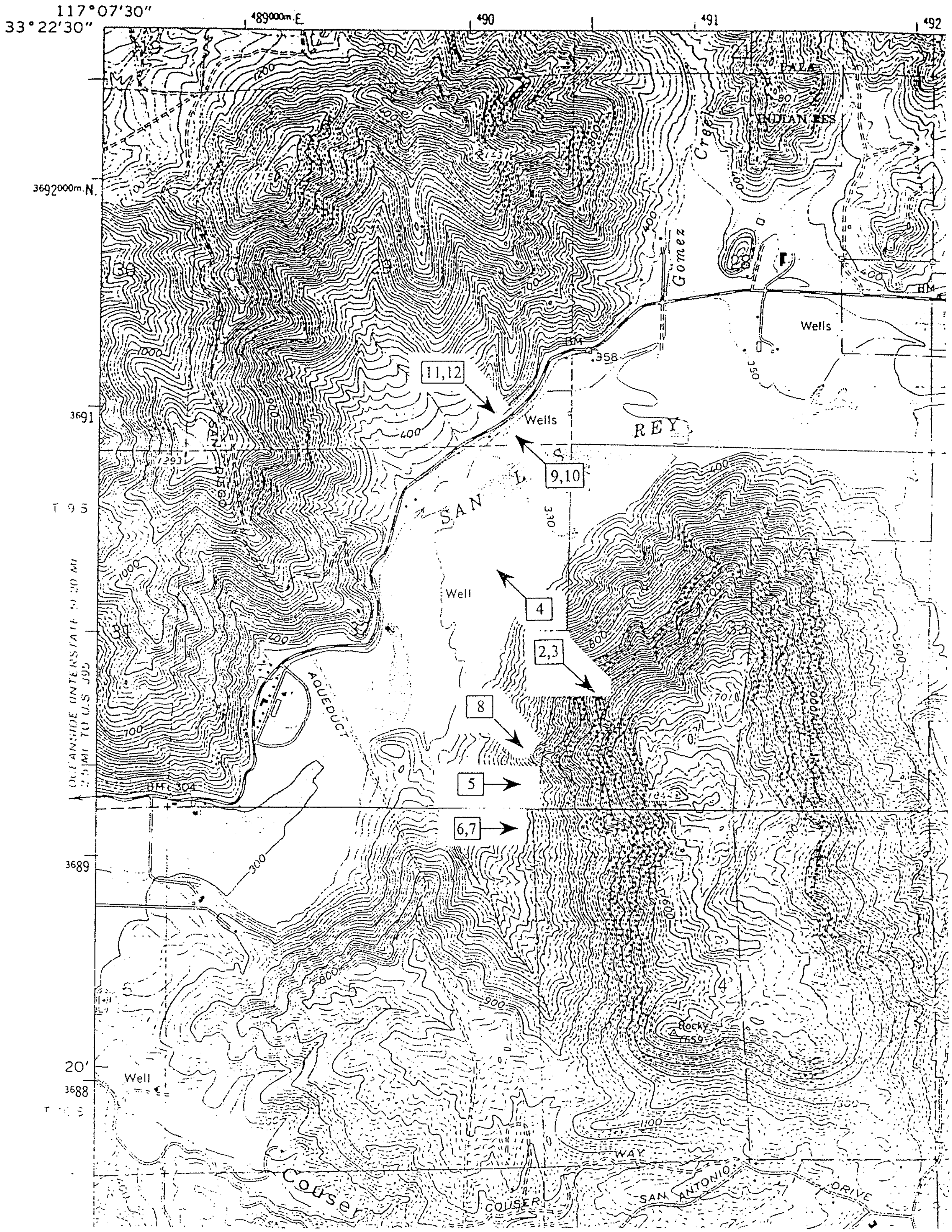

Figure 1. Location map, showing the view directions of the photographs in Figures 2 through 12.

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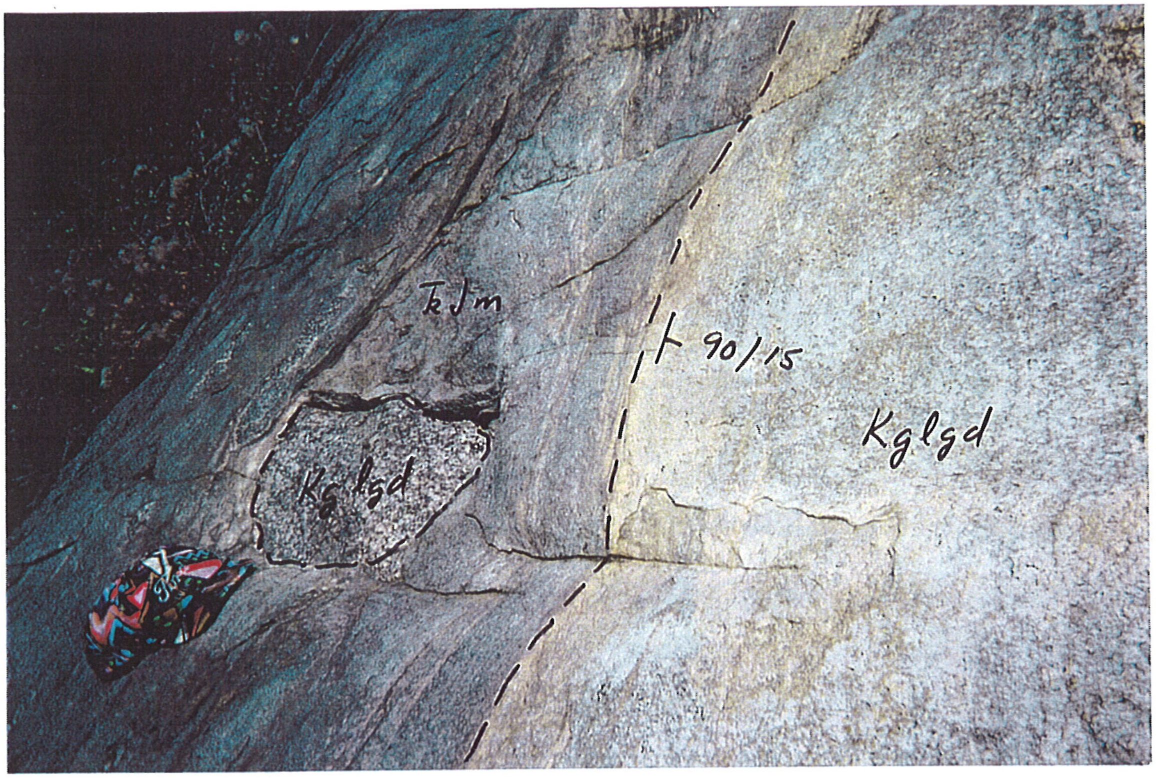

Figure 2. Contact between the leucogranodiorite (Kglgd) and the amphibolites of the metamorphic wedge (Tjm). Note that even though the contact is planar at this scale, it is not brecciated (hence, it is not a fault). In addition, notice the apophysis of lecugranodiorite "poking" through the amphibolite.

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Figure 3. Contact between leucogranodiorite (Kglgd) and the amphibolites of the metamorphic wedge (Tjm). Note pegmatitic dike of Kglgd extending from the contact into the metamorphic unit, which demonstrates that the contact is not a fault.

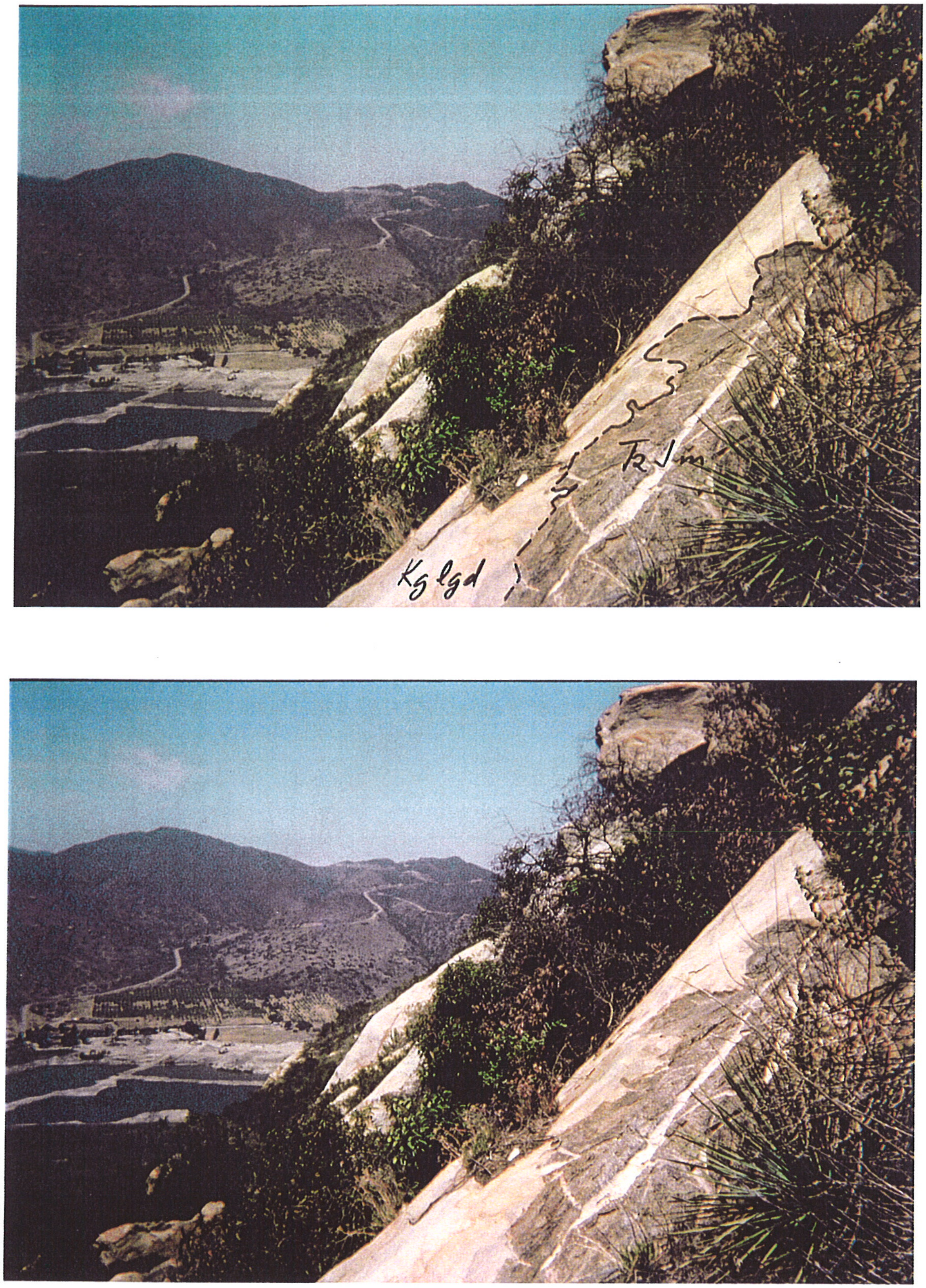


Figure 4. Contact between leucogranodiorite (Kglgd) and the amphibolites of the metamorphic wedge (Tjm). Note that the contact is not planar, and hence not a fault. Note also that the contact could not be reasonably projected to the right of the ponds because of the outcrop of leucogranodiorite in the second plane.

Figure 5. Contact between the tonalite (Kbt) and the amphibolites of the metamorphic wedge (Tjm). Note the irregular nature of the contact, which demonstrates that the contact is not a fault.

Figure 6. Contact between the tonalite (Kbt) and the amphibolites of the metamorphic wedge (Tjm). Note the irregular, intricate nature of the contact, which demonstrates that the contact is not a fault.

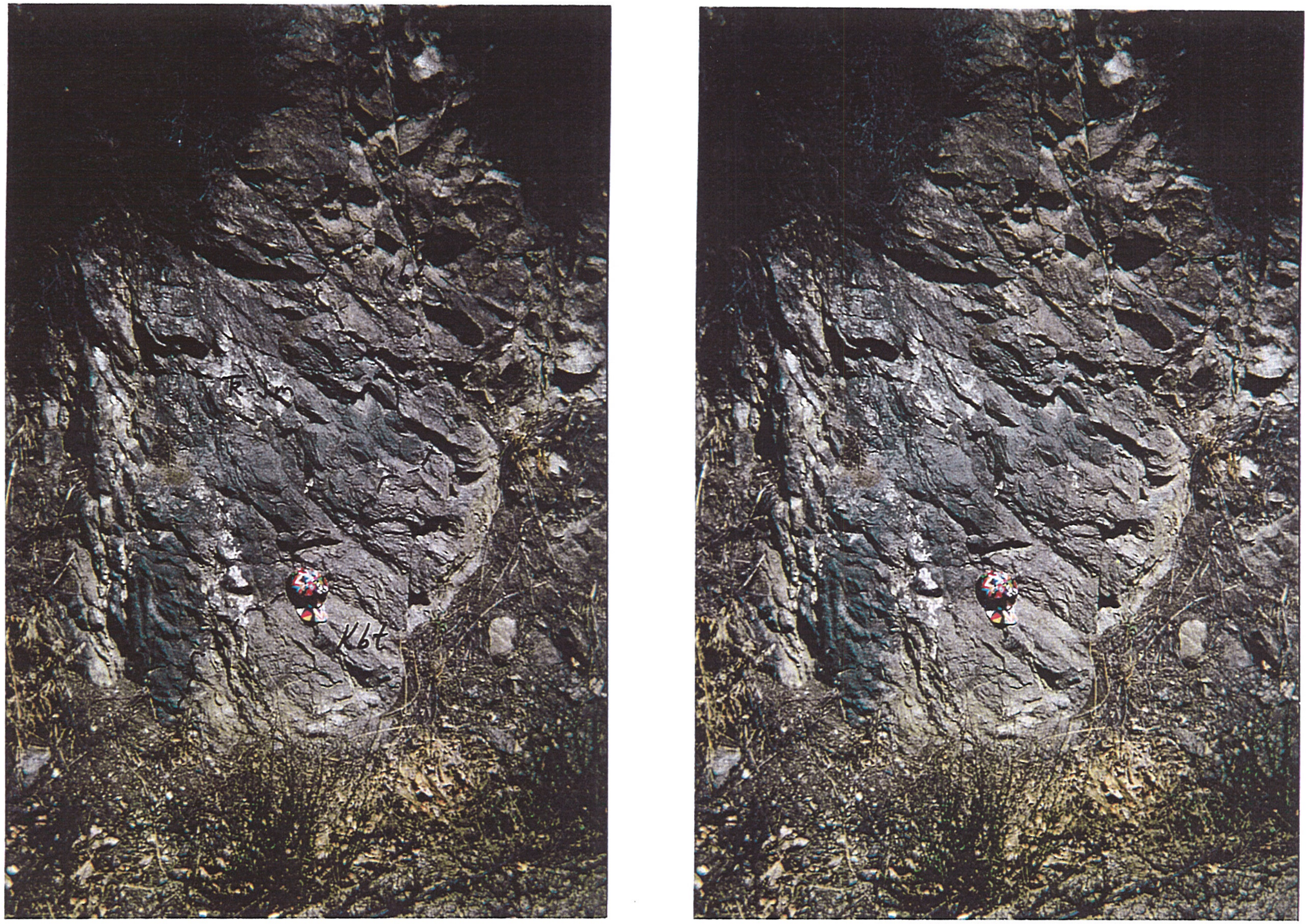
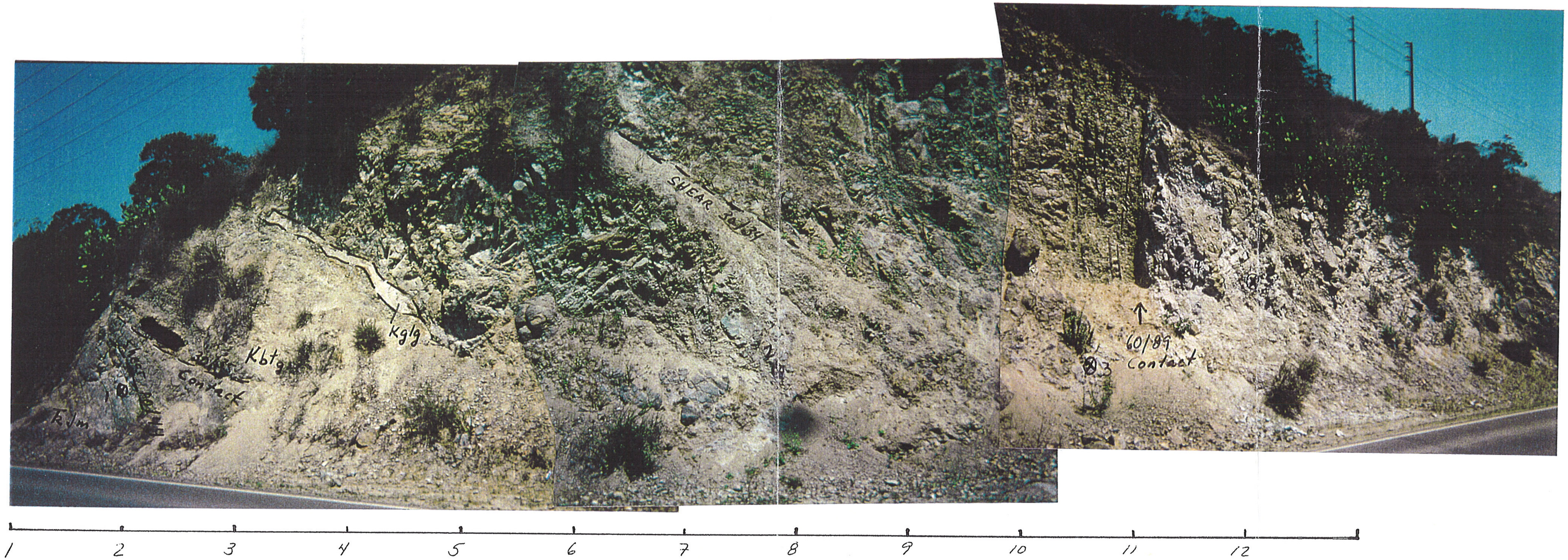


Figure 7. Contact between the tonalite (Kbt) and the amphibolites of the metamorphic wedge (Tjm). Note the irregular, intricate nature of the contact, which demonstrates that the contact is not a fault.

Figure 8. Migmatitic banding in the amphibolites of the metamorphic wedge (Tjm). Note the outcrops of leucogranodiorite (Kglgd) in the upper left, and the fact that banding dips into the slope. Mineralogical banding does not create foliation planes in the rock.



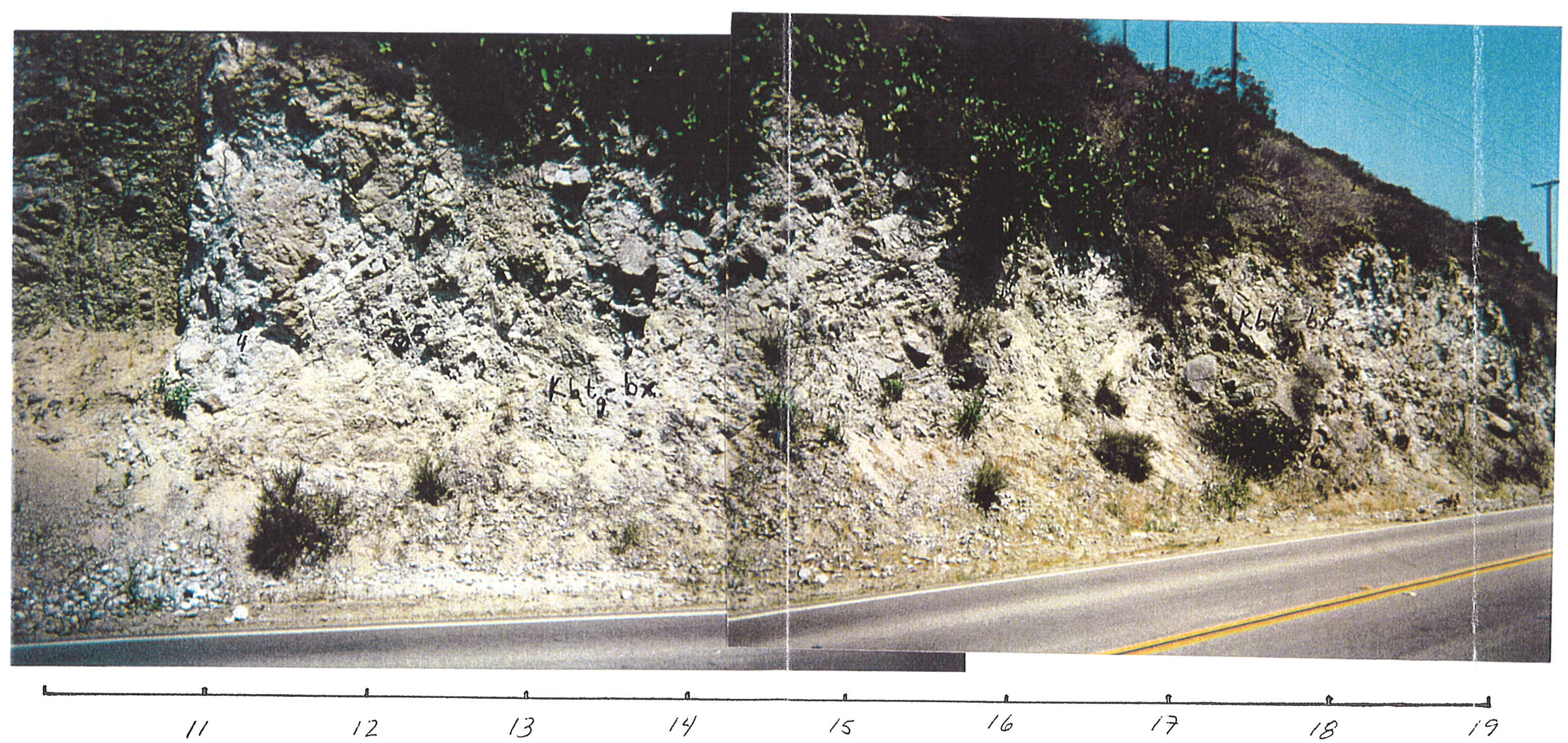


Figure 9. Photo montage of the outcrop created by the road cut of Highway 76 across the southeast corner of Section 29.

Figure 10. Stereopair of the contact between weathered, vertically-fractured gabbro on the left, and the intrusive gabbroic breccia on the right.

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Figure 11. Direction in which the contact of the intrusive breccia would project toward Gregory Mountain.

Figure 12. Photo montage showing the considerable distance between the projection of the contact of the intrusive breccia and Gregory Canyon itself.

ATTACHMENT 3

WATER QUALITY ANALYTICAL DATA

ATTACHMENT 4

PUMPING TEST RESULTS (CURVES)

APPENDIX A

PUMP TEST #1 DATA

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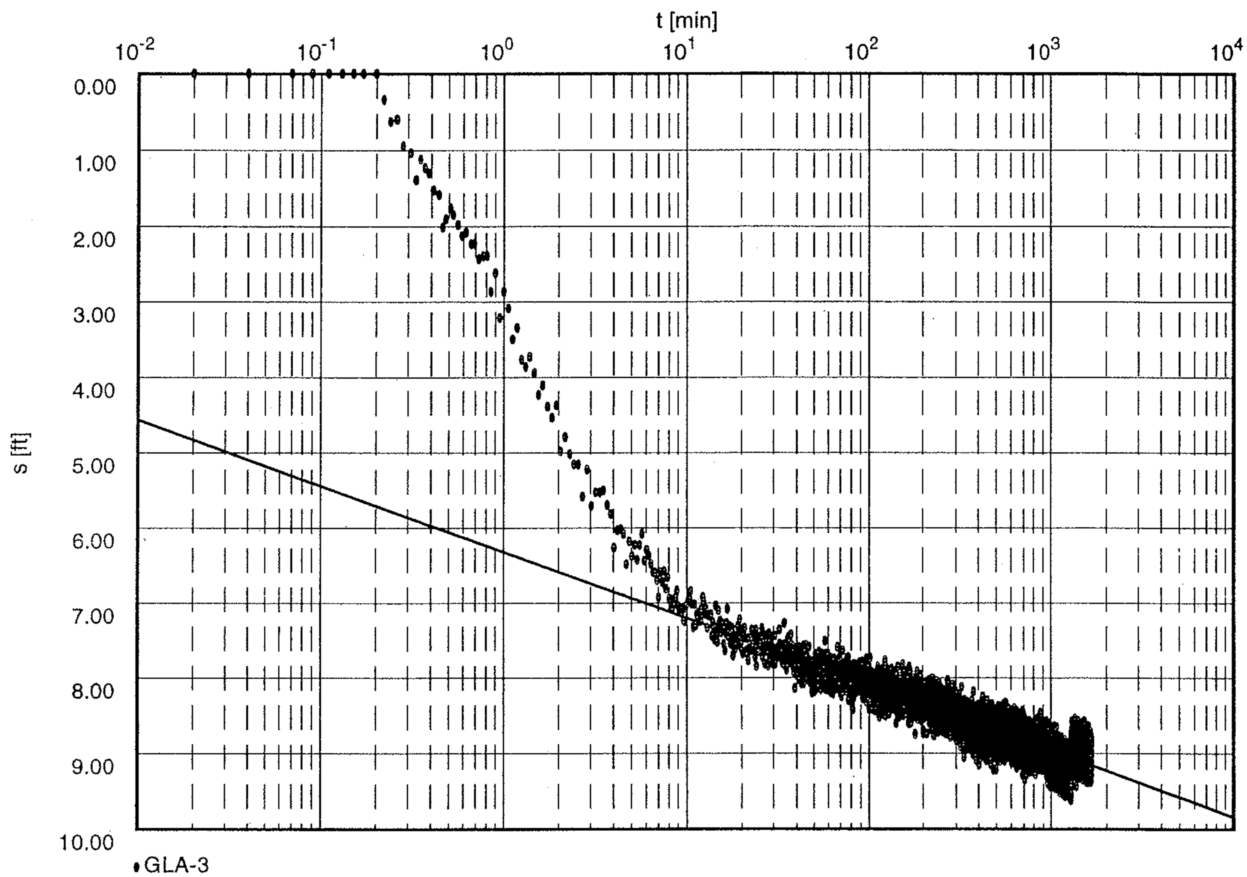
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 08.12.2000 Page 1 Project: Gregory Canyon Pump Test Evaluated by: wbl

Pumping Test No. 1	Test conducted on: 28.11.2000
GLA-3 (pumping well)	
Discharge 10.00 U.S.gal/min	



Transmissivity [ft²/min]: 2.77×10^{-1}

Hydraulic conductivity [ft/min]: 4.62×10^{-3}

Aquifer thickness [ft]: 60.00

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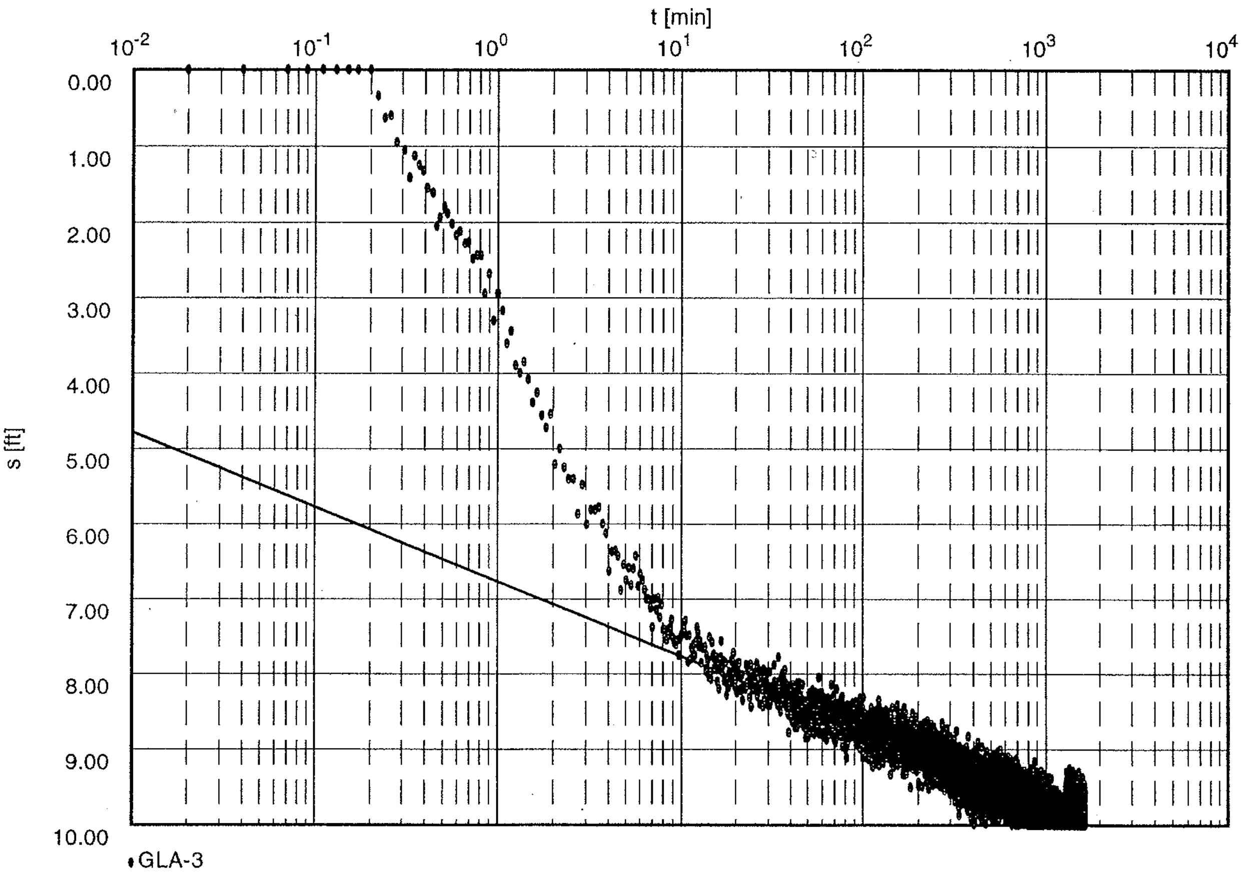
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 08.12.2000 / Page 1 Project: Gregory Canyon Pump Test Evaluated by: wbl

Pumping Test No. 1	Test conducted on: 28.11.2000
GLA-3 (pumping well)	
Discharge 10.00 U.S.gal/min	



Transmissivity [ft²/min]: 2.45×10^{-1}

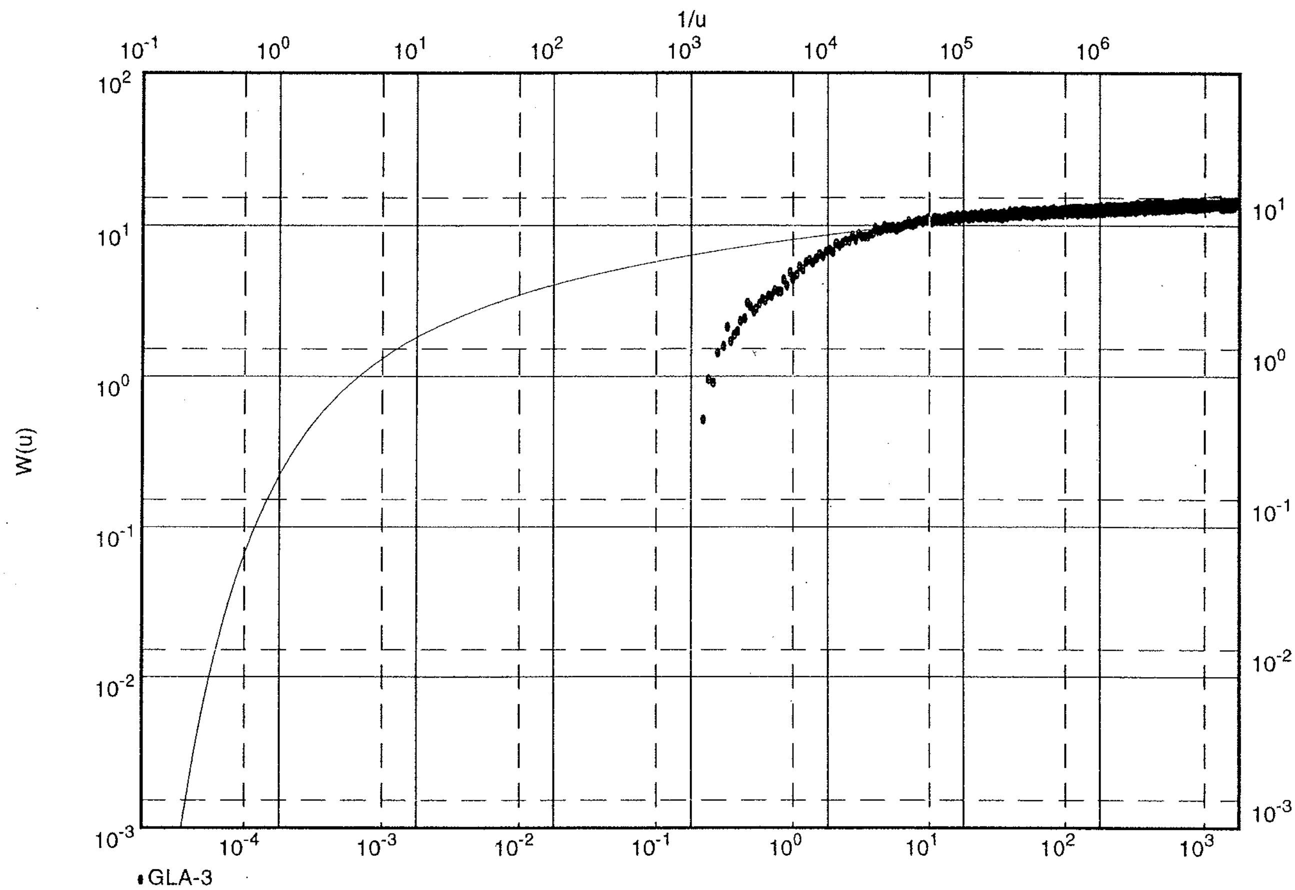
Hydraulic conductivity [ft/min]: 4.09×10^{-3}

Aquifer thickness [ft]: 60.00

Storativity: 8.87×10^{-8}

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Pump Test	
		Evaluated by: wbl	

Pumping Test No. 1	Test conducted on: 28.11.2000
GLA-3 (pumping well)	
Discharge 10.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.61×10^{-1}

Hydraulic conductivity [ft/min]: 2.69×10^{-3}

Aquifer thickness [ft]: 60.00

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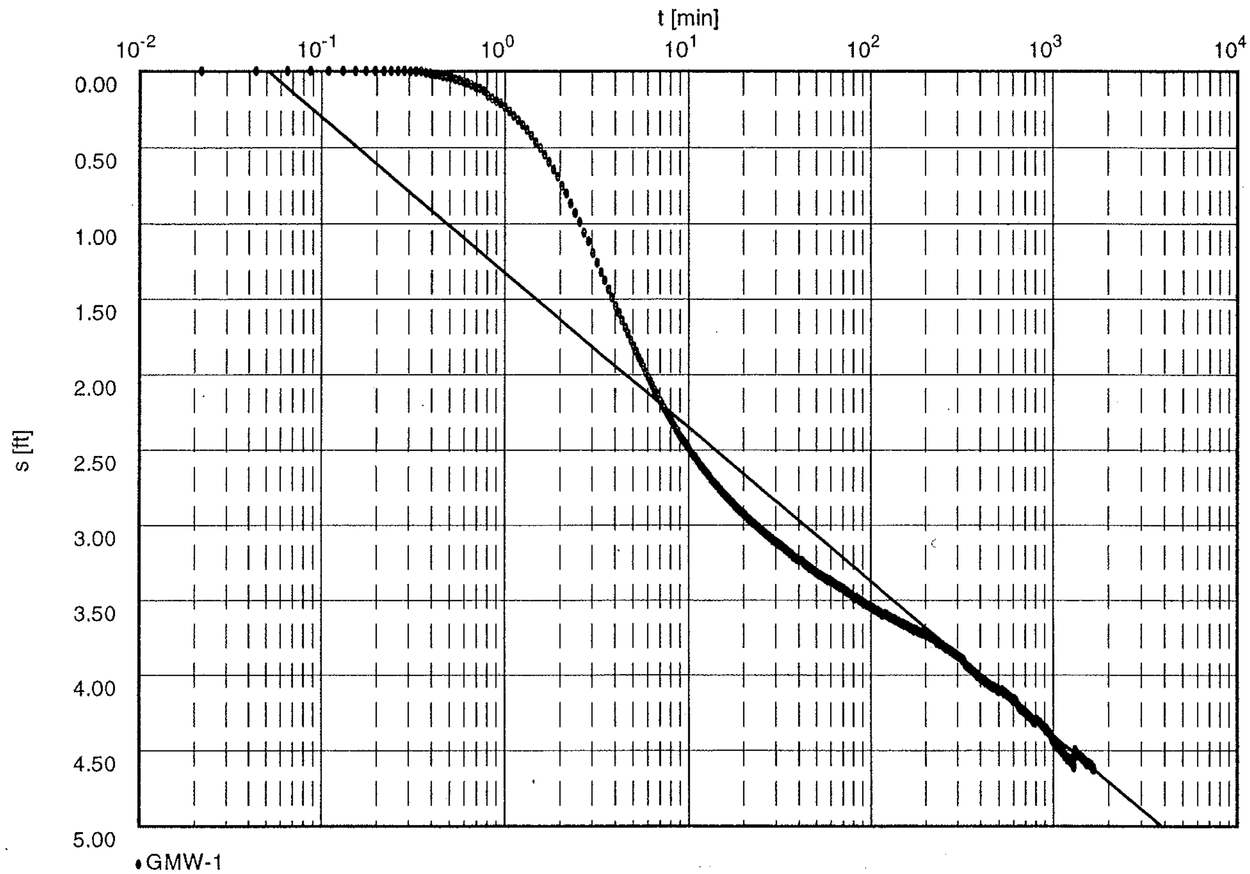
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Landfill	
		Evaluated by: wbl	

Pumping Test No. 1	Test conducted on: 28.11.2000
GMW-1 (observation)	
Discharge 10.00 U.S.gal/min	



Transmissivity [ft²/min]: 2.38×10^{-1}

Hydraulic conductivity [ft/min]: 4.59×10^{-3}

Aquifer thickness [ft]: 52.00

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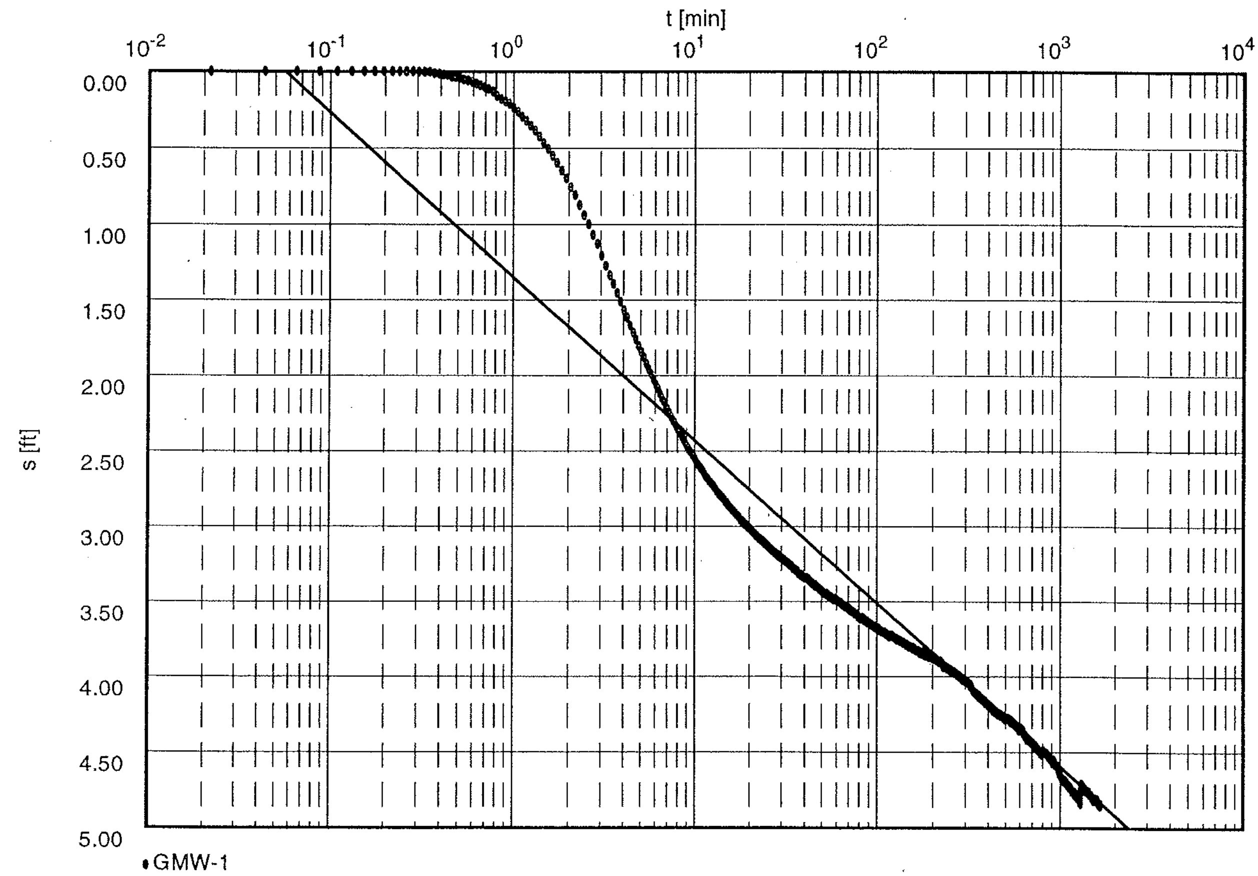
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Landfill	
		Evaluated by: wbl	

Pumping Test No. 1	Test conducted on: 28.11.2000
GMW-1 (observation)	
Discharge 10.00 U.S.gal/min	



Transmissivity [ft²/min]: 2.26×10^{-1}

Hydraulic conductivity [ft/min]: 4.35×10^{-3}

Aquifer thickness [ft]: 52.00

Storativity: 1.28×10^{-4}

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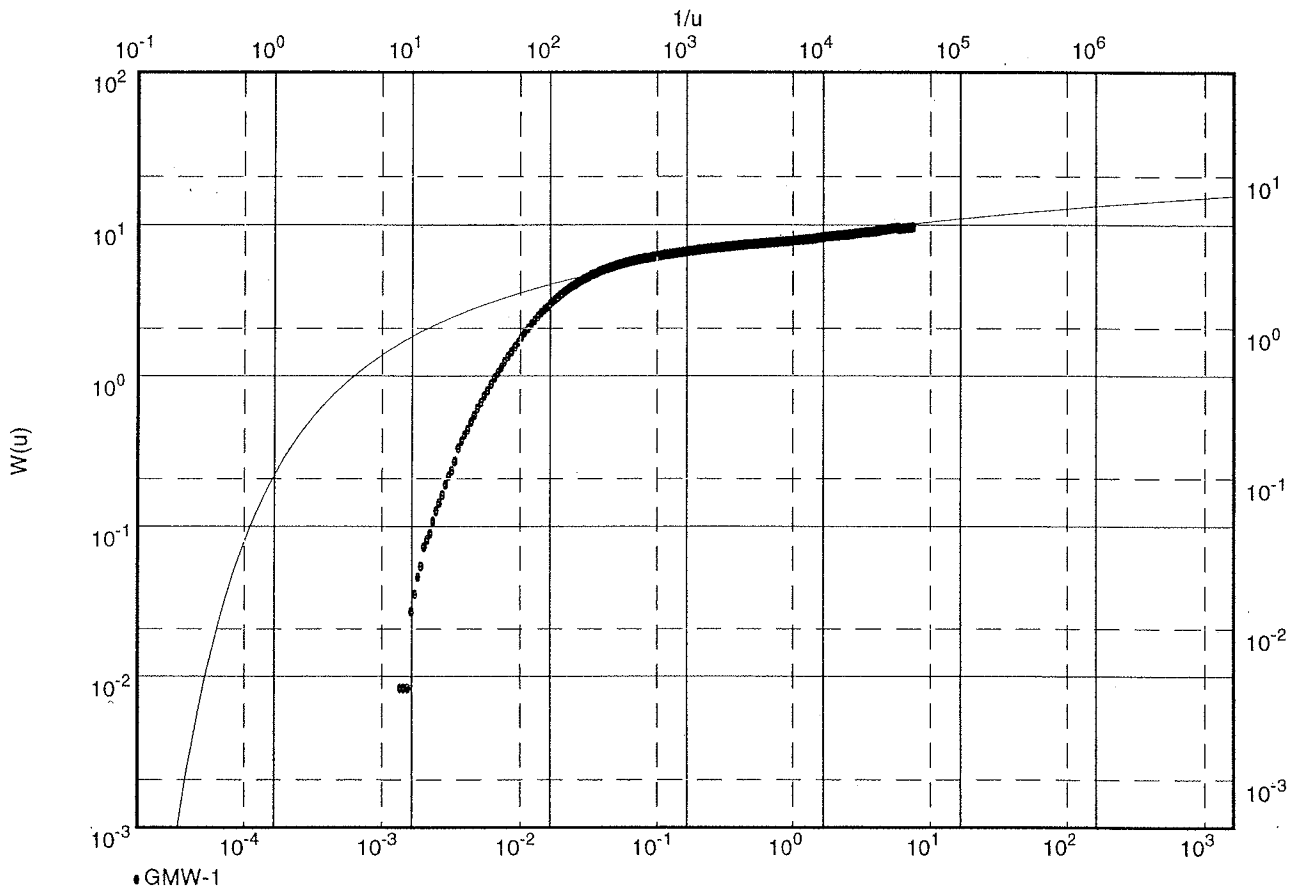
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Landfill	
		Evaluated by: wbl	

Pumping Test No. 1	Test conducted on: 28.11.2000
GMW-1 (observation)	
Discharge 10.00 U.S.gal/min	



Transmissivity [ft²/min]: 2.20×10^{-1}

Hydraulic conductivity [ft/min]: 4.23×10^{-3}

Aquifer thickness [ft]: 52.00

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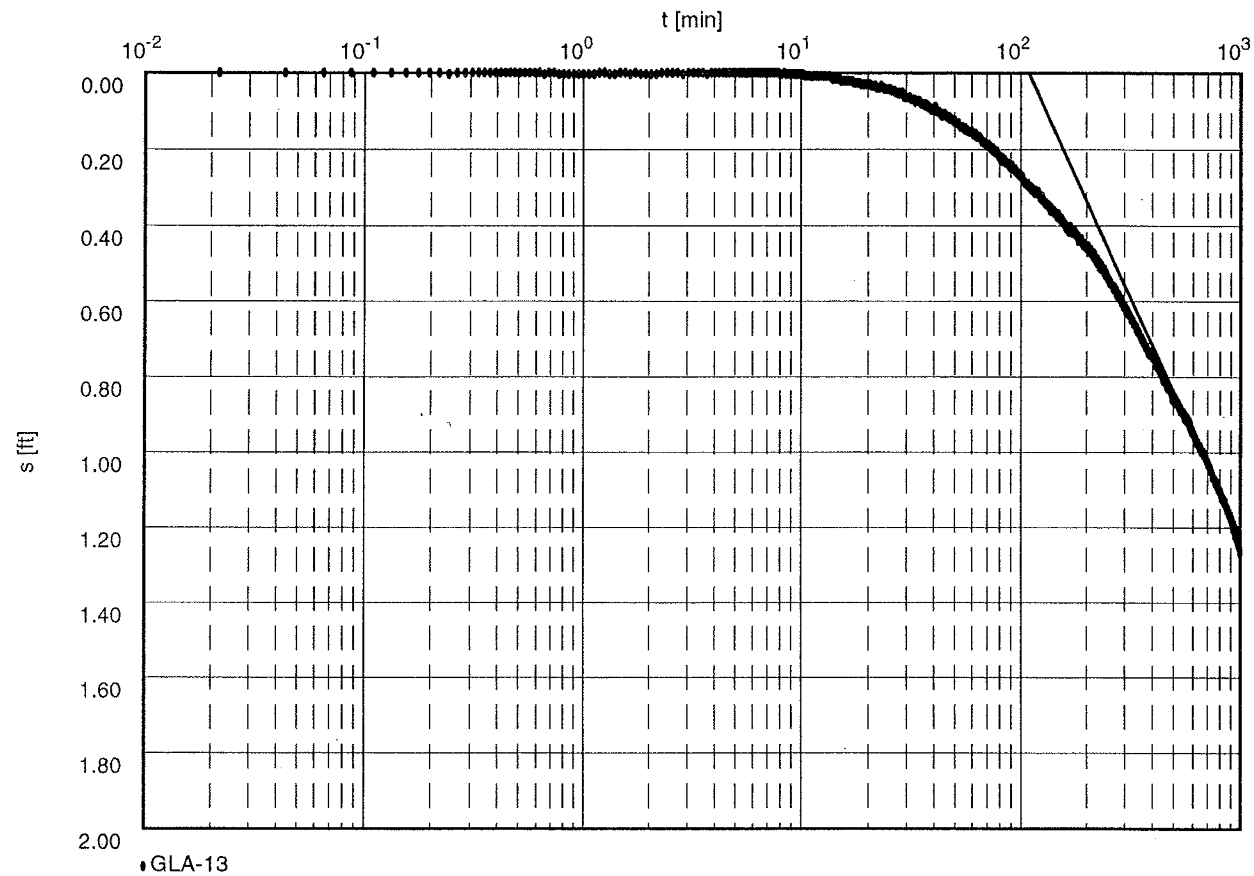
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Pump Test	
		Evaluated by: wbl	

Pumping Test No. 1	Test conducted on: 28.11.2000
GLA-13 (observation)	
Discharge 10.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.92×10^{-1}

Hydraulic conductivity [ft/min]: 1.33×10^{-2}

Aquifer thickness [ft]: 14.50

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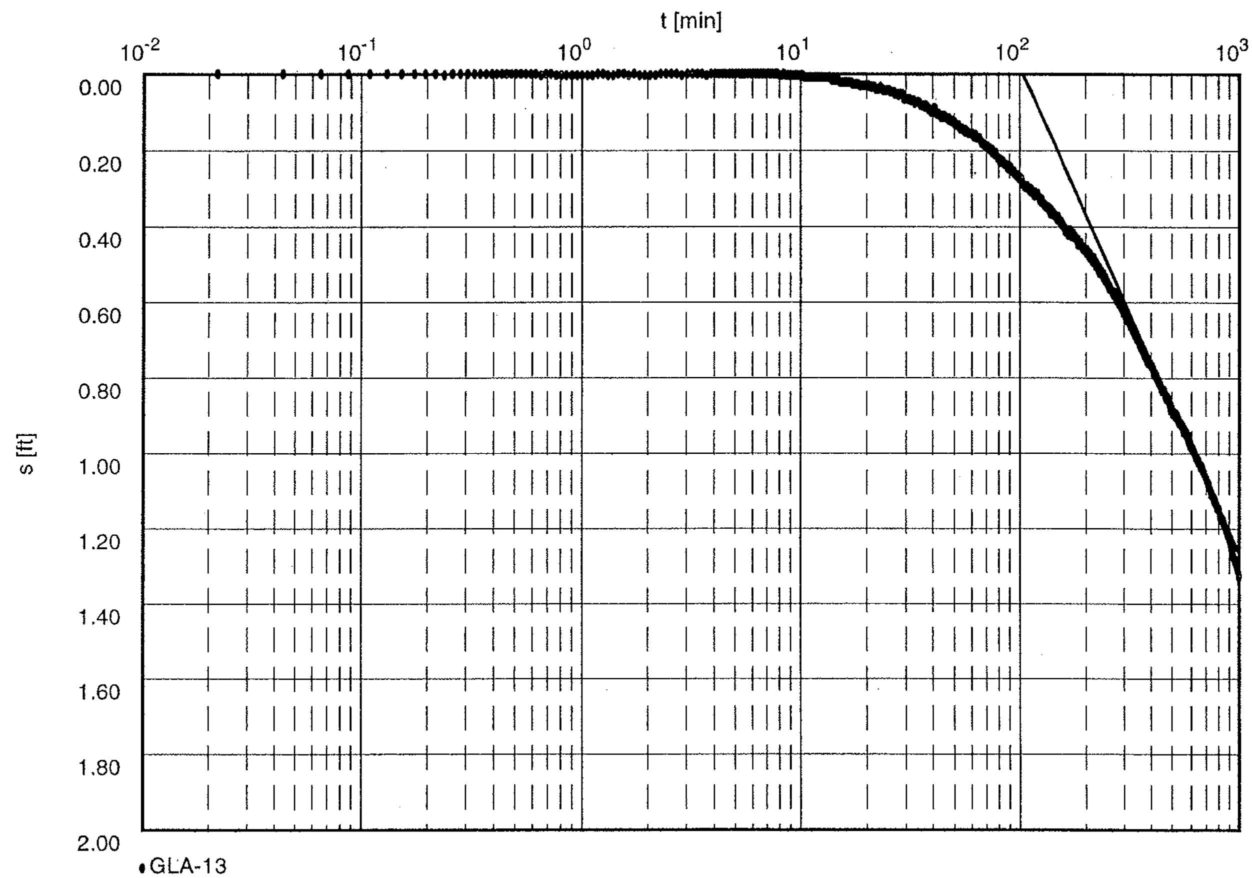
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Pump Test	
		Evaluated by: wbl	

Pumping Test No. 1	Test conducted on: 28.11.2000
GLA-13 (observation)	
Discharge 10.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.90×10^{-1}

Storativity: 1.10×10^{-3}

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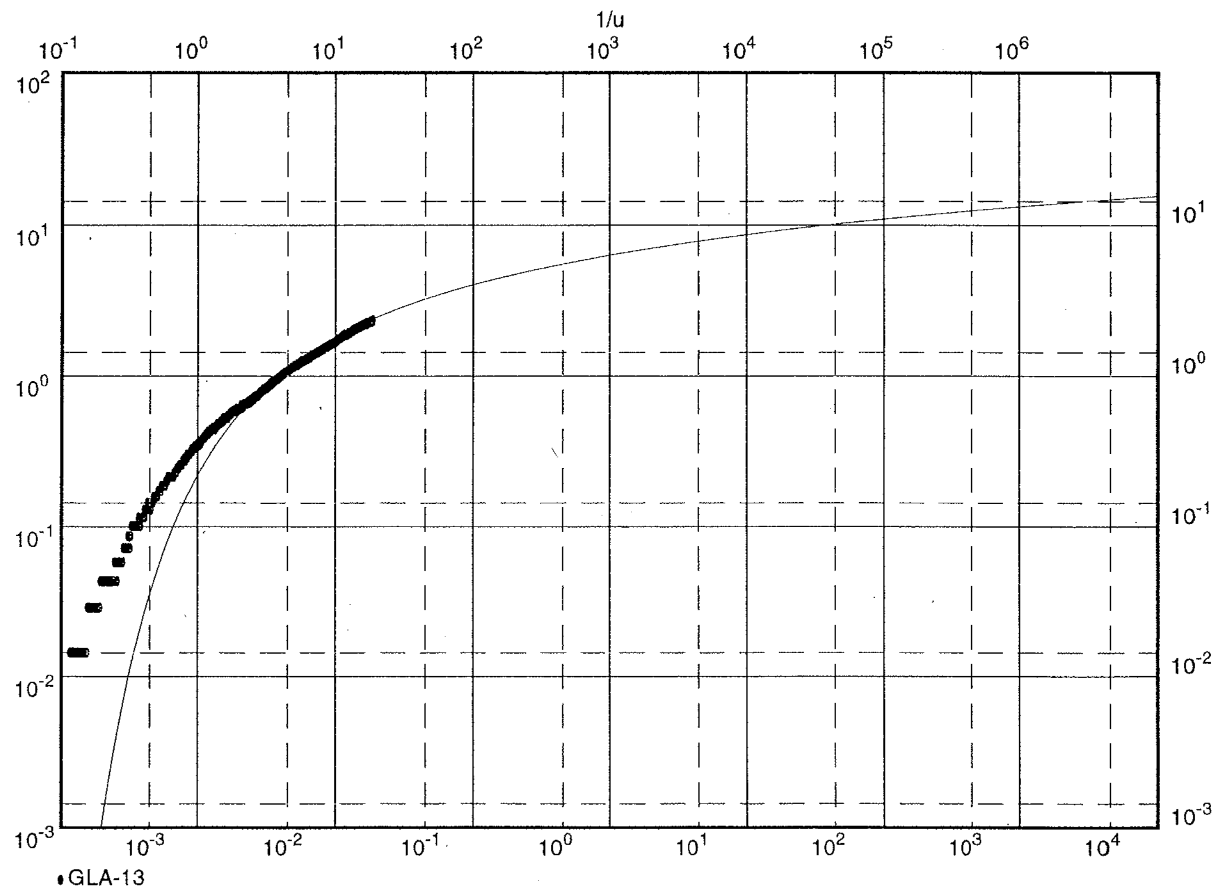
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Pump Test	
		Evaluated by: wbl	

Pumping Test No. 1	Test conducted on: 28.11.2000
GLA-13 (observation)	
Discharge 10.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.52×10^{-1}

Hydraulic conductivity [ft/min]: 1.05×10^{-2}

Aquifer thickness [ft]: 14.50

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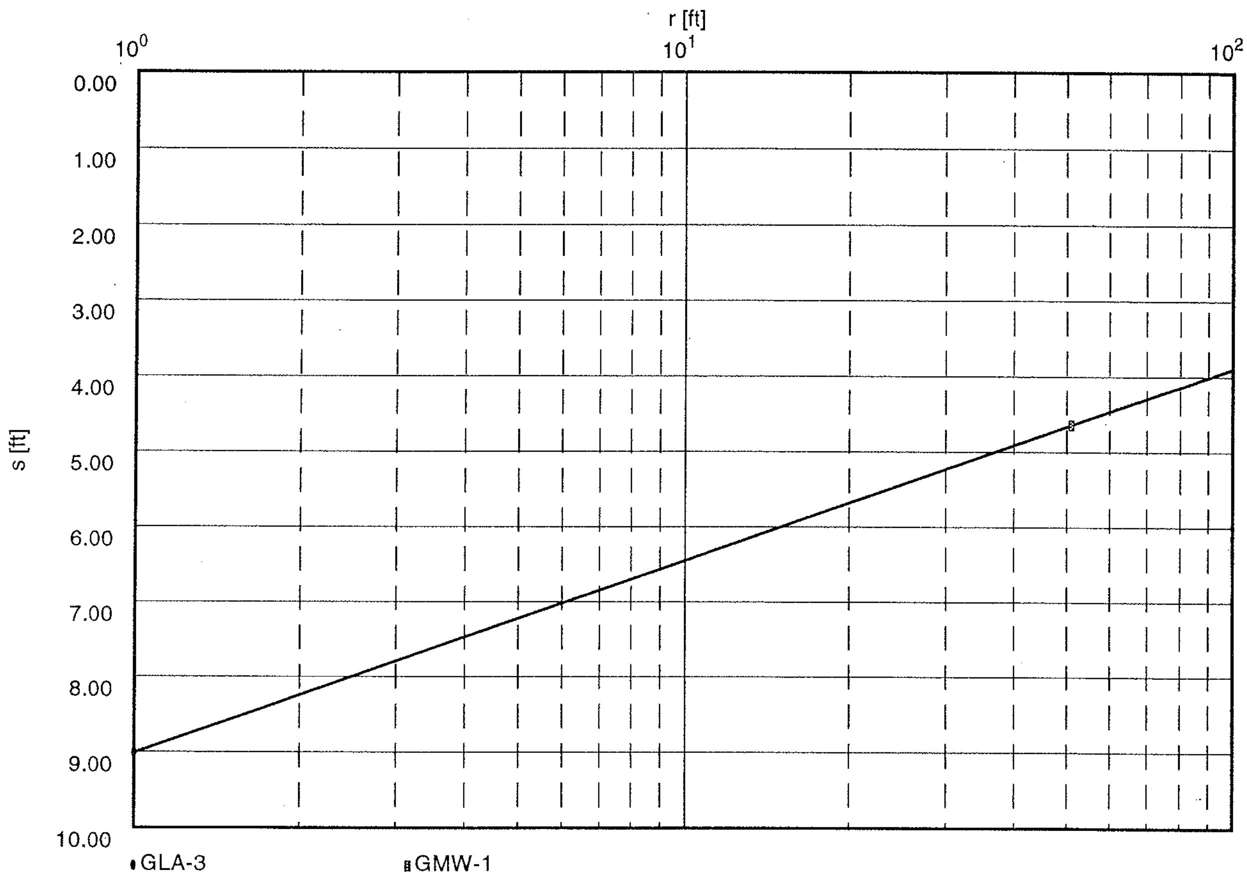
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Distance-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Pump Test	
		Evaluated by: wbl	

Pumping Test No. 1	Test conducted on: 28.11.2000
GLA-3 (pumping well)	
Discharge 10.00 U.S.gal/min	Analysis at time (t) 1600.00 min



Transmissivity [ft²/min]: 1.91×10^{-1}

Hydraulic conductivity [ft/min]: 3.18×10^{-3}

Aquifer thickness [ft]: 60.00

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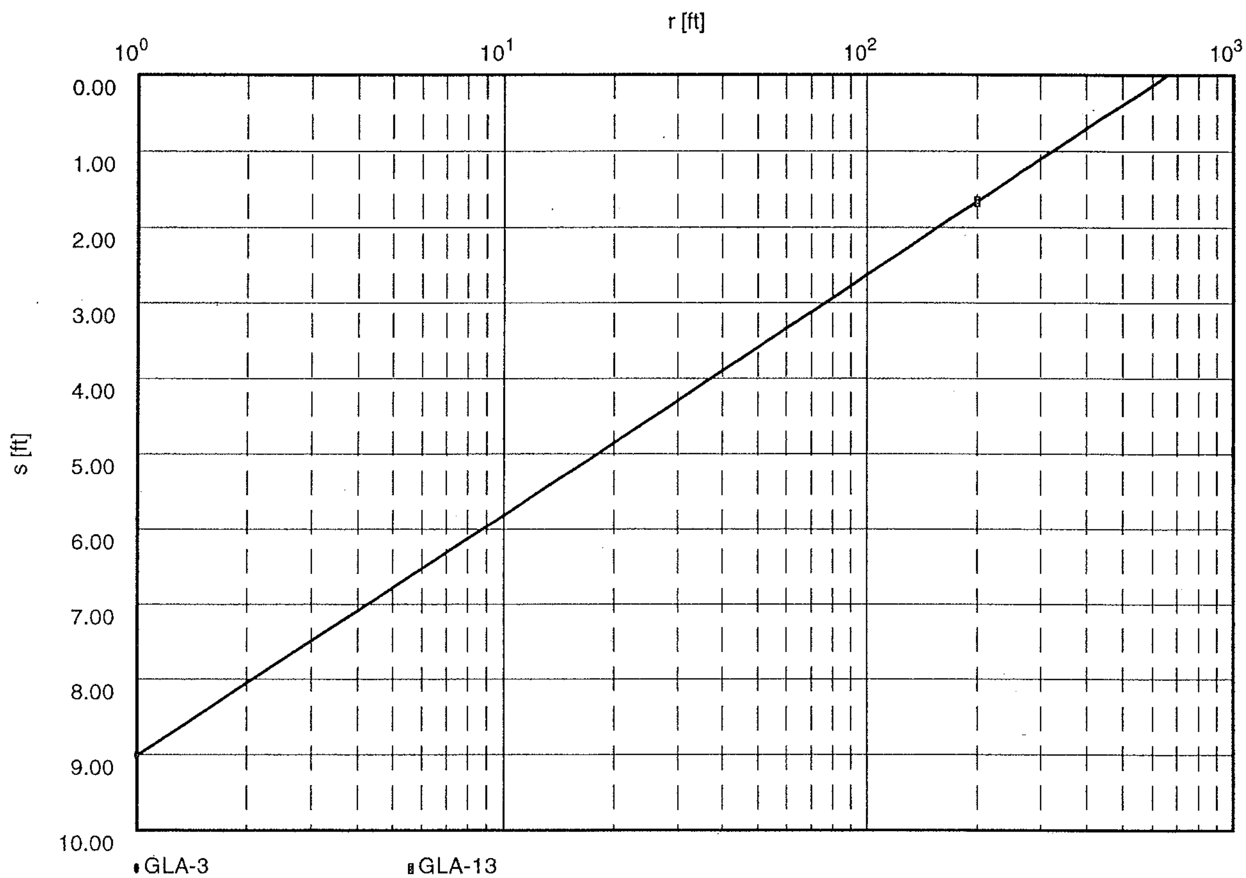
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Distance-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Pump Test	
		Evaluated by: wbl	

Pumping Test No. 1	Test conducted on: 28.11.2000
GLA-3 (pumping well)	
Discharge 10.00 U.S.gal/min	Analysis at time (t) 1600.00 min



Transmissivity [ft²/min]: 1.53×10^{-1}

Hydraulic conductivity [ft/min]: 2.55×10^{-3}

Aquifer thickness [ft]: 60.00

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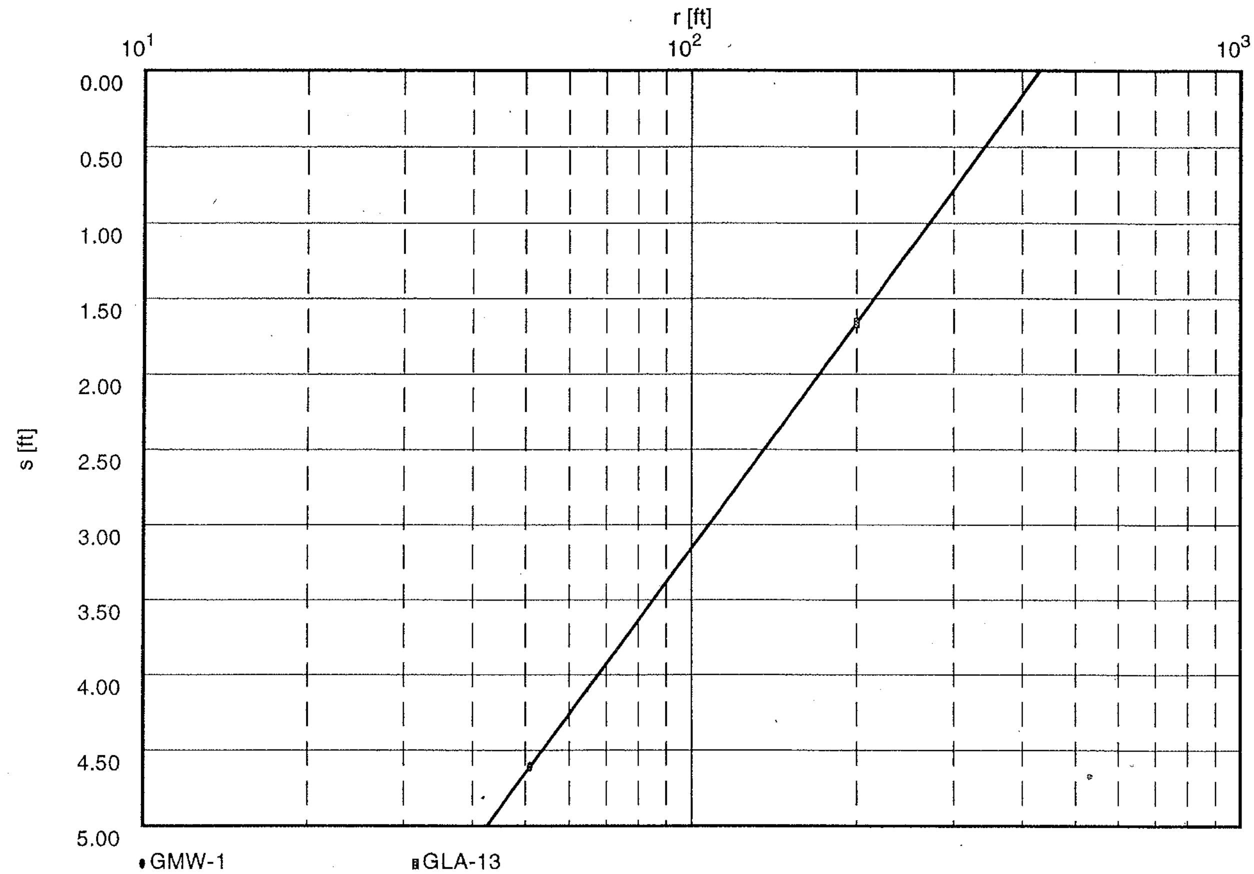
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Distance-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Pump Test	
		Evaluated by: wbl	

Pumping Test No. 1	Test conducted on: 28.11.2000
GLA-3 (pumping well)	
Discharge 10.00 U.S.gal/min	Analysis at time (t) 1600.00 min



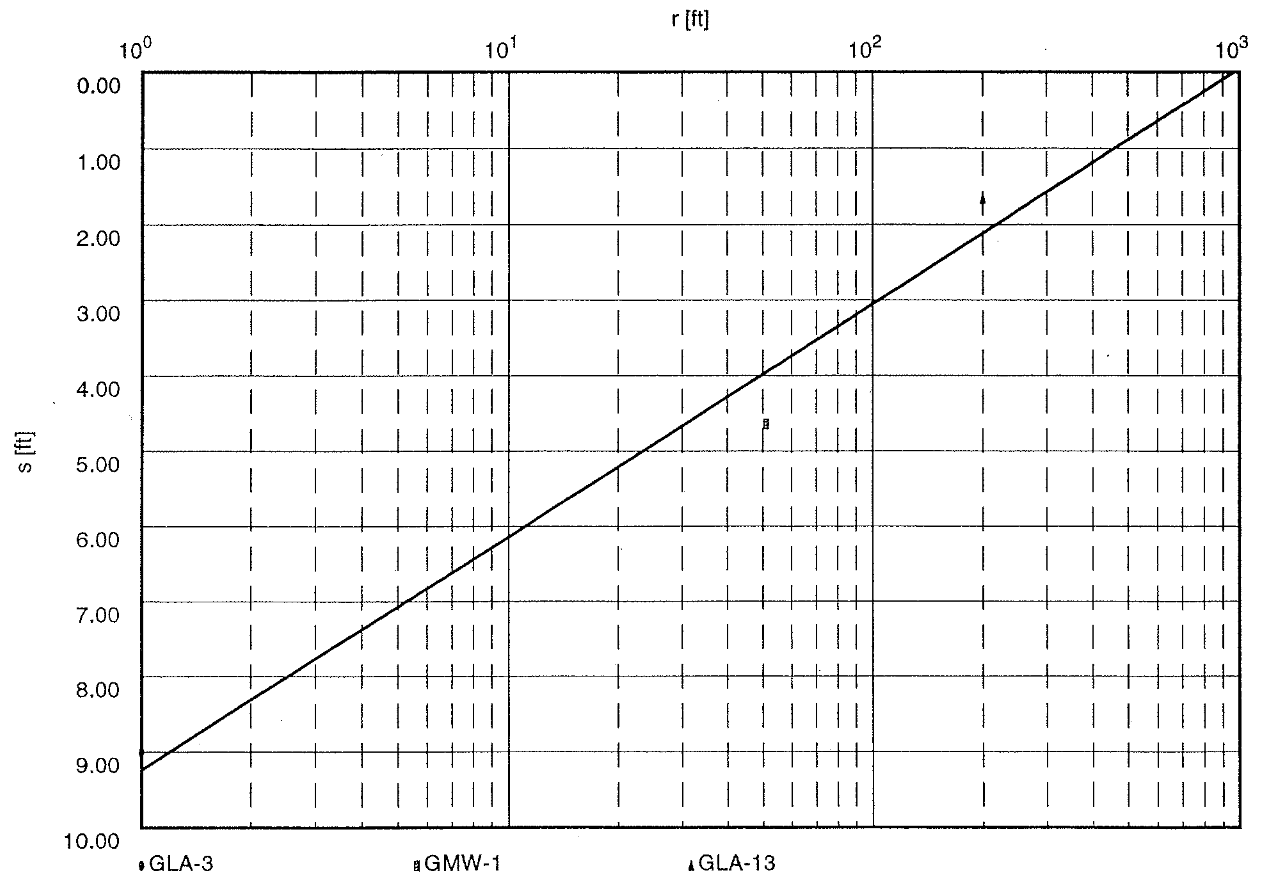
Transmissivity [ft²/min]: 9.84 x 10^{-2}

Hydraulic conductivity [ft/min]: 1.89 x 10^{-3}

Aquifer thickness [ft]: 52.00

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Distance-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Pump Test	
		Evaluated by: wbl	

Pumping Test No. 1	Test conducted on: 28.11.2000
GLA-3 (pumping well)	
Discharge 10.00 U.S.gal/min	Analysis at time (t) 1600.00 min



Transmissivity [ft²/min]: 1.58×10^{-1}

Hydraulic conductivity [ft/min]: 2.63×10^{-3}

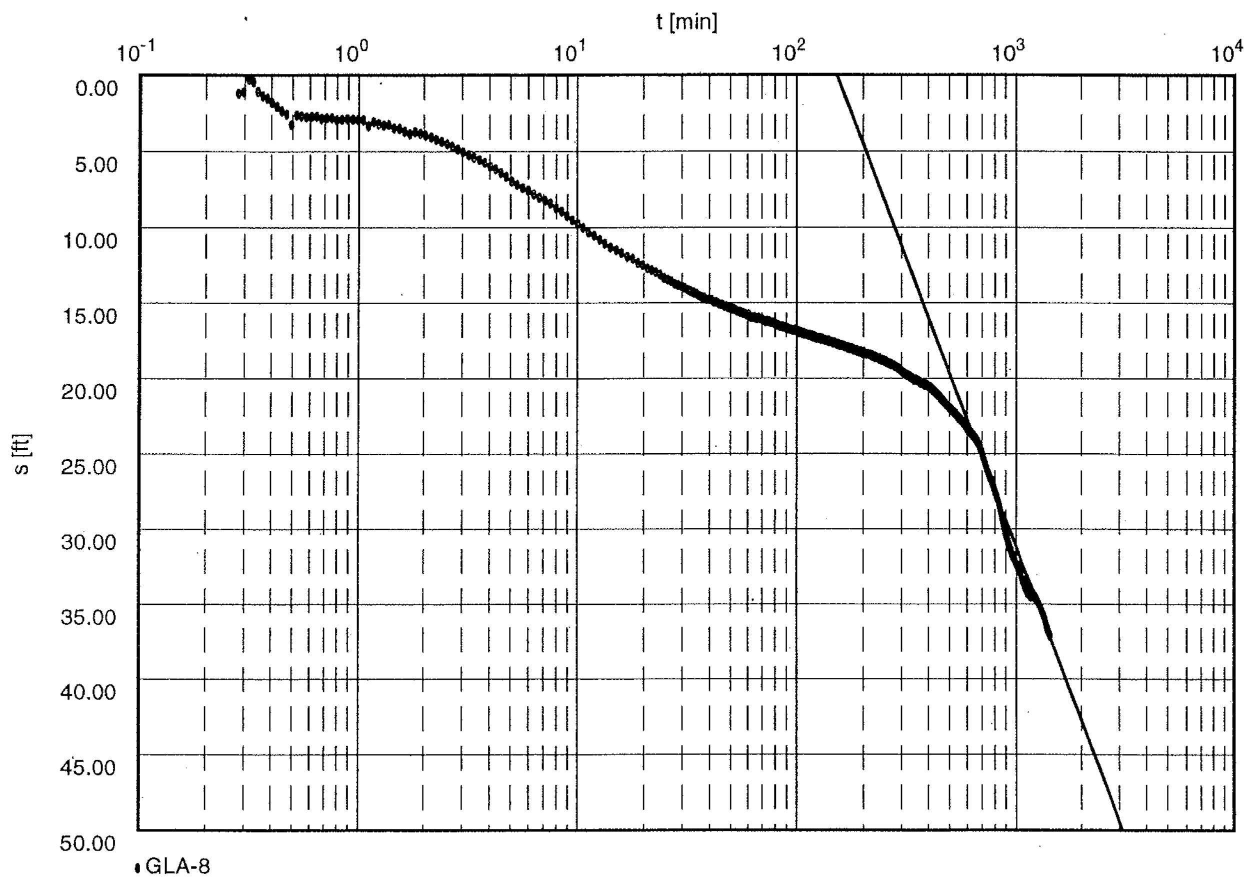
Aquifer thickness [ft]: 60.00

APPENDIX B

PUMP TEST #2 DATA

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Landfill	
		Evaluated by: wbl	

Pumping Test No. 2	Test conducted on: 29.11.2000
GLA-8 (pumping well)	
Discharge 2.00 U.S.gal/min	



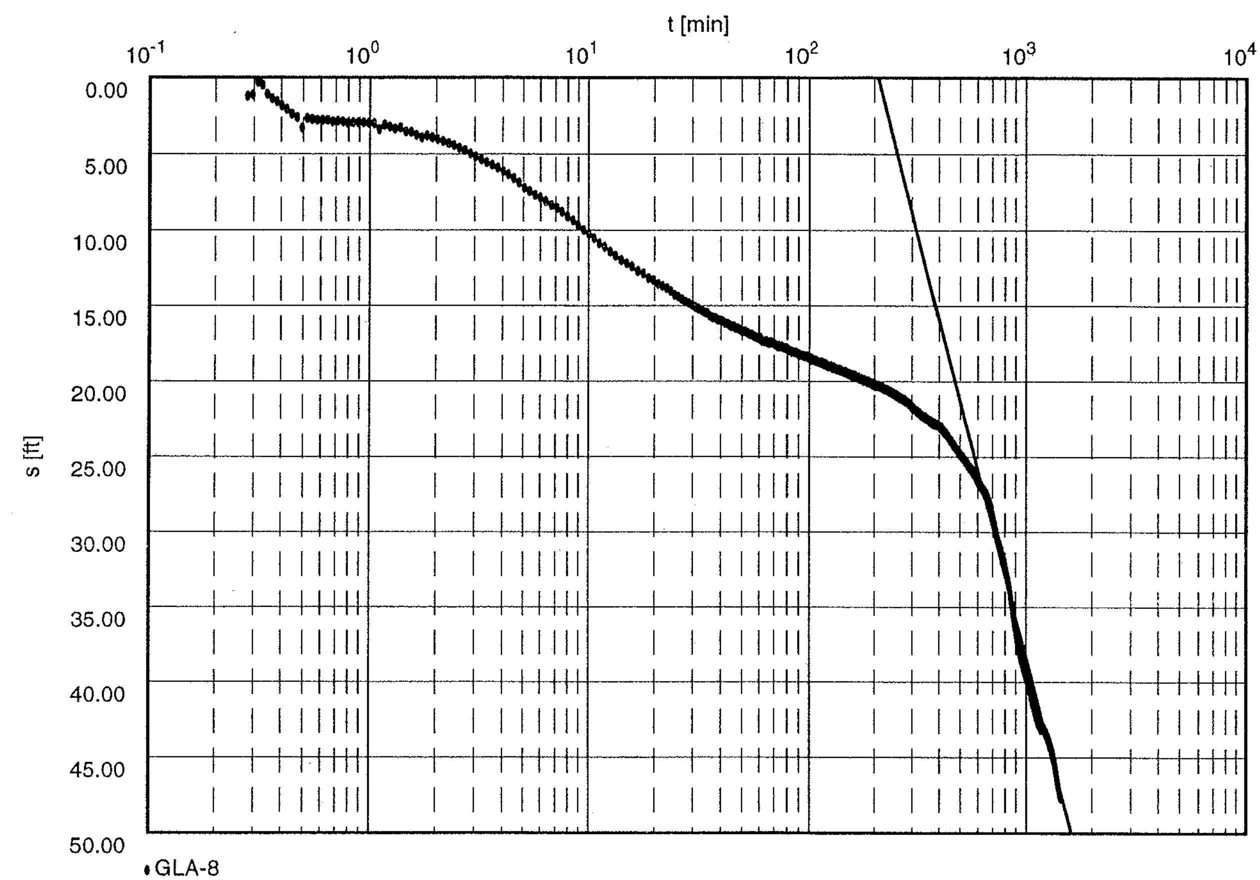
Transmissivity [ft²/min]: 1.28×10^{-3}

Hydraulic conductivity [ft/min]: 1.18×10^{-5}

Aquifer thickness [ft]: 108.00

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Landfill	
		Evaluated by: wbl	

Pumping Test No. 2	Test conducted on: 29.11.2000
GLA-8 (pumping well)	
Discharge 2.00 U.S.gal/min	

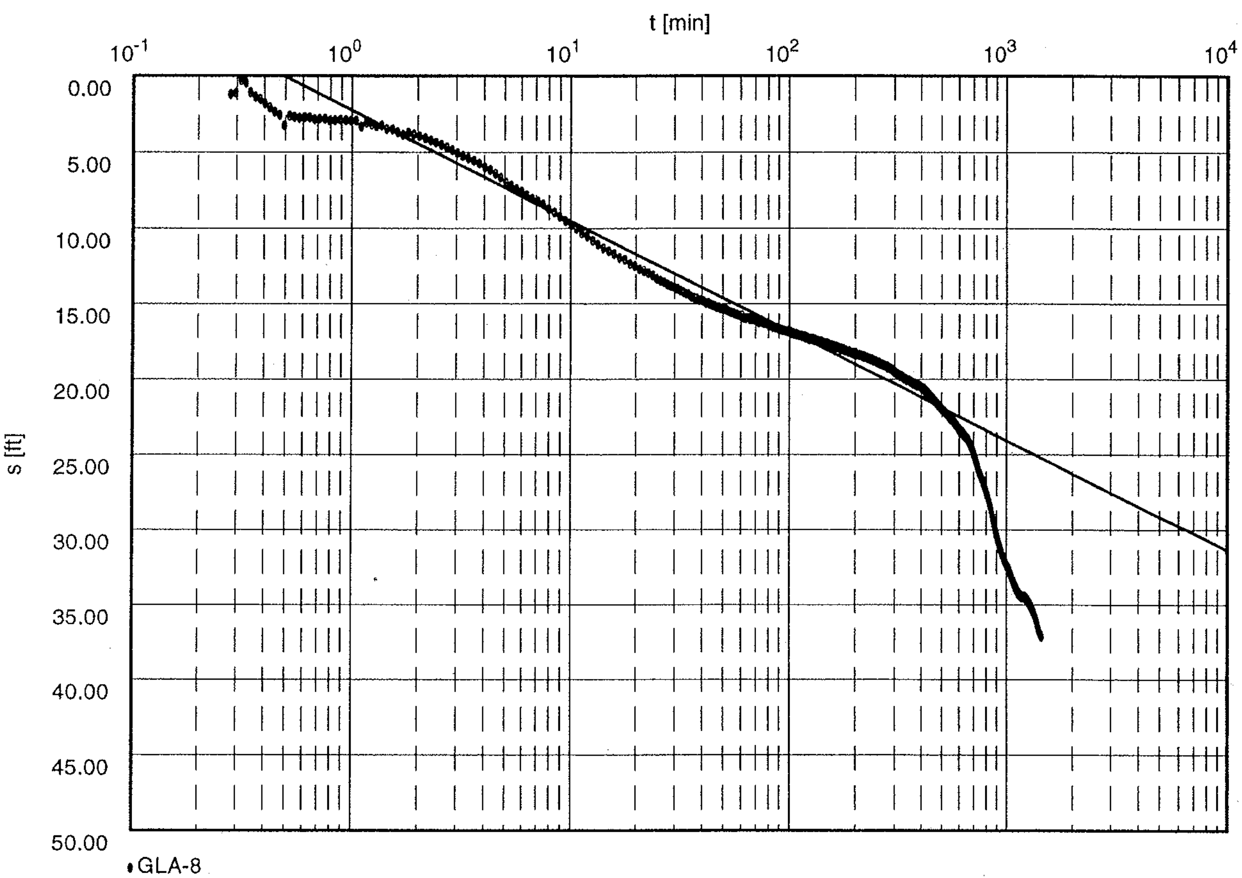


Transmissivity [ft²/min]: 8.68×10^{-4}

Storativity: 4.08×10^{-1}

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Landfill	
		Evaluated by: wbl	

Pumping Test No. 2	Test conducted on: 29.11.2000
GLA-8 (pumping well)	
Discharge 2.00 U.S.gal/min	



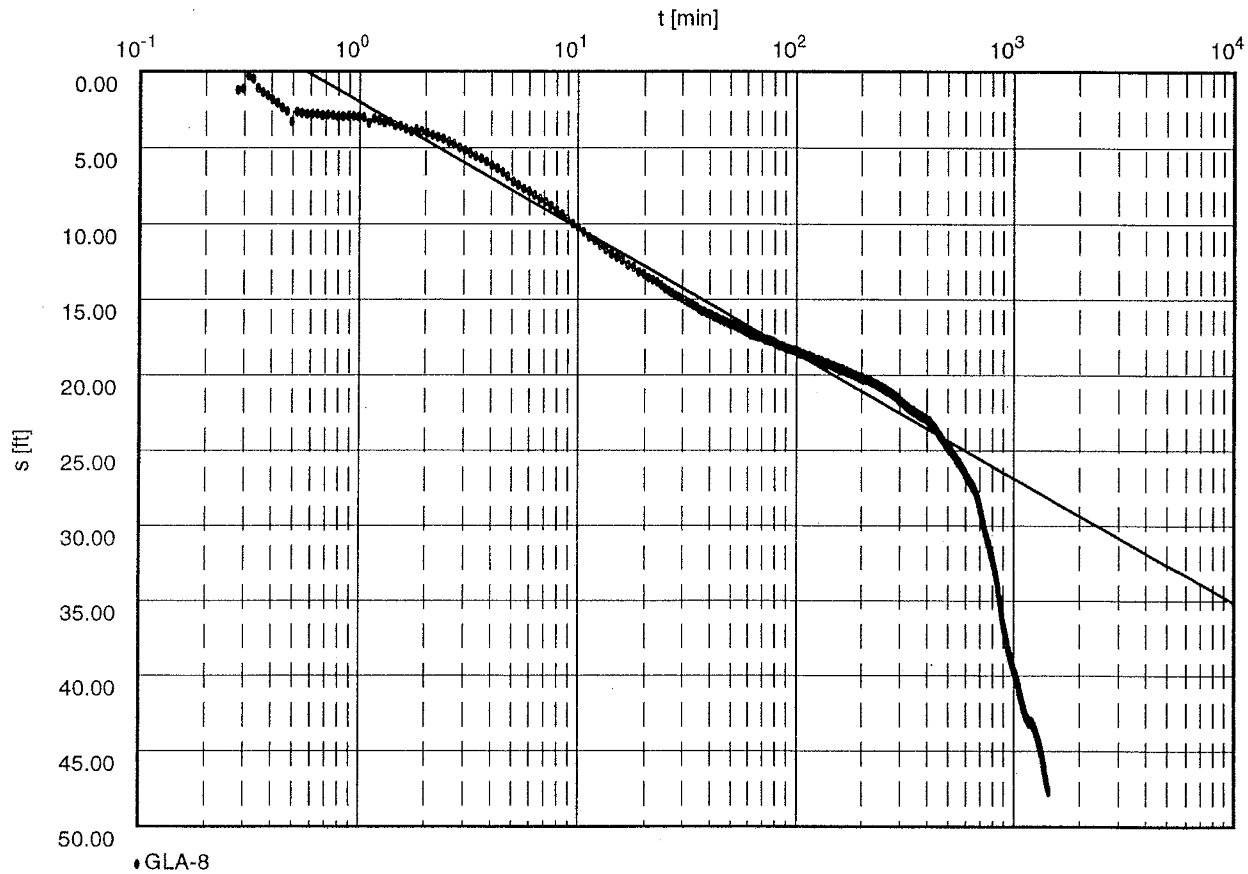
Transmissivity [ft²/min]: 6.72 x 10^{-3}

Hydraulic conductivity [ft/min]: 6.22 x 10^{-5}

Aquifer thickness [ft]: 108.00

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Landfill	
		Evaluated by: wbl	

Pumping Test No. 2	Test conducted on: 29.11.2000
GLA-8 (pumping well)	
Discharge 2.00 U.S.gal/min	



Transmissivity [ft²/min]: 5.90×10^{-3}

Storativity: 7.63×10^{-3}

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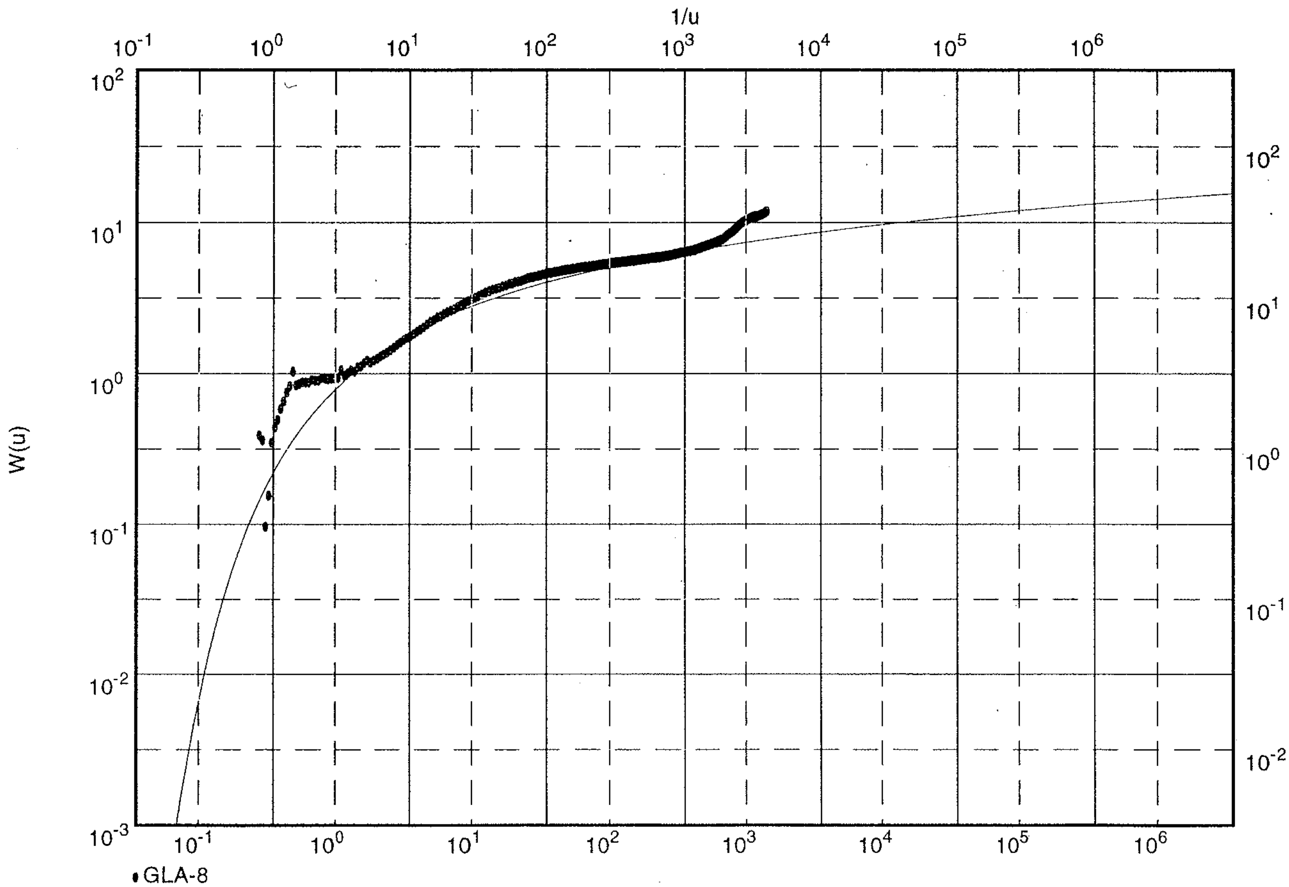
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Landfill	
		Evaluated by: wbl	

Pumping Test No. 2	Test conducted on: 29.11.2000
GLA-8 (pumping well)	
Discharge 2.00 U.S.gal/min	



Transmissivity [ft²/min]: 6.72×10^{-3}

Hydraulic conductivity [ft/min]: 6.22×10^{-5}

Aquifer thickness [ft]: 108.00

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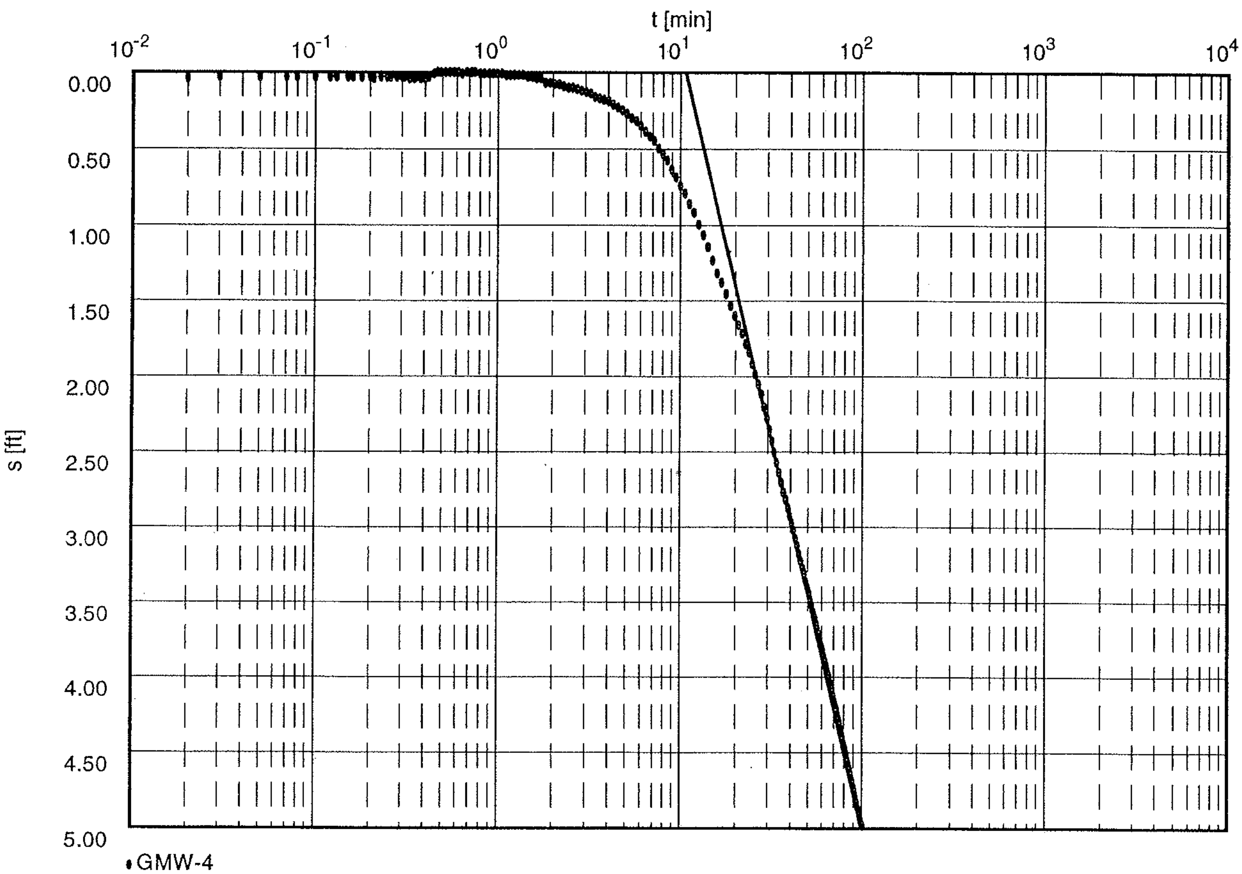
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 08.12.2000 — Page 1 Project: Gregory Canyon Pump Test Evaluated by: wbl

Pumping Test No. 2	Test conducted on: 29.11.2000
GMW-4 (observation)	
Discharge 2.00 U.S.gal/min	



Transmissivity [ft²/min]: 9.47×10^{-3}

Hydraulic conductivity [ft/min]: 2.06×10^{-4}

Aquifer thickness [ft]: 46.00

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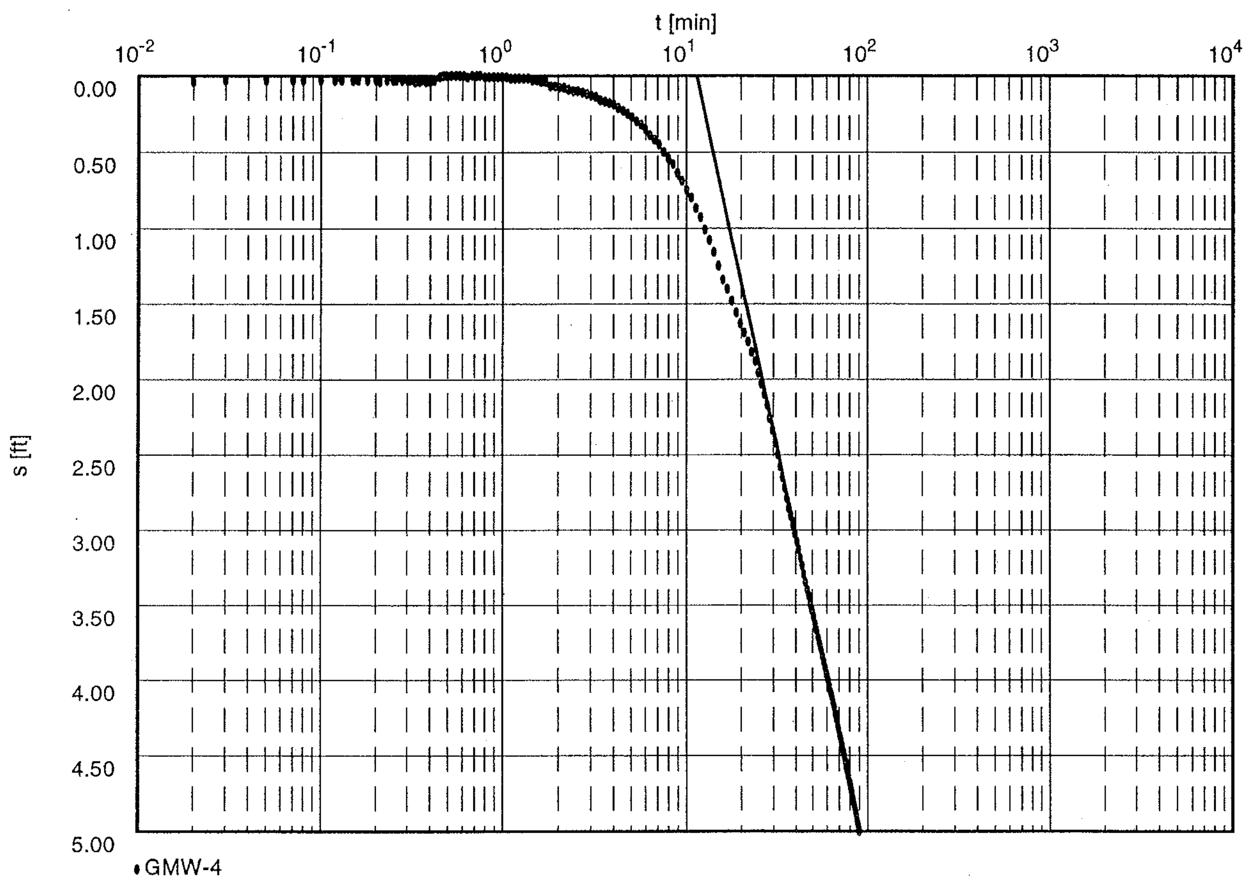
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Pump Test	
		Evaluated by: wbl	

Pumping Test No. 2	Test conducted on: 29.11.2000
GMW-4 (observation)	
Discharge 2.00 U.S.gal/min	



Transmissivity [ft²/min]: 8.84×10^{-3}

Storativity: 1.00×10^{-3}

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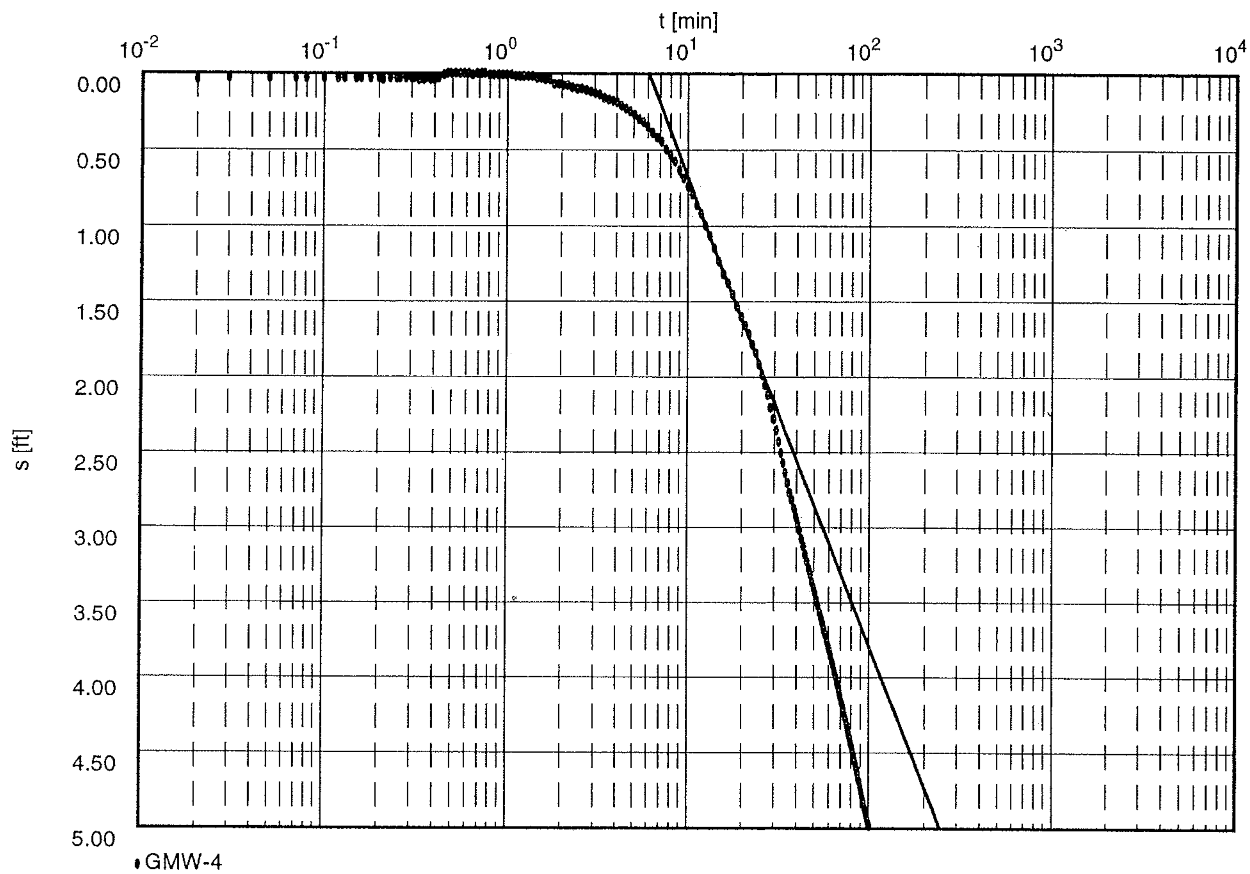
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 08.12.2000 | Page 1 Project: Gregory Canyon Pump Test Evaluated by: wbl

Pumping Test No. 2	Test conducted on: 29.11.2000
GMW-4 (observation)	
Discharge 2.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.56×10^{-2}

Hydraulic conductivity [ft/min]: 3.41×10^{-4}

Aquifer thickness [ft]: 46.00

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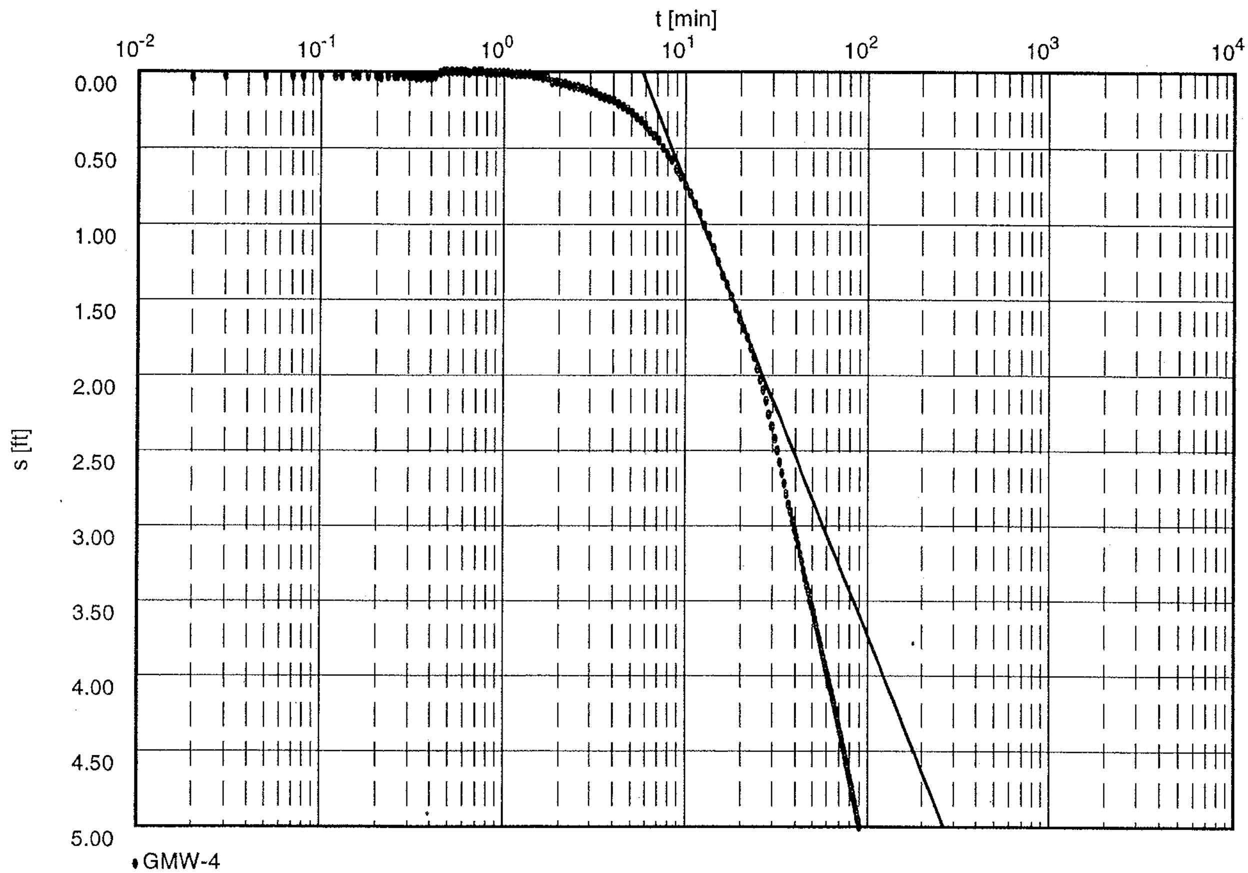
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Time-Drawdown-method after COOPER & JACOB Confined aquifer	Date: 08.12.2000	Page 1
		Project: Gregory Canyon Pump Test	
		Evaluated by: wbl	

Pumping Test No. 2	Test conducted on: 29.11.2000
GMW-4 (observation)	
Discharge 2.00 U.S.gal/min	



Transmissivity [ft²/min]: 1.62×10^{-2}

Storativity: 9.37×10^{-4}

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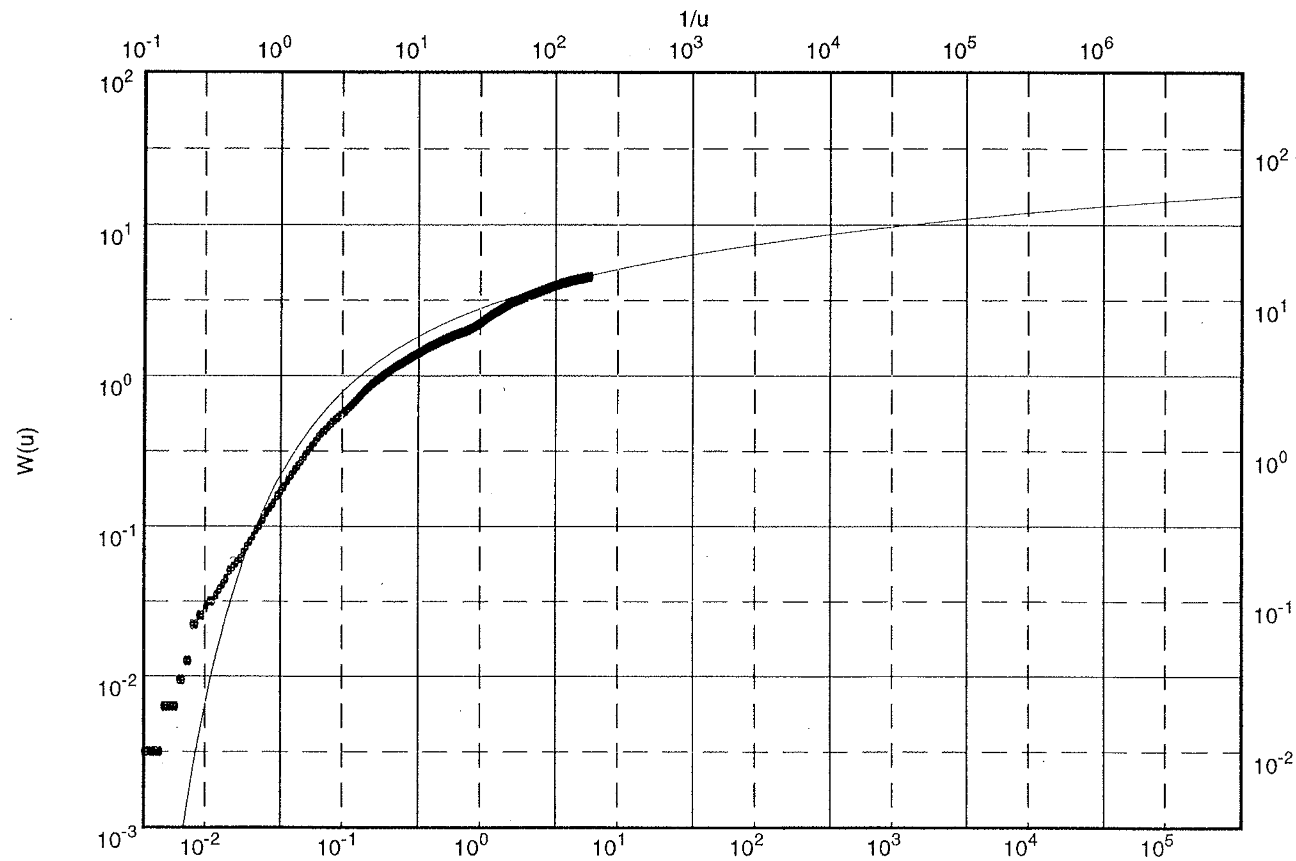
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Theis analysis method Unconfined aquifer	Date: 08.12.2000 / Page 1 Project: Gregory Canyon Pump Test Evaluated by: wbl

Pumping Test No. 2	Test conducted on: 29.11.2000
GMW-4 (observation)	
Discharge 2.00 U.S.gal/min	



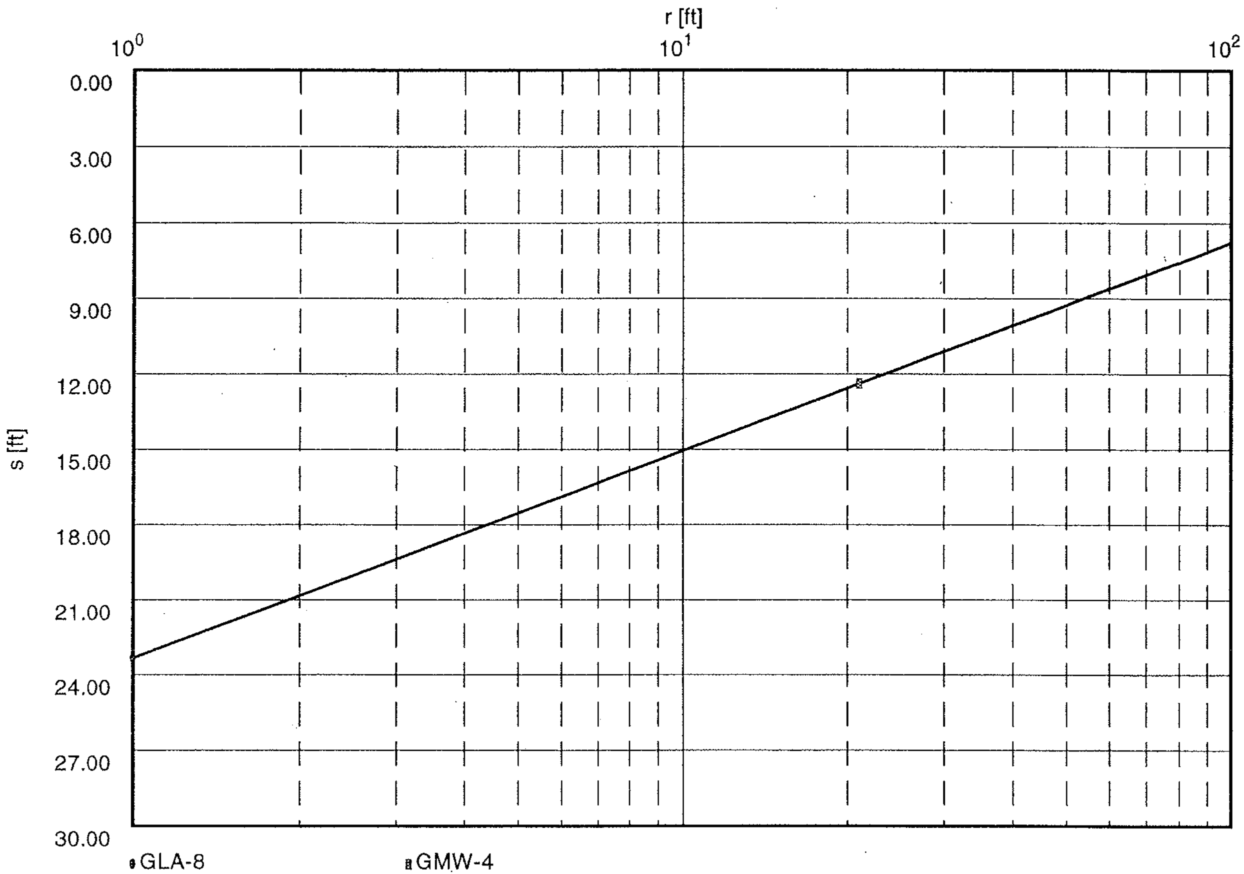
Transmissivity [ft²/min]: 6.72×10^{-3}

Hydraulic conductivity [ft/min]: 1.46×10^{-4}

Aquifer thickness [ft]: 46.00

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Distance-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 12.12.2000 — Page 1 Project: Gregory Canyon Pump Test Evaluated by: wbl

Pumping Test No. 2	Test conducted on: 11.29.2000
GLA-8 (pumping well)	
Discharge 2.00 U.S.gal/min	Analysis at time (t) 600.00 min



Transmissivity [ft²/min]: 1.18×10^{-2}

Hydraulic conductivity [ft/min]: 1.09×10^{-4}

Aquifer thickness [ft]: 108.00

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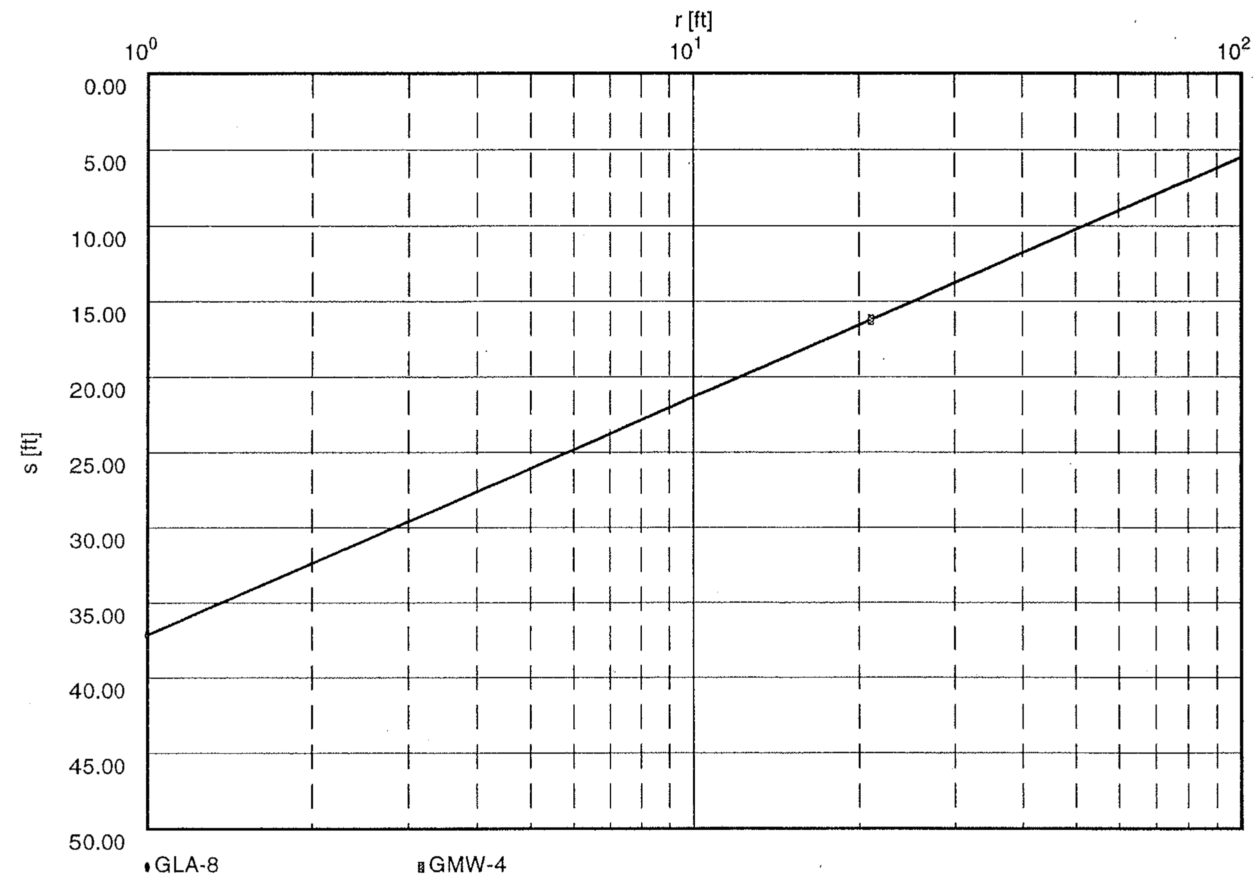
GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California (909) 860-3448	Pumping test analysis Distance-Drawdown-method after COOPER & JACOB Unconfined aquifer	Date: 12.12.2000 | Page 1 Project: Gregory Canyon Pump Test Evaluated by: wbl

Pumping Test No. 2	Test conducted on: 11.29.2000
GLA-8 (pumping well)	
Discharge 2.00 U.S.gal/min	Analysis at time (t) 1440.00 min



Transmissivity [ft²/min]: 6.18×10^{-3}

Hydraulic conductivity [ft/min]: 5.72×10^{-5}

Aquifer thickness [ft]: 108.00

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ATTACHMENT 5

RESULTS OF THE STABILITY ANALYSES

BASE LINER CALCULATIONS

GREGORY CANYON LANDFILL

SEISMIC INDUCED PERMANENT DISPLACEMENT EVALUATION-BASE LINER CROSS-SECTION A-A'

PROCEDURE USED- Bray and Rathje (1998) and Bray et al (1998)

INPUT DATA:

SITE CONDITION- ROCK SITE
FILL HEIGHT, H - 300 ft.
AVERAGE SHEAR WAVE VELOCITY FOR FILL, V_s - 1200 ft/sec
EARTHQUAKE MAGNITUDE for the MCE - 7.1 (on the Elsinore-Julian Segment at ~6 miles)
MAXIMUM HORIZONTAL SITE ACCELERATION, MHA. –0.40g (mean value for the MCE for the Site)

SIGNIFICANT DURATION – $D_{5\text{-}95}$ - ~16 Sec. (for the MPE, Bray et al, 1998)

YIELD ACCELERATION, k_y - 0.10g (from pseudo-static analysis)

CALCULATION:

MEAN PERIOD OF SHAKING, for the MCE $T_m = 0.52$ Sec. (Bray et al ,1998),

PREDOMINANT PERIOD OF FILL- $T_s = 4H/V_s$
$= 4x300/1200 = 1.0$ sec

RATIO $T_S/T_m = 1.0/0.52 = 1.92$

RATIO MHEA/MHA x NRF = 0.32 (from Bray and Rathje (1998), Figure 7b for rock site)

Where- MHEA- Maximum Horizontal Equivalent Acceleration of the fill
MHA - Maximum Horizontal Site Acceleration
NRF - Nonlinear Response Factor = 1.0

Thus, MHEA = 0.32 x MHA x 1.0

= 0.32x 0.40g = 0.13g
or, $k_{max} = 0.13$

Ratio $k_y / k_{max} = 0.10/0.13 = 0.77$

From Figure 11 of Bray and Rathje (1998): $U/(k_{max} D_{5\text{-}95}) = 0.15$ cm/sec

Or, Displacement, U = 0.15 x 0.13 x. 16 = 0.3 cm (0.1 inches)

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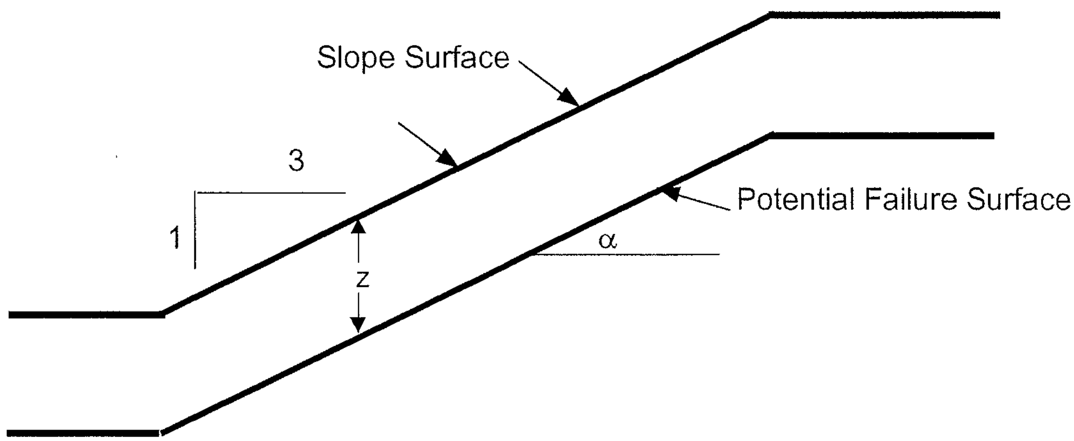
FINAL COVER CALCULATIONS

COVER SLOPE STABILITY ANALYSIS- INFINITE SLOPE

Gregory Canyon Landfill



Data:

Cover Thickness:	$Z =$	2	ft
Cover Soil Density:	$\gamma =$	100	pcf
Soil/Interface Layer Properties:	$c =$	0	psf
	$\phi =$	27	degrees
Slope Angle (3:1, H:V)	$\alpha =$	18.4	degrees
Assumes slope is drained			
Fill Slope			

1). Static Factor of Safety $= \dfrac{\tan\phi}{\tan\alpha} + \dfrac{2c}{\gamma Z \sin 2\alpha} =$ **1.53**

2). Pseudo-static Factor of Safety $= \dfrac{(1-k\tan\alpha)\tan\phi}{k+\tan\alpha} + \dfrac{c}{\gamma Z(\cos^2\alpha)(k+\tan\alpha)}$

Solve for Factor of Safety = 1.0:

Yield Acceleration = k	Pseudo-Static Factor of Safety
0.15 g	**1.00**

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Cover Component Stability Analysis, 40' high slopes with benches @3.5:1
Gregory Canyon Landfill, San Diego County, CA

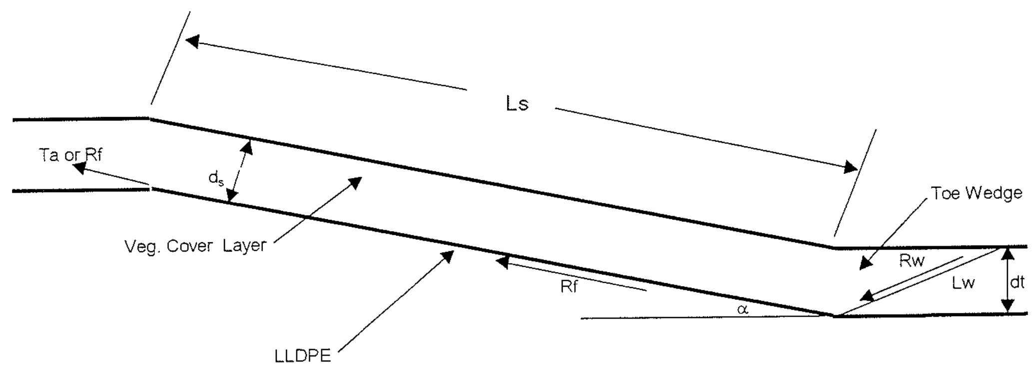
Shear Strength Parameters				Slope Parameters					Toe Parameters			Computed Forces / Unit Width				Geosynthetics			FACTOR OF SAFETY
Soil			Interface				Slope Cover		Soil Thickness		Wedge	Driving	Resisting						
														Geosynthetic					
Sat. Unit Wt.	Int. Friction Angle	Passive Crit. Failure Angle	Friction Angle(1)	Slope Ratio (H:1V)	Slope Inclin.	Soil Thickness	Vert. Ht.	Slope Length	Total	Ave.	Fail. Length	Soil Load	Toe Soil Wedge	Interface Friction	Tensile Demand	Ultimate Tensile Strength (2)	Assigned Safety Factor	Allowable Tensile Strength	
γ_s	ϕ	$\phi_{CR} = 45 - \phi/2$	δ	Z	α	d_s	H_v	$L_s = H_v / SIN\ \alpha$	d_T	$d_a = (2/3)\ d_T$	$L_w = d_T / SIN\phi_{CR}$	$D_s = \gamma_s d_s L_s SIN\alpha$	$R_w = \gamma_s d_a L_w COS\phi_{CR} Tan\phi$	$R_F = \gamma_s d_s L_s COS\alpha Tan\delta$	For FS 1.5; $R_T = 1.5^*D_s - R_w - R_f$	T_u	Sfa	$T_A = T_u / SF_A$	$FS = (R_w + R_f + T_A) / D_s$
(pcf)	(deg)	(deg)	(deg)	(ft)	(deg)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(#/ft)	(#/ft)	(#/ft)	(#/ft)	(#/ft)		(#/ft)	
40' high slope between benches @3.0:1 i																			
Vegetative cover/Textured LLDPE Geomembrane																			
100	32	29	27	3	18.40	2	40	126.8	2	1.3	4.13	8000	293.1	12252.9	-546.0	1080	1.1	982	1.69

Notes:
(1) Friction data courtesy of Serrot International, Inc. as presented in "Static and Dynamic Stability Analysis Report, Phase V-D Expansion, Frank R. Bowerman Landfill, Irvine, CA", by IT Corporation, PN 779606, dated May 2001.
(2) Tensile strength from textured LLDPE Geomembrane by Poly-Flex, Inc.

Conditions:
40' high slope between benches @3.0:1 inclination

Cover Profile

24" of Vegetative Cover
60 mil, Textured LLDPE Geomembrane



C:\2001-082\Table 3 - Covercalc40'hl@3.0_1Textured.xls\11/13/2003

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(Continued)
Cover Component Stability Analysis, Gregory Canyon Landfill, San Diego County, CA

Interface Friction Angle δ	Slope Inclination α	Geogrid/ Geonet Tensile Strength, T_u* lbs/ft	Yield Acceleration K_y*	Calculated Displacement (inches)
Vegetative cover/Textured LLDPE Geomembrane				
27	18.40	982	0.185	3/4 to 4-1/2 inches

Case:
40' high slope between benches @3.0:1 inclinatio

Vegetative cover/Textured LLDPE Geomembrane		
Ls	126.79	
Ky=	**0.185**	g
Geogrid Tensile strength	982	lbs/ft
FS**=	**1.00**	
Ls	126.79	
Ky=	**0.15**	g
Geogrid Tensile strength	982	lbs/ft
FS**=	**1.01**	**Pseudo-static**

Notes:
*Solve for T_u and K_y when FS=1.00

$$**FS= \frac{((\gamma_s \delta_s L_s \cos\alpha)-(K_y \gamma_s \delta_s L_s \sin\alpha))(\tan\delta)+T_u}{(\gamma_s \delta_s L_s \sin\alpha + K_y \gamma_s \delta_s L_s \cos\alpha)}$$

**Equation adapted from Kramer, 1996, Geotechnical Earthquake Engineering, pg 434
Variables defined on previous page

SEISMIC INDUCED PERMANENT DISPLACEMENT EVALUATION-COVER GREGORY CANYON LANDFILL

PROCEDURE USED- Bray and Rathje (1998) and Bray et al (1998)

INPUT DATA:

SITE CONDITION- ROCK SITE

FILL HEIGHT, H, feet	100'	200'	300'	400'	500'
SHEAR WAVE VELOCITY, V_s, ft/sec	650	800	900	1000	1100

(from Bray, et al., (1998), Figure 3)

EARTHQUAKE MAGNITUDE for the MCE: 7.1 (on the Elsinore-Julian Segment at ~6 mi.)

MAXIMUM HORIZONTAL SITE ACCELERATION, k_{max} — 0.40g (mean value for the MCE for the Site)

SIGNIFICANT DURATION – D_{5-95} — ~16 Sec. (for the MPE, Bray et al, 1998)

YIELD ACCELERATION, k_y — 0.185g (from pseudo-static analysis for cover component, Table 3)

CALCULATION:

MEAN PERIOD OF SHAKING, for the MCE: $T_m = 0.52$ Sec. (Bray et al ,1998)

FILL HEIGHT, H, feet	100'	200'	300'	400'	500'
PREDOMINANT FILL PERIOD, T_s, sec ($T_s = 2.4H/V_s$)	0.37	0.60	0.80	0.96	1.09
RATIO T_s/T_m =	0.71	1.15	1.54	1.85	2.10
RATIO MHEA/MHA x NRF =	1.2	0.96	0.83	0.80	0.76

(from Bray and Rathje (1998), Figure 8b for rock site)

Where- MHEA- Maximum Horizontal Equivalent Acceleration of the fill = k_{max}
MHA - Maximum Horizontal Site Acceleration
NRF - Nonlinear Response Factor = 1.0

Thus, calculate:

FILL HEIGHT, H, feet	100'	200'	300'	400'	500'
MHEA (or k_{max}):	0.48	0.38	0.33	0.32	0.30
Ratio of k_y/k_{max} =	0.39	0.49	0.56	0.58	0.62

Calculate Displacement, U, from Figure 13 of Bray and Rathje (1998):

FILL HEIGHT, H, feet	100'	200'	300'	400'	500'
DISPLACEMENT, U, inches:	**3.7"**	**1.8"**	**1.0"**	**0.8"**	**0.5"**

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SEISMIC INDUCED PERMANENT DISPLACEMENT EVALUATION-COVER GREGORY CANYON LANDFILL

PROCEDURE USED - Makdisi and Seed (1978)

INPUT DATA:

SITE CONDITION- ROCK SITE

FILL HEIGHT, H, feet	100'	200'	300'	400'	500'
SHEAR WAVE VELOCITY, V_s, ft/sec	650	800	900	1000	1100
(from Bray, et al., (1998), Figure 3)					

EARTHQUAKE MAGNITUDE for the MCE: 7.1 (on the Elsinore-Julian Segment at ~6 mi.)

MAXIMUM HORIZONTAL SITE ACCELERATION, k_{max} — 0.40g (mean value for the MCE for the Site)

SIGNIFICANT DURATION – D_{5-95} — ~16 Sec. (for the MPE, Bray et al, 1998)

YIELD ACCELERATION, k_y — 0.185g (from pseudo-static analysis for cover component, Table 3)

CALCULATION:

FILL HEIGHT, H, feet	100'	200'	300'	400'	500'
PREDOMINANT FILL PERIOD, T_s, sec	0.37	0.60	0.80	0.96	1.09
($T_s = 2.4H/V_s$)					

RATIO $k_y/k_{max} = 0.185/0.40 = 0.46$

From Figure 11b, Makdisi and Seed (1978), for k_y/k_{max}=0.46, Displacement, U/k_{max} g T=0.03

Therefore, Displacement U= 0.03(k_{max} g T_s)

U = 0.03sec (0.40g) (32.2 ft/sec^2) (T_s, sec)

FILL HEIGHT, H, feet	100'	200'	300'	400'	500'
CALCULATED DISPLACEMENT, U	**1.7"**	**2.3"**	**3.7"**	**4.5"**	**5.1"**

ATTACHMENT 6

LEACHATE GENERATION DATA

(SEE ATTACHMENT 3 FOR CD)

APPENDIX C-1

SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION REPORT

SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION REPORT

GREGORY CANYON LANDFILL
SAN DIEGO, CALIFORNIA

OCTOBER 2004

PREPARED FOR:

Gregory Canyon, Ltd.
3 Embarcadero Center, Suite 2360
San Francisco, California 94111

PREPARED BY:

GeoLogic Associates
16885 West Bernardo Drive, Suite 305
San Diego, California 92127

4/02

SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION REPORT
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY

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SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION REPORT
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

1.0 INTRODUCTION

This report documents the installation and testing of additional groundwater monitoring wells at the proposed Gregory Canyon Landfill (GCLF) site located in northern San Diego County, California (Figure 1). GeoLogic Associates (GLA) completed the work on behalf of Gregory Canyon Limited in response to comments from the Regional Water Quality Control Board – San Diego Region (RWQCB) on the Joint Technical Document (JTD) for discharge of municipal solid waste at the proposed GCLF site submitted on April 9, 2004. In a letter dated May 28, 2004, the RWQCB noted that the following components were missing from the JTD.

1. Documentation for installation of additional groundwater monitoring wells.
2. Results of aquifer pump tests of the proposed groundwater monitoring network.
3. An acceptable demonstration that the proposed monitoring network will be able to provide the earliest detection of a release of waste constituents to groundwater from the proposed solid waste management unit at Gregory Canyon.

Project work was performed to supplement the Geologic, Hydrogeologic, and Geotechnical Investigations Report (GLA, May 2003), and to address the concerns listed above by the RWQCB. Site background information is provided in the GLA (May, 2003) report.

Well installation and testing project was completed between June and August 2004 under the supervision of a geologist registered in the State of California, and in general accordance with the well installation specifications developed by GLA for the Gregory Canyon Landfill project. The project's scope of work involved the following activities:

- Drilling and geologic logging of 11 exploratory borings using hollow-stem auger and air rotary casing hammer (ARCH) techniques;
- Logging of each bedrock boring using borehole geophysics;
- Installation of nine groundwater monitoring wells;
- Well modifications to grout up the lower portions of two open hole wells;
- Conducting aquifer testing including variable-rate, constant-rate, and slug tests;
- Evaluation of the site groundwater environment and proposed groundwater monitoring network primarily along the point of compliance;
- Preparation of this report.

Each of the field activities are described in Section 2.0 below followed by presentation of our interpretation of the field data in Section 3.0, a discussion and interpretation of the data relative to the site itself in Section 4.0 and a summary of conclusions developed from this hydrogeologic investigation in Section 5.0.

2.0 SITE ACTIVITIES

Based on discussions with RWQCB staff, GLA selected 11 locations for exploratory drilling and subsequently constructed groundwater monitoring wells in nine of these borings (Figure 2). In addition, at the request of the RWQCB, two existing wells (GLA-2 and GLA-10) were modified to include grouting up the lower portion of their open hole construction. A summary of the drilling and well construction program is summarized on Table 1. GLA supervised the drilling and monitoring well installation work from June 3 through July 22, 2004, and aquifer pumping tests were subsequently completed through August 30, 2004. Prior to mobilization, permits for well drilling and construction were obtained from the County of San Diego Department of Environmental Health. GLA met with the URS Corporation (project biologist) at Gregory Canyon on May 24, 2004 to also review the proposed drilling locations for potential biological concerns. All excavations (access roads, drill pads, and borings) were subsequently monitored by SWCA Environmental Consultants (project archeologists) for archeological artifacts that might be exposed during excavation or drilling.

2.1 DRILLING PROGRAM

Alluvial borings (Lucio-2R and SLRMWD #34R) were drilled using a CME-95 hollow-stem auger (HSA) drilling rig to excavate 8-inch nominal diameter borings. The remaining nine bedrock borings were drilled using a Speed Star-30K ARCH drilling rig to excavate 8.5-inch-diameter borings. All drilling was performed by Water Development Corporation (WDC), a California-licensed well drilling company. During drilling, grab samples were collected at regular intervals from the drill cuttings for logging of subsurface conditions. Upon retrieval, the soil samples were logged and the following items were recorded on boring logs:

- Color;
- Soil type or rock type;
- Grain size;
- Rock hardness;
- Presence of potential marker beds;
- Presence of groundwater;
- Degree of weathering or alteration;
- Unified Soil Classification; and
- Other pertinent observations.

The boring logs are provided in Attachment A. During drilling six mil-thick plastic sheeting was used to protect the ground surface near work areas. Upon completion of drilling at each location, the drilling equipment and surplus materials were removed from the site.

After reaching target depth, each bedrock boring was also logged using borehole geophysics. Geophysical logging was completed by COLOG and as described in Section 2.3.

2.1.1 Exploratory Borings

Although proposed groundwater monitoring wells GLA-3S and GLA-17 were drilled to their target depths of 80 and 500 feet below ground surface (bgs), these wells were not completed as groundwater monitoring wells. Proposed groundwater monitoring well GLA-3S was to be screened across both the saturated alluvium and bedrock above the producing zone identified in well GLA-3. However, first groundwater was encountered within the bedrock at a depth of 52 feet bgs, 16 feet below the alluvium/bedrock contact. The static water level was measured at 24 feet bgs, defining the potentiometric surface in the bedrock fracture flow system. Since completing well GLA-3S would only duplicate the groundwater monitoring capability already provided by existing wells GLA-3 and GMW-1, the borehole was abandoned following completion of borehole geophysics. Well GLA-17 was proposed to monitor groundwater along the northwestern ridge of Gregory Canyon (Plate 1), however the borehole was drilled to a total depth of 500 feet bgs and remained dry. Therefore, the borehole was abandoned following completion of borehole geophysics. Previous wells drilled on the western ridge (GMP-3 and GLA-9) were also found to be dry, or recharged only by perched water (e.g., GLA-4), suggesting that the western (tonalite) ridge of Gregory Canyon may act as a groundwater barrier.

2.1.2 Groundwater Well Modifications

At the request of the RWQCB, the bottom of two open borehole wells, GLA-10 and GLA-2, were sealed using a cement/bentonite grout slurry (Plate 2). The grout consisted of a mixture of neat, Type II (Portland) cement and bentonite powder. The bentonite was added at a rate of approximately 5% by dry weight of cement. The grout was thoroughly mixed in small batches using pressure nozzles to circulate the mixture. Water was added at a rate of approximately 10 gallons per sack of cement. The grout seal was placed using tremmie pipe and positive displacement techniques to fill the borehole annulus under pressure to the ground surface. Since well GLA-10 is a designated water level measuring station only, it was sealed to a depth of 57 feet bgs and will remain as an open hole across the bedrock section of the well. Well GLA-2, which will be included as a site groundwater monitoring well, was sealed to a depth of 103 feet bgs, and was subsequently reamed to 8.5-inches to the depth of 104 feet bgs to facilitate construction of a cased well.

2.2 MONITORING WELL CONSTRUCTION

Monitoring wells were designed and constructed in accordance with the project specifications. Well construction summary diagrams showing well construction details along with the boring logs are presented in Attachment A and summarized in Table 1.

As detailed in Attachment A, seven bedrock monitoring wells (and one well [GLA-2] that was modified) were constructed using factory-sealed, flush-threaded, 4-inch diameter schedule 40 PVC, and two alluvial wells were constructed with factory-sealed, flush threaded 2-inch diameter schedule 40 PVC casing. The wells were constructed with 20- to 50-foot-long well screens with 0.020-inch-wide, factory-milled slots. Stainless steel centralizers were placed at the top and bottom of the screen and at 40-foot intervals.

Commercial washed and graded Monterey-type sand filter pack was placed in the annular space between the borehole wall and the well screen. GLA selected #3 sand (in combination with 0.020-inch screen slots) for use as well "filter pack." During installation, the depth to the top of the filter pack was measured periodically to verify the volume of sand in the well annulus. Filter pack sands were placed from the bottom of the boreholes to approximately 2 feet above the top of the well screen. The wells were then pre-developed by surging to settle the filter pack. Following pre-development, additional sand was placed in the annulus, as necessary, to maintain at least 2 feet of separation between the top of screen and the top of the filter pack.

A minimum 4-foot-thick layer of bentonite chips was placed in the annulus above the sand filter pack to isolate the upper grout slurry seal from the well screen section. Medium-sized bentonite chips were placed directly on top of filter pack sands. These materials were wetted (if necessary), and allowed to hydrate for not less than 60 minutes. If the bentonite seal was higher in elevation than the static water level in the well, the bentonite chips were hydrated with approximately 10 gallons of water per foot of chips. Following hydration, the depth to the top of the seal was measured to verify conformance with well design.

Following bentonite seal placement, the remainder of the annular space between the well casing and borehole wall was sealed using a cement/bentonite grout slurry. The grout consisted of a mixture of neat, Type II/V (Portland) cement and bentonite powder. The bentonite was added at a rate of approximately 5% by dry weight of cement. The grout was thoroughly mixed in small batches using pressure nozzles to circulate the mixture. Water was added at a rate of approximately 10 gallons per sack of cement. The grout seal was placed using tremie pipe and positive displacement techniques to fill the borehole annulus under pressure to 3 feet bgs.

Each monitoring well was completed with the addition of concrete from the top of the grout to the surface and a protective surface completion. A 5-foot long, 10-inch-diameter, lockable steel stand pipe with a hinged lid was embedded in a 5-foot by 5-foot square, minimum 4-inch-thick concrete pad and each monitoring well was secured with a padlock. In addition, two 4-inch-diameter, concrete-filled bollards (crash posts) were installed at wells GLA-B and GLA-G. Each bollard was installed to a depth of 2 feet below ground and extended to at least 3 feet above ground.

2.2.1 Well Development

Following construction, the new monitoring wells were developed in general accordance with the project specifications using the procedures described in the following sections. Final well development was completed for each newly installed well on July 6 and 22, 2004. Development activities typically included the following:

- Initial static water level measurement;
- Surging to remove sediment from the filter packs;
- Bailing to remove suspended solids from groundwater in well casings;
- Pumping to remove residual sediments; and
- Final static water level measurement.

Bailing and pumping were performed until waters brought to the surface were generally sediment free and "visually" clear. Pertinent development information is summarized on the monitoring well completion summaries included in Attachment A.

2.2.2 Well Survey

Nolte and Associates, a California Registered Land Surveyor determined the location (northing and easting), pad elevation, top of well monument elevation, and top of PVC well casing elevation for each new monitoring well. Units of measure were U.S. survey feet, and were determined to an accuracy of 0.03 foot (an accuracy deemed adequate for this high relief site). The top of the well monument elevation was measured at the center of the monument. The top of PVC casing elevation was measured from the north side of the casing. Well survey data are summarized on Table 2. Groundwater equipotential contours based on the new wells are presented on Plate 1.

2.3 GEOPHYSICAL LOGGING

Prior to well construction or borehole abandonment, the nine borings that were completed within bedrock were logged using borehole geophysics by COLOG, Inc. between June 11, 2004 and July 21, 2004. Borehole geophysics included the following logs:

- optical televiewer
- neutron log;
- gamma log;
- dual-induction log;
- 4pi-density log;
- water quality log (temperature, electrical conductivity).

These geophysical tools were used for fracture and feature analysis to evaluate fracture orientations and other characteristics such as aperture and mineral infilling, and identification of water producing fractures or zones. The geophysical logs are included in Attachment B and are summarized in Section 3.1.

2.4 AQUIFER TESTING PROGRAM

In response to comments from the RWQCB, GLA conducted an aquifer testing program to evaluate the hydraulic properties of the bedrock fracture flow system in Gregory Canyon and to demonstrate the extent of hydraulic interconnection in Gregory Canyon wells at the point of compliance. The program included long-term variable discharge pumping tests, long-term constant rate discharge pumping tests, and slug tests (drawdown-recovery). Pump test data are included in Attachment C.

For both variable discharge and constant rate pump tests, a Grundfos Redi-Flo 2 electric submersible pump was used (except for the test on well GLA-3 pumping test where a Grundfos 4-inch electric submersible pump was used). The pump was typically positioned between two to three feet above the well bottom. A check valve was plumbed into the discharge pipe approximately one foot above the top of the pump to prevent back-flow of pumped water. An analog totalizer was used to quantify the volume of groundwater discharged during each test, and periodically during each test, the analog flow meter's accuracy was verified using a stop watch and five-gallon bucket. Vented pressure transducers and a digital data logger were used to measure and record the aquifer response to pumping in the test well and the observation well(s). In accordance with RWQCB discharge guidelines and based on the groundwater chemistry determined from historical water quality data from wells on the project site, water generated during the pump tests was discharged to the ground.

2.4.1 Variable Discharge Tests

Long–term variable discharge tests were performed on June 18 and 28, 2004. Figures 3 through 5 depict time-drawdown curves for the pumping wells and observations wells along with time-barometric pressure, and time-pumping rate. Each of these tests are described below, while a discussion of the overall results as they relate to the site characteristics is provided in Section 3.0.

GLA-A Test - The GLA- A variable discharge test was begun at 15:12 on June 14, 2004, and included observation wells GLA-2, GLA-D, and GLA-14 at distances of 191 feet, 315 feet, and 410 feet, respectively, from the pumping well. As shown on the time-pumping rate graph on Figure 3, the test began at an initial pumping rate of 3.0 gallons per minute (gpm), but after 496 minutes, the pumping well dewatered. Although the pumping well was allowed to recover and was restarted the pumping well dewatered again. Following a second recovery, the pump rate was adjusted so the well would not dewater, with pumping rates continued to be reduced to 1.1 gpm (the lowest functional pumping rate). The test ended at 15:16 on June 16, 2004 after about 48 hours (2884 minutes). A total of about 4,222 gallons of water was pumped from well GLA-A, and at the end of the test, drawdown in the pumping well was measured at 17.88 feet. However, there was insufficient groundwater in the fracture flow system to sustain an effective pumping test, and no clear influence from the pumping well was recognized during this test (Figure 3).

GLA-3 Test - The GLA-3 variable discharge test began at 13:04 on June 18, 2004, and included observation wells GLA-C, GLA-B and GLA-12 at distances of 240 feet, 370 feet and 545 feet, respectively, from the pumping well. Wells GMW-1 and GLA-13 were not included as observation wells for this test since they had been included previously in a pumping test conducted in 2000 (GLA, 2001). The test began at an initial pumping rate of 10 gpm using a Grundfos 4-inch electric submersible pump set approximately 50 feet off the bottom of the well. After 296 minutes, the pumping rate was increased to 12 gpm. After 1,135 minutes, the pumping rate was increased to 15 gpm, and after 1,316 minutes the pumping rate was increased to 16.7 gpm for the remainder of the test. The test ended at 7:06 on June 20, 2004 after about 42 hours (2,522 minutes). At the end of the test 35,833 gallons of water had been pumped and the drawdown in the pumping well was measured at 29.43 feet. The observed groundwater response in observation well GLA-C (the closest well to pumping well GLA-3) was erratic (e.g., increasing during much of the test) and a malfunctioning transducer is suspected. As shown on Figure 4, groundwater levels in observation well GLA-B steadily decreased (approximately 0.35 foot) over the duration of the test. However, observations in well GLA-12 initially decreased sharply (to 120 minutes), followed by only slight response and appeared to be mimicking barometric pressure.

GLA-B Test - The GLA-B variable discharge test began at 15:02 on June 28, 2004, and included observation wells GLA-C and GLA-12 at distances of 135 feet and 200 feet, respectively, from the pumping well. It should be noted that at the time of this variable discharge test, well GLA-G (located between wells GLA-B and GLA-12) had not yet been constructed. The test began with an initial pumping rate of 1.8 gpm, but after 148 minutes, the well dewatered. The pumping well was allowed to recover for 30 minutes. Following recovery, the pump rate was lowered so the well would not dewater, with pumping rates varying from 1.3 gpm to 1.65 gpm. The test ended at 15:58 on June 29, 2004 after about 25 hours (1,498 minutes). At the end of the test about 2,179 gallons of water had been pumped and the drawdown in the pumping well was measured at 28.42 feet. As shown on Figure 5, groundwater levels in observation well GLA-C steadily decreased (approximately 0.26 foot) over the duration of the test. However, the groundwater level in well GLA-12 appears to mimic barometric pressure, with no discernable drawdown response to the pumping well.

2.4.2 Constant Rate Tests

Long-term constant rate pumping tests were performed on June 21 and July 28, 2004. Figures 6 and 7 depict time-drawdown curves for the pumping wells and observations wells along with time-barometric pressure, and time-pumping rate.

GLA-13 Test - The GLA-13 test was performed at a relatively constant rate of 4.3 gpm, beginning at 15:02 on June 28, 2004. Two observation wells GLA-D and GLA-2 were selected at distances of 172 feet and 312 feet, respectively, from the pumping well. It should be noted that at the time of this pumping test, well GLA-F had not yet been constructed. In addition, a previous test including GLA-13 and GLA-3 demonstrated communication between these two wells (GLA, 2001), and therefore, GLA-3 was not included as an observation well during this test. The test ran for about 20 hours (1,167 minutes). At the end of the test about 5,018 gallons of water had been pumped and the drawdown in the pumping well was measured at 3.89 feet. As shown on Figure 6, groundwater levels in observation well GLA-D steadily decreased (approximately 0.34 foot) over the duration of the test, while the groundwater level in GLA-2 appears to mimic barometric pressure, with no discernable responses to the pumping well.

GLA-G Test - The GLA-G test was performed at a relatively constant rate of 2.5 gpm, beginning at 15:00 on July 28, 2004. Two observation wells GLA-B and GLA-12 were selected at distances of 101 feet and 101.5 feet, respectively, from the pumping well. The test ran for about 24 hours (1,438 minutes). At the end of the test about 3,603 gallons of water had been pumped and the drawdown in the pumping well was measured at 14.0 feet. As shown on Figure 7, groundwater levels in the observation wells decreased steadily over the duration of the test. The groundwater level in GLA-B steadily decreased approximately 0.84 foot, and in GLA-12 the groundwater level decreased approximately 0.27 foot.

2.4.3 Slug Tests

After reviewing the variable rate and constant rate pump test results, and all drilling logs, it appeared that three fracture flow domains could be identified as follows (Plate 1):

- A groundwater flow barrier formed by the unweathered tonalite underlying the west ridgeline;
- A low flow zone forming an extension of the west ridgeline; and
- A maximum flow zone along the axis of Gregory Canyon in the weathered bedrock zone.

The groundwater barrier was evident in wells GLA-9, GMP-3, GLA-4, and exploratory boring GLA-17 on the upper west ridge of Gregory Canyon. The low flow zone extends north into the "saddle" area near well GLA-2 (Plate 1). As is evident in well GLA-2, groundwater recovery is very slow and aquifer pumping tests do not show a measurable response to pumping at wells GLA-A or GLA-13. Groundwater monitoring wells GLA-E and GLA-F (Plates 1 and 2) were drilled to further investigate this apparent low flow zone/groundwater barrier. While all three wells (GLA-2, GLA-E and GLA-F) have measurable groundwater, none of these wells were amenable to traditional pumping tests due to slow recovery rates. Therefore, in order to evaluate the hydraulic properties within this low flow zone, slug tests were performed instead. At each well, a bailer was used to remove the water from the borehole, and remote data recorders (In-Situ Trolls) were installed in the bottom of each well to measure recovery.

<u>GLA-2 Slug Test</u> - The GLA-2 slug test was performed on August 2, 2004. Prior to bailing, the water level was measured at 73.28 feet bgs. Approximately 25 gallons of water was removed from the well and the water level was measured at 93.86 feet bgs. The Troll was then lowered into the well to record the water level data. The test ran approximately 18 days (25,902 minutes). The ending water level was measured at 73.47 feet bgs, or within 98 percent of the original (approximately static) water level.

<u>GLA-E Slug Test</u> - The GLA-E slug test was performed on August 2, 2004. Prior to bailing the water level was measured at 99.50 feet bgs. Approximately 155 gallons of water was removed from the well and the water level was measured at 149.86 feet bgs. The Troll was then lowered into the well. The test ran approximately 27 days (39,222 minutes). The ending water level was measured at 77.93 feet bgs, nearly 100 percent of the static water level.

<u>GLA-F Slug Test</u> - The GLA-F slug test was performed on August 2, 2004. Prior to bailing the water level was measured at 69.58 feet bgs. Approximately 280 gallons of water were removed from the well and the water level was measured at 162.30 feet bgs. The Troll was then lowered into the well. The test ran approximately 18 days (25,782 minutes). The ending water level was measured a 69.62 feet bgs, approximately 100 percent of the static water level.

In each case, and as evident from a correlation of the producing fracture identified by an earlier COLOG geophysical survey in well GLA-2, the well data plots as a curvilinear line indicative of a draining condition created by the water cascading down the well from the water producing fracture until the water level had risen to head conditions in that fracture. Once groundwater was recharged to the fracture head elevation, the predicted straight line plot was obtained, characteristic of a recovering well.

3.0 INTERPRETATION OF THE RESULTS

The following sections provide a summary of the results obtained from the borehole excavations, geophysical logging and aquifer tests performed for this supplemental hydrogeologic investigation.

3.1 GEOPHYSICS

3.1.1 Fracture Analysis

An optical televiewer probe was used for fracture and feature analysis since it provides the highest resolution available for fracture and feature analysis in boreholes. The results from the optical televiewer probe were tabulated and graphically presented on rose diagrams and pole plots (Attachment B) to show the distribution of the fractures. On the rose diagrams, the strike azimuth and dip directions are plotted within a 20 degree segments. The following table summarizes the interpretations derived from these plots:

Well	Comments
GLA-A	Based on 28 fractures, the pole-plots show considerable scatter with a predominance of moderate to high-angle fractures. Rose diagrams show dominant northwesterly and northerly strike azimuths of 300-320 degrees and 340-360 degrees and a dominant dip direction to the west.
GLA-B	Based on 21 fractures, the pole-plots show a well defined scatter pattern in the southwest and southeast quadrants with a predominance of moderate to high-angle fractures. Rose diagrams show a dominant strike azimuth of 20-40 degrees and a dominant dip direction to the north-northeast.
GLA-C	Based in 18 fractures, the pole-plots show a well defined scatter pattern in the southeast quadrant with a predominance of moderate to high-angle fractures. Rose diagrams show two dominant northerly strike azimuths of 20-40 and 340-360 degrees with no dominant dip direction.
GLA-D	Based on 36 fractures, the pole-plots show considerable scatter with a predominance of moderate to high-angle fractures. Rose diagrams show a dominant northerly strike azimuth of 340-360 degrees with a dominant dip direction to the west.
GLA-E	Based on 29 fractures, the pole-plots show considerable scatter with a predominance of moderate to high-angle fractures. Rose diagrams show a dominant northerly strike azimuth of 300-320 degrees with a dominant dip direction to the southwest.
GLA-F	Based on 31 fractures, the pole-plots show a well defined scatter pattern concentrating in the southeast quadrant with a predominance of moderate to high-angle fractures. Rose diagrams show two dominant northeasterly to easterly strike azimuths of 20-40 and 60-80 degrees with a dominant dip direction to the northwest.
GLA-G	Based on 29 fractures, the pole-plots show a well defined scatter pattern in the southwest and northeast quadrants with a predominance of high-angle fractures. Rose diagrams show a dominant northerly strike azimuth of 0-20 degrees with a dominant dip direction to the east.
GLA-3S	The number of fractures is small (4 fractures), and the pole-plots and rose diagrams do not contain sufficient data for interpretation.

Well	Comments
GLA-17	Based on 167 fractures, the pole-plots show considerable scatter with a predominance of moderate to high-angle fractures. In addition, rose diagrams show the dominant northerly strike azimuths of 320-340 degrees with the dominant dip direction to the east.
COMPOSITE	Based on all of the fractures measured (363), the pole-plots show a well defined scatter pattern concentrating in the southwest and northeast quadrants with a predominance of moderate to high-angle fractures. In addition, rose diagrams show a dominant northerly strike azimuth of 340-360 degrees and dominant northwesterly and east dip directions.

Based on review of the recent fracture data obtained from eight boreholes with sufficient fractures for trend evaluation, the overall (composite) northerly strike azimuth between 340 and 360 degrees is generally consistent with fracture patterns identified in 12 earlier boreholes. Previous fracture data concluded that although the data may differ from point to point at any given location, there is a predominance of northerly striking fractures paralleling the axis of Gregory Canyon.

3.1.2 Geophysical Analysis

The results from the neutron, gamma, dual-induction, 4pi-density, and water quality logs were used to evaluate the character of fractures identified in the fracture analysis and possible water producing zones. Neutron logs were used to identify relative changes in hydrogen which can be correlated to water; gamma logs were used to identify weathered (clayey) intervals; dual-induction and 4pi-density logs were used to identify fractured (less dense) intervals; and the water quality logs were used to measure relative changes in temperature and electrical conductivity. The logging was helpful in describing the drilled rock section, but was not generally successful in defining specific water producing fractures or zones. However, based on the sum of geophysical analysis to date, it is apparent that groundwater flow in Gregory Canyon point of compliance wells occurs within transmissive fractures, and can be separated into two distinct zones. Groundwater in the "canyon" area (e.g., wells GLA-B, -C, and -G), occurs within the weathered bedrock, while groundwater in the western "saddle" area (e.g., wells GLA-A, GLA-D, GLA-E, and GLA-F) occurs within the unweathered bedrock and the transmissive fractures are few. This is consistent with earlier GLA observations (GLA, 1997) that identified average yield and low-yield wells. The average yield wells (wells yielding from 5 to 20 gpm) were found to be located within Gregory Canyon itself, while the low-yield wells (e.g., wells GLA-1, GLA-2, GLA-4 and dry well GLA-9) with recovery rates less than 5 gpm, are located along the western ridgeline.

3.2 AQUIFER TESTING

Long-term aquifer test data were analyzed using AquiferTest Pro, Version 3.5, numerical modeling software (Röhrich and Waterloo Hydrogeologic, 2002) to calculate aquifer hydraulic properties. A summary of the calculated hydraulic properties from the aquifer tests, including aquifer tests performed in 2000 (GLA, 2001), are presented in Table 3 and the individual calculations and plots are included in Attachment C.

3.2.1 Aquifer Classification

Using the information contained on the boring logs, geophysical logs, and well construction summary diagrams (Attachments A and B), the aquifer interval, aquifer type, and degree of well screen penetration were determined for each tested well. The results of the classification are summarized below.

Well	Depth to Water (fbgs)	Screen Interval (fbgs)	Aquifer Interval (fbgs)	Aquifer	
				Flow Condition	Screen Penetration
GLA-A	73.30	74.4-104.4	85-103	Fracture Flow	Partial
GLA-B	40.00	51.2-91.2	40-84	Fracture Flow	Partial
GLA-C	37.12	41.0-81.0	40-80	Fracture Flow	Partial
GLA-D	60.27	95.1-145.1	93-137	Fracture Flow	Partial
GLA-E	77.6	Open Hole	83-133	Fracture Flow	Partial
GLA-F	69.6	Open Hole	69-152	Fracture Flow	Partial
GLA-G	40.18	61.5-101.5	43-101	Fracture Flow	Partial
GLA-2	73.28	70.38-95.38	83-85	Fracture Flow	Partial
GLA-3	25.0	Open Hole	NA	Fracture Flow	Partial
GLA-12	37.92	32.0-52.0	NA	Fracture Flow	Partial
GLA-13	50.50	49.5-69.5	NA	Fracture Flow	Partial
GLA-14	37	35.5-55.5	NA	Fracture Flow	Partial

Note: NA – Not Available/Optical televiewer evaluation was not performed.

3.2.2 Calculated Long-Term Specific Capacity

The long-term specific capacity value was calculated for each of the tested wells and the resulting values are summarized on Table 3. The calculated values for the monitoring wells ranged from 0.06 to 1.11 gallons per minute per foot of drawdown (gpm/ft), with the range of specific capacities being generally higher for wells located in the "canyon" area.

3.2.3 Calculated Hydraulic Properties

The long-term constant rate aquifer test data were evaluated using Cooper-Jacob straight-line solution (1946), Theis-curve fitting solution (1935), and, Moench Fracture Flow solution (1993). Hydraulic conductivity calculations were also completed for slug tests using Bower and Rice solution (1976) using aquifer recovery data. Plots showing the best fit for the data are presented in Attachment C. The analyses were biased toward the "middle- to late-time" portions of the data plots so as not to include data obtained during well casing and filter pack dewatering.

The calculated hydraulic conductivity (K), transmissivity (T), and storativity (S) values that were obtained from the aquifer pumping test data are summarized in Table 3 along with aquifer pumping test data obtained from wells GLA-3 and GLA-8 during the Phase 5 Supplemental Investigation (GLA, 2001). As shown on Table 3, for the recent pumping tests, the range of calculated K values ranged from 1.75E-05 to 24.6 feet/day, with K values highest in the "canyon" area (0.137 to 24.6 feet/day for the canyon wells). Bedrock transmissivity values were derived from the computed hydraulic conductivity values in the canyon wells, and aquifer thickness estimates, based in part on well tests by

COLOG summarized in Section 3.1. As shown on Table 3, transmissivity values ranged from 8.77 to 650 ft^2/day. Bedrock storativity values ranged from 1.99 E-06 to 0.28.

Hydraulic properties calculated from the earlier (GLA, 2001) aquifer pumping tests at wells GLA-3 and GLA-8 are generally consistent with the more recent test data. Hydraulic conductivities calculated range from 8.96E-02 to 19.15 feet/day, a slightly broader range of values that are skewed lower by the K value calculated in upper canyon well GLA-8, but consistent with wells within the canyon area of the site as compared to the saddle wells. Bedrock transmissivity values range from 1.25 to 352 ft^2/day, and bedrock storativity values range from 8.87E-08 to 0.41, which are within the range of values for these parameters and include slightly lower values than the recently tested canyon wells.

4.0 DISCUSSION

Successive investigations of Gregory Canyon begun in 1991 have added incrementally to the body of data and observations underlying a basic understanding of the site hydrogeology. The recent work described above, which is the basis of this supplemental report, similarly enables updates and revisions to that understanding. The additional observations addressed here relate to the nature of recharge derived from Gregory Mountain, the mineralization of fractures, the effect of the weathering zone on fracture flow, and the apparent flow barrier formed by the western ridgeline of Gregory Canyon.

Recharge. The influence of Gregory Mountain in terms of groundwater recharge to its adjacent areas is clear from inspection of Figure 1; no other topographic element in the area is as likely a source of recharge to Gregory Canyon. The western ridgeline of Gregory Canyon is a relatively minor topographic feature, which would contribute little to the canyon recharge even assuming hydraulic properties similar to those of Gregory Mountain. It is likely that the recharge mound below Gregory Mountain is symmetrical and elongated in a north-south orientation, reflecting the mountain's flat-topped morphology, trend and size. In addition, it is evident from air photo analysis that the leucogranodiorite underlying the mountain is cut by pronounced intersecting fractures capable of conveying precipitation below ground.

Recharge from Gregory Canyon flows via fractures below an equipotential surface to the alluvial aquifer of the San Luis Rey River. The water level in the alluvium adjacent the bedrock, which fluctuates seasonally and with climatic intervals, is the local base level of the equipotential surface. The quantity of water transmitted to the alluvial aquifer through the fractures is minor relative to the volume of water transmitted through the alluvium even in dry periods. During wet periods, whether considered on an annual or decadal basis, water levels rise in the alluvial aquifer at the mouths of adjoining canyons, and the adjacent equipotential surface expands as the bedrock's fracture system fills. At the present time of extended drought, the water level in the alluvial aquifer has dropped below the screen levels of wells at the mouth of Gregory Canyon, and the bedrock equipotential surface has similarly contracted.

Fracture Mineralization. The majority of fractures observed in downhole videos or other images are filled by mineralization. Some of these features are pegmatite dikes or veins related to intrusion of the leucogranodiorite into the tonalite host rock. However, most are younger mineral veins filling fractures of tectonic origin that cross-cut the pegmatite dikes and veins. The mineral assemblage filling the younger fractures consists of epidote, chlorite, and a probable zeolite mineral (presumably laumontite). Both fractures and mineralization are presumably related chiefly to stresses and hydrothermal activity along the Elsinore fault, located about 5½ miles to the northeast; these mineral veins. Low temperature hydrothermal zeolite assemblages are found in basement rocks along strike-slip faults elsewhere in Southern California. In face, the name *Aqua Tibia* given to the segment of the San Luis Rey River basin where it crosses the Elsinore fault is consistent with this observation.

Weathering. Another feature of the site not previously emphasized is the weathering profile shown in the sections of Plates 2 and 3. As interpreted from drilling logs, the zone of weathering is deeper along the invert of Gregory Canyon and shallows on the sidewalls. It should be noted that weathering is different in kind from, and younger than hydrothermal mineralization. Flow apparently is enhanced even by a moderate degree of rock decomposition and mineral vein dissolution. Relatively significant water producing zones are mostly located in the weathered zone in wells near the canyon axis. In contrast, flow in unweathered rock is more limited in terms of both quantity and occurrence of producing fractures.

Flow Barrier. The sum of observations to date suggests that fracture flow below the weathered zone is limited. Four wells drilled along the west ridgeline to depths significantly below the projected equipotential surface are dry (one well, GLA 4 is recharged by a perched water condition), and other wells drilled in unweathered bedrock underlying the northern extension of the west ridgeline (in the low flow zone shown on Plates 1 and 2) recharge very slowly from relatively isolated fractures. Therefore, the west ridgeline is believed to form a groundwater flow barrier. This interpretation is included on Plate 1, which illustrates modified equipotential and water table contours based on this interpretation. Plate 1 indicates that fracture flow below the equipotential surface is west northwest from the Gregory Mountain recharge area to Gregory Canyon; occurs largely in the weathered zone; and is bounded by unweathered tonalite under the west ridgeline.

This finding supports the interpretation presented in GLA's Phase 5 Hydrogeologic Investigation Report (GLA, 1997), which stated that:

> "...cores of only slightly weathered tonalite form boulder knobs throughout the western flank of Gregory Canyon. This surface observation holds true for all the wells drilled along the western ridge (GLA-1, GLA-2,GLA-4, and GLA-9), which after going through a thin interval of weathered rock encountered hard, unaltered, and very sparsely fractured tonalite. It appears, thus, that the geomorphic expression of the western ridge results from an underlying core of comparatively pristine tonalite. ...The low-yield of these wells, coupled with the observation made before regarding the hard and sparsely fractured nature of the substrate,

> suggests that the western and southern ridges act as low permeability barriers along the periphery of the site."

Hydraulic Communication. Despite relatively high fracture frequencies observed in wells and in limited outcrops there are few water-producing fractures in the Gregory Canyon boreholes and wells. Mineralization of the fracture system appears to explain the paucity of water-producing fractures. Hydraulic communication between these boreholes might be better visualized as occurring in a system of interconnected channel-ways within the mineralized vein system of the weathered zone, rather than as a system of intersecting open fractures.

Fracture flow models typically do not specifically account for mineralized fracture systems, unless the effect is accounted for by default assumptions about fracture apertures. In a discussion of fracture frequency, fracture spatial density, and connectivity of fracture networks, Renshaw (2000) suggests that for the typical range of fracture spatial densities, connectivity of fractures is on the order of 30% or less. Renshaw (2000) further notes that,

> "...once a network is connected, the primary source of uncertainty in predicting the permeability of fractured rock does not arise from uncertainty in the connectedness of the network, but rather from uncertainty in the transmissivities of the individual fractures, which arises from uncertainty in the fracture apertures, state of stress, and multiphase flow effects".

This statement suggests that there are two determinations to be made in characterizing a fracture flow network. The first is to determine if the fracture network is connected, the second is to determine the transmissive nature of the whole fracture system.

With respect to the first determination, well tests as reported herein provide direct evidence of connectivity. While it is problematic to specify the fraction of interconnections within the fracture system, especially given the complicating factors of mineralization and weathering, it is possible based on well response to drawdown to assess the relative connectivity of adjacent bedrock domains.

With respect to the second determination, system transmissivity cannot be determined from well tests on individual fractures. Thus, hydraulic calculations as presented herein serve to provide a sense of the range of parametric values related to isolated segments of individual fractures, but do not provide an estimate of the average parametric values of all fractures in the system.

Monitoring Wells. The line of wells across the mouth of Gregory Canyon inclusive of GLA-14 and GLA-12 spans two bedrock domains apparently reflecting two degrees of fracture interconnectivity. Relative to Plate 1, and as presented in the table below, those wells east of and including GLA-13 all show a response to drawdown of other wells in that group.

Well	Adjacent Well	Distance (ft.)	Communication Test Reference
GLA-12	GLA-G	101.5	GLA-G pumping test (2004)
GLA-G	GLA-B	101	GLA-G pumping test (2004)
GLA-B	GLA-C	135	GLA-B pumping test (2004)
GLA-C	GLA-3	240	GLA-3 pumping test and GLA-B pumping test (2004)[1]
GMW-1	GLA-13	200	GLA-3 pumping test (2001)
GLA-3	GMW-1	51	GLA-3 pumping test (2001)
GLA-13	GLA-D	172	GLA-13 pumping test (2004)
GLA-D	GLA-F	90	GLA-A pumping test (2004)[2]
GLA-F	GLA-2	50	GLA-A pumping test (2004)[2]
GLA-2	GLA-E	110	GLA-A pumping test (2004)[2]
GLA-E	GLA-A	80	GLA-A pumping test (2004)[2]

1- GLA-3 pumping test demonstrates response between GLA-3 and GLA-B at a distance of 370 feet, and the GLA-B pumping test demonstrates response between GLA-B and GLA-C.

2- Communication is inferred from a response in observation well GLA-D during the GLA-A pumping test, and wells GLA-E and GLA-F were completed to provide additional monitoring capabilities within the low-flow zone.

In contrast, wells west of GLA-13 (in the low flow zone) have not been shown to respond similarly. This does not suggest that the wells in the low flow zone are isolated from each other or from wells east of and including GLA-13, since the projected equipotential surface includes all of the well data. Rather it suggests that the fraction of connected fractures within the low flow zone is less than in the bedrock domain to the east, assuming no difference in the transmissivity of the fractures. While a smaller well spacing in the low flow zone could be utilized to identify a similar drawdown response, it is not necessary to place additional wells in the low flow zone to detect contaminant transport because all fractures are recharged from the same source.

The currently proposed monitoring wells are located ideally for downgradient monitoring. As a result, the groundwater flow direction is effectively parallel to this groundwater flow barrier so that groundwater flowing under the landfill footprint will be brought to the line of compliance wells. Bedrock well GLA-14 is well situated for monitoring the efficacy of the groundwater barrier. Similarly, since the two dimensional flow model performed by GLA (1995) showed that groundwater would migrate along the southern limit of the alluvial groundwater section, alluvial wells GLA-16 and SLRMWD#34R are well situated for monitoring downgradient of the point of compliance monitoring system. A more detailed discussion of the proposed groundwater monitoring system is provided below.

Groundwater Monitoring System. The following sections describe the groundwater monitoring system proposed to evaluate groundwater conditions at the GCLF in accordance with CCR Title 27 §20405, and 40 CFR 258.51 through 258.54. The monitoring system's first defense beyond the landfill liner system is the series of weathered/fractured bedrock wells proposed along the downgradient limit of the landfill or POC. All of the bedrock wells are screened across the first water bearing zone with the majority of these wells screened across the upper more weathered/fractured bedrock zone and thus the more highly conductive portion of the fractured bedrock flow system. However, a dual detection monitoring system, which includes dedicated wells in both the alluvial and fractured bedrock groundwater systems, is proposed.

The detection monitoring program will include downgradient wells to collect representative samples of groundwater at the POC, and upgradient wells to collect samples of groundwater that are representative of background conditions. As currently proposed, with the exception of the spacing between wells GLA-14 (west of the landfill) and GLA-A, the wells are spaced about 50 to 240 feet apart, with a higher density of wells (closer spacing) along the western ridge saddle area of the site (wells GLA-A, GLA-D, GLA-E, GLA-F, and GLA-2) where there are fewer interconnected water bearing fractures. Wells GLA-14 and GLA-A, which are currently constrained by the SDCWA aqueduct easement are spaced approximately 400 feet apart. As presented herein, cross-hole testing performed following well construction demonstrates that the proposed monitoring network will be able to provide the earliest detection of a release of waste constituents to ground water from the proposed solid waste management unit at Gregory Canyon. As an additional groundwater system enhancement, each of the bedrock POC wells will be equipped with a dedicated pump and plumbed to convey groundwater to an on-site tank. In this way, a hydraulic barrier will be maintained along the POC and capture the groundwater as it flows to the POC. The detection monitoring program system is summarized in the following table.

Gregory Canyon Landfill
Detection Monitoring Program

Monitoring Point	Unit	Monitoring Point I.D.	Status
Groundwater Monitoring Well	Bedrock	GLA-4, GLA-5, GLA-11, GLA-18*	Background/ Cross-gradient
Groundwater Monitoring Well	Bedrock	GLA-2, GMW-1, GLA-12, GLA-13, GLA-14, GLA-A, GLA-B, GLA-C, GLA-D, GLA-E, GLA-F, and GLA-G	Compliance
Water Level Measuring Station	Bedrock	GLA-1, GLA-3, GLA-7, GLA-8, GLA-10	Not Applicable
Groundwater Monitoring Well	Alluvial	Lucio #2R	Background
Groundwater Monitoring Well	Alluvial	GMW-3	Compliance
Groundwater Monitoring Well	Alluvial	GLA-16, SLRMWD #34R	Sentry
Surface Water Station	Gregory Canyon	GCSW-2	Compliance
Surface Water Station	San Luis Rey River	SLRSW-1	Background
Surface Water Station	San Luis Rey River	SLRSW-2	Compliance

*Proposed well to be constructed.

Groundwater Monitoring Points – For the bedrock fracture flow system, POC groundwater monitoring wells include GLA-12, GLA-13, GLA-14, GLA-2, GMW-1, and GLA-A through GLA-G, as shown on Figure 2. Wells GLA-1, GLA-3, and GLA-10, will be utilized as water level measuring station and as contingency monitoring wells. In addition, though wells GLA-7 and GLA-8 are located within the future landfill footprint, they will also continue to be used as water level measuring stations until landfill development reaches their location, at which time they will be properly abandoned.

Existing wells GLA-4, GLA-5, GLA-11, and proposed well GLA-18 (located on the east side of the landfill footprint) will be background wells. Of these wells, the only well that cannot be constructed prior to landfill operations is GLA-18. Because of the steep slopes, access to this well location is not anticipated until the landfill operations extend a significant distance up the canyon and the utility pad is constructed. Until that time, a drill rig will not be able to gain access to the area for well construction.

The water quality monitoring program will also include monitoring of the San Luis Rey River valley alluvial prism from compliance well GMW-3, Lucio Dairy well #2R (located at the Lucio Dairy near the northeastern property boundary). Wells GLA-16 and SLRMWD#34R will serve as alluvial "sentry" wells located further downgradient of the facility along the modeled groundwater flowpath (GLA, 1995). Under this monitoring program, the proposed monitoring well network will be maintained throughout the life of the landfill and through the post-closure period. Existing wells, which are not included within the monitoring network but are located within the footprint of the landfill will be properly abandoned prior to landfilling in that area. It should be noted that in the event that facility construction requires the destruction of any of these wells (e.g., a well located in the proposed ancillary facilities area), a replacement well would be constructed in the vicinity of the originally designated well.

<u>Groundwater Sampling Procedures.</u> The following sampling procedures provide minimum requirements that shall be followed when performing groundwater sampling at the Gregory Canyon Landfill. Depending on the location of the well two separate sampling procedures are proposed for the GCLF. As a result of the hydraulic barrier at the POC, all compliance bedrock aquifer wells will be sampled in accordance with the procedures discussed under the bedrock compliance well sampling procedures section. All other wells (alluvial and bedrock-background/cross-gradient) will be sampled in accordance with the procedures discussed under standard sampling procedures section.

Procedures to be used for groundwater sampling are outlined in the *<u>Practical Guide for Groundwater Sampling</u>* and *<u>RCRA Groundwater Monitoring Technical Enforcement Guidance Document</u>*.

Standard Purging Procedures for Sampling – Prior to collecting groundwater samples, purging of a well is necessary to provide a representative sample of groundwater that approximates formational conditions. Temperature, pH, turbidity, and EC or conductivity of the purged water are measured to evaluate whether stable conditions have been achieved. It is assumed that stability or formational conditions have been achieved when the difference between successive field indicator measurements is less than ten percent. The amount of water that must be purged from a well is a function of the stability of the measured parameters, as well as the recovery rate of the well. Purging should be performed at a sufficiently slow rate so that recharging water does not cascade in the filter pack and casing.

A well is considered to be fast recharging if groundwater levels recover to within 80 percent or more of the original static water level within two hours of purging. A minimum of one borehole volume should be purged before temperature, pH, turbidity, and EC parameters are measured in the purged water. An additional one-half borehole volume should be purged prior to re-measuring the water quality parameters. It is assumed that stability or formational conditions have been achieved when the difference between successive measurements is less than ten percent. If the values vary by more than 10 percent, additional one-half borehole volumes should be purged until temperature, pH, and EC parameters have adequately stabilize, up to a total of three borehole volumes. The well should be allowed to recharge to 80 percent of its static condition prior to sample collection.

A well is considered to be slow recharging if groundwater levels do not recover to within 80 percent or more within two hours of purging. Slow recharging wells should be purged by removing one borehole volume of water, and then allowing the well to recover for up to two hours prior to collecting samples.

A borehole volume is the amount of water contained within the casing of a well (called a casing volume) plus the water contained within the filter pack surrounding the well casing. The following equation is used to calculate the borehole volume in the screened interval of a well:

$$\text{Borehole volume (gallons)} = (7.48\pi/4)[CD^2+P(BD^2-CD^2)](WD-GW)$$

Where:

BD = borehole diameter (feet)
CD = casing diameter (feet)
P = porosity of filter pack (as a decimal)
WD = well depth (feet)
GW = depth to groundwater (feet)

The following equation is used to calculate the borehole volume in the unscreened interval of a well:

$$\text{Borehole volume (gallons)} = (7.48\pi/4)(CD^2)(WD-GW)$$

Where:

CD = casing diameter (feet)
WD = well depth (feet)
GW = depth to groundwater (feet)

Bedrock Compliance Well Purging Procedures for Sampling – As a result of very low flow rates in the majority of bedrock wells at the POC, a permanent dewatering condition at the POC is proposed of for the GCLF, thereby creating a hydraulic sump. To achieve a permanent dewatering condition at the POC, bedrock wells will be equipped with float sensors and electric submersible pumps. As a result, additional purging of bedrock wells at the POC is unnecessary to provide a representative sample of groundwater that approximates formational conditions. Prior to sample collection each bedrock well would be allowed to recover (no greater than 48 hours), until a sufficient volume of water enters the well to collect a sample.

5.0 CONCLUSIONS

In summary, the following conclusions can be made from the hydrogeologic conditions observed during this investigation:

- Based on exploratory boring GLA-17 and previous drilling (GLA-4, GLA-9 and GMP-3), the western tonalite ridge acts as a groundwater barrier forcing groundwater to move parallel to this boundary and down the axis of Gregory Canyon;
- Fracture analysis indicates a strong north-trending fracture orientation parallel to the axis of Gregory Canyon;
- Interpretation of boring logs indicates a thicker sequence of weathered bedrock near the axis of Gregory Canyon;
- Pumping test results indicate that the "canyon" wells provide significantly greater flow rates compared to the western "saddle" wells;
- Pumping tests conducted between the "canyon" wells (i.e., wells east of and including GLA-13) indicate hydraulic interconnections as exhibited by the response to drawdown between these wells; and
- Slug tests in the western "saddle" area indicate fewer interconnected fractures as a result of significant mineralization within fractures and a lack of weathering within the bedrock.

Based on these observations, groundwater is interpreted to flow north-northwest down the axis of Gregory Canyon towards the San Luis Rey River. As in previous hydrogeologic studies for the Gregory Canyon site, the hydrogeologic data support the interconnectivity of the fracture flow system across the site, albeit at a lesser degree of connectivity within the low flow zone. Since the bedrock fracture flow system is recharged from the same source, all of the proposed groundwater monitoring wells sample the same groundwater, and as a result the groundwater monitoring network will provide chemical evidence of contaminant transport along the point of compliance. Given this interpretation, the proposed groundwater monitoring network for the Gregory Canyon Landfill is adequate to monitor potential release from the site. It should be noted, that the Gregory Canyon Landfill incorporates additional monitoring capacity through the installation of a leak detection layer between the upper and lower HDPE liner systems, which will provide the earliest detection of a release from the landfill.

6.0 CLOSURE

This report is based on the data presented above and described herein. GeoLogic Associates should be notified of any conditions that differ from those described herein since this may require reevaluation of the data, conclusions, and work plan detailed above. This report has not been prepared for use by other parties or projects other than those described above. It may not contain sufficient information for other parties or purposes.

This report has been prepared in accordance with generally accepted geotechnical and hydrogeologic practices, and makes no warranties, either expressed or implied, as to the professional content and data presented herein.

GeoLogic Associates

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Gary L. Lass, CHg, CEG
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FIGURES

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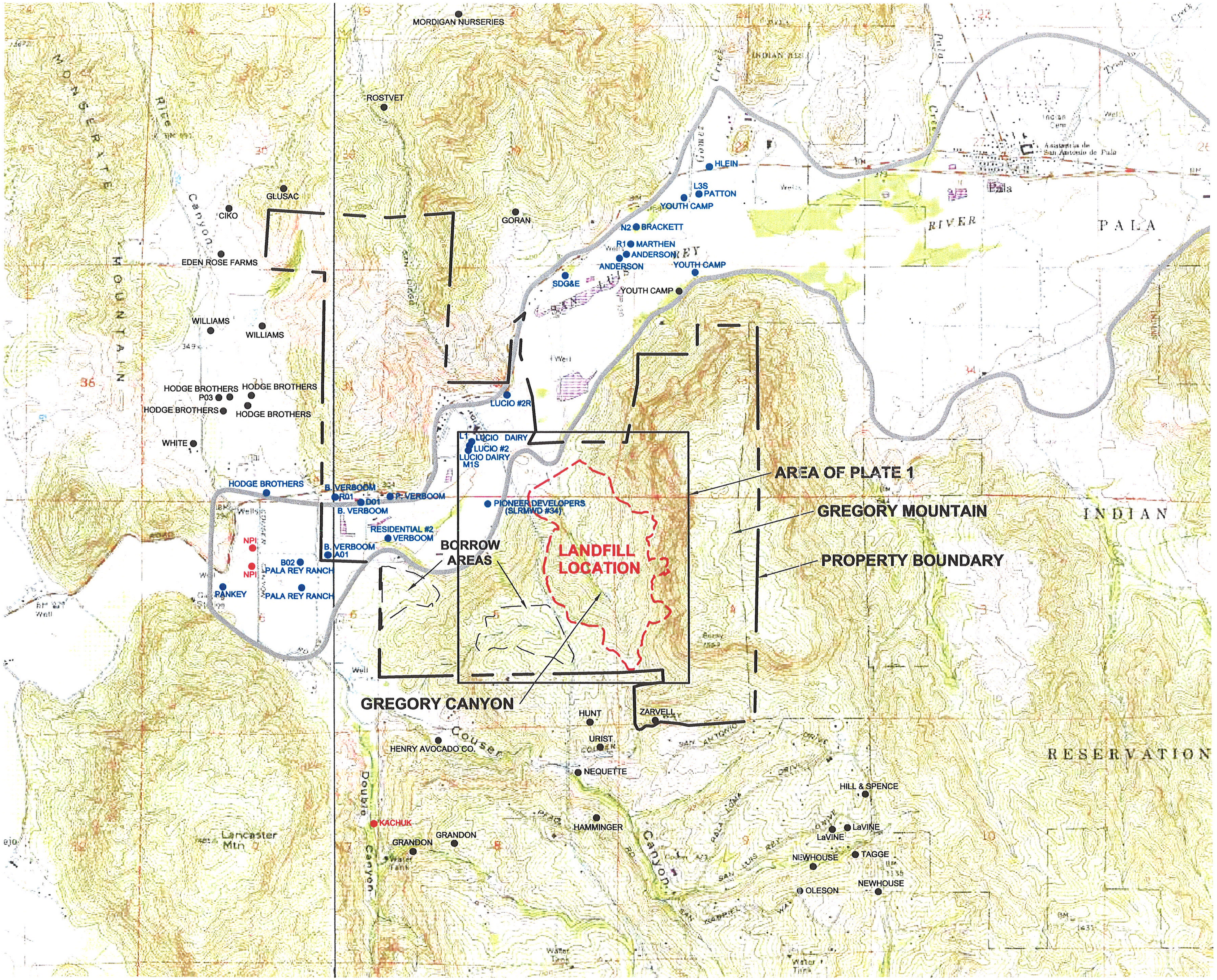

EXPLANATION:

WHITE ● APPROXIMATE LOCATION OF LOCAL GROUNDWATER WELL SCREENED IN BEDROCK (NOT FIELD VERIFIED)

PANKEY ● APPROXIMATE LOCATION OF LOCAL GROUNDWATER WELL SCREENED IN ALLUVIUM (NOT FIELD VERIFIED)

NPI ● APPROXIMATE LOCATION OF LOCAL GROUNDWATER WELL SCREENED IN ALLUVIUM AND BEDROCK (NOT FIELD VERIFIED)

APPROXIMATE LIMIT OF PALA BASIN

REFERENCE:

USGS 7.5 MINUTE PALA (1988) AND BONSALL (1975) CALIFORNIA QUADRANGLES

CALIFORNIA DEPARTMENT OF WATER RESOURCES WATER WELL DRILLERS REPORTS

SAN DIEGO COUNTY WATER AUTHORITY GROUNDWATER REPORT (1997)

N

APPROXIMATE SCALE: 1" = 2300'

FIGURE 1

SITE LOCATION MAP

SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION REPORT
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	OCTOBER 2004	9539

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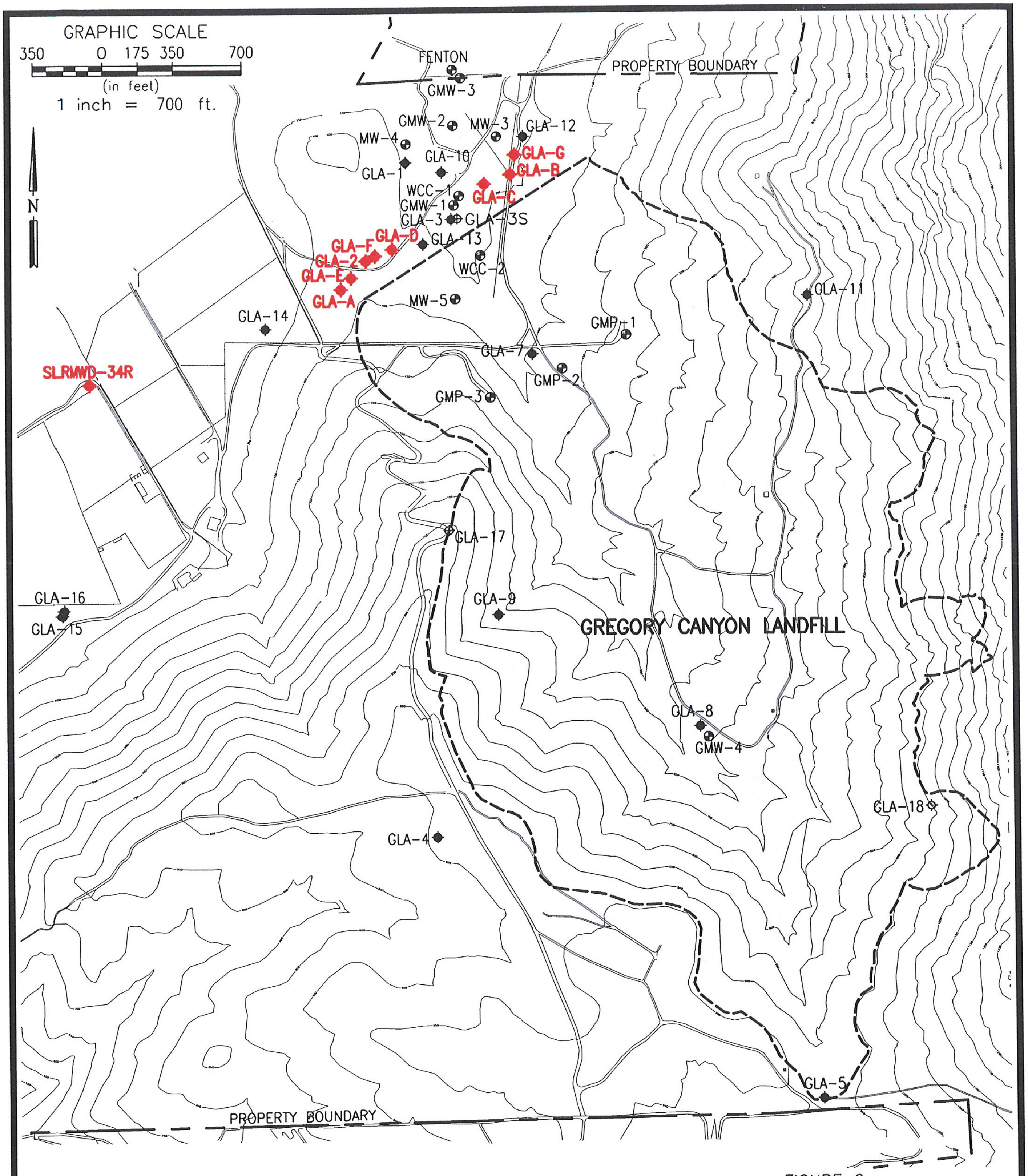

FIGURE 2

EXPLANATION:

- NEW MONITORING WELL BY GLA
- MONITORING WELL BY GLA
- EXPLORATORY BORING (GLA, 2004)
- PROPOSED MONITORING WELL
- MONITORING WELL BY OTHERS

WELL LOCATION MAP

SUPPLEMENTAL HYDROGEOLOGIC INVESTIGATION REPORT
GREGORY CANYON LANDFILL
SAN DIEGO COUNTY, CALIFORNIA

GeoLogic Associates
Geologists, Hydrogeologists, and Engineers

DRAWN BY:	DATE:	JOB NO.
VL	OCTOBER 2004	9539

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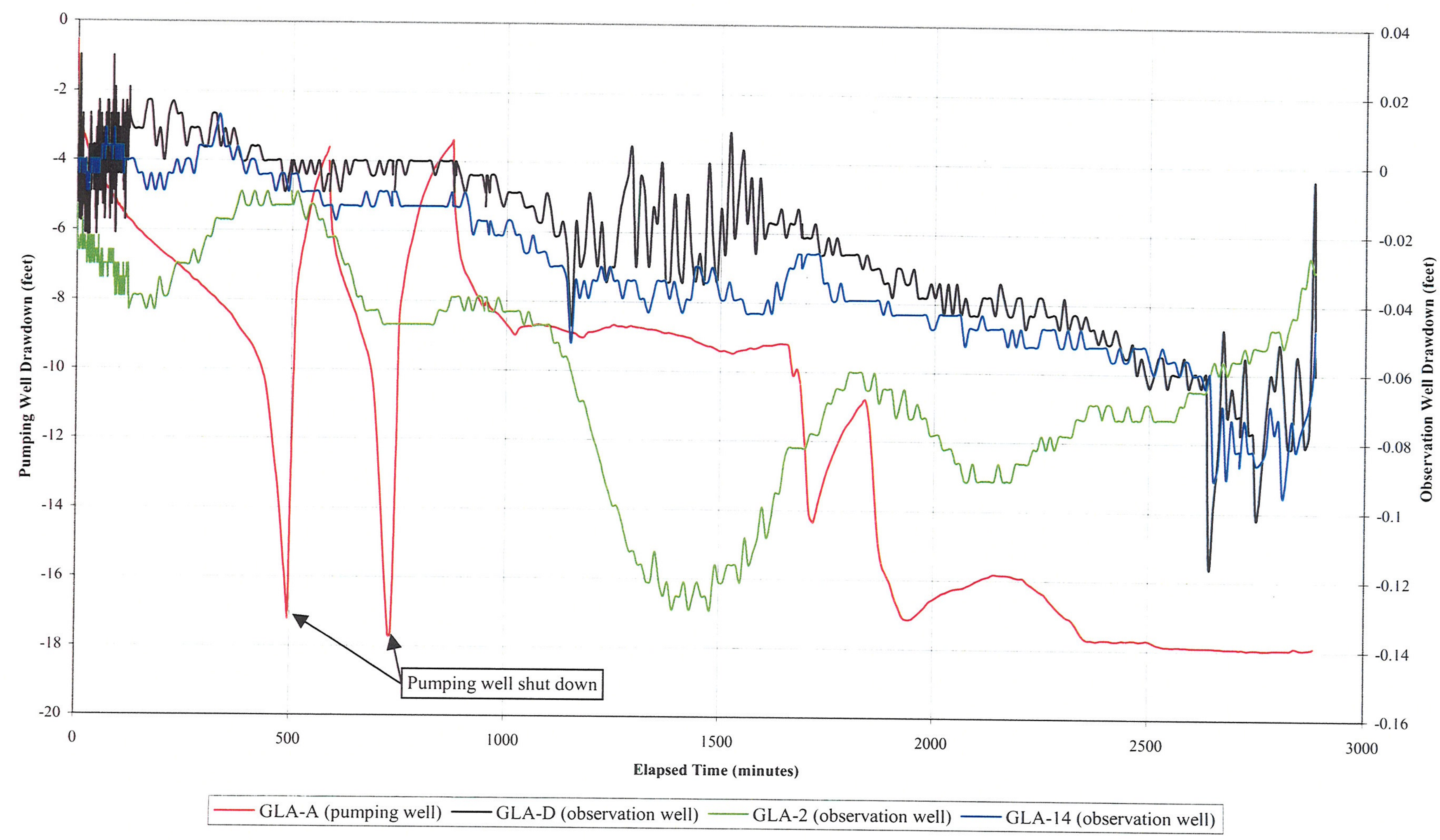
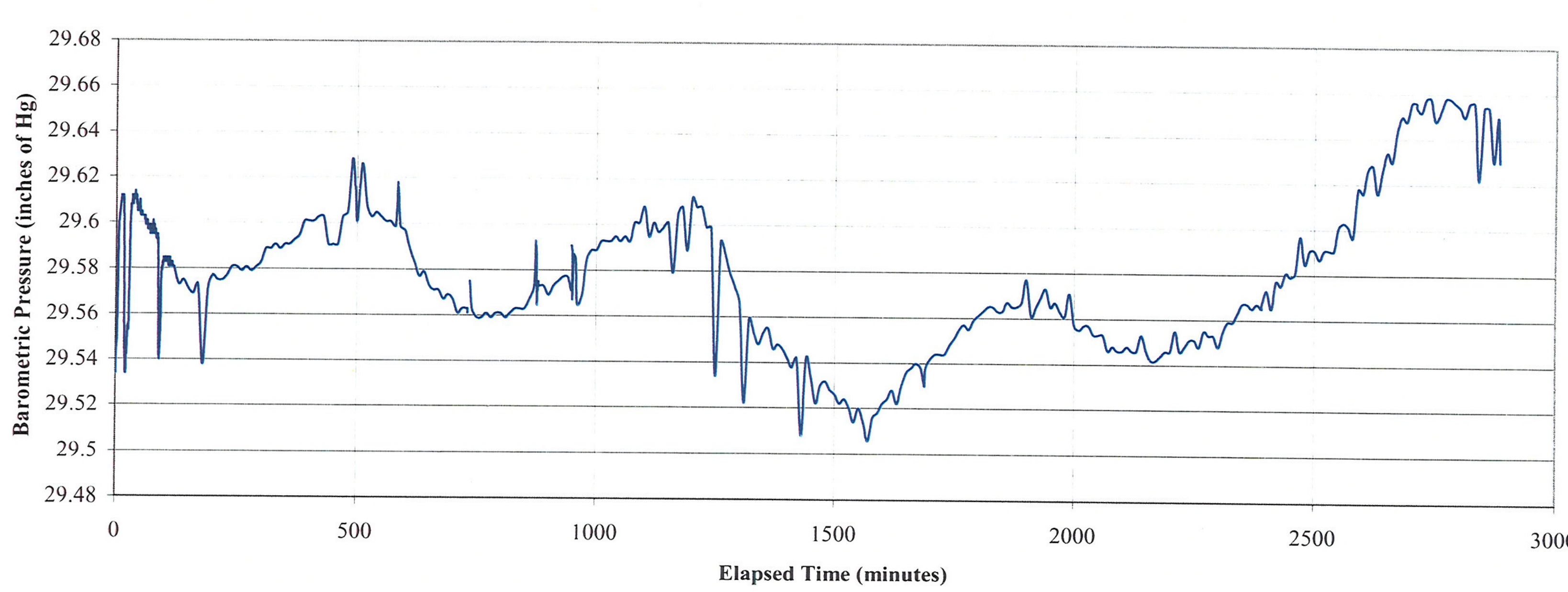
Figure 3
Aquifer Pumping Test
Gregory Canyon
Well GLA-A



Barometric Pressure vs Time



Pumping Rate vs Time

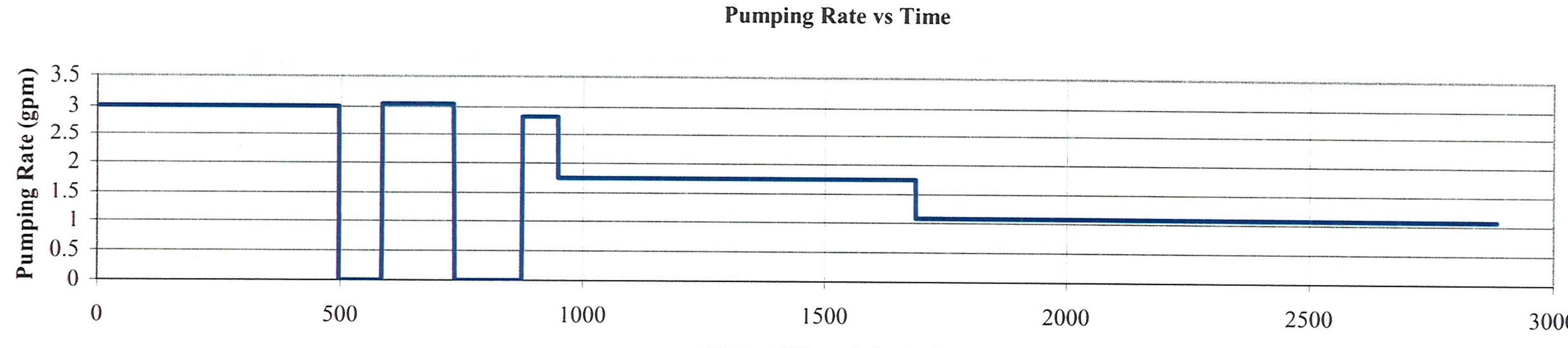


Figure 4
Aquifer Pumping Test
Gregory Canyon
Well GLA-3

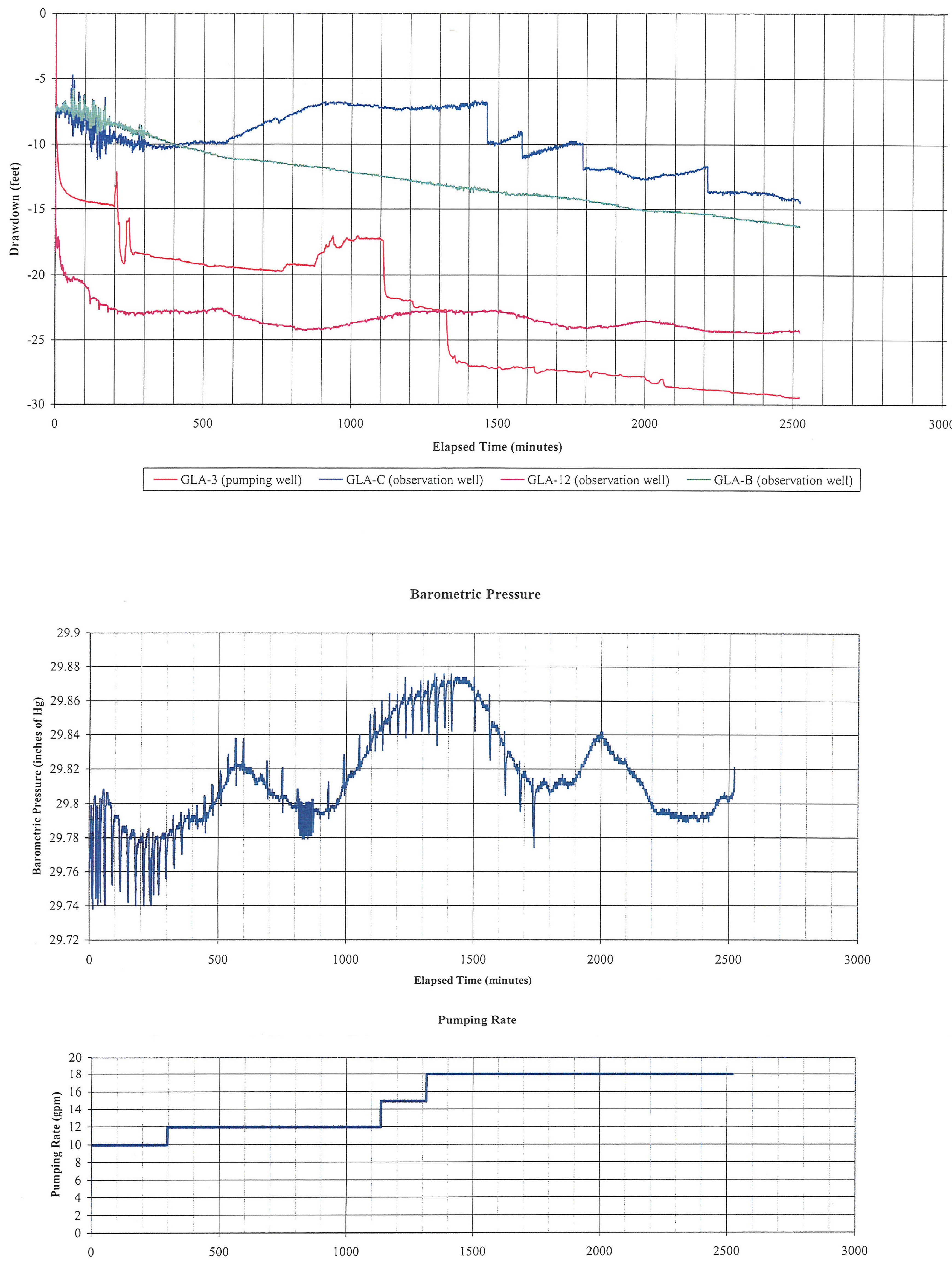


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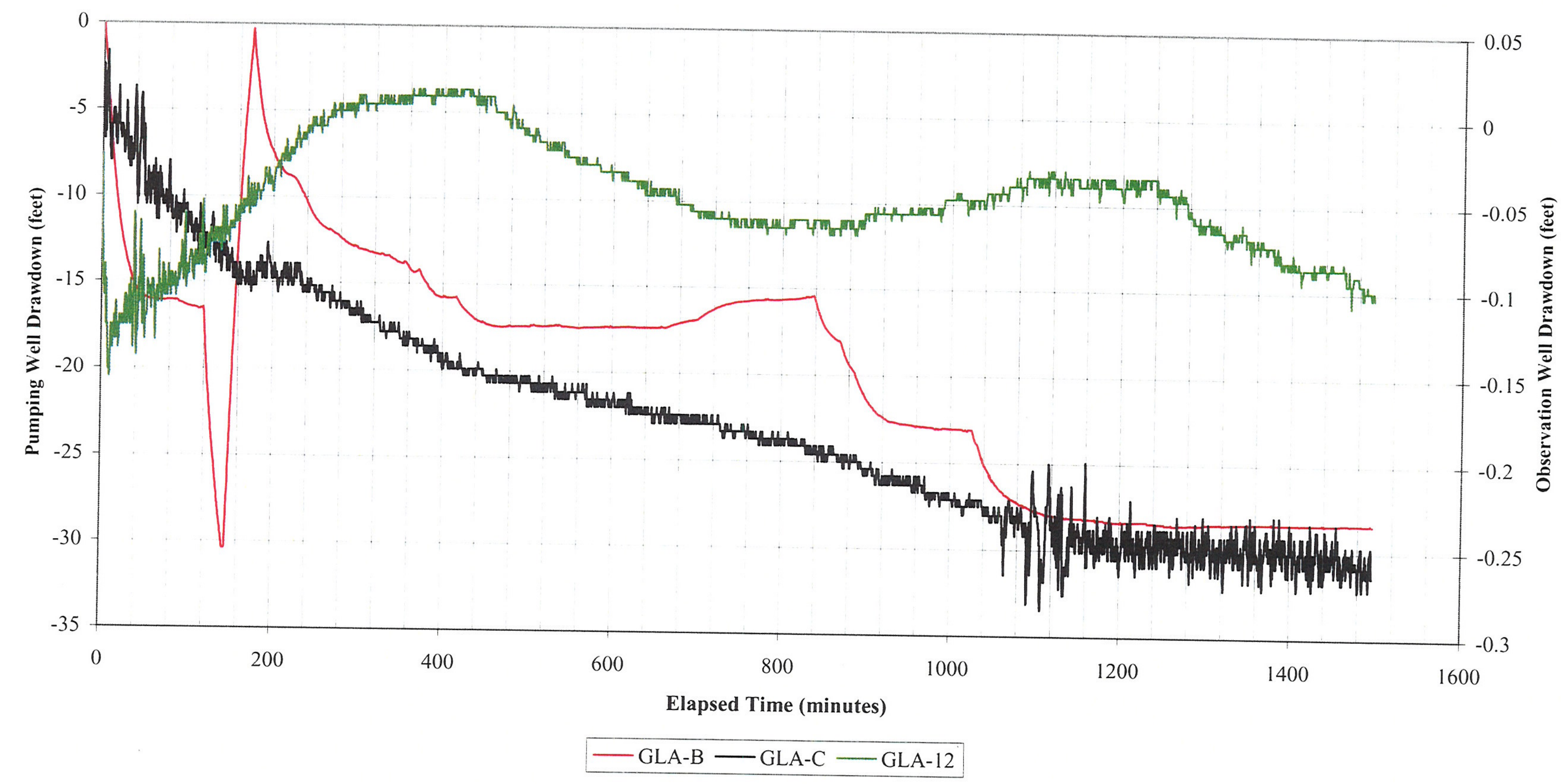
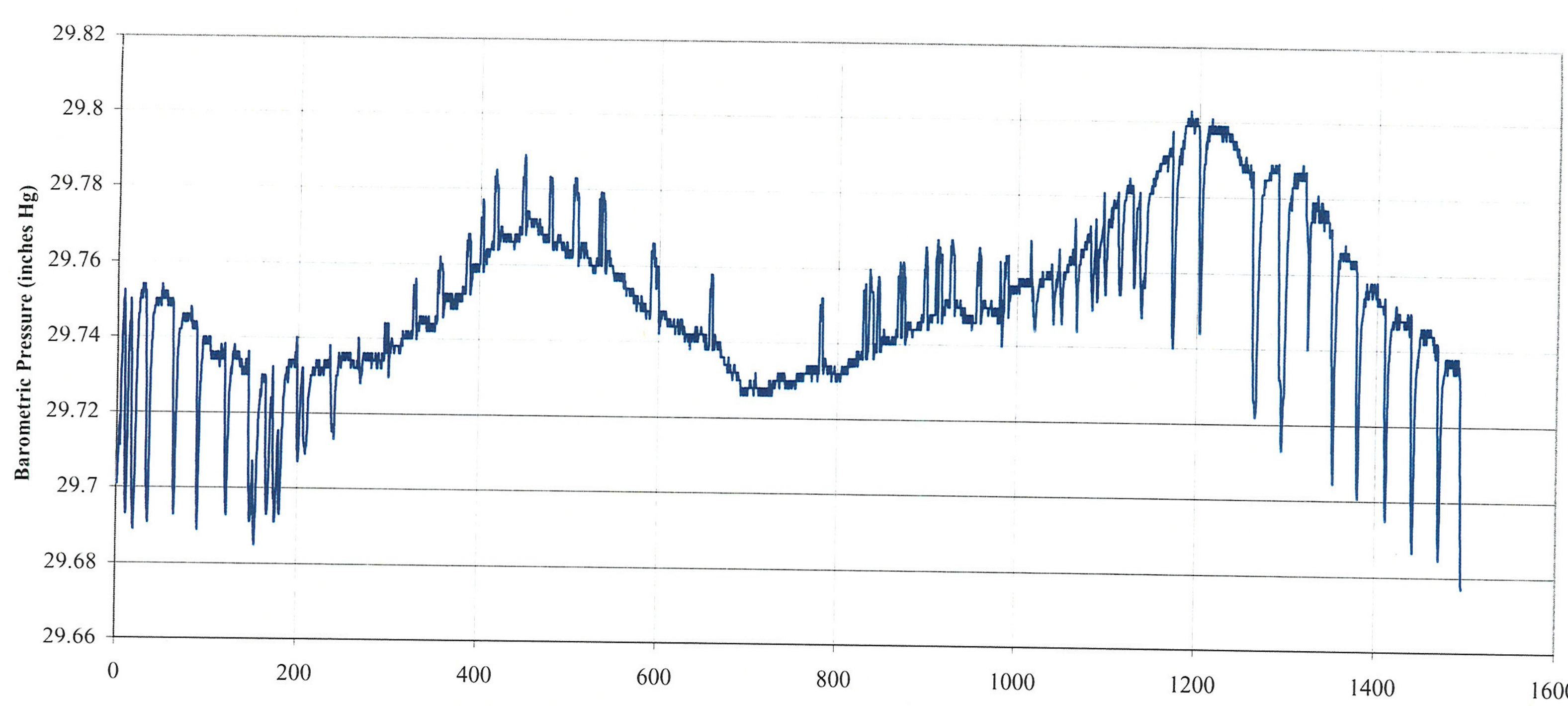
Figure 5
Aquifer Pumping Test
Gregory Canyon
Well GLA-B



Barometric Pressure



Pumping Rate

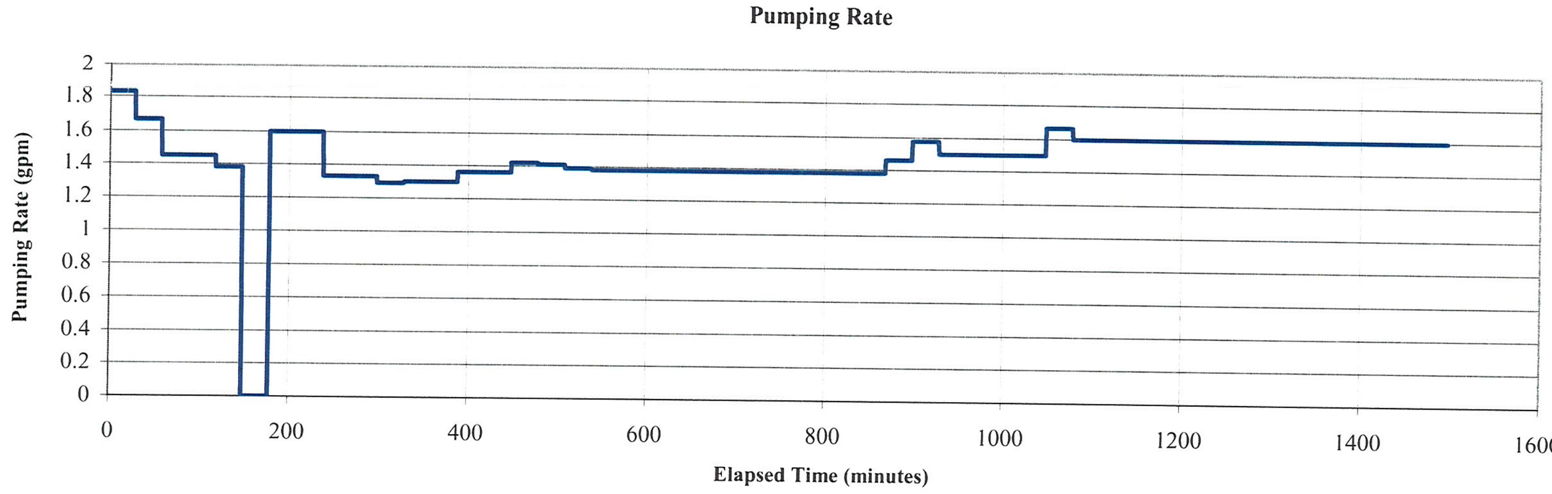
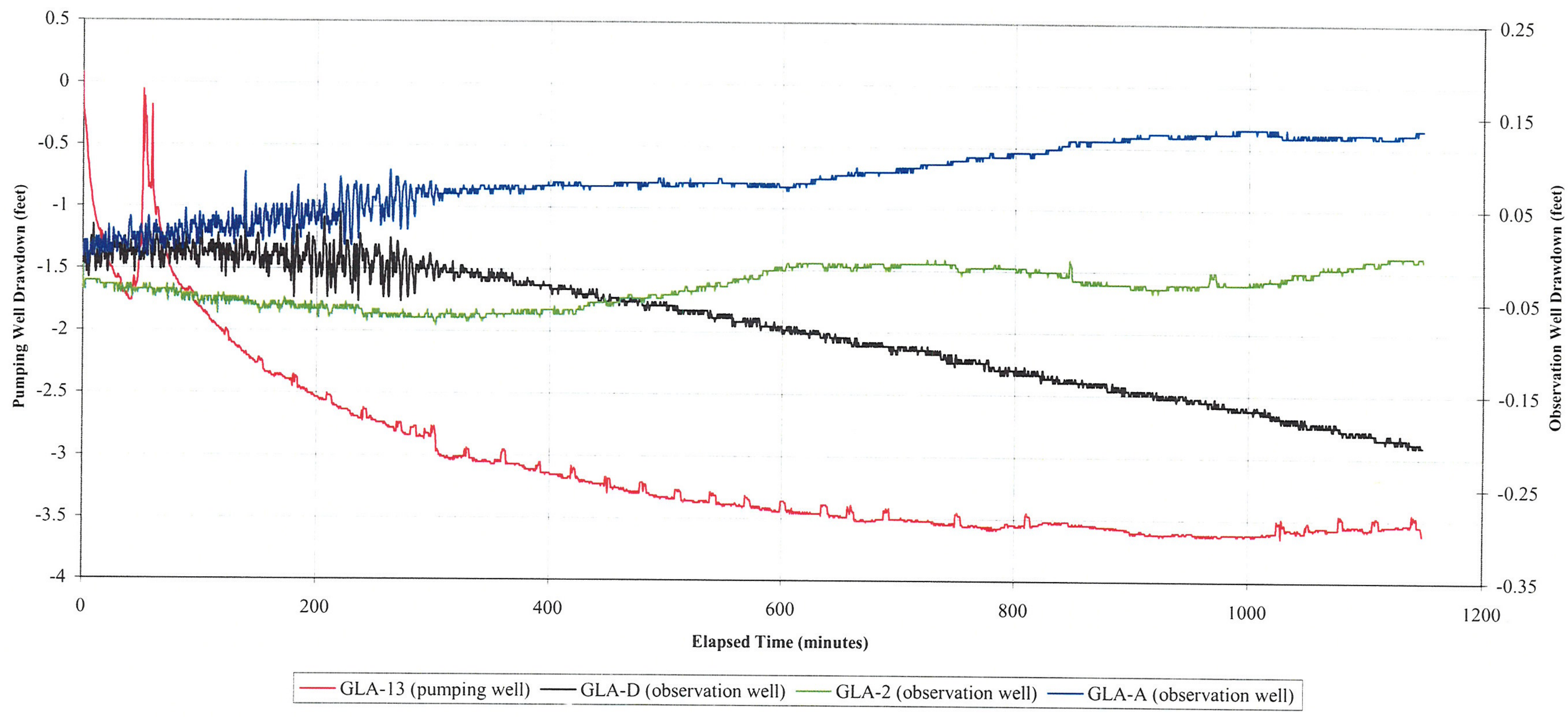
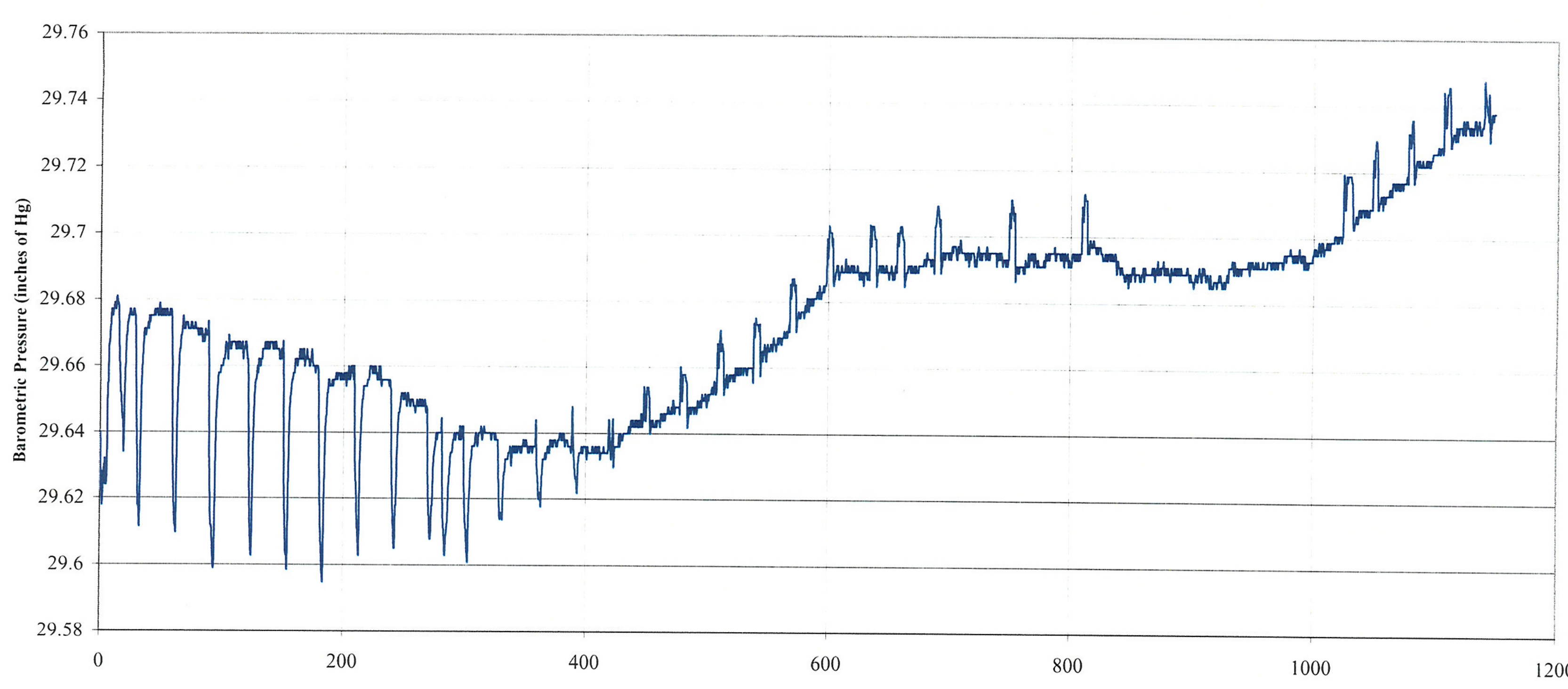


Figure 6
Aquifer Pumping Test
Gregory Canyon
Well GLA-13



Barometric Pressure vs Time



Pumping Rate

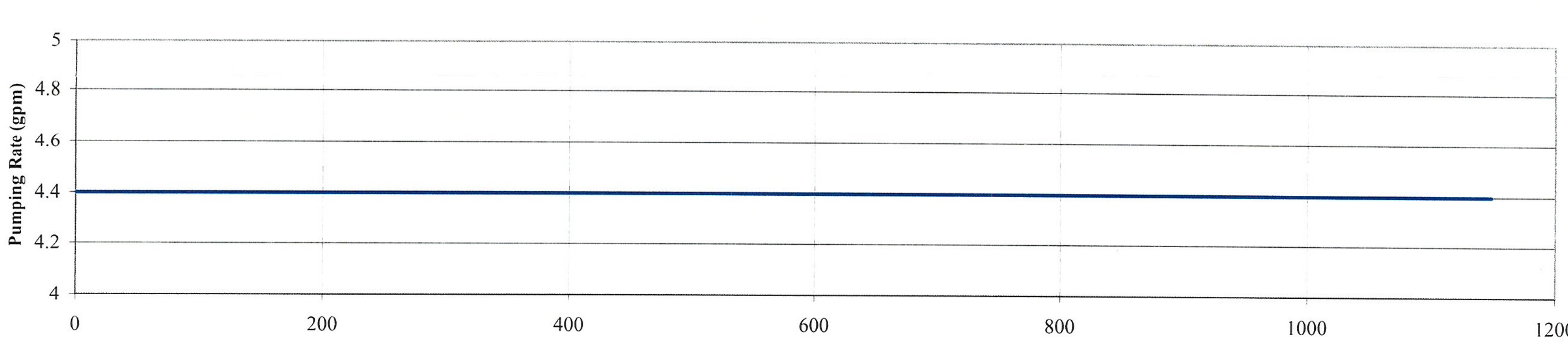


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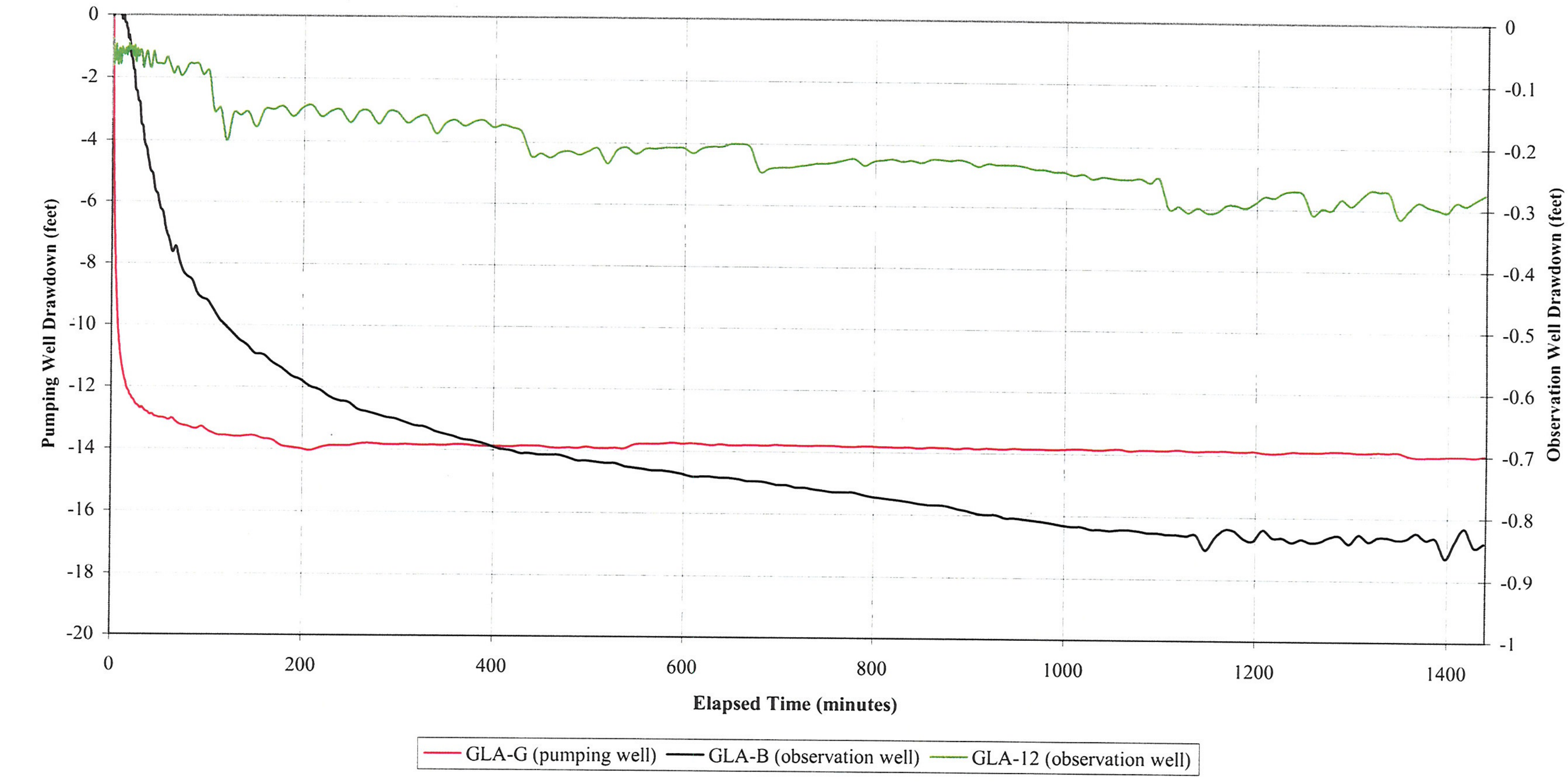
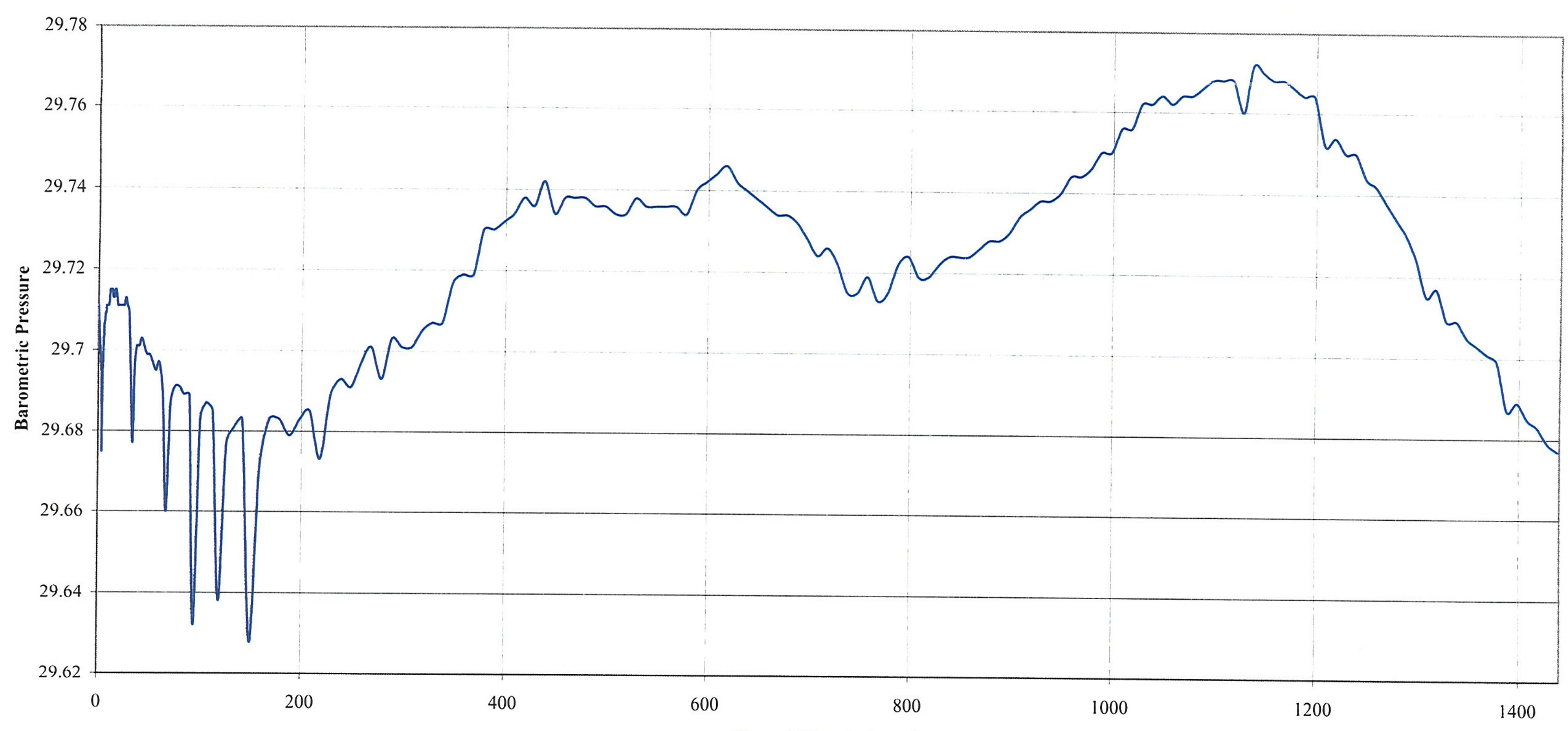
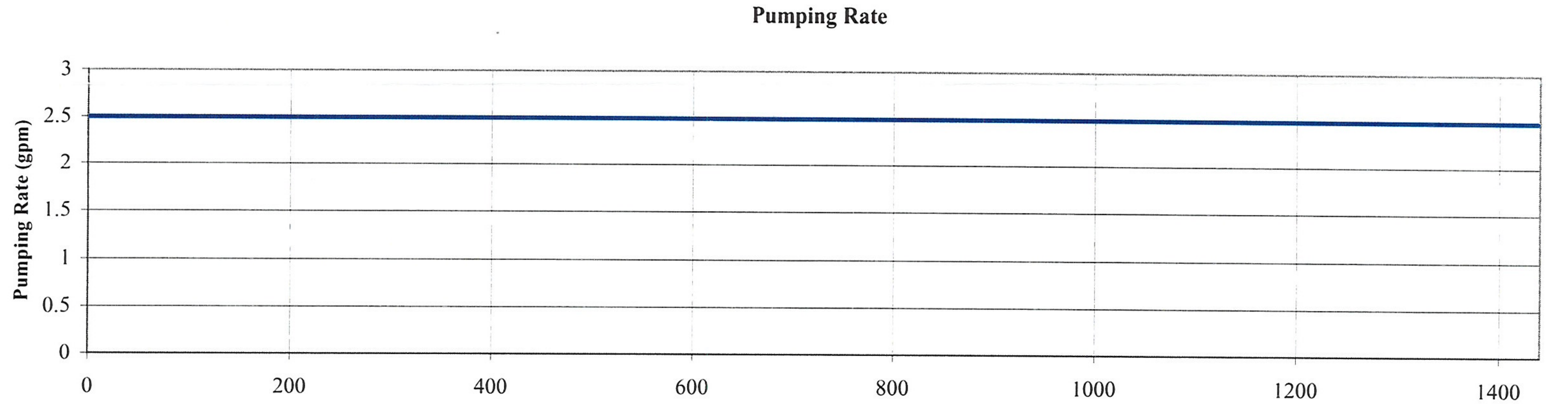
Figure 7
Aquifer Pumping Test
Gregory Canyon
Well GLA-G



Barometric Pressure vs Time



Pumping Rate



TABLES

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TABLE 1
MONITORING WELL CONSTRUCTION DATA
GREGORY CANYON LANDFILL MONITORING WELLS

Well Number	Status	Casing Elevation (feet MSL)	Depth (in feet) To: Bottom of Well	First Water	Static Water (feet)	Static Water (date)	Original Well Construction: Diameter & Material	Filter Pack	Slot Size	Screen Interval	Drilling Method	Aquifer Material
Detection Monitoring Wells												
GLA-2	Compliance	379.39	95.4	-	75.49	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	70.38-95.38	Air Rotary	Bedrock
GLA-4	Background	904.99	250	103	72.84	8/25/04	5.5" Open Hole	None	NA	30-240	Dual Wall Rev. - Air	Bedrock
GLA-5	Background	927.92	195	100	39.89	8/25/04	5.5" Open Hole	None	NA	30-190	Dual Wall Rev. - Air	Bedrock
GLA-11	Background	777.32	243	231	201.20	8/25/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	202.5-242.5	Air Rotary	Bedrock
GLA-12	Compliance	345.79	53	38	39.85	8/25/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	32-52	Air Rotary	Bedrock
GLA-13	Compliance	358.15	70	58	53.00	8/25/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	49.5-69.5	Air Rotary	Bedrock
GLA-14	Compliance	334.13	56	42	40.90	8/25/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	35.5-55.5	Air Rotary	Bedrock
GLA-18 [2]	Background	915 (est.)	-	-	-	-	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	To be determined	Air Rotary	Bedrock
GLA-A	Compliance	380.35	104.4	85	77.85	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	74.4-104.4	Air Rotary	Bedrock
GLA-B	Compliance	347.04	91.5	42	42.67	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	51.2-91.2	Air Rotary	Bedrock
GLA-C	Compliance	343.45	81.5	46.7	39.79	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	41-81	Air Rotary	Bedrock
GLA-D	Compliance	367.65	146.2	105.6	62.92	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	95.1-145.1	Air Rotary	Bedrock
GLA-E [3]	Compliance	385 (est.)	152.9	152.8	77.6	10/9/04	Open Hole (pend. constr.)	#3 Monterey Sd.	0.020"	83-153	Air Rotary	Bedrock
GLA-F [3]	Compliance	375 (est.)	165.5	164.8	69.7	10/9/04	Open Hole (pend. constr.)	#3 Monterey Sd.	0.020"	65-165	Air Rotary	Bedrock
GLA-G	Compliance	347.58	104	85	43.25	8/25/04	4" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	61.15-101.15	Air Rotary	Bedrock
Lucio #2R [4]	Background	310 (est.)	40	12.5	12.7	6/8/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	10-40	Hollow-Stem Auger	Alluvium
GMW-1	Compliance	331.36	90.5	21.25	26.8	10/9/04	5" and 4.25" Open Hole	None	NA	48-90.5	Air Rotary	Bedrock
GMW-3	Compliance	320.36	49.5	12.83	16.32	3/14/00	4" Dia. Sch. 40 PVC	2/12 Sand	0.020"	9.5-49.5	Hollow-Stem Auger	Alluvium
SLRMWD #34R [4]	Sentry	310 (est.)	30	12.6	15.0	10/9/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	9-29	Hollow-Stem Auger	Alluvium
GLA-16	Sentry	307.54	33.5	10.6	17.22	8/25/04	2" Dia. Sch. 40 PVC	#3 Monterey Sd.	0.020"	9.5-29.5	Air Rotary	Alluvium
Water Level Measuring Stations (wells GLA-7 and GLA-8 will be abandoned prior to landfilling in that area)												
GLA-3 [1]	Compliance	332.02	150	-	29.08	8/25/04	Open Hole (pend. constr.)	None	NA	45-100	Air Rotary	Bedrock
GLA-1	-	343.72	300	210	41.9	8/25/04	Open Hole	None	NA	20-300	Dual Wall Rev. - Air	Bedrock
GLA-7	-	402.85	160	50	52.16	8/25/04	Open Hole	None	NA	30-160	Dual Wall Rev. - Air	Bedrock
GLA-8	-	633.11	300	86	73.78	8/25/04	Open Hole	None	NA	15-300	Dual Wall Rev. - Air	Bedrock
GLA-10	-	326.59	57	33	24.09	8/25/04	Open Hole	None	NA	50-57	Dual Wall Rev. - Air	Bedrock

Notes: GLA-17 was drilled to 500 feet and was dry. Borehole was downhole logged before it was grouted to surface with neat cement slurry.

1. The bottom of existing well GLA-3 will be grouted to design depth of approximately 100 feet below ground surface once groundwater monitoring system is approved.
2. GLA-18 will be constructed once the transmission line power pole pad has been constructed and there is adequate drilling rig access to the proposed location.
3. Wells GLA-E and GLA-F had not reached static water levels during the drilling program, and therefore will be constructed as wells once the groundwater system is approved.
4. R indicates replacement constructed in vicinity of the existing groundwater monitoring well.

WELL INFORMATION	GLA-1	GLA-2	GLA-3	GLA	GLA-F*	GLA-G	MW-3	GMW-1	GMW-2	GMW-4	GMP-2
Elevation of Well (feet MSL):											
Top of Well Casing	343.72	379.39	332.02	904.	374	347.58	327.58	331.36	324.64	637.53	437.64
Total Depth of Well (ft.): At installa	300	95	150	25	166	101	24.6	90	106	116	87.5
Depth of Screened Interval	20-300	70-95	45-150	30-2	80-165	61-101	?-24.6	48-90	50-106	55-116	45-87
Depth to Water (from top of well casing (ft.)):											
12/3/1996	37.98	69.65	21.81	165.0	-	-	-	21.24	19.84	-	68.13
12/16/1996	37.10	69.73	23.84	149.9	-	-	23.20	21.89	20.46	65.72	69.54
9/13/1999	39.36	70.58	25.38	70.5	-	-	24.10	23.37	21.39	68.17	72.42
3/14/2000	38.05	71.11	23.66	60.3	-	-	22.98	22.97	20.03	68.69	73.88
11/14-15/00	38.82	72.36	24.80	62.5	-	-	23.56	24.12	20.52	71.53	76.33
12/5-6/00	-	72.23	-	64.7	-	-	-	-	-	-	-
1/30/2001	40.25	72.99	26.78	76.2	-	-	-	-	-	-	-
2/26/2001	40.09	72.98	26.74	71.6	-	-	-	-	-	-	-
3/12/2001	39.99	72.95	26.57	70.5	-	-	-	-	-	-	-
4/13/2001	40.08	73.08	26.55	148.6	-	-	-	-	-	-	-
5/14/2001	40.22	73.19	26.78	98.09	-	-	-	-	-	-	-
6/20/2001	40.62	73.25	27.11	74.5	-	-	-	-	-	-	-
7/11/2001	40.63	73.43	27.24	128.1	-	-	-	-	-	-	-
8/29/2001	40.80	73.62	27.56	76.7	-	-	-	-	-	-	-
9/5/2001	40.72	73.53	26.91	74.2	-	-	-	-	-	-	-
10/29/2001	40.80	73.90	27.54	75.4	-	-	-	-	-	-	-
11/28/2001	40.68	73.88	27.5	73.6	-	-	-	-	-	-	-
12/11/2001	40.55	73.25	27.37	73.0	-	-	-	-	-	-	-
3/29/2002	40.70	73.98	27.48	70.6	-	-	-	-	-	-	-
8/19/2002	41.64	74.19	28.39	69.8	-	-	-	-	-	-	-
8//25/2004	41.90	75.49	29.08	72.8	-	43.25	-	-	-	-	-
10/9/2004	41.78	75.45	28.94	73.0	69.7	43.15	23.85	26.80	21.89	79.97	86.94
Elevation of Water Surface (ft. MSL):											
12/3/1996	305.74	309.74	310.21	739.9	-	-	-	310.12	304.80	-	369.51
12/16/1996	306.62	309.66	308.18	755.0	-	-	304.38	309.47	304.18	571.81	368.10
9/13/1999	304.36	308.81	306.64	834.	-	-	303.48	307.99	303.25	569.36	365.22
3/14/2000	305.67	308.28	308.36	844.	-	-	304.60	308.39	304.61	568.84	363.76
11/14-15/00	304.90	307.03	307.22	842.	-	-	304.02	307.24	304.12	566.00	361.31
12/5-6/00	-	307.16	-	840.	-	-	-	-	-	-	-
1/30/2001	303.47	306.40	305.24	828.	-	-	-	-	-	-	-
2/26/2001	303.63	306.41	305.28	833.	-	-	-	-	-	-	-
3/12/2001	303.73	306.44	305.45	834.	-	-	-	-	-	-	-
4/13/2001	303.64	306.31	305.47	756.3	-	-	-	-	-	-	-
5/14/2001	303.50	306.2	305.24	806.9	-	-	-	-	-	-	-
6/20/2001	303.10	306.14	304.91	830.	-	-	-	-	-	-	-
7/11/2001	303.09	305.96	304.78	776.8	-	-	-	-	-	-	-
8/29/2001	302.92	305.77	304.46	828.	-	-	-	-	-	-	-
9/5/2001	303.00	305.86	305.11	830.	-	-	-	-	-	-	-
10/29/2001	302.92	305.49	304.48	829.	-	-	-	-	-	-	-
11/28/2001	303.04	305.51	304.52	831.	-	-	-	-	-	-	-
12/11/2001	303.17	306.14	304.65	831.	-	-	-	-	-	-	-
3/29/2002	303.02	305.41	304.54	834.	-	-	-	-	-	-	-
8/19/2002	302.08	305.20	303.63	835.	-	-	-	-	-	-	-
8//25/2004	301.82	303.90	302.94	832.	-	304.33	-	-	-	-	-
10/9/2004	301.94	303.94	303.08	831.	304.30	304.43	303.73	304.56	302.75	557.56	350.70

Notes:

NM - Not measured/not applicable.

*GLA-E and GLA-F - Reference elevaton based on topgraphic map

** GLA-4 - Water level had not yet recovered prior to W

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TABLE 3
AQUIFER TEST RESULTS
GREGORY CANYON LANDFILL

Pump Test (date tested)	Well	Distance From Pumping Well (feet)	Specific Capacity (gpm/ft)	Analytical Method	Data Points	Hydraulic Conductivity (ft/day)	Transmissivity (ft2/day)	Storativity
GLA-G (2004)	GLA-G	1	0.18	Cooper-Jacob (time-drawdown), Confined	Middle	0.943	60.3	NC
	GLA-G	1	0.18	Theis, Confined	Late	0.137	8.77	7.90E-03
	GLA-G	1	0.18	Moench (fracture flow)	Late	0.369	23.6	0.053
	GLA-B	101	0.06	Cooper-Jacob (time-drawdown), Confined	Middle-Late	3.96	254	NC
	GLA-B	101	0.06	Cooper-Jacob (time-drawdown), Confined	Late	6	384	NC
	GLA-B	101	0.06	Theis, Confined	Late	3.86	247	2.13E-04
	GLA-B	101	0.06	Moench (fracture flow)	Late	3.26	208	1.99E-06
	GLA-12	101.5	not tested	Cooper-Jacob (time-drawdown), Confined	Late	7.82	500	3.36E-03
	GLA-12	101.5	not tested	Theis, Confined	Late	10.2	650	1.09E-03
	GLA-12	101.5	not tested	Moench (fracture flow)	Late	7.89	505	1.95E-03
GLA-13 (2004)	GLA-13	1	1.11	Cooper-Jacob (time-drawdown), Confined	Late	4.79	87.7	NC
	GLA-13	1	1.11	Theis, Confined	Late	7.14	131	0.280
	GLA-13	1	1.11	Moench (fracture flow)	Late	8.19	150	0.097
	GLA-D	172	not tested	Cooper-Jacob (time-drawdown), Confined	Late	24.6	451	NC
	GLA-D	172	not tested	Theis, Confined	Late	7.87	144	5.04E-03
	GLA-D	172	not tested	Moench (fracture flow)	Late	7.87	144	4.68E-03
GLA-3 (2000)	GLA-3	1	1.00	Cooper-Jacob (time-drawdown), Confined	Late	5.89	352	8.87E-08
	GLA-3	1	1.00	Theis, Unconfined	Late	3.87	231.8	NC
	GMW-1	51	not tested	Cooper-Jacob (time-drawdown), Confined	Late	6.26	325.4	1.28E-04
	GMW-1	51	not tested	Theis, Unconfined	Late	6.09	316.8	NC
	GLA-13	200	not tested	Cooper-Jacob (time-drawdown), unconfined	late	19.15	276.48	NC
	GLA-13	200	not tested	Cooper-Jacob (time-drawdown), Confined	late	NC	273.6	NC
	GLA-13	200	not tested	Theis, Unconfined	late	15.12	218.88	NC
GLA-8 (2000)	GLA-8	1	not tested	Cooper-Jacob (time-drawdown), unconfined	late	0.017	1.84	NC
	GLA-8	1	not tested	Cooper-Jacob (time-drawdown), Confined	late	NC	1.25	0.408
	GLA-8	1	not tested	Cooper-Jacob (time-drawdown), unconfined	middle	0.0896	9.68	9.37E-04
	GLA-8	1	not tested	Cooper-Jacob (time-drawdown), Confined	middle	NC	8.50	7.63E-03
	GLA-8	1	not tested	Theis, unconfined	mid-late	0.0896	9.68	NC
	GMW-4	21	not tested	Cooper-Jacob (time-drawdown), unconfined	late	0.297	13.64	NC
	GMW-4	21	not tested	Cooper-Jacob (time-drawdown), Confined	late	NC	12.73	1.00E-03
	GMW-4	21	not tested	Cooper-Jacob (time-drawdown), unconfined	middle	0.491	22.46	NC
	GMW-4	21	not tested	Cooper-Jacob (time-drawdown), Confined	middle	NC	23.33	0.094
	GMW-4	21	not tested	Theis, unconfined	late	0.210	9.68	NC
Bail Test (date tested)	**Well**	**Distance From Pumping Well (feet)**	**Specific Capacity (gpm/ft)**	**Analytical Method**	**Data Points**	**Hydraulic Conductivity (ft/day)**	**Transmissivity (ft2/day)**	**Storativity**
GLA-E (2004)	GLA-E	NA	not tested	Bower-Rice Slug/Bail	Late	3.07E-03	NC	NC
GLA-F (2004)	GLA-F	NA	not tested	Bower-Rice Slug/Bail	Late	2.55E-03	NC	NC
GLA-2 (2004)	GLA-2	NA	not tested	Bower-Rice Slug/Bail	Late	1.75E-05	NC	NC

Notes: NA - Not Applicable
NC - Not Calculated

ATTACHMENT A

BORING LOGS AND WELL CONSTRUCTION LOGS

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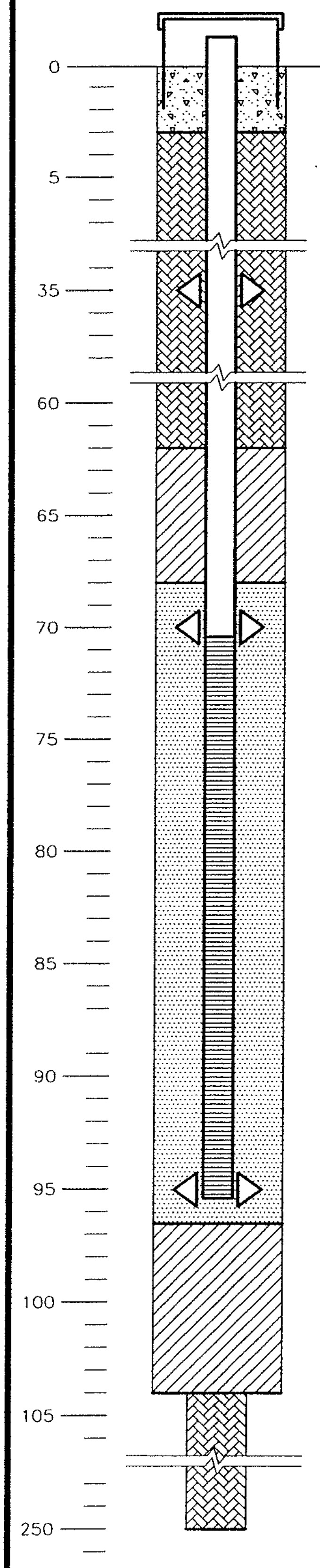
GeoLogic Associates

MONITORING WELL COMPLETION SUMMARY

WELL NO.: GLA-2

JOB NO.: 9539
PROJECT: GREGORY CANYON LANDFILL
LOCATION: GREGORY CANYON, PALA, CA
INSPECTOR: W. LOPEZ, CHG
CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 377.33
ELEVATION TOP OF CASING: 379.39
DATE STARTED: 6/25/04
DATE FINISHED: 6/28/04
TOTAL DEPTH: 95.38 feet



DRILLING SUMMARY:

Total Depth: Reamed to 104 feet
Borehole diameter: 8-1/2"
Driller: WDC EXPLORATION AND WELLS

Rig: SPEED STAR 30K
Bit(s): TRI-CONE

Drilling Fluid: AIR

Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION DETAILS:

Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.06 to 70.38 feet.)

Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 70.38 to 95.38 feet.)

Filter Pack: #3 Monterey type sand. (From 68 to 96.5 feet.)

Bentonite Seal: Medium chipped bentonite. (From 62 to 68 feet and from 96.5 to 104 feet.)

Grout Seal: Neat cement slurry with 5% bentonite. (From 3 to 62 feet and from 104 to 250 feet.)

Centralizer: Stainless steel. (At 35, 70 and 95 feet.)

Cement: From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	11/18/96	11:20	11/19/96	8:19
Coring:	-	-	-	-
Geophys. Logging:	12/12/96	-	12/12/96	-
Bottom Seal Placement: (Grout/Bentonite)	6/24/04	14:00	6/28/04	10:41
Ream:	6/25/04	15:00	6/28/04	9:00
Casing Install:	6/28/04	10:28	6/28/04	10:55
Filter Placement:	6/28/04	10:41	6/28/04	10:23
Seal Placement: (Bentonite)	6/28/04	11:03	6/28/04	11:08
Seal Placement: (Grout)	6/28/04	12:20	6/28/04	13:00

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	7/06/04	11:44	11:58
Bailing	7/06/04	12:00	12:07
Pumping			

Total Gallons Removed: 10

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. ($\mu s/cm$)	Temp (°F)

Comments:

Well was developed by surging and bailing until dry.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
7/26/04	7:30	20 days after well development	-	76.58	300.75	WBL

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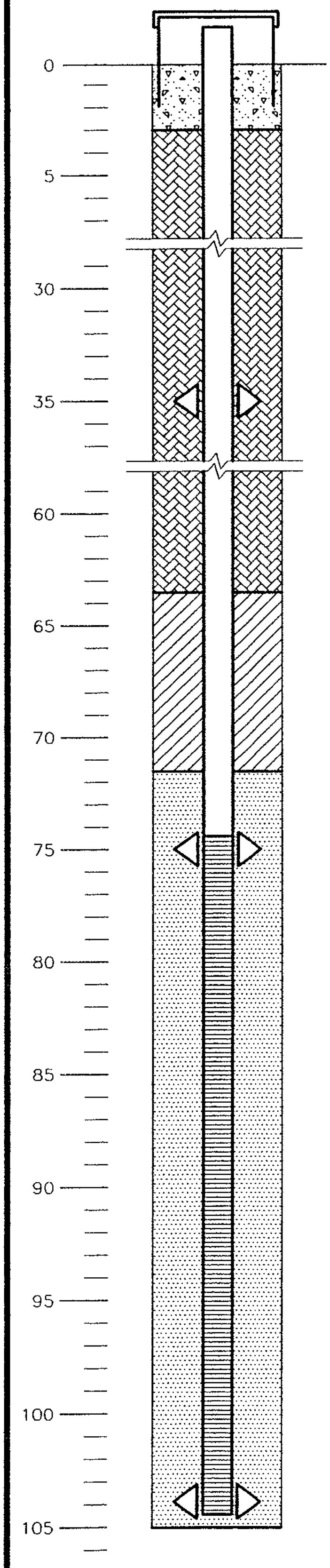
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-A**

JOB NO.: 9539
PROJECT: GREGORY CANYON LANDFILL
LOCATION: GREGORY CANYON, PALA, CA
INSPECTOR: W. LOPEZ, CHG
CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 377.49
ELEVATION TOP OF CASING: 380.35
DATE STARTED: 7/20/04
DATE FINISHED: 7/21/04
TOTAL DEPTH: 104.4 feet



DRILLING SUMMARY:

Total Depth: 105 feet
Borehole diameter: 8-1/2"
Driller: WDC EXPLORATION AND WELLS

Rig: SPEED STAR 30K
Bit(s): TRI-CONE / DOWNHOLE HAMMER

Drilling Fluid: AIR

Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION DETAILS:

Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.86 to 74.4 feet.)

Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 74.4 to 104.4 feet.)

Filter Pack: #3 Monterey type sand. (From 71.5 to 105 feet.)

Bentonite Seal: Medium chipped bentonite. (From 63.5 to 71.5 feet.)

Grout Seal: Neat cement slurry with 5% bentonite. (From 3 to 63.5 feet.)

Centralizer: Stainless steel. (At 35, 75 and 104 feet.)

Cement: From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	6/08/04	16:50	6/09/04	9:55
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	6/11/04	7:30	6/11/04	9:15
Casing Install:	6/24/04	10:00	6/24/04	10:10
Filter Placement:	6/24/04	10:15	6/24/04	11:10
Seal Placement: (Bentonite)	6/24/04	11:10	6/24/04	11:20
Seal Placement: (Grout)	6/24/04	12:30	6/24/04	13:10

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	7/06/04	8:30	8:40
Bailing	7/06/04	8:40	9:00
Pumping	7/06/04	10:25	11:15

Total Gallons Removed: 165

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. (µs/cm)	Temp (°F)

Comments:

Well was developed by surging, bailing and pumping water until visibly clear, approximately less then 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
6/11/04	7:15	Prior to well construction	-	75.22	302.27	WBL
7/06/04	8:25	Prior to well development	-	75.30	302.19	WBL

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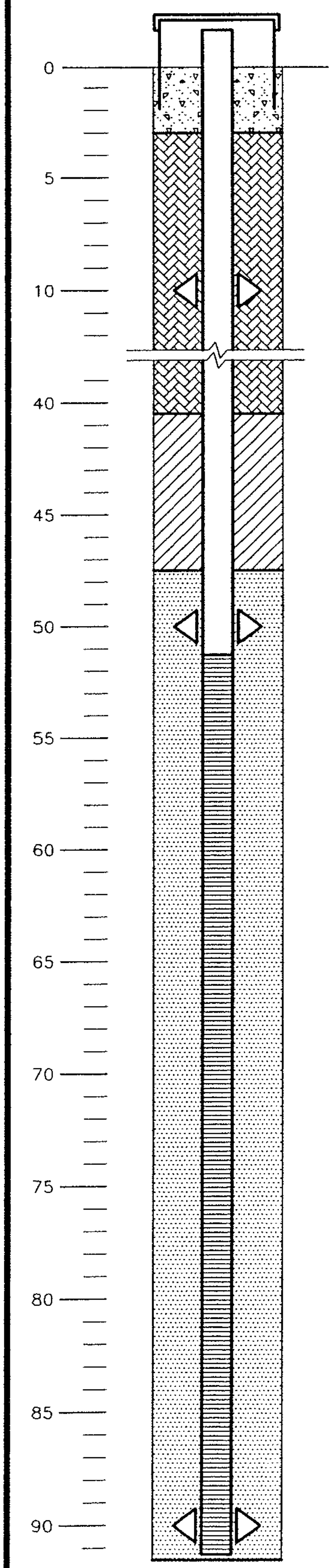
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-B**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: GREGORY CANYON LANDFILL
LOCATION: GREGORY CANYON, PALA, CA
INSPECTOR: J. HOWER, CEG
CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 344.14
ELEVATION TOP OF CASING: 347.04
DATE STARTED: 6/09/04
DATE FINISHED: 6/23/04
TOTAL DEPTH: 91.22 feet



DRILLING SUMMARY:

Total Depth: 91.5 feet
Borehole diameter: 8-1/2"
Driller: WDC EXPLORATION AND WELLS

Rig: SPEED STAR 30K
Bit(s): TRI-CONE / DOWNHOLE HAMMER

Drilling Fluid: AIR

Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION DETAILS:

Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.9 to 51.22 feet.)

Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 51.22 to 91.22 feet.)

Filter Pack: #3 Monterey type sand. (From 47.5 to 91.5 feet.)

Bentonite Seal: Medium chipped bentonite. (From 40.5 to 47.5 feet.)

Grout Seal: Neat cement slurry with 5% bentonite. (From 3 to 47 feet.)

Centralizer: Stainless steel. (At 10, 50 and 90 feet.)

Concrete From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	6/09/04	15:57	6/10/04	10:49
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	6/11/04	9:30	6/11/04	11:15
Casing Install:	6/21/04	10:20	6/21/04	10:50
Filter Placement:	6/21/04	10:52	6/21/04	11:15
Seal Placement: (Bentonite)	6/21/04	11:27	6/21/04	11:38
Seal Placement: (Grout)	6/23/04	8:30	6/23/04	9:45

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block			
Bailing			
Pumping	6/28/04 6/29/04	15:00	16:00

Total Gallons Removed: 2400

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. (μs/cm)	Temp (°F)

Comments:

Well was developed during pump test conducted on 6/28/04 and 6/29/04. Discharge visibly clear, less then 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
6/11/04	8:19	Prior to well construction	-	39.70	304.44	AF
7/06/04	14:30	After well development	-	40.00	304.14	WBL

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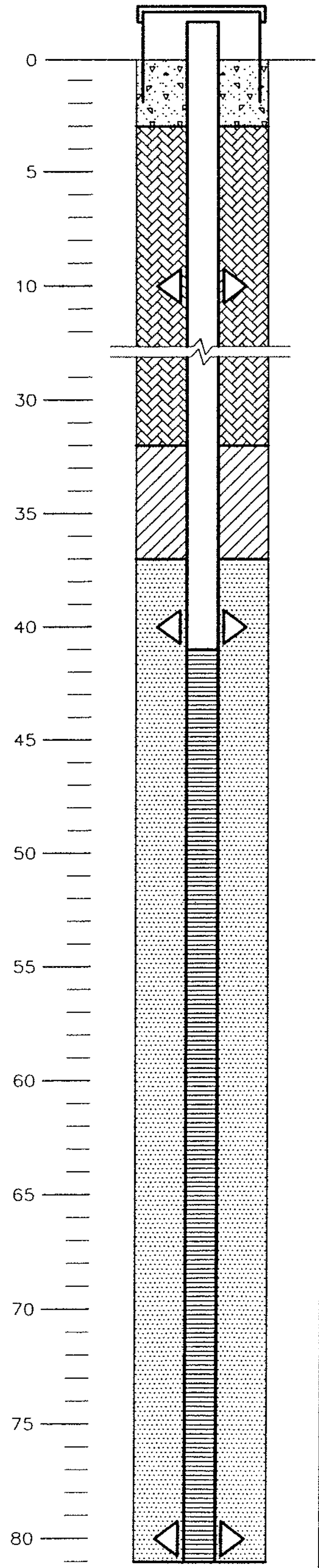
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-C**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: GREGORY CANYON LANDFILL
LOCATION: GREGORY CANYON, PALA, CA
INSPECTOR: W. LOPEZ, CHG
CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 340.76
ELEVATION TOP OF CASING: 343.45
DATE STARTED: 6/03/04
DATE FINISHED: 6/03/04
TOTAL DEPTH: 81 feet



DRILLING SUMMARY:

Total Depth: 81 feet
Borehole diameter: 8-1/2"
Driller: WDC EXPLORATION AND WELLS

Rig: SPEED STAR 30K
Bit(s): TRI-CONE / DOWNHOLE HAMMER

Drilling Fluid: AIR

Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION DETAILS:

Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.69 to 41 feet.)

Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 41 to 81 feet.)

Filter Pack: #3 Monterey type sand. (From 37 to 81 feet.)

Bentonite Seal: Medium chipped bentonite. (From 32 to 37 feet.)

Grout Seal: Neat cement slurry with 5% bentonite. (From 3 to 32 feet.)

Centralizer: Stainless steel. (At 10, 40 and 80 feet.)

Concrete From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	6/10/04	16:35	6/11/04	9:19
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	6/18/04	7:30	6/18/04	9:00
Casing Install:	6/21/04	13:05	6/21/04	13:35
Filter Placement:	6/21/04	13:35	6/21/04	14:05
Seal Placement: (Bentonite)	6/21/04	14:08	6/21/04	14:23
Seal Placement: (Grout)	6/23/04	10:15	6/23/04	11:30

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	7/06/04	14:15	14:28
Bailing	7/06/04	14:28	14:38
Pumping	7/06/04	14:50	PM

Total Gallons Removed: 170

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. ($\mu s/cm$)	Temp (°F)

Comments:

Well was developed by surging, bailing and pumping water until visibly clear, approximately less then 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
6/12/04	15:55	Prior to well construction	-	40.14	303.31	WBL
7/06/04	14:10	Prior to well development	-	37.12	306.33	WBL

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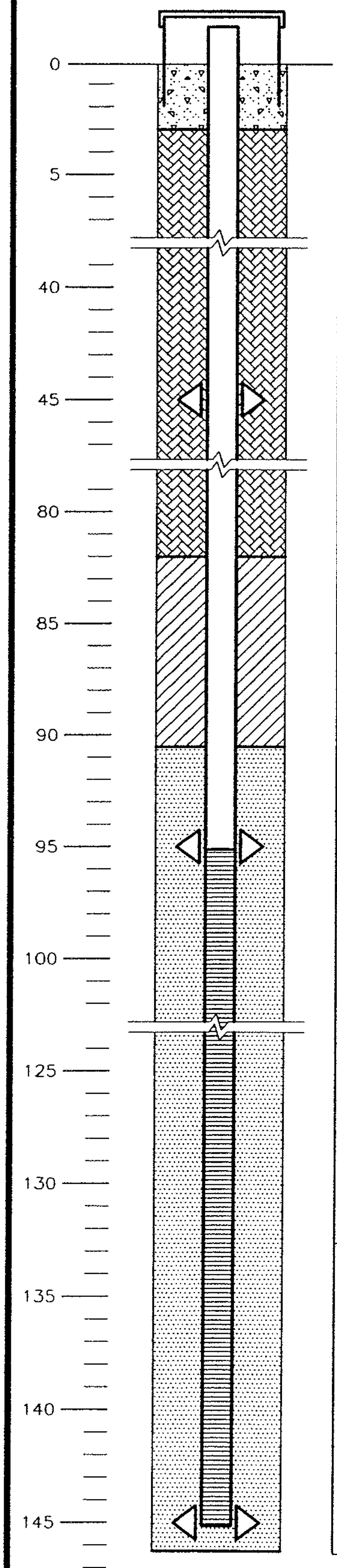
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-D**

PAGE: 1 OF 1

JOB NO.: 9539
PROJECT: GREGORY CANYON LANDFILL
LOCATION: GREGORY CANYON, PALA, CA
INSPECTOR: W. LOPEZ, CHG
CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 364.77
ELEVATION TOP OF CASING: 367.65
DATE STARTED: 6/07/04
DATE FINISHED: 6/25/04
TOTAL DEPTH: 145.1 feet



DRILLING SUMMARY:

Total Depth: 146.2 feet
Borehole diameter: 8-1/2"
Driller: WDC EXPLORATION AND WELLS

Rig: SPEED STAR 30K
Bit(s): TRI-CONE / DOWNHOLE HAMMER

Drilling Fluid: AIR

Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION DETAILS:

Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.88 to 95.1 feet.)

Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 95.1 to 145.1 feet.)

Filter Pack: #3 Monterey type sand. (From 90.5 to 146.2 feet.)

Bentonite Seal: Medium chipped bentonite. (From 82 to 90.5 feet.)

Grout Seal: Neat cement slurry with 5% bentonite. (From 3 to 82 feet.)

Centralizer: Stainless steel. (At 45, 95 and 145 feet.)

Cement: From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	6/07/04	14:25	6/08/04	8:55
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	6/11/04	13:15	6/11/04	15:15
Casing Install:	6/25/04	7:30	6/25/04	7:45
Filter Placement:	6/25/04	8:10	6/25/04	8:45
Seal Placement: (Bentonite)	6/25/04	8:45	6/25/04	8:54
Seal Placement: (Grout)	6/25/04	10:30	6/25/04	11:10

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	7/06/04	13:15	13:25
Bailing	7/06/04	13:25	13:50
Pumping			

Total Gallons Removed: 90

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. (μs/cm)	Temp (°F)

Comments:

Well was developed by surging and bailing until dry.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
6/21/04	11:30	Prior to well construction	-	59.50	305.27	WBL
7/06/04	12:15	Prior to well development	-	60.27	304.50	WBL

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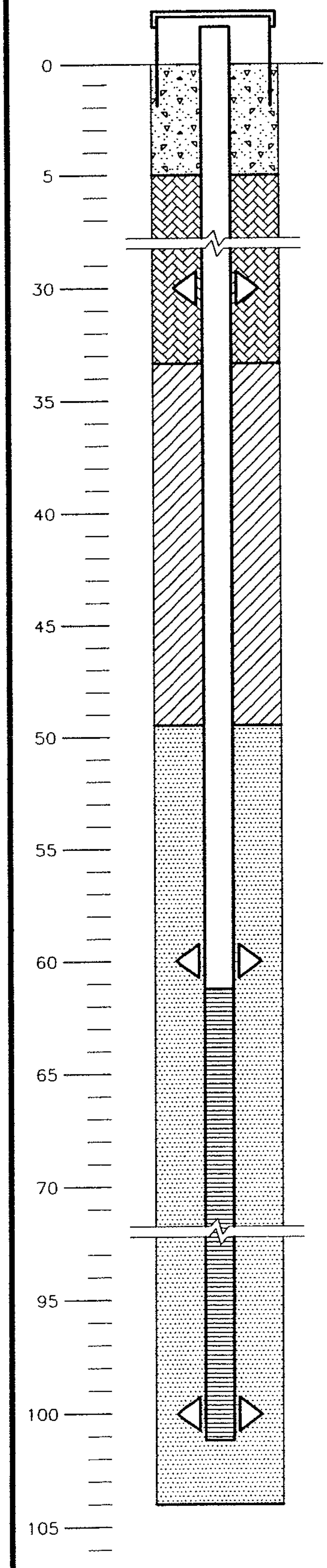
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **GLA-G**

JOB NO.: 9539
PROJECT: GREGORY CANYON LANDFILL
LOCATION: GREGORY CANYON, PALA, CA
INSPECTOR: W. LOPEZ, CHG
CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: 345.04
ELEVATION TOP OF CASING: 347.58
DATE STARTED: 7/20/04
DATE FINISHED: 7/21/04
TOTAL DEPTH: 101.15 feet



DRILLING SUMMARY:

Total Depth: 104 feet
Borehole diameter: 8-1/2"
Driller: WDC EXPLORATION AND WELLS

Rig: SPEED STAR 30K
Bit(s): TRI-CONE / DOWNHOLE HAMMER

Drilling Fluid: AIR

Protective Casing: 9-5/8" diameter steel conductor from 0 to 20'

WELL CONSTRUCTION DETAILS:

Casing: 4" diameter, flush threaded, Sch. 40 PVC. (From +2.54 to 61.15 feet.)

Screen: 4" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 61.15 to 101.15 feet.)

Filter Pack: #3 Monterey type sand. (From 49.5 to 104 feet.)

Bentonite Seal: Medium chipped bentonite. (From 33.3 to 49.5 feet.)

Grout Seal: Neat cement slurry with 5% bentonite. (From 5 to 33.3 feet.)

Centralizer: Stainless steel. (At 30, 60 and 100 feet.)

Cement: From 0 to 5 feet.

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	7/20/04	9:40	7/20/04	11:07
Coring:	-	-	-	-
Ream:	-	-	-	-
Geophys. Logging:	7/21/04	7:30	7/21/04	9:15
Casing Install:	7/21/04	10:23	7/21/04	10:45
Filter Placement:	7/21/04	10:47	7/21/04	11:42
Seal Placement: (Bentonite)	7/21/04	12:15	7/21/04	12:30
Seal Placement: (Grout)	7/21/04	15:00	7/21/04	15:30

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	7/22/04	10:15	10:25
Bailing	7/22/04	10:25	10:35
Pumping	7/22/04	11:03	17:10

Total Gallons Removed: 522

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. ($\mu s/cm$)	Temp (°F)

Comments:

Well was developed by surging, bailing and pumping water until visibly clear, approximately less then 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL (feet)	By
7/22/04	10:00	Prior to well development	-	40.18	304.86	WBL

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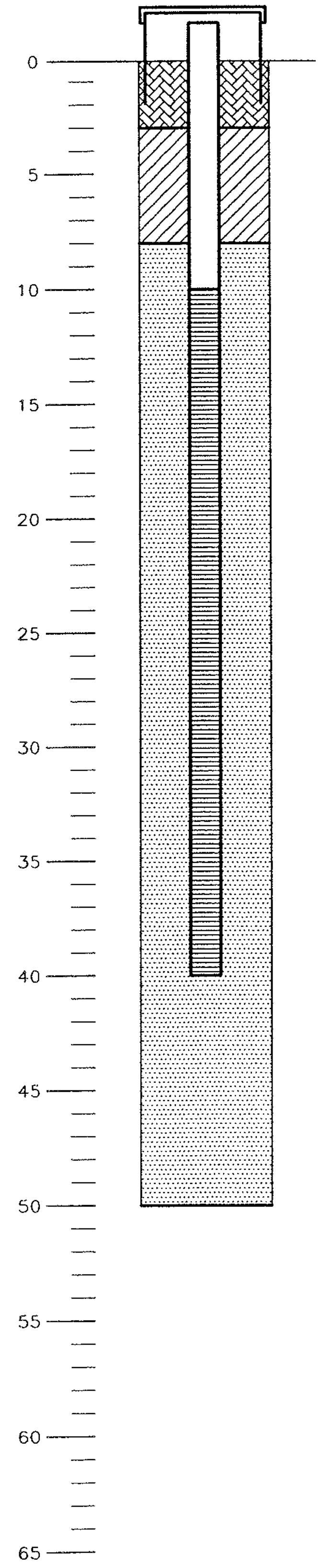
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **LUCIO-2R**

JOB NO.: 9539
PROJECT: GREGORY CANYON LANDFILL
LOCATION: GREGORY CANYON, PALA, CA
INSPECTOR: W. LOPEZ, CHG
CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: ND
ELEVATION TOP OF CASING: ND
DATE STARTED: 6/03/04
DATE FINISHED: 6/03/04
TOTAL DEPTH: 40 feet



DRILLING SUMMARY:

Total Depth: 50 feet
Borehole diameter: 8"
Driller: WDC EXPLORATION AND WELLS

Rig: CME-95
Bit(s): BLADE BIT

Drilling Fluid: NA

Protective Casing: AUGER

WELL CONSTRUCTION DETAILS:

Casing: 2" diameter, flush threaded, Sch. 40 PVC. (From +3 to 10 feet.)

Screen: 2" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 10 to 40 feet.)

Filter Pack: #3 Monterey type sand. (From 8 to 50 feet.)

Bentonite Seal: Medium chipped bentonite. (From 3 to 8 feet.)

Concrete Seal: From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	6/03/04	8:33	6/03/04	9:03
Coring:	-	-	-	-
Ream:	-	-	-	-
Casing Install:	6/03/04	9:08	6/03/04	9:10
Filter Placement:	6/03/04	9:10	6/03/04	10:03
Seal Placement: (Bentonite)	6/03/04	10:03	6/03/04	10:05
Seal Placement: (Concrete)	6/03/04	10:20	6/03/04	10:45

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	6/08/04	10:00	10:10
Bailing	6/08/04	10:15	10:20
Pumping	6/08/04	10:30	11:00

Total Gallons Removed: 155

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. ($\mu s/cm$)	Temp (°F)

Comments:

Well was developed by surging, bailing and pumping water until visibly clear, approximately less then 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL	By
6/03/04	9:10	During well construction	-	12.5	-	WBL
6/08/04	9:30	Prior to well development	-	12.7	-	WBL
6/08/04	11:00	After well development	-	12.7	-	WBL

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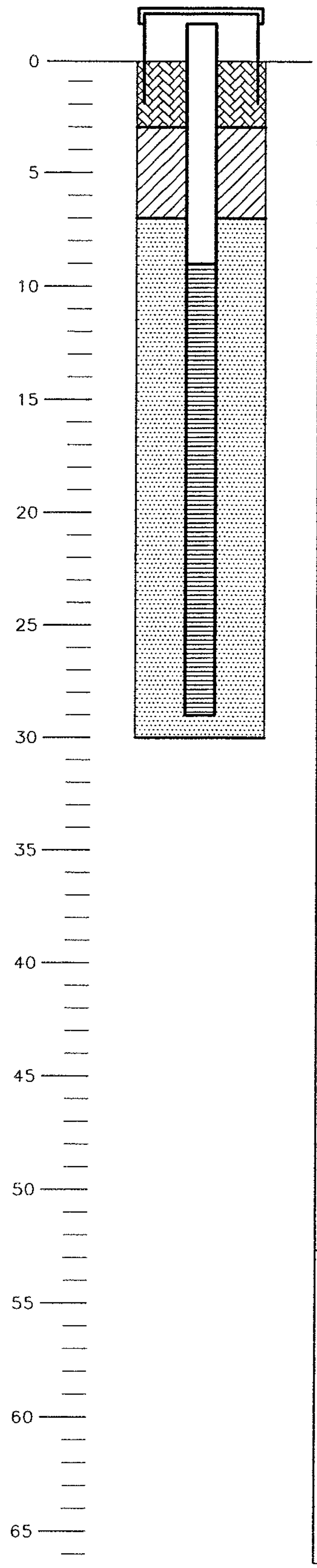
MONITORING WELL COMPLETION SUMMARY

WELL NO.: **SLRMWD-34R**

JOB NO.: 9539
PROJECT: GREGORY CANYON LANDFILL
LOCATION: GREGORY CANYON, PALA, CA
INSPECTOR: W. LOPEZ, CHG
CHECKED BY: W. LOPEZ, CHG

ELEVATION GROUND LEVEL: ND
ELEVATION TOP OF CASING: ND
DATE STARTED: 6/03/04
DATE FINISHED: 6/03/04
TOTAL DEPTH: 29 feet



DRILLING SUMMARY:

Total Depth: 30 feet
Borehole diameter: 8"
Driller: WDC EXPLORATION AND WELLS

Rig: CME-95
Bit(s): BLADE BIT

Drilling Fluid: NA

Protective Casing: AUGER

WELL CONSTRUCTION DETAILS:

Casing: 2" diameter, flush threaded, Sch. 40 PVC. (From +3 to 9 feet.)

Screen: 2" diameter, flush threaded, Sch. 40 PVC with 0.020" slots. (From 9 to 29 feet.)

Filter Pack: #3 Monterey type sand. (From 7 to 30 feet.)

Bentonite Seal: Medium chipped bentonite. (From 3 to 7 feet.)

Cement Seal: From 0 to 3 feet.

WELL CONSTRUCTION LOG:

	Start Date	Start Time	Finish Date	Finish Time
Drilling:	6/03/04	12:20	6/03/04	12:40
Coring:	-	-	-	-
Ream:	-	-	-	-
Casing Install:	6/03/04	12:42	6/03/04	12:45
Filter Placement:	6/03/04	12:45	6/03/04	13:08
Seal Placement: (Bentonite)	6/03/04	13:08	6/03/04	13:10
Seal Placement: (Cement)	6/03/04	13:15	6/03/04	13:45

WELL DEVELOPMENT LOG:

	Date	Start Time	Finish Time
Surge Block	6/08/04	11:45	11:55
Bailing	6/08/04	12:00	12:05
Pumping	6/08/04	12:15	12:45

Total Gallons Removed: 155

STABILIZATION TEST DATA:

Gallons	pH	Spec. Cond. ($\mu s/cm$)	Temp (°F)

Comments:

Well was developed by surging, bailing and pumping water until visibly clear, approximately less then 5 NTU.

WELL MONITORING DATA:

Date	Time	Description	Corr.	Depth (feet)	SWL	By
6/03/04	14:00	After well construction	-	12.6	-	WBL
6/08/04	11:25	Prior to well development	-	13.4	-	WBL
6/08/04	13:00	After well development	-	13.4	-	WBL

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GeoLogic Associates
Boring Log

BORING NO.: GLA-17

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: A. FYODOROVA

DATE STARTED: 6/16/04
DATE FINISHED: 6/18/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: NA
TOTAL DEPTH: 500 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:48						0				WEATHERED BEDROCK: Gray to dark gray (N4-N5), fine, hightly weathered, poorly indurated TONALITE.	Damp.
										...(5') - intermittent apolite dikes.	
8:55											
9:24						10				...(10') - highly to moderately weathered, moderately indurated.	...(10') - set conductor casing to 10 feet.
										...(15'-18') - light yellowish brown (10YR 6/4) GRANODIORITE dike with fine to coarse euhedral crystals.	Damp.
9:31											
9:36						20				...(22'-23') - brown (7.5YR 5/2), fine to medium GRANODIORITE dike.	Damp.
						30				...(33') - fine to medium with some iron-oxide staining.	
9:47											
9:53						40					
										BEDROCK: Very dark gray (N3), aphanitic to fine, slightly to moderately weathered, well indurated TONALITE with some iron-oxide staining.	
						50					...(50') - inject water for dust control.
10:06											
10:16						60					
						70				...(69') - color change to dark grayish brown (2.5Y 4/2).	
10:24											
10:31						80					
						90				...(96') - quartz vein.	
10:41											
10:50						100					

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GeoLogic Associates
Boring Log

JOB NO.:	9539	DATE STARTED:	6/16/04	GW DEPTH:	NA
SITE LOCATION:	GREGORY CANYON LANDFILL	DATE FINISHED:	6/18/04	TOTAL DEPTH:	500 feet
DRILLING METHOD:	AIR ROTARY	ELEVATION:	ND		
CONTRACTOR:	WDC EXPLORATION AND WELLS	NORTHING:	ND		
LOGGED BY:	A. FYODOROVA	EASTING:	ND		

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
10:50						100					
						110					
11:09											
11:17						120				...(119') – fine to medium with some iron-oxide staining, slightly weathered.	
										...(125') – color change to pale olive (5Y 6/3); fine to coarse, moderately weathered, some iron-oxide staining.	
						130					
										...(134') – color change to olive gray (5Y 5/2); thin apalite dike.	
11:30											
11:35						140					
						150				...(150') – fine-grained.	
11:51											
12:18						160					
										...(166') – calcite veins.	
						170				...(170'–173') – pale brown (10YR 6/3) to brown (10YR 5/3), fine to coarse GRANODIORITE dike with some iron-oxide staining.	
12:36										...(173') – dark gray (N4) to black (N2.5), aphanitic to fine, very well indurated TONALITE with thin calcite veins.	
12:42						180					
						190					...(192'–196') – no cuttings return.
										...(196') – predominately fine euhedral crysals.	
13:13											
13:20						200					

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GeoLogic Associates
Boring Log

BORING NO.: GLA-17

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: A. FYODOROVA

DATE STARTED: 6/16/04
DATE FINISHED: 6/18/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: NA
TOTAL DEPTH: 500 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
13:20						200				...same as above.	
						210					
13:53											
14:00						220					
						230					
14:34											
14:39						240					
						250					
15:13											
15:19						260					
						270					
15:15											
6/17 7:15						280					
						290				...(290–300') – predominately aphanitic.	
7:50											
7:54						300				...(300') – dark gray to gray (N4–N5), fine to medium, very well indurated TONALITE.	

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GeoLogic Associates
Boring Log

BORING NO.: GLA-17

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: A. FYODOROVA

DATE STARTED: 6/16/04
DATE FINISHED: 6/18/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: NA
TOTAL DEPTH: 500 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
7:54						300				...(300') - dark gray to gray (N4-N5), fine to medium, very well indurated TONALITE.	
						310					
8:29											
8:34						320					
						330					
9:13											
9:23						340					
						350					
9:58											
10:10						360				...(360') - fine to aphanitic with calcite veins.	
						370					
11:01											
11:12						380					
						390					
11:49											
12:01						400					

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GeoLogic Associates
Boring Log

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: A. FYODOROVA

DATE STARTED: 6/16/04
DATE FINISHED: 6/18/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: NA
TOTAL DEPTH: 500 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
12:01						400				...same as above.	
12:18											
6/18 7:54						410					
8:10											
8:14						420					
						430					
9:03											
9:08						440					
						450					
9:41											
9:48						460					
						470					
10:16											
10:21						480					
						490					
11:00						500					

Notes:

1. Total depth of boring 500 feet.
2. No groundwater encountered.
3. Borehole geophysics conducted on 6/21/04.
4. Boring abandoned with neat cement grount on 6/22/04.

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GeoLogic Associates
Boring Log

BORING NO.: GLA-3S

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: A. FYODOROVA

DATE STARTED: 6/14/04
DATE FINISHED: 6/15/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 24.37 feet
TOTAL DEPTH: 80 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:40						0			SW	YOUNGER ALLUVIUM: Dark brown (10YR 2/2) GRAVELLY SAND with COBBLES and BOULDERS. SAND is fine to medium, well graded; GRAVEL and COBBLES well rounded.	Moist.
						5				...(6') – color change to brown (75YR 5/4).	
8:48											
6/15 8:33						10					Refusal on boulder, switch to Stratex.
										...(12') – BOULDER.	
						15				...(14') – SAND is fine to coarse with volcanic COBBLES.	
										...(17') – increasing GRAVEL, COBBLES, and BOULDERS.	
						20					
									SM	OLDER ALLUVIUM: Light brown (7.5YR 6/4) SILTY SAND with scattered GRAVEL. SAND is fine to coarse, well graded.	Moist.
						25				...(26') – color change to yellow-brown (7.5YR 4/4).	Very moist
8:52						30					
										...(31') – increasing GRAVEL and COBBLES cemented with silica, well indurated.	Moist.
						35					
										WEATHERED BEDROCK: Olive (5Y 5/4), highly weathered with iron-oxide staining and alteration of feldspars to CLAY, medium to coarse GRANODIORITE (GRUSS).	Very moist. ...(37') – set conductor casing.
						40				...(41') – color change dark brown (10YR 3/3).	
						45				...(44'–47') – apolite dike, fine to coarse, well indurated.	...(44') – damp.
9:40										...(47') – moderately weathered.	
9:54						50				...(49') – iron-oxide staining on fractured surfaces.	
10:00										...(51') – apolite vein.	...(52') – wet.
13:29											

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GeoLogic Associates
Boring Log

BORING NO.: GLA-3S

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: A. FYODOROVA

DATE STARTED: 6/14/04
DATE FINISHED: 6/15/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 24.37 feet
TOTAL DEPTH: 80 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						50					
10:00							▽			...(51') – aplite vein.	
13:29											...(52') – wet.
13:31											
13:36						55					
13:42										...(58') – increasing mafic minerals.	Saturated.
13:48											
						60					
						65					
						70					
						75					
14:00						80					
						85					
						90					
						95					
						100					

Notes:

1. Total depth of boring 80.0 feet; borehole open to 77.5 feet.
2. Groundwater first encountered at 52.0 feet on 6/15/04; static water level measured at 24.37 feet on 6/17/04.
3. Borehole geophysics performed on 6/18/04.
4. Borehole abandoned with neat cement grout on 6/23/04.

GeoLogic Associates
Boring Log

BORING NO.: GLA-A

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/08/04
DATE FINISHED: 6/09/04
ELEVATION: 429575.97
NORTHING: 1737085.44
EASTING: 377.49

GW DEPTH: 75.12 feet
TOTAL DEPTH: 105 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
16:50						0			SM	SOIL: Strong brown (7.5YR 4/6), fine, poorly graded SILTY SAND.	Dry.
						5					
										WEATHERED BEDROCK: Olive brown (2.5Y 4/3), fine, highly weathered with iron-oxide staining, poorly indurated TONALITE (GRUSS).	Slightly moist.
						10					
						15					...(16') – set conductor casing, switch to downhole hammer.
										...(18') – color change to dark gray (2.5Y 4/1); moderately to slightly weathered, moderately indurated.	
17:00						20					
6/07 7:15										BEDROCK: Black (N2.5), fine to medium, hornblend rich with quartz, moderately indurated TONALITE.	Dry.
7:22						25					
7:32											
						30				...(30') – color varies from black (N2.5) to dark gray (2.5Y 4/1).	Dry.
						35					
						40					
7:55						45					
8:23											
						50					
						55					
						60					

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GeoLogic Associates
Boring Log

BORING NO.: GLA-A

JOB NO.:	9539	DATE STARTED:	6/08/04	GW DEPTH:	75.12 feet
SITE LOCATION:	GREGORY CANYON LANDFILL	DATE FINISHED:	6/09/04	TOTAL DEPTH:	105 feet
DRILLING METHOD:	AIR ROTARY	ELEVATION:	429575.97		
CONTRACTOR:	WDC EXPLORATION AND WELLS	NORTHING:	1737085.44		
LOGGED BY:	W. LOPEZ, CHG	EASTING:	377.49		

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						60				...same as above.	
8:42											
8:56						65					
						70					
						75					
						80					
9:13										...(83'–95') – color predominately dark gray (2.5Y 4/1); increasing quartz and feldspar.	Cuttings moist.
9:30						85					...(85') – first water encountered.
						90					
						95					
						100					
9:55						105					
						110					
						115					
						120					

Notes:

1. Total depth of boring 105 feet.
2. Groundwater first encountered at 85 feet, static water level measured at 75.12 feet on 6/11/04.
3. Borehole geophysics donducted on 6/11/04.
4. Monitoring well constructed in boring (see well completion summary).

GeoLogic Associates
Boring Log

BORING NO.: GLA-B

JOB NO.:	9539	DATE STARTED:	6/09/04	GW DEPTH:	40.66 feet
SITE LOCATION:	GREGORY CANYON LANDFILL	DATE FINISHED:	6/10/04	TOTAL DEPTH:	91.5 feet
DRILLING METHOD:	AIR ROTARY	ELEVATION:	430149.38		
CONTRACTOR:	WDC EXPLORATION AND WELLS	NORTHING:	1737940.66		
LOGGED BY:	W. LOPEZ, CHG/A. FYODOROVA	EASTING:	344.14		

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
15:57						0			SM	COLLUVIUM: Dark yellowish brown (10YR 4/4), fine, poorly graded SILTY SAND.	Slightly moist.
16:00						5					
16:25						10				...(10') – grain size increase to fine to coarse with fine GRAVEL; well graded.	Moist.
16:37						15				WEATHERED BEDROCK: Light olive brown (2.5Y 5/4), fine, highly weathered with iron-oxide staining and alteration of feldspars to CLAY, poorly indurated GRANODIORITE (GRUSS).	Moist.
6/10 8:11						20					
8:14										...(22–25') – color change to strong brown (7.5YR 5/6); grain size increase to fine to coarse.	
8:26						25					
8:28											... (26') – set conductor casing.
8:35						30					
						35				...(35') – color change to olive brown (2.5Y 4/3).	Very moist.
8:41						40	▼ ▽				
9:21						45					...(42') – sound for water, wet at bottom of boring.
						50					...(52'–60') – very moist.

CONTINUED ON NEXT PAGE

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GeoLogic Associates
Boring Log

BORING NO.: GLA-B

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: W. LOPEZ, CHG/A. FYODOROVA

DATE STARTED: 6/09/04
DATE FINISHED: 6/10/04
ELEVATION: 430149.38
NORTHING: 1737940.66
EASTING: 344.14

GW DEPTH: 40.66 feet
TOTAL DEPTH: 91.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						50					
											...(52'-60') - very moist.
						55					
						60				...(60') - medium to coarse.	
9:30											
10:12											...(62') - sound for water, water measured at 57.75 feet.
						65				...(65') - fine to medium.	
						70					
										...(71') - fine, moderately weathered.	
						75					
										...(76') - fine to coarse.	Moist.
						80					...(80') - free water.
10:22											
10:27											
						85					
10:49						90				UNWEATHERED BEDROCK: Gray (N5-N6), medium to coarse, very well indurated GRANODIORITE/TONALITE with euhedral crystals.	
						95					
						100					

Notes:

1. Total depth of boring 91.5 feet (refusal with tri-cone bit).
2. Groundwater first encountered at 42 feet on 6/10/04; static water level measured at 40.66 feet on 6/11/04.
3. Borehole geophysics conducted on 6/11/04.
4. Groundwater monitoring well constructed in boring (see well completion summary).

GeoLogic Associates
Boring Log

BORING NO.: GLA-C

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: A. FYODOROVA

DATE STARTED: 6/10/04
DATE FINISHED: 6/11/04
ELEVATION: 430101.73
NORTHING: 1737809.29
EASTING: 340.76

GW DEPTH: 40.14 feet
TOTAL DEPTH: 81 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
14:35						0			SM	TOPSOIL: Brown (75YR 4/3), fine to coarse, well graded SILTY SAND.	Dry.
									SM	COLLUVIUM: Strong brown (7.5YR 5/6), fine to medium, moderately graded SILTY SAND.	Damp.
						5				...(6') – well indurated.	
						10				...(10') – GRAVEL and COBBLES predomiately apalite and metavolcanics.	
										WEATHERED BEDROCK: Strong brown (7.5YR 5/6), fine to coarse, highly weathered with alteration of feldspars to CLAY, poorly indurated GRANODIORITE (GRUSS).	Very moist.
						15				...(17') – pegmatite dike.	
16:46										...(18'–19') – apalite dike.	
6/11 7:42						20				...(20') – becomes moderately weathered with slight iron-oxide staining.	
						25				...(24'–25') – pegmotite dike.	
										...(26'–27') – diabase/mafic dike, highly weathered to CLAY.	...(26') – very moist. ...(27') – set conductor casing.
8:01											
8:07						30					
										...(33') – color change to dark grayish brown (2.5Y 4/2).	
						35					
						40	▼				
						45	∇				
8:14											
8:55						50					...(50') – wait 30 minutes sound for water; water measured at 46.7'.

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GeoLogic Associates
Boring Log

BORING NO.: GLA-C

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: A. FYODOROVA

DATE STARTED: 6/10/04
DATE FINISHED: 6/11/04
ELEVATION: 430101.73
NORTHING: 1737809.29
EASTING: 340.76

GW DEPTH: 40.14 feet
TOTAL DEPTH: 81 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:55						50					...(50') – wait 30 minutes sound for water; water measured at 46.7'.
						55				...(55'-56') – color change to olive brown (2.5Y 4/3).	
9:02						60					
9:08											...(63'-67') – no cuttings return.
						65					
										...(67') – slightly to moderately weathered.	Moist.
						70					
											...(72') – very moist.
						75				...(75') – slightly weathered.	
											...(77') – wet.
9:19						80					
						85					
						90					
						95					
						100					

Notes:

1. Total depth of boring 81.0 feet; borehole open to 77.5 feet.
2. Groundwater first encountered at 46.7 feet; static water level measured at 40.14 feet on 6/11/04.
3. Borehole geophysics conducted on 6/18/04.
4. Groundwater monitoring well constructed in boring (see well completion summary).

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GeoLogic Associates
Boring Log

BORING NO.: GLA-D

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/07/04
DATE FINISHED: 6/08/04
ELEVATION: 429775.68
NORTHING: 1737341.82
EASTING: 364.77

GW DEPTH: 59.5 feet
TOTAL DEPTH: 146.2 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
14:25						0			SC	SOIL: Dark reddish brown (5YR 3/3), fine, poorly graded CLAYEY SAND.	Moist.
						5				WEATHERED BEDROCK: Olive brown (2.5Y 4/3) to brown (10YR 4/3), fine, highly weathered with iron-oxide staining, poorly indurated TONALITE (GRUSS) with GRANODIORITE dikes composed of quartz and feldspar phenocrysts.	Slightly moist.
14:32											
15:00						10					
						15				...(15') - fine to medium; increasing felsic minerals.	
15:12											...(18') - set conductor casing.
15:18						20					
										...(22') - moderately weathered with some highly weathered intervals.	
						25					
						30				BEDROCK: Brown (10YR 4/3) to black (N2.5), fine to medium, hornblend and quartz rich, moderately indurated TONALITE.	Dry.
						35					
15:30											
16:02						40					Switch to downhole hammer.
16:09											
16:15						45					
						50				...(50') - color change to black (N2.5).	
						55					
						60					...(60') - dry.

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: GLA-D

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/07/04
DATE FINISHED: 6/08/04
ELEVATION: 429775.68
NORTHING: 1737341.82
EASTING: 364.77

GW DEPTH: 59.5 feet
TOTAL DEPTH: 146.2 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						60				...same as above.	...(60') – dry.
16:30											
16:35						65					
						70					
						75					
						80					
16:55											
17:05						85					
						90					
						95					...(98') – very moist to slightly wet cuttings.
						100				...(100–110') – very well indurated.	
17:50						105	▽				
6/08 7:25											...(105.6') – first water encountered.
						110					
						115					
						120					

CONTINUED ON NEXT PAGE

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GeoLogic Associates
Boring Log

BORING NO.: GLA-D

JOB NO.:	9539	DATE STARTED:	6/07/04
SITE LOCATION:	GREGORY CANYON LANDFILL	DATE FINISHED:	6/08/04
DRILLING METHOD:	AIR ROTARY	ELEVATION:	429775.68
CONTRACTOR:	WDC EXPLORATION AND WELLS	NORTHING:	1737341.82
LOGGED BY:	W. LOPEZ, CHG	EASTING:	364.77

GW DEPTH: 59.5 feet
TOTAL DEPTH: 146.2 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						120				...same as above.	
8:08						125					
8:18											
						130					...(130') - cuttings are damp.
						135					
						140					...(142') - very moist.
8:55						145					
						150				Notes: 1. Total depth of boring 146.2 feet. 2. Groundwater first encountered at 105.6 feet on 6/7/04, static water level measured at 59.5 feet on 6/21/04. 3. Borehole geophysics conducted on 6/11/04. 4. Monitoring well constructed in boring (see well completion summary).	
						155					
						160					
						165					
						170					
						175					
						180					

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GeoLogic Associates
Boring Log

BORING NO.: GLA-E

JOB NO.:	9539	DATE STARTED:	7/14/04
SITE LOCATION:	GREGORY CANYON LANDFILL	DATE FINISHED:	7/15/04
DRILLING METHOD:	AIR ROTARY	ELEVATION:	ND
CONTRACTOR:	WDC EXPLORATION AND WELLS	NORTHING:	ND
LOGGED BY:	W. LOPEZ, CHG	EASTING:	ND

GW DEPTH: 152.80 feet
TOTAL DEPTH: 152.85 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
16:58						0			SM	SOIL: Brown (7.5YR 5/4), fine to medium, poorly graded SILTY SAND.	Dry.
						5				WEATHERED BEDROCK: Brown (7.5YR 5/4) to strong brown (7.5YR 5/6), fine to medium, moderately weathered, moderately indurated TONALITE (GRUSS) with GRANODIORITE dikes.	Dry.
						10				BEDROCK: Olive brown (2.5Y 5/4), fine to coarse, well indurated, unweathered TONALITE. ...(13') - color change to dark gray (7.5YR 4/1) to (5Y 4/1).	Dry.
17:30						15					
6/15 8:10 8:13											...(16') - set conductor casing, switch to downhole hammer.
8:25						20					
						25					...(25') - slightly moist.
						30					
						35					
8:33											
8:39						40					
						45					...(45') - dry.
						50					
						55					
8:49											
8:51						60					

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/14/04
DATE FINISHED: 7/15/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 152.80 feet
TOTAL DEPTH: 152.85 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:51						60				...same as above.	
8:53											
9:10						65				...(65') – minor iron-oxide staininig.	Dry.
						70					
						75					
9:20											
9:27						80				...(80') – color change to gray (N5-N6); very well indurated.	Dry.
						85					
						90					
						95					
9:44											
9:50						100					...(100') – dry.
						105					
						110					
						115					
10:10											
10:28						120					...(120') – dry.

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: GLA-E

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/14/04
DATE FINISHED: 7/15/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 152.80 feet
TOTAL DEPTH: 152.85 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
10:28						120				...same as above.	...(120') - dry.
						125					
						130					
						135					
10:52											
11:03						140					...(140') - dry.
										...(142') - well indurated.	
						145					
						150					Stop for 2 hours, sound for water, wet at bottom of boring.
11:15											
						155				Notes: 1. Total depth of boring 152.85 feet. 2. Groundwater first encountered at 152.8'. 3. Borehole geophysics conducted on 7/20/04.	
						160					
						165					
						170					
						175					
						180					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

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GeoLogic Associates
Boring Log

BORING NO.: GLA-F

JOB NO.:	9539	DATE STARTED:	7/16/04
SITE LOCATION:	GREGORY CANYON LANDFILL	DATE FINISHED:	7/16/04
DRILLING METHOD:	AIR ROTARY	ELEVATION:	ND
CONTRACTOR:	WDC EXPLORATION AND WELLS	NORTHING:	ND
LOGGED BY:	W. LOPEZ, CHG	EASTING:	ND

GW DEPTH: 164.8 feet
TOTAL DEPTH: 165.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
7:30						0			SM	SOIL: Strong brown (7.5YR 5/6), fine to medium, poorly graded SILTY SAND.	Dry.
						5				WEATHERED BEDROCK: Dark brown (7.5YR 3/4), fine to medium, highly weathered with iron-oxide staining and alteration of feldspars to CLAY, poorly indurated TONALITE (GRUSS).	Moist.
						10				Olive brown (2.5Y 4/3), fine to medium, moderately weathered, poorly to moderately indurated TONALITE.	Moist.
						15					...(17') – set conductor casing, switch to downhole hammer.
						20					...(20') – dry.
8:05						25					
8:13											
						30				BEDROCK: Gray (2.5Y 4/1), fine to medium, unweathered, well indurated TONALITE.	Dry.
						35					
						40					
8:20						45				...(45') – very well indurated.	
8:26											
						50					
						55					
						60					

CONTINUED ON NEXT PAGE

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

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GeoLogic Associates
Boring Log

BORING NO.: GLA-F

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/16/04
DATE FINISHED: 7/16/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 164.8 feet
TOTAL DEPTH: 165.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						60				...same as above.	
8:40						65					
8:48											
						70					
						75					...(75') - dry.
						80					
											...(83') - dry.
9:03						85					
9:09											
						90					
						95					
						100					
											...(103') - dry.
9:25						105					
9:35											
						110					
						115					
						120					

CONTINUED ON NEXT PAGE

GeoLogic Associates
Boring Log

BORING NO.: GLA-F

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/16/04
DATE FINISHED: 7/16/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 164.8 feet
TOTAL DEPTH: 165.5 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						120				...same as above.	
											...(123') – dry.
9:55						125					
10:02											
						130					
						135					
						140					
10:24						145					
10:30											...(146') – very moist.
						150					
						155					
						160					
10:45						165	▽				
						170				Notes: 1. Total depth of boring 165.5 feet. 2. Groundwater first encountered at 164.8'. 3. Borehole geophysics conducted on 7/20/04.	
						175					
						180					

The data presented on this log is a simplification of actual conditions encountered and applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change with the passage of time.

GeoLogic Associates
Boring Log

BORING NO.: GLA-G

JOB NO.:	9539	DATE STARTED:	7/20/04
SITE LOCATION:	GREGORY CANYON LANDFILL	DATE FINISHED:	7/20/04
DRILLING METHOD:	AIR ROTARY	ELEVATION:	430247.55
CONTRACTOR:	WDC EXPLORATION AND WELLS	NORTHING:	1737961.72
LOGGED BY:	W. LOPEZ, CHG	EASTING:	345.04

GW DEPTH: 40.18 feet
TOTAL DEPTH: 104 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
9:40						0			SM	COLLUVIUM: Strong brown (7.5YR 4/6), fine to coarse, well graded SILTY SAND with iron-oxide staining.	Dry.
						5					
										...(8') - color change to brown (7.5YR 5/4).	Moist.
						10				...(12') - color change to strong brown (7.5YR 5/6)	
						15				...(13-16') - GRANODIORITE BOULDER.	...(16') - set conductor casing.
10:13						20				WEATHERED BEDROCK: Brown (7.5YR 4/4), fine to coarse, highly weathered with iron-oxide staining and alteration of feldspars to CLAY, poorly indurated GRANODIORITE.	...(20') - switch to downhole hammer.
10:21											
10:24										...(24') - color change to light yellowish brown (2.5Y 6/4).	
10:29						25					
						30					
						35				...(35') - color change to olive brown (2.5Y 4/3) to dark grayish brown (2.5Y 4/2); moderately weathered, poorly indurated, little to no CLAY.	
						40	▼				
10:36											
10:41						45					
											...(48') - very moist.
						50					
						55					
						60				...(60') - fine to medium.	

CONTINUED ON NEXT PAGE

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GeoLogic Associates
Boring Log

BORING NO.: GLA-G

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: AIR ROTARY
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 7/20/04
DATE FINISHED: 7/20/04
ELEVATION: 430247.55
NORTHING: 1737961.72
EASTING: 345.04

GW DEPTH: 40.18 feet
TOTAL DEPTH: 104 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
						60				...(60') – fine to medium.	
10:46 10:51						65				...(65'–70') – color change to pale yellow (2.5Y 7/4); medium to coarse.	...(65') – very moist to slightly wet.
						70				...(70') – color change to yellowish brown (10YR 5/8); fine to medium.	
						75					
						80					
10:56 11:02						85	▽			...(85') – color change to dark grayish brown (2.5Y 4/2); fine to coarse.	...(85') – first water encountered.
						90					
						95					...(93') – slightly wet.
						100					
11:07						105				Notes: 1. Total depth of boring 104 feet. 2. Groundwater first encountered at 85 feet on 7/20/04; static water level measured at 40.18 feet on 7/22/04. 3. Borehole geophysics conducted on 7/20/04. 4. Groundwater monitoring well constructed on 7/21/04 (see well completion summary).	
						110					
						115					
						120					

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GeoLogic Associates
Boring Log

BORING NO.: LUCIO-2R

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/03/04
DATE FINISHED: 6/03/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 12.5 feet
TOTAL DEPTH: 50 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
8:33						0			SM	ALLUVIUM: Brown (10YR 4/2), fine to coarse, well graded SILTY SAND with GRAVEL. GRAVEL is subrounded to subangular.	Slightly moist.
						5					...(5') - moist.
						10					
						15					
8:45						20			SW	Dark gray (10YR 4/1), well graded, fine to coarse SAND with fine to medium, subrounded to subangular GRAVEL.	Wet.
						25					
8:54						30					
						35					
8:58						40					...(40') - saturated.
						45					
9:03						50					

Notes:

1. Total depth of boring 50 feet.
2. Groundwater measured at 12.5 feet.
3. Groundwater monitoring well constructed on 6/3/04 (see well conmpletion summary).

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GeoLogic Associates
Boring Log

BORING NO.: SLRMWD-34R

JOB NO.: 9539
SITE LOCATION: GREGORY CANYON LANDFILL
DRILLING METHOD: HOLLOW STEM AUGER
CONTRACTOR: WDC EXPLORATION AND WELLS
LOGGED BY: W. LOPEZ, CHG

DATE STARTED: 6/03/04
DATE FINISHED: 6/03/04
ELEVATION: ND
NORTHING: ND
EASTING: ND

GW DEPTH: 12.6 feet
TOTAL DEPTH: 30 feet

TIME	DRY DENSITY (LBS/CU. FT.)	MOISTURE (%)	BLOWS (COUNT/FT.)	SAMPLE SIZE (INCHES)	SAMPLE NO.	DEPTH IN FEET	ELEVATION IN FEET	MATERIAL SYMBOL	USCS/GEOLOGIC FORMATION	DESCRIPTION	COMMENTS
12:20						0			SM	ALLUVIUM: Yellowish brown (10YR 5/4), fine, poorly graded, micaceous SILTY SAND.	Dry.
						5					...(5') - slightly moist.
						10					
										...(12') - fine to coarse with trace of fine to medium, subgrounded GRAVEL.	
12:28						15					...(14') - wet.
						20					...(20') - saturated.
						25			SW	Dark gray (10YR 4/1), fine to coarse SAND with trace of subrounded GRAVEL.	
12:40						30					

Notes:

1. Total depth of boring 30 feet.
2. Groundwater measured at 12.6 feet.
3. Groundwater monitoring well constructed on 6/3/04 (see well completion summary).

Depth scale: 35, 40, 45, 50, 55, 60

CONTINUED ON NEXT PAGE

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ATTACHMENT B

GEOPHYSICAL LOGS, STEREOGRAPHIC POLE-PLOTS AND ROSE DIAGRAMS

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CO GEOLOGIC ASSOCIATES
WELL GLA-A
FLD GREGORY CANYON
CTY PALA
STE
FILING No

COLOG

BOREHOLE GEOPHYSICS & HYDROPHYSICS

A Division of Layne Christensen Company

11001 Etiwanda Ave., Fontana CA 92337
PH: (909) 390-2833 FAX (909) 390-6097

COMPANY GEOLOGIC ASSOCIATES
WELL ID GLA-A
FIELD PALA
COUNTRY USA STATE CA

LOCATION
GREGORY CANYON LANDFILL PROJECT

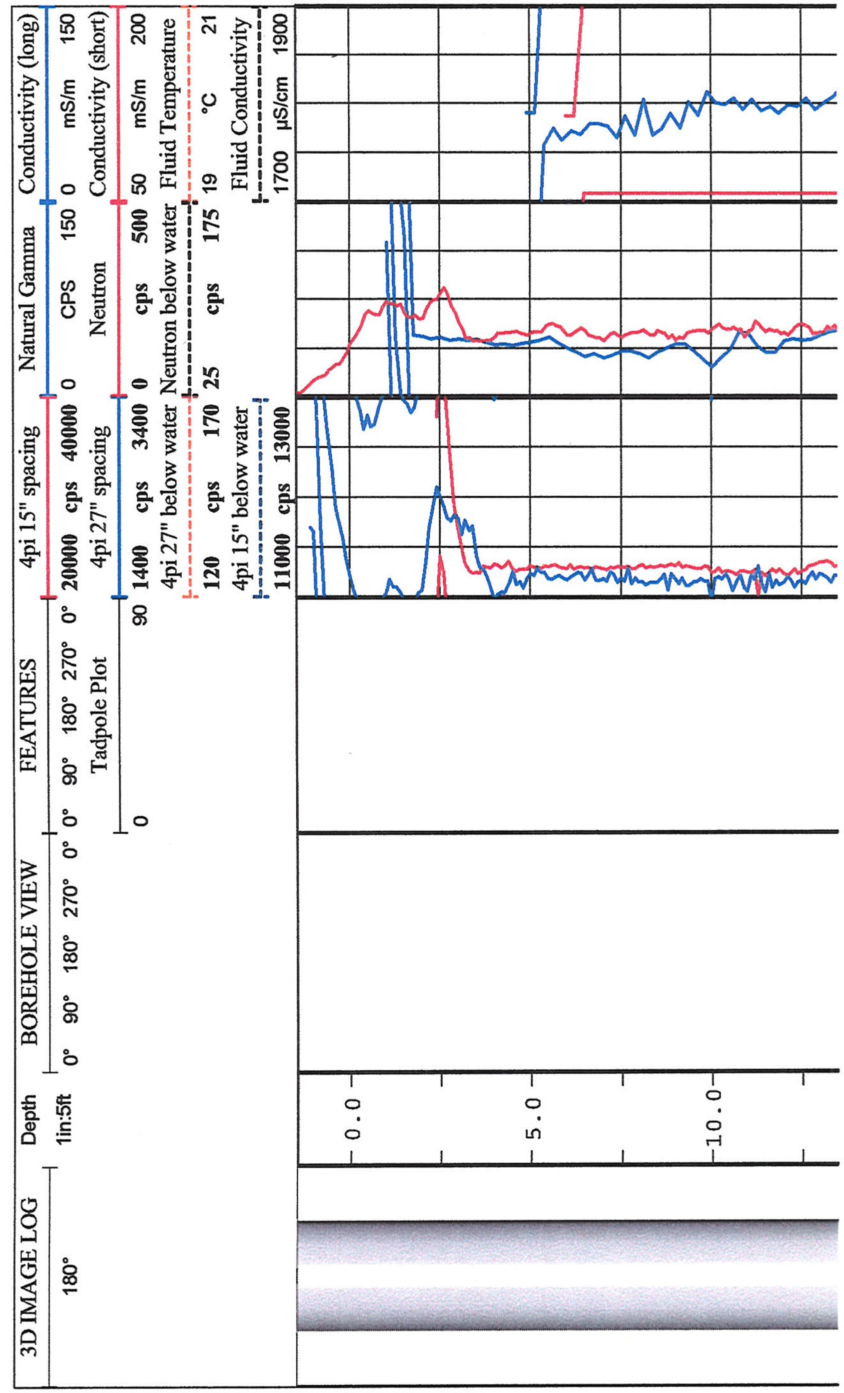
SEC TWP RGE

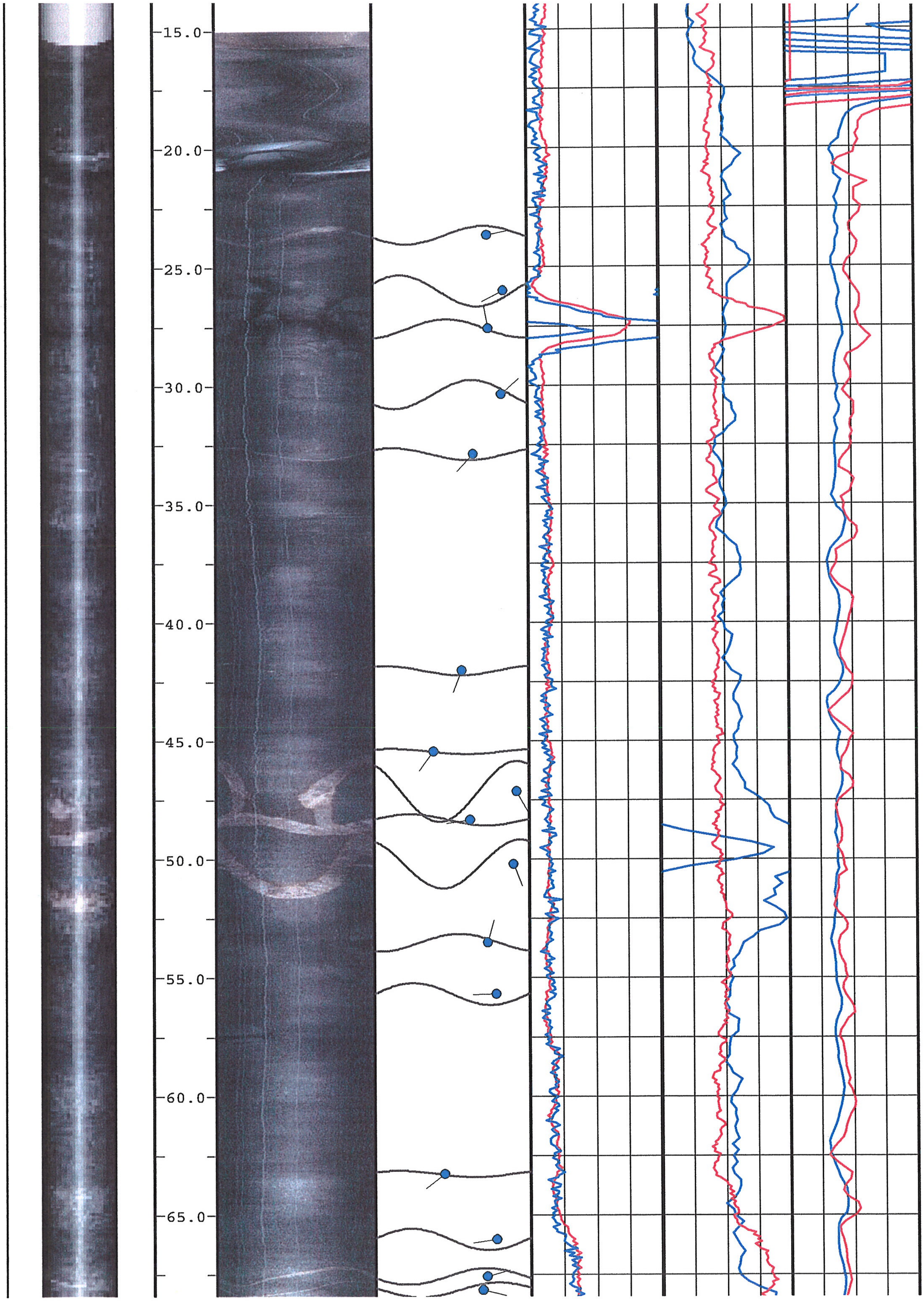
OTHER SERVICES

PERMANENT DATUM	GROUND SURFACE	ELEVATION	K.B.
LOG MEAS. FROM	GROUND SURFACE	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND SURFACE		G.L.

DATE	11/06/04	TYPE FLUID IN HOLE	
RUN No	1	SALINITY	
TYPE LOG	ENGINEERING SUITE	DENSITY	
DEPTH-DRILLER	104'	LEVEL	
DEPTH-LOGGER	104'	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	104'		
TOP LOGGED INTERVAL	20'		
OPERATING RIG TIME			
RECORDED BY			
WITNESSED BY			

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO





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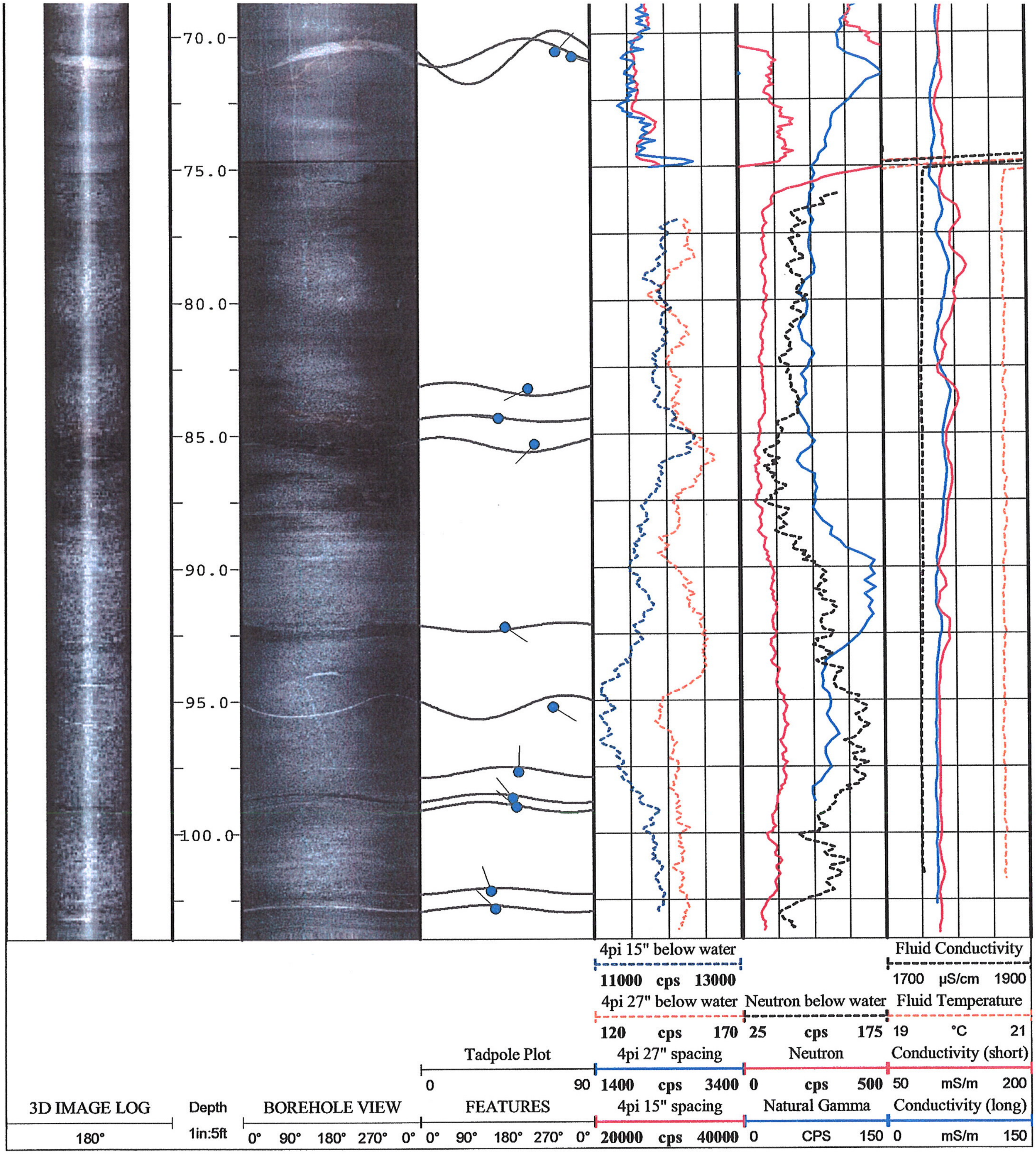
70.0
75.0
80.0
85.0
90.0
95.0
100.0
4pi 15" below water
11000 cps 13000
4pi 27" below water
120 cps 170
Neutron below water
25 cps 175
Fluid Conductivity
1700 µS/cm 1900
Fluid Temperature
19 °C 21
Tadpole Plot
0 90
4pi 27" spacing
1400 cps 3400
Neutron
0 cps 500
Conductivity (short)
50 mS/m 200
3D IMAGE LOG
180°
Depth
1in:5ft
BOREHOLE VIEW
0° 90° 180° 270° 0°
FEATURES
0° 90° 180° 270° 0°
4pi 15" spacing
20000 cps 40000
Natural Gamma
0 CPS 150
Conductivity (long)
0 mS/m 150

Orientation Summary Table
Image Features
Wellbore: GLA-A
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	7.21	23.65	78.06	66.43
2	7.92	25.99	241.70	76.15
3	8.40	27.57	350.37	67.17
4	9.25	30.35	48.73	74.72
5	10.02	32.87	222.32	58.20
6	12.80	42.01	201.05	51.04
7	13.85	45.44	216.78	34.57
8	14.37	47.13	151.29	82.70
9	14.73	48.33	261.33	55.66
10	15.30	50.19	158.49	80.89
11	16.31	53.51	15.13	65.61
12	16.97	55.67	268.12	70.63
13	19.28	63.25	232.73	40.37
14	20.12	66.00	262.20	70.29
15	20.60	67.57	74.93	64.52
16	20.77	68.13	103.72	62.13
17	21.53	70.65	44.75	72.15
18	21.60	70.85	106.92	80.53
19	25.38	83.27	246.30	56.93
20	25.72	84.37	274.06	41.52
21	26.01	85.35	225.44	60.36
22	28.11	92.22	123.39	44.54
23	29.03	95.24	122.00	69.66
24	29.77	97.68	1.21	51.31
25	30.07	98.65	320.48	48.44
26	30.18	99.00	309.09	50.19
27	31.14	102.16	340.30	37.05
28	31.34	102.82	314.95	39.30

All directions are with respect to magnetic north.

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CO GEOLOGIC ASSOCIATES
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11001 Etiwanda Ave., Fontana CA 92337
PH: (909) 390-2833 FAX (909) 390-6097

COMPANY	GEOLOGIC ASSOCIATES
WELL ID	GLA-B
FIELD	GREGORY CANYON LANDFILL
COUNTRY	USA
STATE	CA

LOCATION
GREGORY CANYON LANDFILL PROJECT

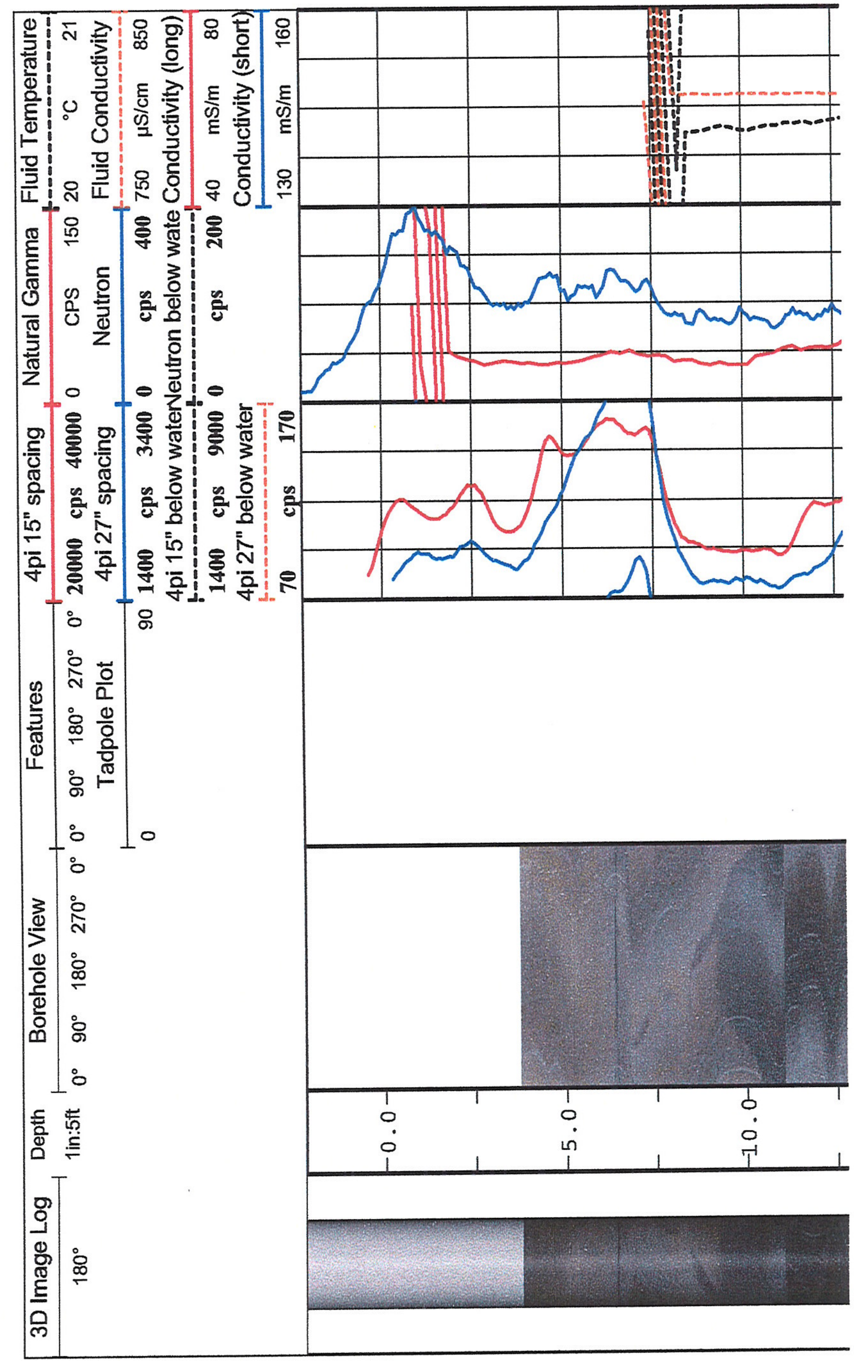
SEC TWP RGE

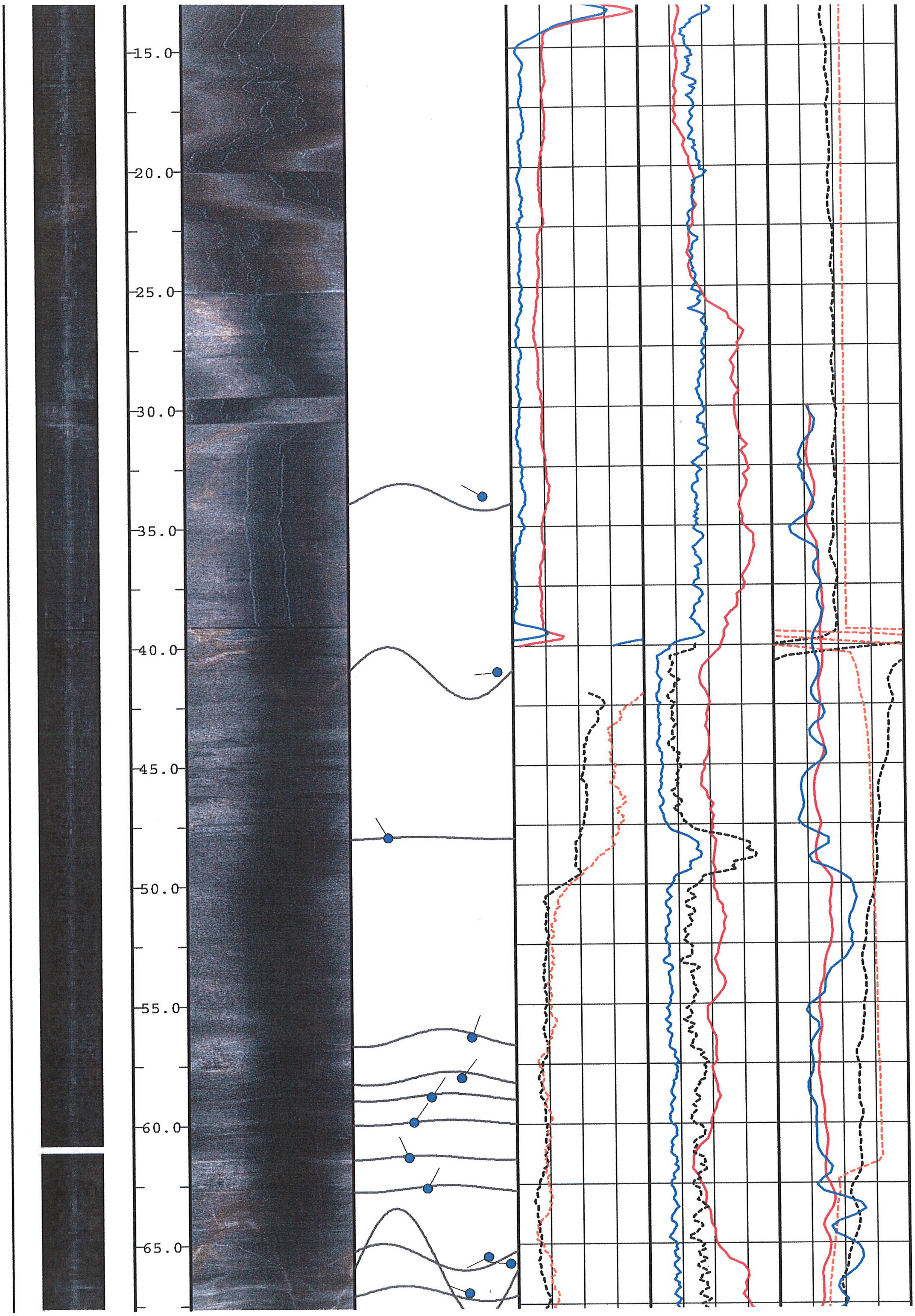
OTHER SERVICES

PERMANENT DATUM	GROUND SURFACE	ELEVATION		K.B.
LOG MEAS. FROM	GROUND SURFACE	ABOVE PERM. DATUM		D.F.
DRILLING MEAS. FROM	GROUND SURFACE			G.L.

DATE	11/06/04	TYPE FLUID IN HOLE	WATER
RUN No	1	SALINITY	
TYPE LOG	ENGINERING SUITE	DENSITY	
DEPTH-DRILLER	90'	LEVEL	
DEPTH-LOGGER	90'	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	90'		
TOP LOGGED INTERVAL	25'		
OPERATING RIG TIME			
RECORDED BY	J. ABREAU		
WITNESSED BY	B. LOPEZ		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO

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25.0
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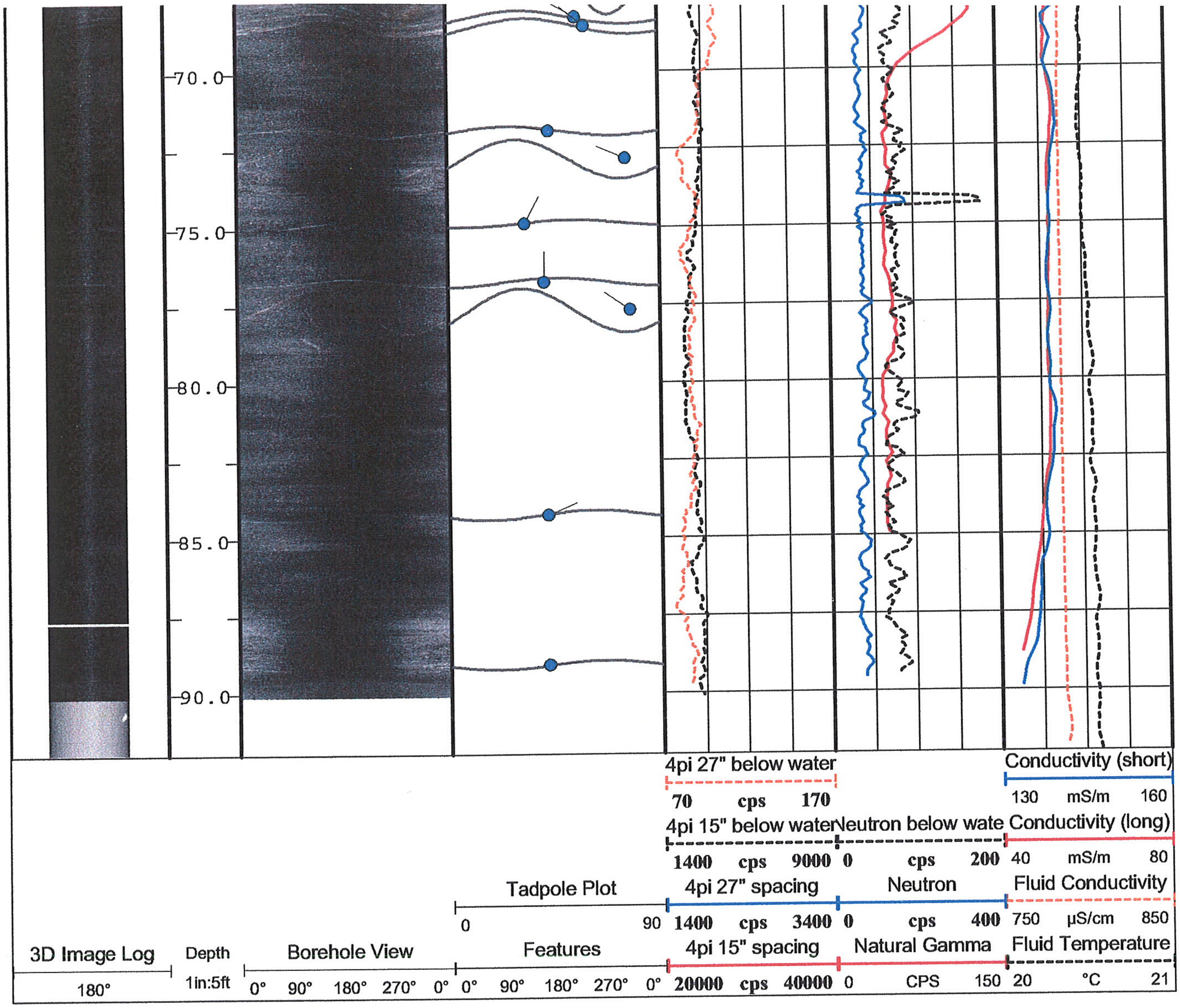
35.0
40.0
45.0
50.0
55.0
60.0
65.0



70.0
75.0
80.0
85.0
90.0
4pi 27" below water
70 cps 170
4pi 15" below water
1400 cps 9000
Neutron below wate
0 cps 200
Conductivity (short)
130 mS/m 160
Conductivity (long)
40 mS/m 80
Tadpole Plot
0 90
4pi 27" spacing
1400 cps 3400
Neutron
0 cps 400
Fluid Conductivity
750 µS/cm 850
3D Image Log
180°
Depth
1in:5ft
Borehole View
0° 90° 180° 270° 0°
Features
0° 90° 180° 270° 0°
4pi 15" spacing
20000 cps 40000
Natural Gamma
0 CPS 150
Fluid Temperature
20 °C 21

481

Orientation Summary Table
Image Features
Wellbore: GLA-B
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	10.27	33.71	299.60	74.05
2	12.52	41.08	264.91	81.50
3	14.62	47.98	328.94	21.01
4	17.18	56.35	20.45	65.71
5	17.69	58.04	37.73	59.94
6	17.93	58.83	33.81	43.45
7	18.25	59.87	34.60	33.90
8	18.70	61.35	335.40	30.96
9	19.09	62.63	28.51	40.86
10	19.97	65.52	244.22	73.90
11	20.06	65.80	274.29	85.98
12	20.42	67.01	291.01	63.19
13	20.79	68.22	299.50	54.93
14	20.88	68.52	310.15	58.37
15	21.91	71.87	279.93	43.31
16	22.18	72.78	293.70	75.59
17	22.81	74.85	28.77	32.46
18	23.39	76.74	0.51	40.94
19	23.67	77.66	303.59	77.06
20	25.68	84.25	66.50	41.99
21	27.15	89.09	84.01	41.99

All directions are with respect to magnetic north.

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COLOG

BOREHOLE GEOPHYSICS & HYDROPHYSICS

A Division of Layne Christensen Company

11001 Etiwanda Ave., Fontana CA 92337
PH: (909) 390-2833 FAX (909) 390-6097

CO GEOLOGIC ASSOCIATES
WELL GLA-C
FLD GREGORY CANYON
CTY PALA
STE
FILING No

COMPANY	GEOLOGIC ASSOCIATES		
WELL ID	GLA-C		
FIELD	GREGORY CANYON		
COUNTRY	USA	STATE	CA

LOCATION
GREGORY CANYON ALNDFILL

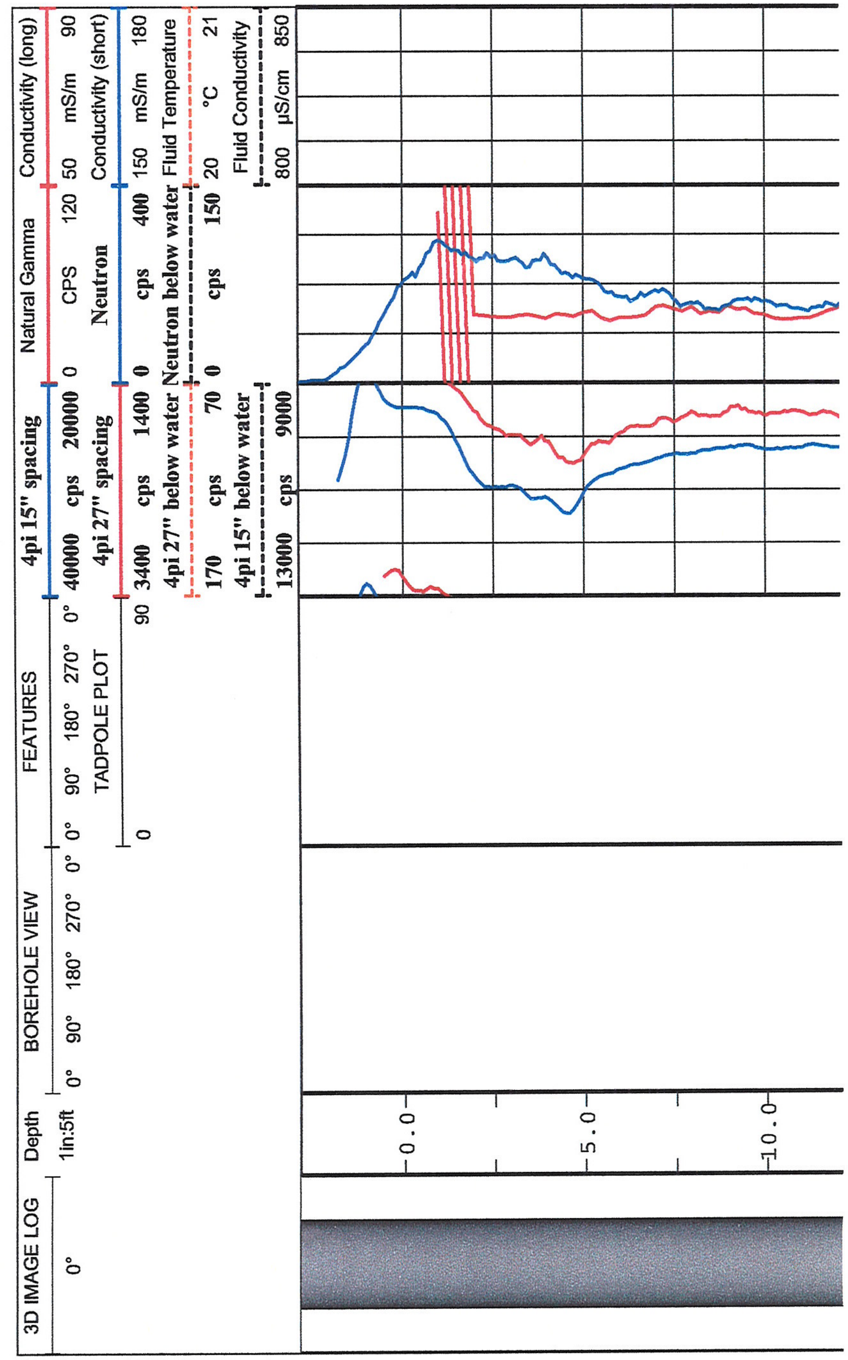
SEC TWP RGE

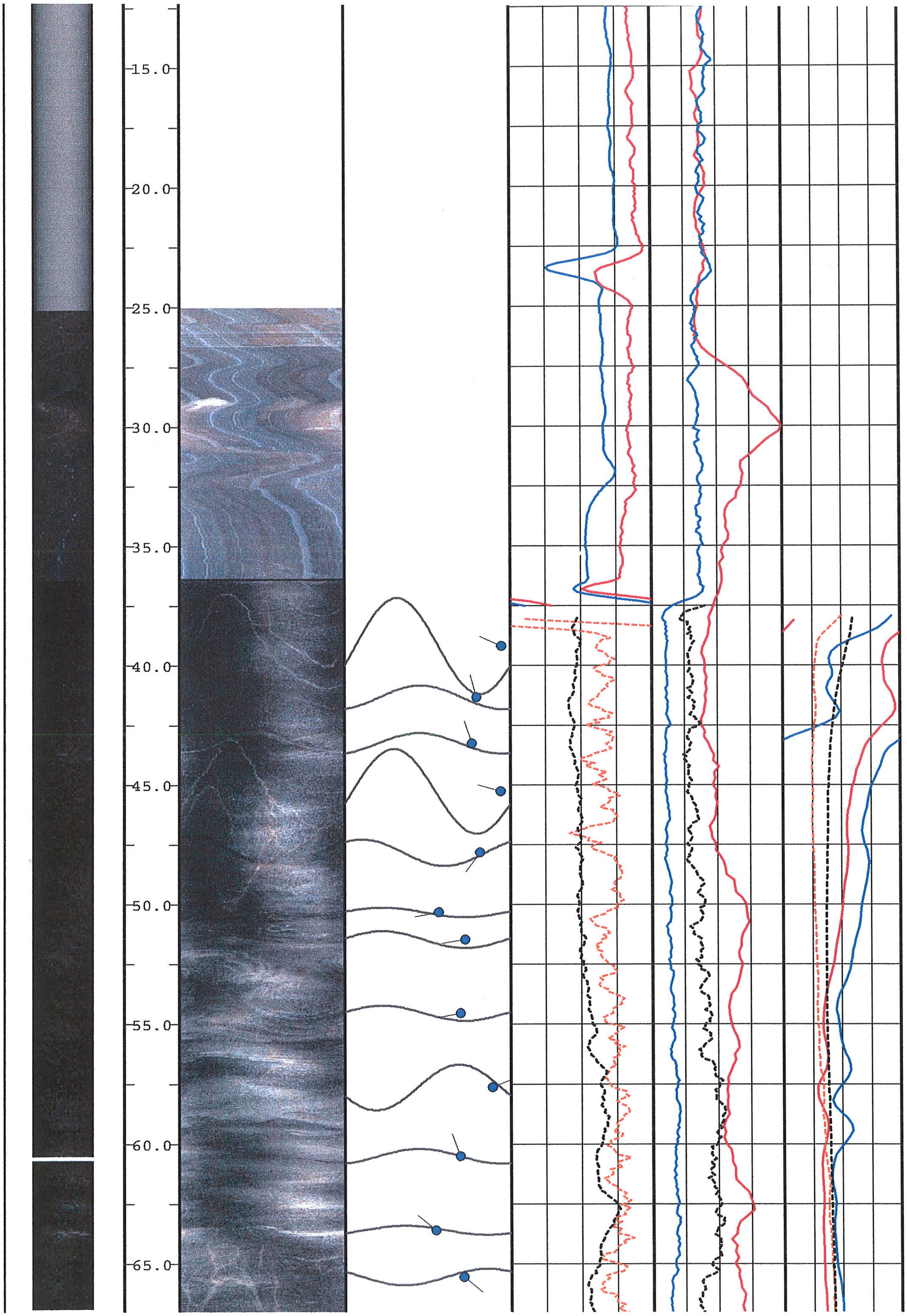
OTHER SERVICES

PERMANENT DATUM	GROUND SURFACE	ELEVATION	K.B.
LOG MEAS. FROM	GROUND SURFACE	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND SURFACE		G.L.

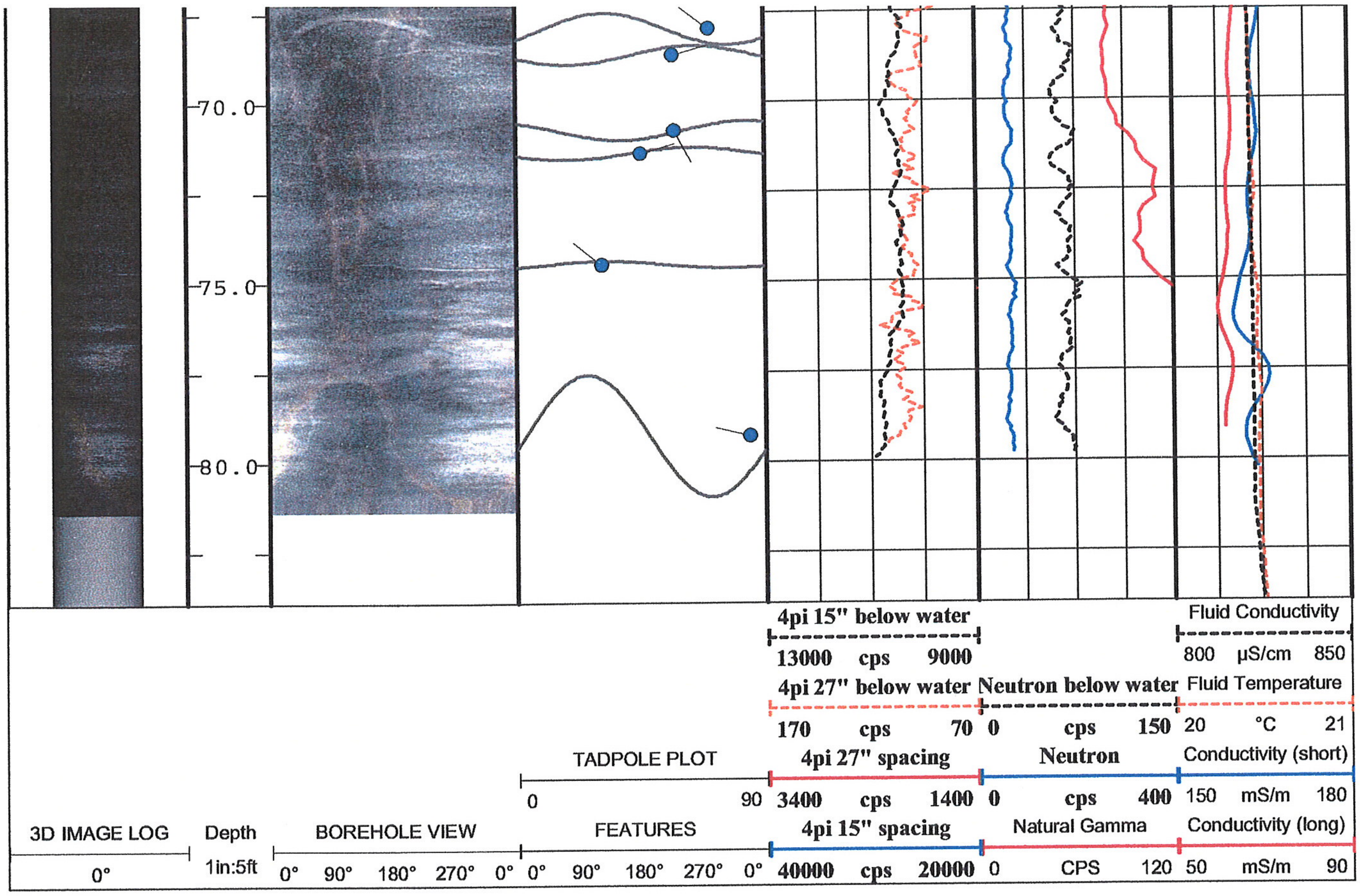
DATE	18/06/04	TYPE FLUID IN HOLE	
RUN No	1	SALINITY	
TYPE LOG	OPTV, NEUTRON, DENSITY	DENSITY	
DEPTH-DRILLER	82'	LEVEL	
DEPTH-LOGGER	82'	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	82'		
TOP LOGGED INTERVAL	25'		
OPERATING RIG TIME			
RECORDED BY			
WITNESSED BY			

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO





484



70.0
75.0
80.0
4pi 15" below water
13000 cps 9000
4pi 27" below water
170 cps 70
Neutron below water
0 cps 150
Fluid Conductivity
800 µS/cm 850
Fluid Temperature
20 °C 21
TADPOLE PLOT
0 90
4pi 27" spacing
3400 cps 1400
Neutron
0 cps 400
Conductivity (short)
150 mS/m 180
3D IMAGE LOG
0°
Depth
1in:5ft
BOREHOLE VIEW
0° 90° 180° 270° 0°
FEATURES
0° 90° 180° 270° 0°
4pi 15" spacing
40000 cps 20000
Natural Gamma
0 CPS 120
Conductivity (long)
50 mS/m 90

Orientation Summary Table
Image Features
Wellbore: GLA-C
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	11.94	39.16	293.38	85.34
2	12.59	41.32	344.26	71.77
3	13.18	43.23	341.41	69.14
4	13.79	45.24	286.55	84.72
5	14.57	47.80	216.67	73.63
6	15.33	50.31	260.65	51.03
7	15.68	51.44	261.05	65.28
8	16.62	54.53	260.65	62.92
9	17.56	57.62	67.27	80.16
10	18.43	60.48	339.97	62.49
11	19.38	63.57	309.30	49.33
12	19.97	65.52	128.16	64.36
13	20.71	67.95	307.15	70.01
14	20.93	68.67	74.81	56.86
15	21.57	70.78	151.48	57.54
16	21.77	71.41	73.39	45.23
17	22.71	74.50	307.87	30.96
18	24.16	79.27	282.32	84.48

All directions are with respect to magnetic north.

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CO GEOLOGIC ASSOCIATES
WELL GLA-D
FLD GREGORY CANYON
CTY PALA
STE
FILING No

COLOG

BOREHOLE GEOPHYSICS & HYDROPHYSICS

A Division of Layne Christensen Company

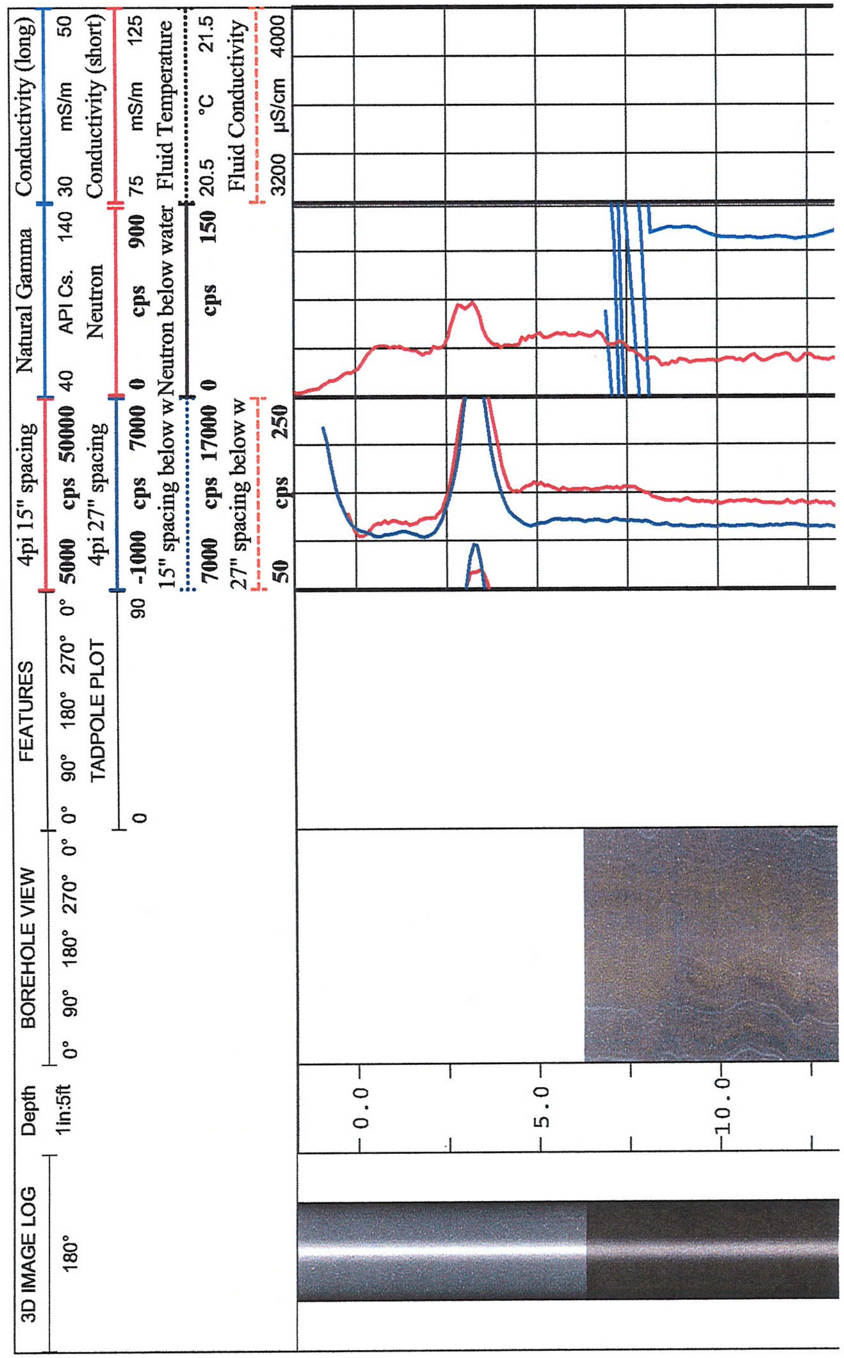
11001 Etiwanda Ave., Fontana CA 92337
PH: (909) 390-2833 FAX (909) 390-6097

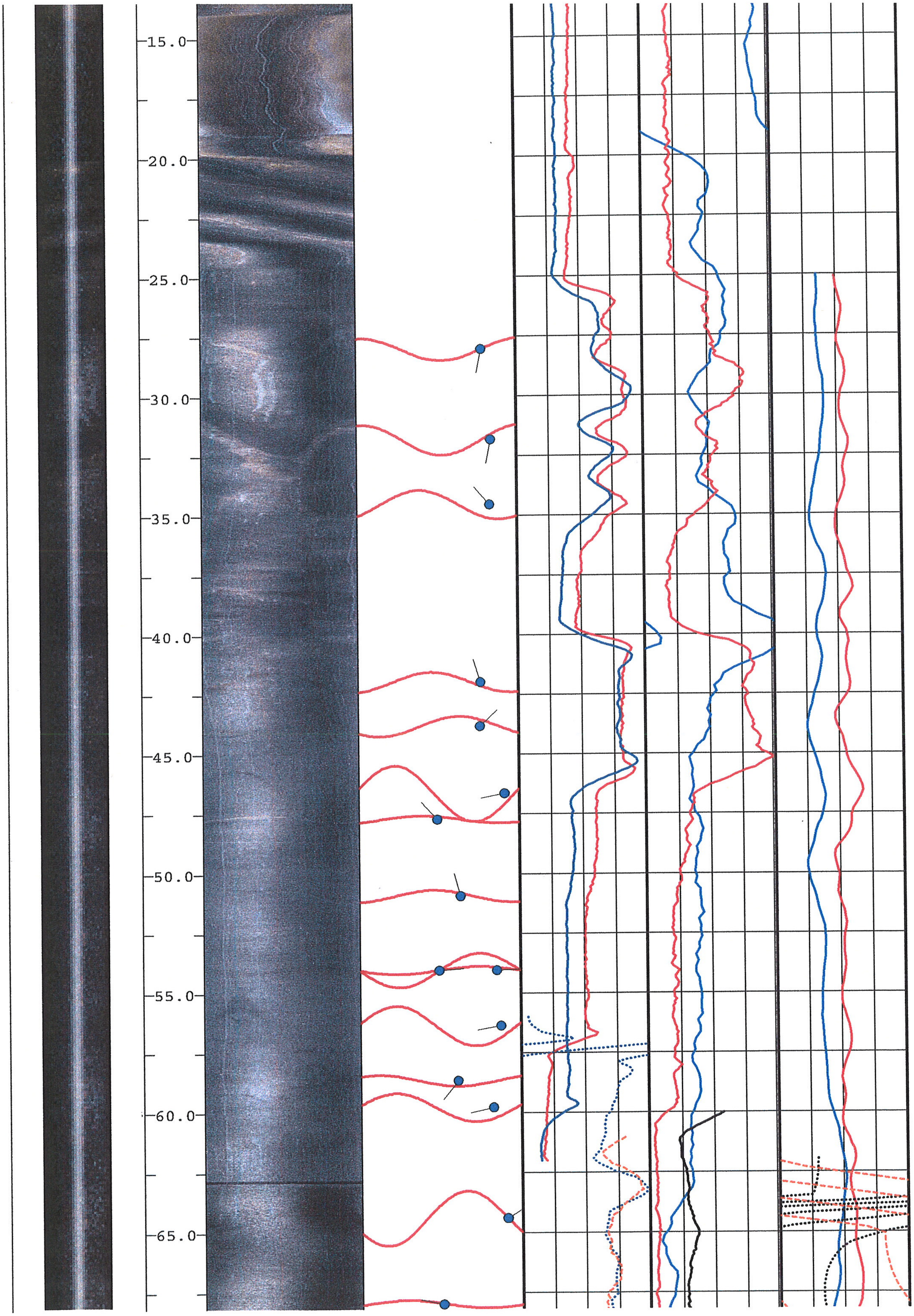
COMPANY	GEOLOGIC ASSOCIATES		
WELL ID	GLA-D		
FIELD	GREGORY CANYON		
COUNTRY	USA	STATE	CA

LOCATION GREGORY CANYON			OTHER SERVICES
SEC	TWP	RGE	
PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM		ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE	11/06/04	TYPE FLUID IN HOLE	
RUN No	1	SALINITY	
TYPE LOG	OPTV, NEUTRON, DENSITY	DENSITY	
DEPTH-DRILLER	147'	LEVEL	
DEPTH-LOGGER	147'	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	147'		
TOP LOGGED INTERVAL	20'		
OPERATING RIG TIME			
RECORDED BY	J. ABREAU		
WITNESSED BY	B. LOPEZ		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO

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20.0
25.0
30.0
35.0
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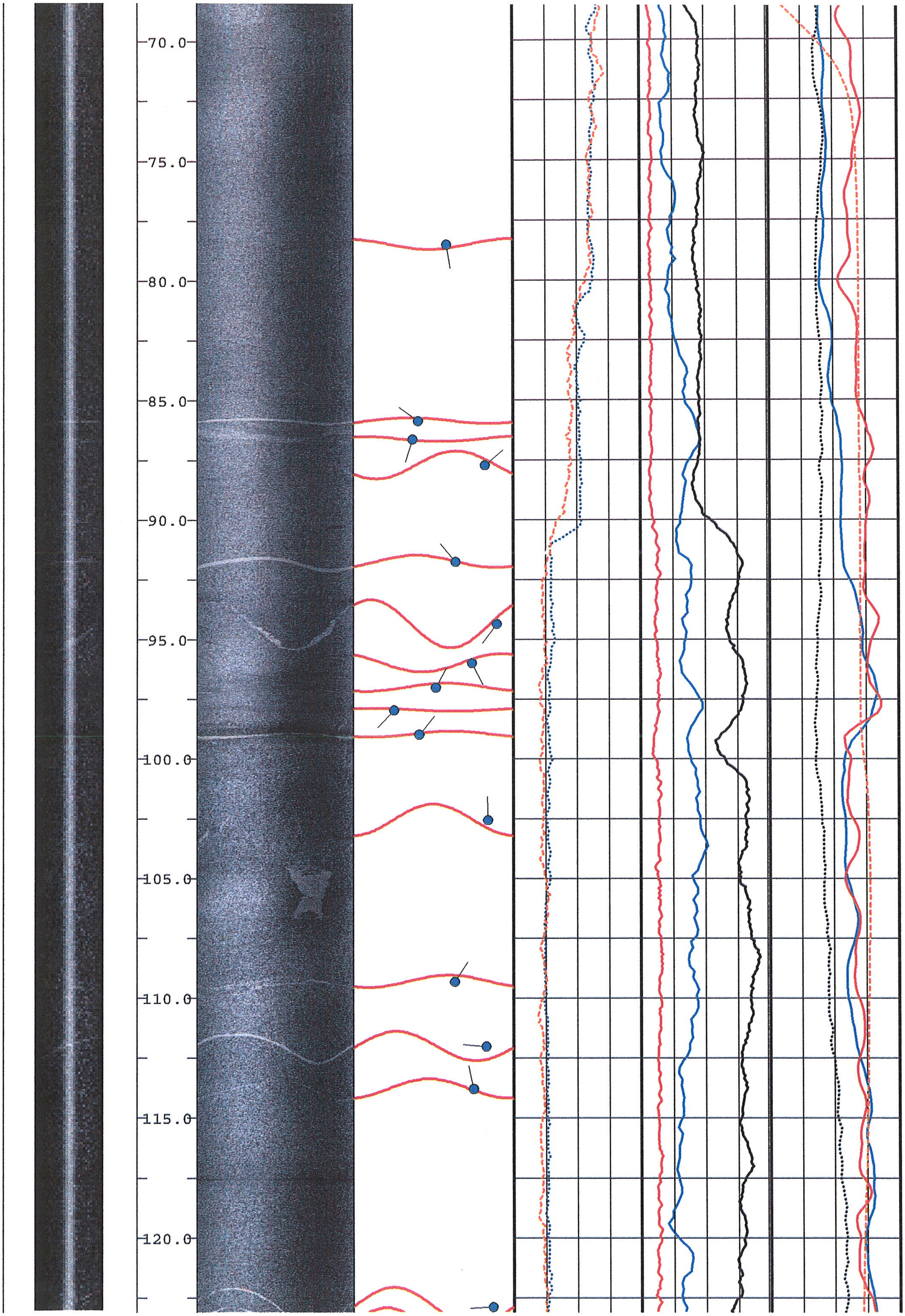
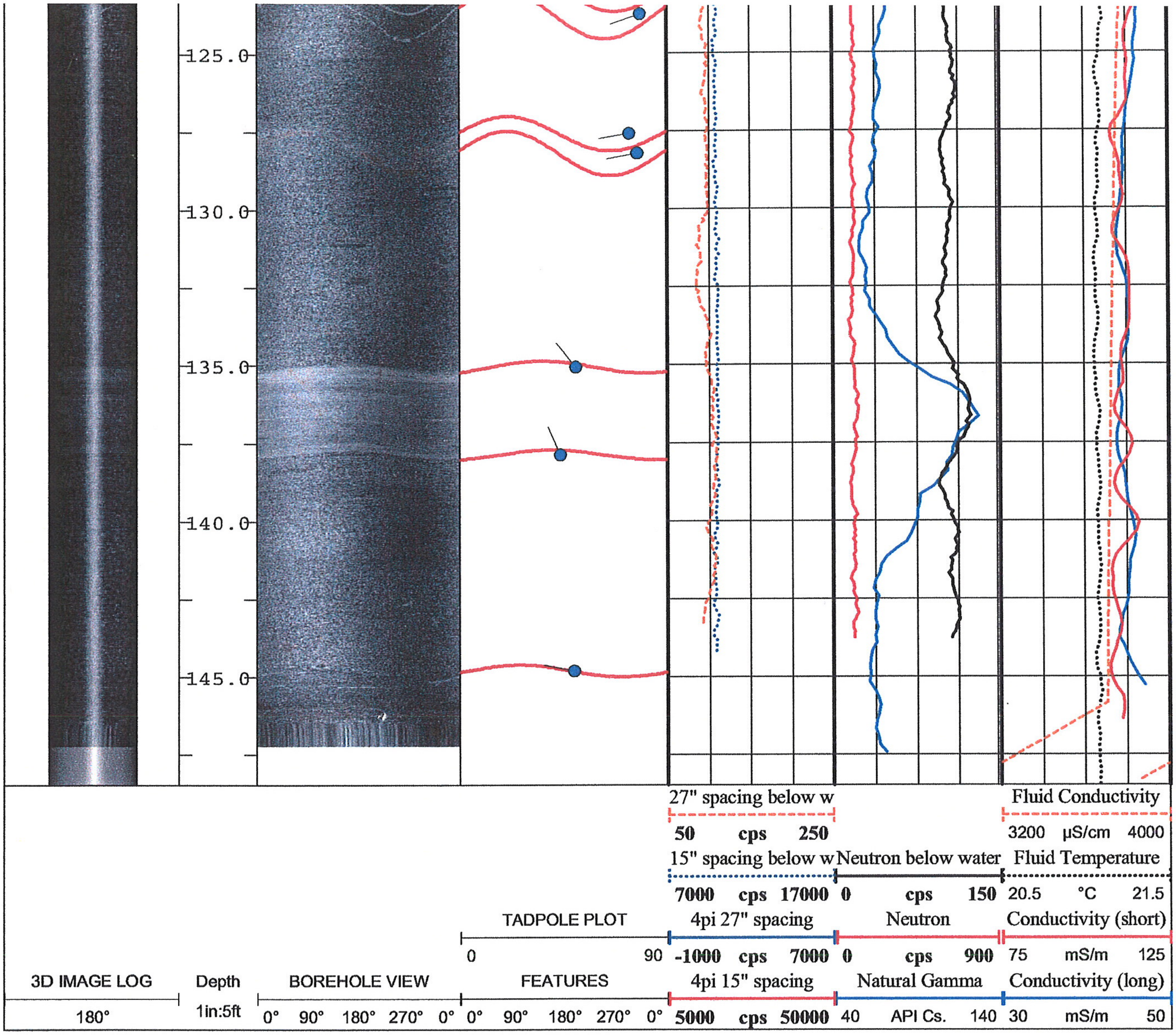
45.0
50.0
55.0
60.0
65.0


70.0
75.0
80.0
85.0
90.0
95.0
100.0
105.0
110.0
115.0
120.0


125.0
130.0
135.0
140.0
145.0
27" spacing below w
50 cps 250
15" spacing below w
7000 cps 17000
4pi 27" spacing
-1000 cps 7000
4pi 15" spacing
5000 cps 50000
Neutron below water
0 cps 150
Neutron
0 cps 900
Natural Gamma
40 API Cs. 140
Fluid Conductivity
3200 µS/cm 4000
Fluid Temperature
20.5 °C 21.5
Conductivity (short)
75 mS/m 125
Conductivity (long)
30 mS/m 50
TADPOLE PLOT
0 90
FEATURES
0° 90° 180° 270° 0°
3D IMAGE LOG
180°
Depth
1in:5ft
BOREHOLE VIEW
0° 90° 180° 270° 0°

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Orientation Summary Table
Image Features
Wellbore: GLA-D
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	8.54	28.03	191.13	70.67
2	9.70	31.81	191.26	75.49
3	10.52	34.53	318.86	74.91
4	12.79	41.96	343.58	68.85
5	13.35	43.81	46.15	68.36
6	14.21	46.63	258.85	82.03
7	14.54	47.70	317.19	44.19
8	15.52	50.93	345.81	56.77
9	16.47	54.02	85.90	44.54
10	16.47	54.04	88.23	77.00
11	17.18	56.35	259.91	78.90
12	17.88	58.65	219.43	54.67
13	18.21	59.76	257.98	74.48
14	19.63	64.39	57.33	81.82
15	20.72	67.97	281.61	45.57
16	23.93	78.50	171.24	52.60
17	26.17	85.87	304.96	36.65
18	26.40	86.63	196.48	33.42
19	26.73	87.71	50.15	74.24
20	27.96	91.74	319.91	57.53
21	28.76	94.35	217.95	80.76
22	29.25	95.98	152.90	66.75
23	29.57	97.00	27.80	46.56
24	29.85	97.94	224.06	22.78
25	30.17	98.97	39.20	37.09
26	31.26	102.56	358.41	75.85
27	33.31	109.30	33.08	56.93
28	34.14	112.00	274.75	74.90
29	34.68	113.77	348.31	67.71
30	37.45	122.87	268.54	78.43
31	37.72	123.74	252.12	78.56
32	38.89	127.58	261.59	73.65
33	39.07	128.19	260.76	77.14
34	41.17	135.06	320.53	50.19
35	42.02	137.86	337.09	43.63
36	44.14	144.81	281.61	49.33

All directions are with respect to magnetic north.

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BOREHOLE GEOPHYSICS & HYDROPHYSICS

A Division of Layne Christensen Company

11001 Etiwanda Ave., Fontana CA 92337
PH: (909) 390-2833 FAX (909) 390-6097

CO GEOLOGIC ASSOCIATES
WELL GLA-E
FLD GREGORY CANYON
CTY PALA
STE
FILING No

COMPANY	GEOLOGIC ASSOCIATES		
WELL ID	GLA-E		
FIELD	PALA		
COUNTRY	USA	STATE	CA

LOCATION
GREGORY CANYON LANDFILL

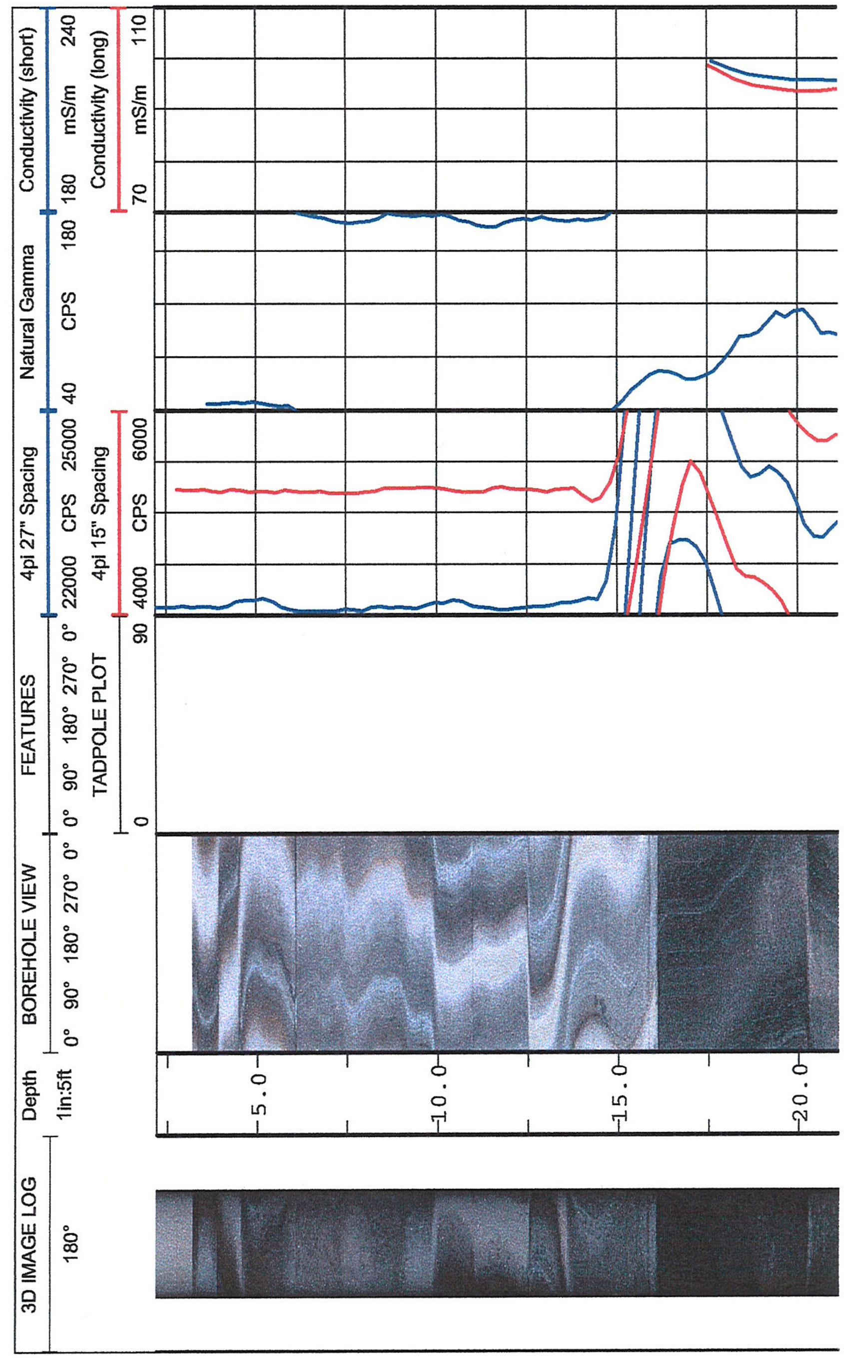
SEC TWP RGE

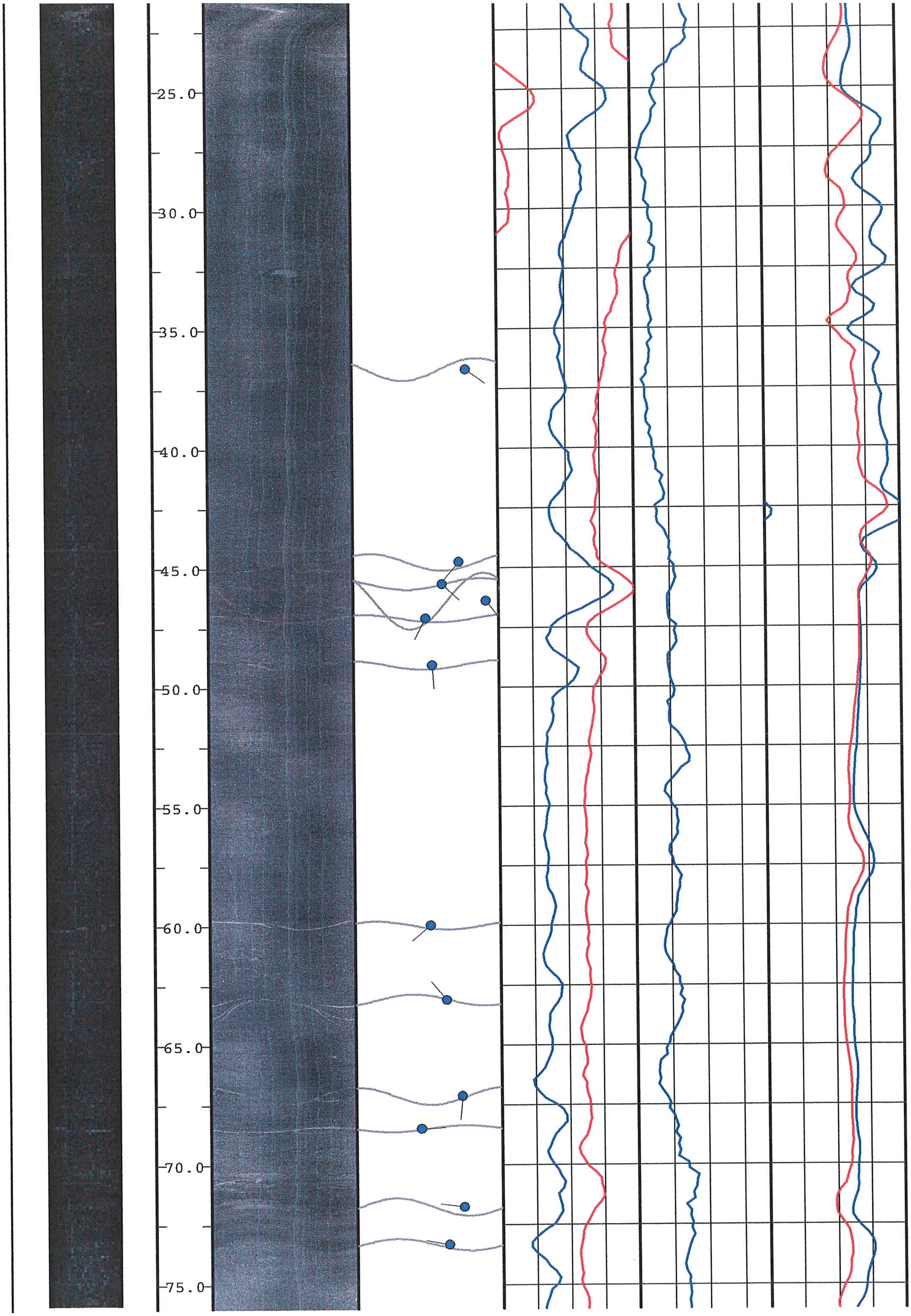
OTHER SERVICES

PERMANENT DATUM	ELEVATION	K.B.
LOG MEAS. FROM	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM		G.L.

DATE	20/07/04	TYPE FLUID IN HOLE	
RUN No	1	SALINITY	
TYPE LOG	OPTV, NEUTRON, DENSITY	DENSITY	
DEPTH-DRILLER	154'	LEVEL	
DEPTH-LOGGER	154'	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	154'		
TOP LOGGED INTERVAL	20'		
OPERATING RIG TIME			
RECORDED BY	J. ABREAU		
WITNESSED BY	B. LOPEZ		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO





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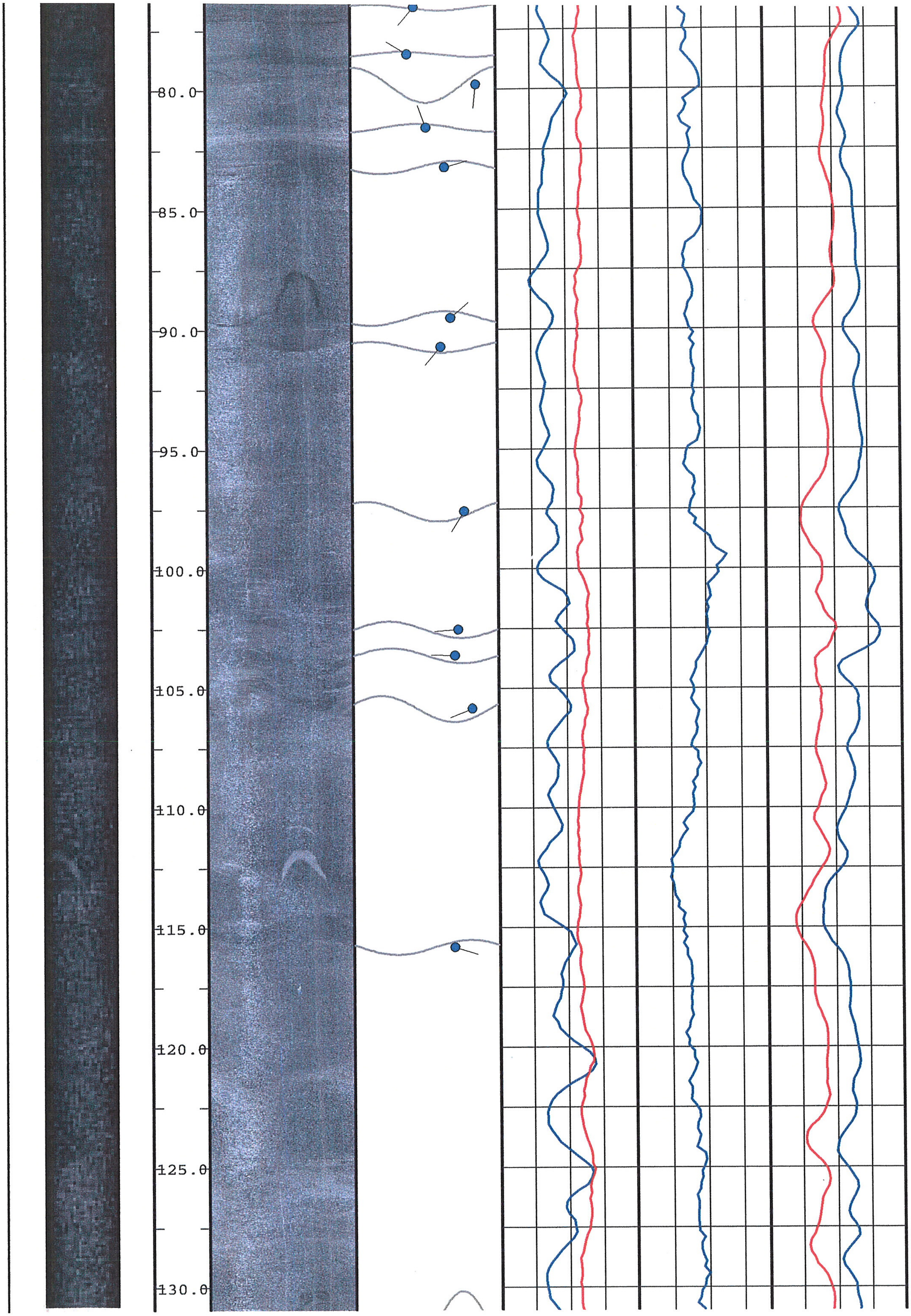
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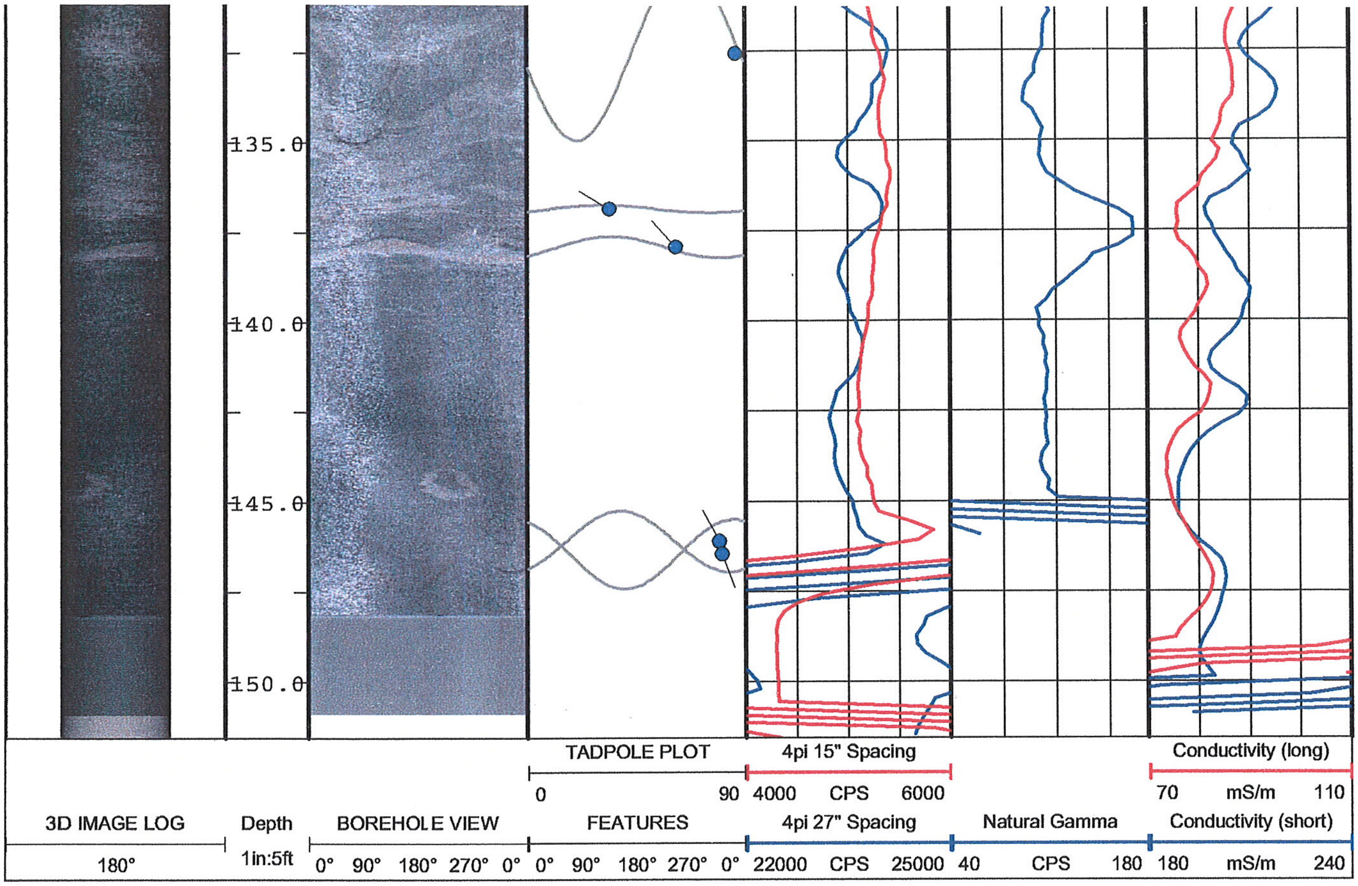
100.0
105.0
110.0
115.0
120.0
125.0
130.0



135.0
140.0
145.0
150.0
TADPOLE PLOT
0
90
4pi 15" Spacing
4000 CPS 6000
Conductivity (long)
70 mS/m 110
3D IMAGE LOG
180°
Depth
1in:5ft
BOREHOLE VIEW
0° 90° 180° 270° 0°
FEATURES
0° 90° 180° 270° 0°
4pi 27" Spacing
22000 CPS 25000
Natural Gamma
40 CPS 180
Conductivity (short)
180 mS/m 240

495

Orientation Summary Table
Image Features
Wellbore: GLA-E
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	11.18	36.68	125.40	70.45
2	13.63	44.72	220.30	65.40
3	13.91	45.65	132.18	54.77
4	14.13	46.35	140.50	82.05
5	14.35	47.09	207.33	44.65
6	14.95	49.05	175.72	48.44
7	18.28	59.96	230.15	46.56
8	19.23	63.09	321.64	56.10
9	20.46	67.11	184.79	65.40
10	20.87	68.46	87.60	40.03
11	21.86	71.73	277.06	66.09
12	22.34	73.30	280.43	56.52
13	23.33	76.54	221.08	39.21
14	23.93	78.50	302.20	34.84
15	24.32	79.78	184.95	77.55
16	24.86	81.57	341.08	46.56
17	25.37	83.23	74.64	57.74
18	27.28	89.50	48.73	60.95
19	27.65	90.71	221.08	54.77
20	29.74	97.58	211.78	68.74
21	31.25	102.51	267.47	64.66
22	31.57	103.59	271.36	62.78
23	32.25	105.82	248.19	73.41
24	35.30	115.81	107.04	61.89
25	40.40	132.55	81.12	86.11
26	41.72	136.87	301.43	33.90
27	42.04	137.93	317.45	61.44
28	44.53	146.10	332.27	79.03
29	44.64	146.46	159.33	80.32

All directions are with respect to magnetic north.

497

COLOG

BOREHOLE GEOPHYSICS & HYDROPHYSICS

A Division of Layne Christensen Company

11001 Etiwanda Ave., Fontana CA 92337
PH: (909) 390-2833 FAX (909) 390-6097

CO GEOLOGIC ASSOCIATES
WELL GLA-F
FLD GREGORY CANYON
CTY PALA
STE
FILING No

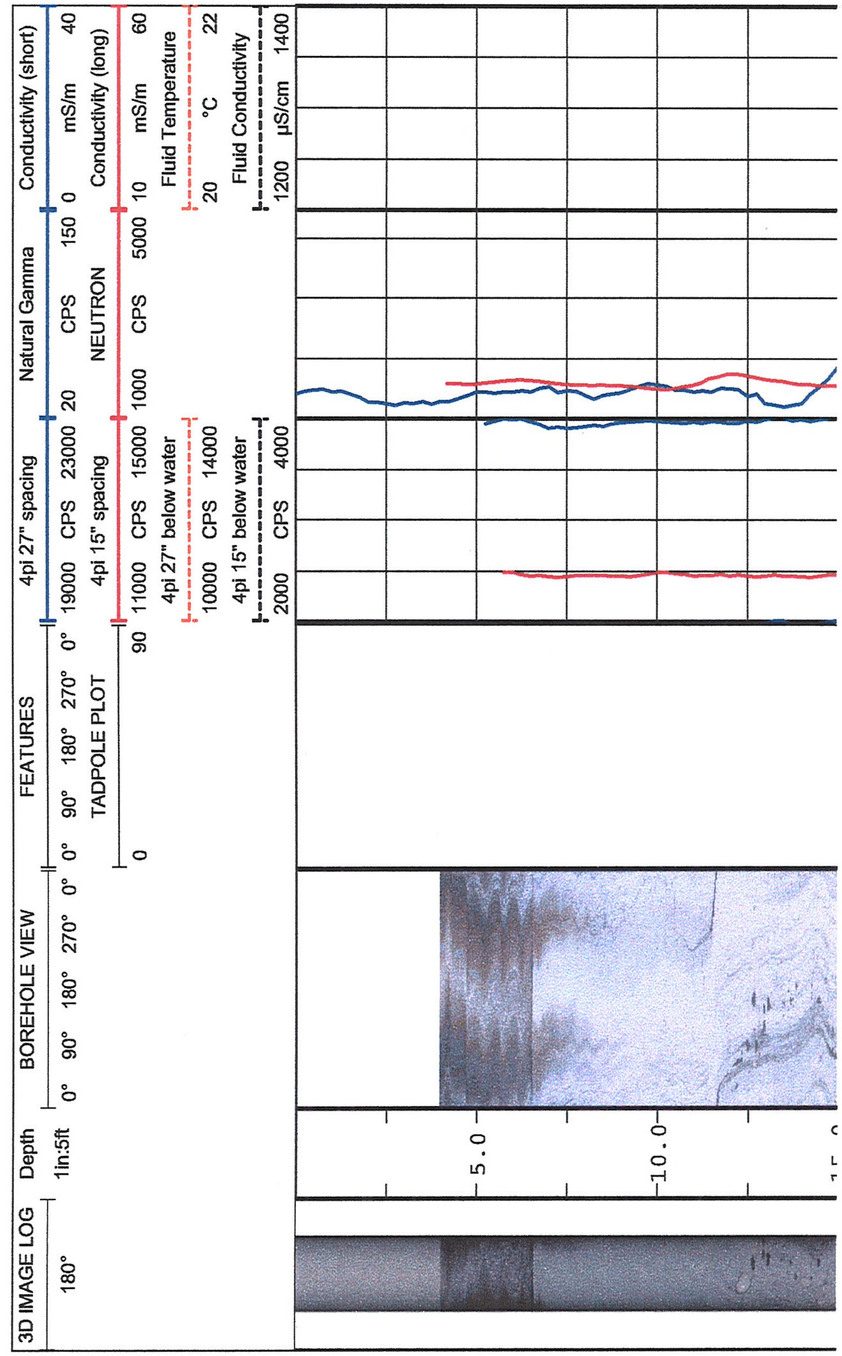
COMPANY	GEOLOGIC ASSOCIATES		
WELL ID	GLA-F		
FIELD	PALA		
COUNTRY	USA	STATE	CA

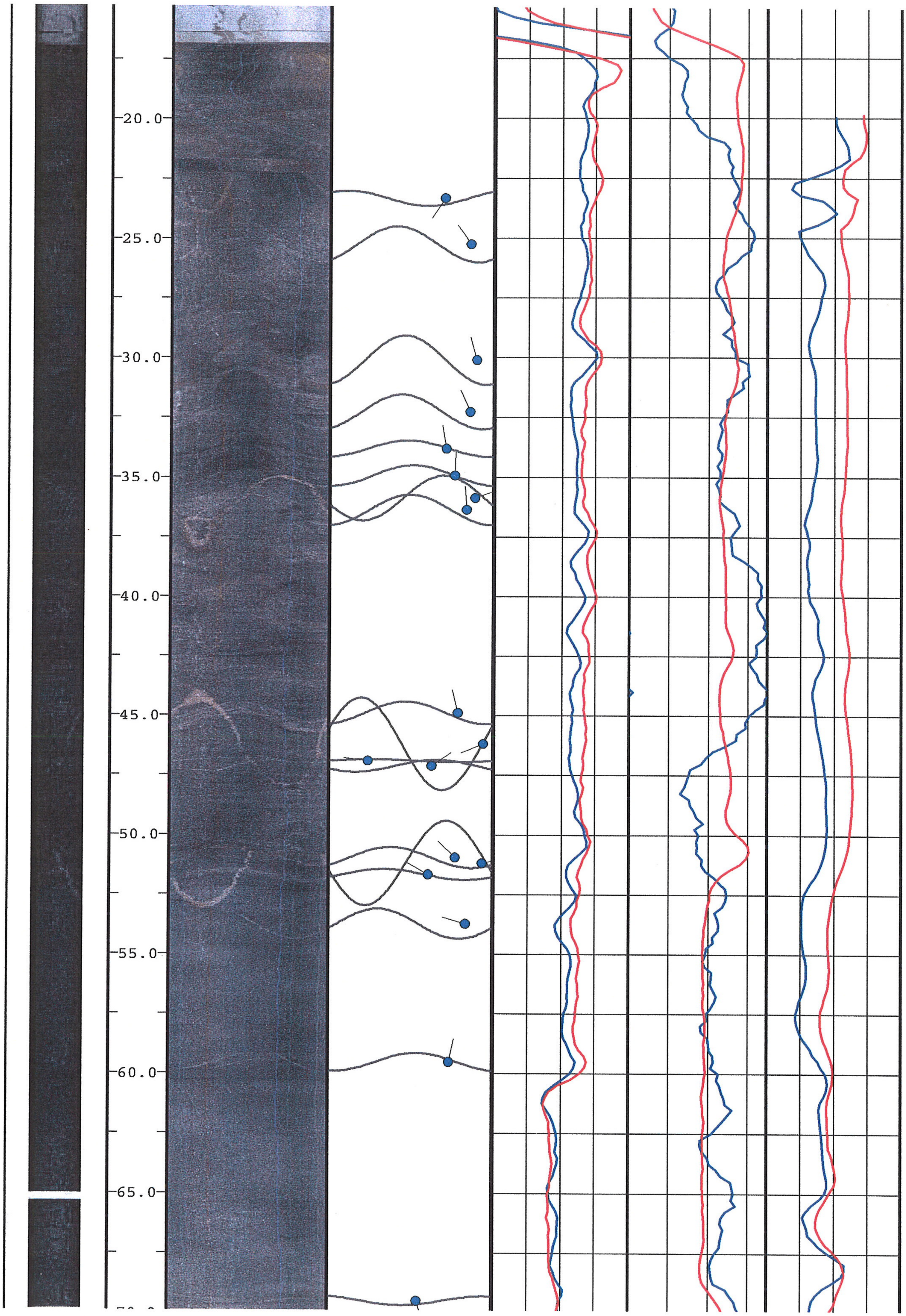
LOCATION GREGORY CANYON LANDFILL SEC TWP RGE	OTHER SERVICES

PERMANENT DATUM	GROUND SURFACE	ELEVATION	K.B.
LOG MEAS. FROM	GROUND SURFACE	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND SURFACE		G.L.

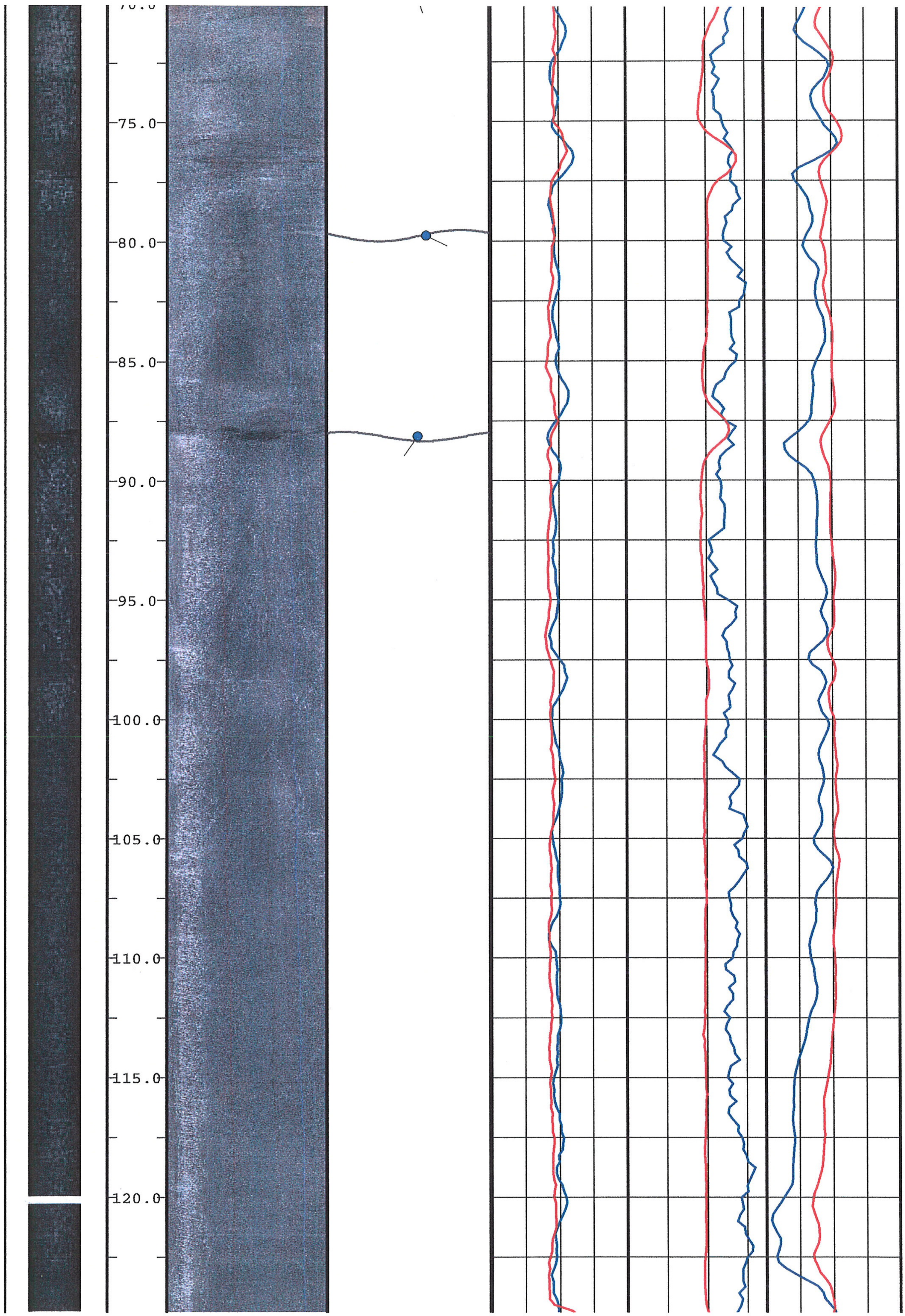
DATE	21/07/04	TYPE FLUID IN HOLE	
RUN No	1	SALINITY	
TYPE LOG	OPTV, NEUTRON, DENSITY	DENSITY	
DEPTH-DRILLER	165'	LEVEL	
DEPTH-LOGGER	165'	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	165'		
TOP LOGGED INTERVAL	20'		
OPERATING RIG TIME			
RECORDED BY	J. ABREAU		
WITNESSED BY	B. LOPEZ		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO





458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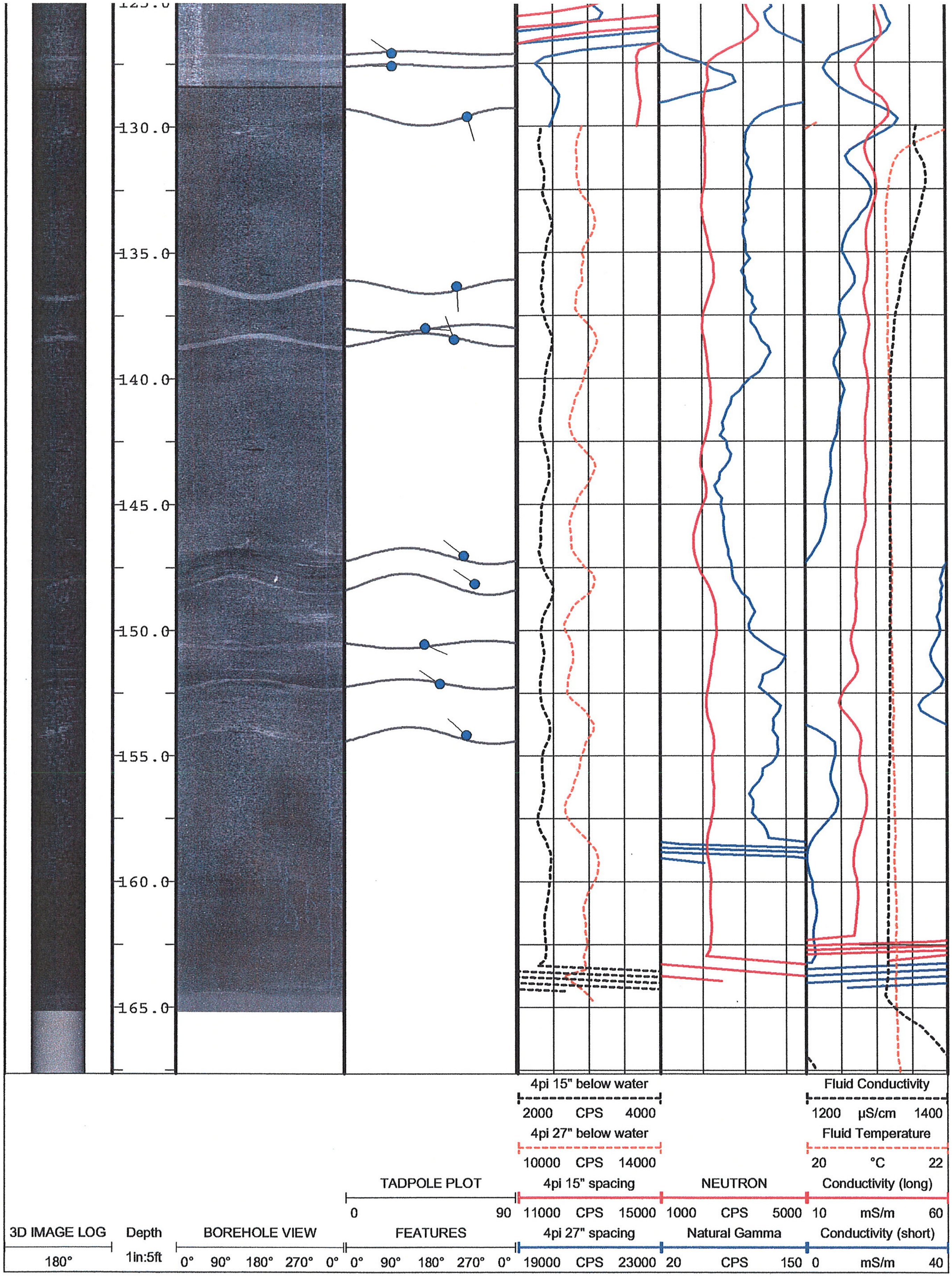
80.0
85.0
90.0
95.0
100.0
105.0
110.0
115.0
120.0



125.0
130.0
135.0
140.0
145.0
150.0
155.0
160.0
165.0
3D IMAGE LOG
180°
Depth
1in:5ft
BOREHOLE VIEW
0° 90° 180° 270° 0°
TADPOLE PLOT
0 90
FEATURES
0° 90° 180° 270° 0°
4pi 15" below water
2000 CPS 4000
4pi 27" below water
10000 CPS 14000
4pi 15" spacing
11000 CPS 15000
4pi 27" spacing
19000 CPS 23000
NEUTRON
1000 CPS 5000
Natural Gamma
20 CPS 150
Fluid Conductivity
1200 µS/cm 1400
Fluid Temperature
20 °C 22
Conductivity (long)
10 mS/m 60
Conductivity (short)
0 mS/m 40

Orientation Summary Table
Image Features
Wellbore: GLA-F
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	7.11	23.33	214.25	63.06
2	7.70	25.26	325.30	77.69
3	9.17	30.10	343.78	80.93
4	9.84	32.28	336.76	77.24
5	10.31	33.81	351.37	64.30
6	10.65	34.93	2.82	69.06
7	10.93	35.86	70.17	80.07
8	11.09	36.37	355.53	75.53
9	13.68	44.89	346.96	70.96
10	14.08	46.18	248.47	85.17
11	14.29	46.89	277.32	21.01
12	14.36	47.11	55.26	56.72
13	15.53	50.94	314.84	69.73
14	15.60	51.18	78.46	84.71
15	15.75	51.67	299.95	54.77
16	16.38	53.73	286.67	75.40
17	18.14	59.51	12.96	66.49
18	21.18	69.49	161.04	48.95
19	24.30	79.74	114.97	54.77
20	26.87	88.14	215.16	50.19
21	38.73	127.07	305.68	24.51
22	38.89	127.59	272.49	24.51
23	39.51	129.61	163.25	64.41
24	41.56	136.35	176.53	58.87
25	42.06	137.99	94.45	42.37
26	42.20	138.45	341.29	57.74
27	44.81	147.03	308.40	62.78
28	45.16	148.16	304.78	68.54
29	45.89	150.55	113.16	41.6
30	46.37	152.13	303.57	50.19
31	46.99	154.18	313.23	63.89

All directions are with respect to magnetic north.

COLOG

BOREHOLE GEOPHYSICS & HYDROPHYSICS

A Division of Layne Christensen Company

11001 Etiwanda Ave., Fontana CA 92337
PH: (909) 390-2833 FAX (909) 390-6097

CO GEOLOGIC ASSOCIATES
WELL GLA-G
FLD GREGORY CANYON
CTY
STE
FILING No

COMPANY	GEOLOGIC ASSOCIATES		
WELL ID	GLA-G		
FIELD	PALA		
COUNTRY	USA	STATE	CA

LOCATION
GREGORY CANYON LANDFILL

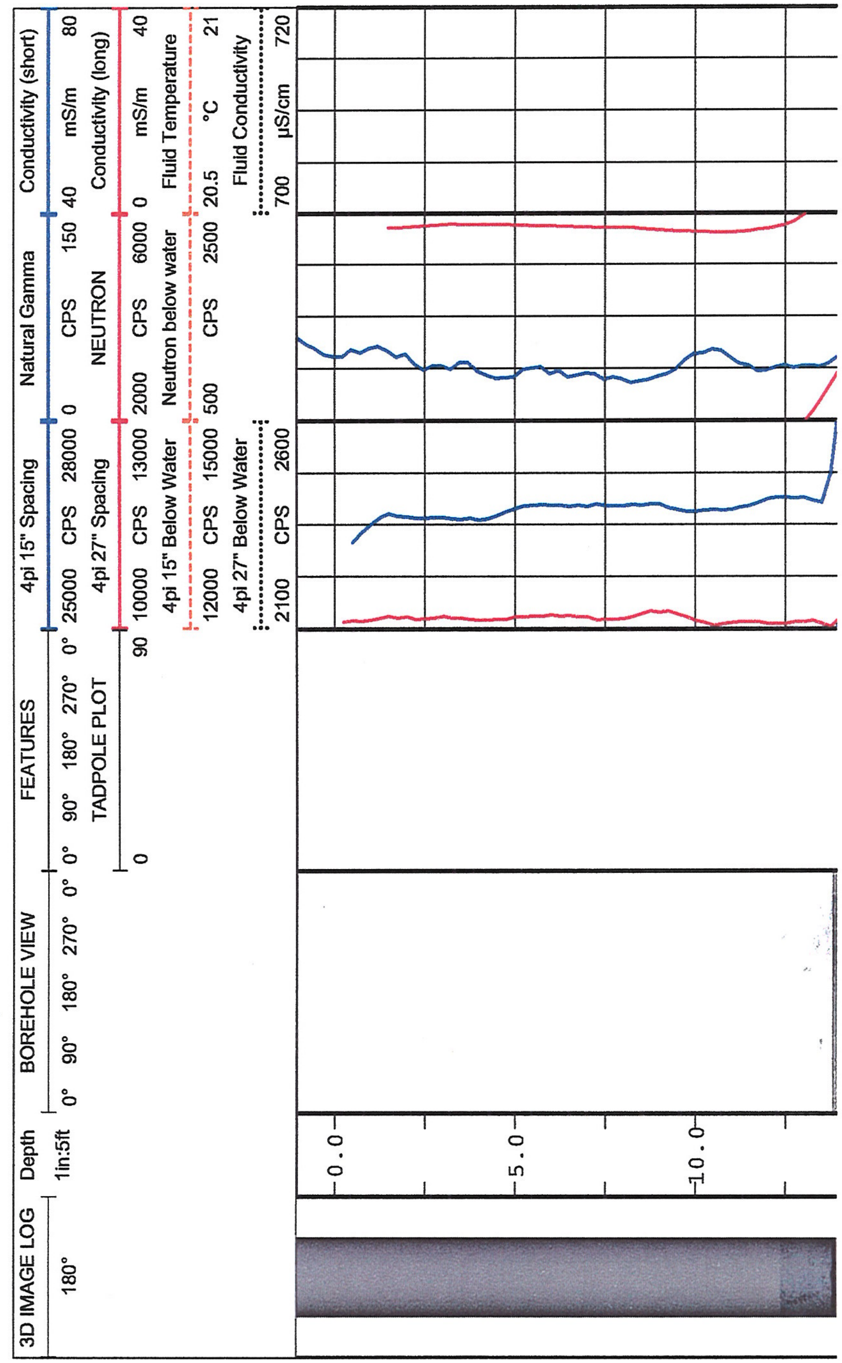
SEC TWP RGE

OTHER SERVICES

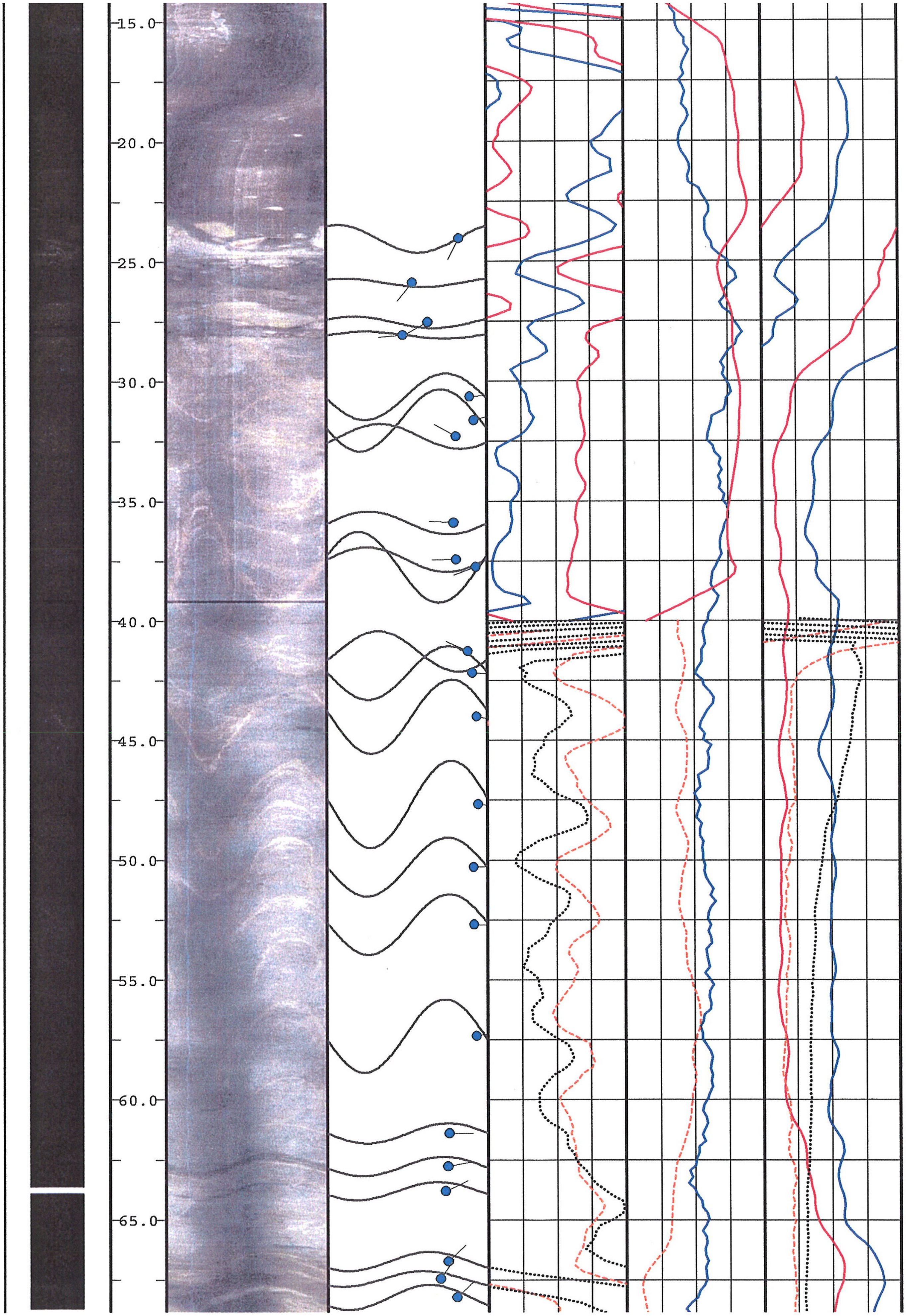
PERMANENT DATUM	GROUND SURFACE	ELEVATION	K.B.
LOG MEAS. FROM	GROUND SURFACE	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE	21/07/04	TYPE FLUID IN HOLE	
RUN No	1	SALINITY	
TYPE LOG	OPTV, NEUTRON, DENSITY	DENSITY	
DEPTH-DRILLER	105'	LEVEL	
DEPTH-LOGGER	105'	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	105'		
TOP LOGGED INTERVAL	15'		
OPERATING RIG TIME			
RECORDED BY	J. ABREAU		
WITNESSED BY	B.LOPEZ		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO



502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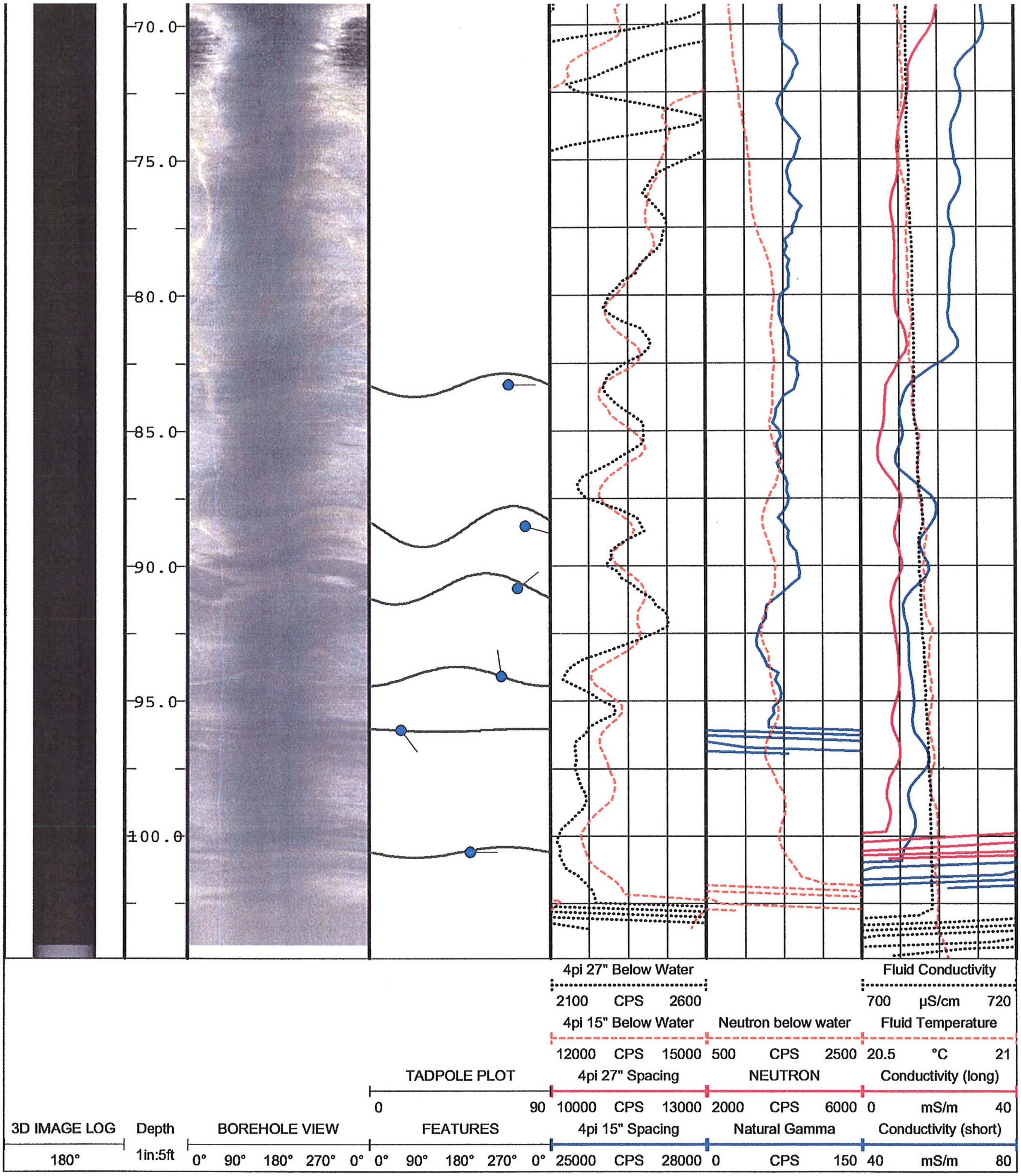
65.0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75.0
80.0
85.0
90.0
95.0
100.0
4pi 27" Below Water
2100 CPS 2600
4pi 15" Below Water
12000 CPS 15000
4pi 27" Spacing
10000 CPS 13000
4pi 15" Spacing
25000 CPS 28000
Neutron below water
500 CPS 2500
NEUTRON
2000 CPS 6000
Natural Gamma
0 CPS 150
Fluid Conductivity
700 µS/cm 720
Fluid Temperature
20.5 °C 21
Conductivity (long)
0 mS/m 40
Conductivity (short)
40 mS/m 80
TADPOLE PLOT
0 90
FEATURES
0° 90° 180° 270° 0°
3D IMAGE LOG
180°
Depth
1in:5ft
BOREHOLE VIEW
0° 90° 180° 270° 0°

504

Orientation Summary Table
Image Features
Wellbore: GLA-G
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	7.32	24.03	206.52	74.29
2	7.88	25.86	219.12	48.44
3	8.39	27.51	241.70	57.22
4	8.55	28.05	266.49	42.97
5	9.34	30.64	87.02	80.31
6	9.63	31.61	75.83	82.72
7	9.84	32.28	299.90	72.57
8	10.94	35.89	273.83	71.14
9	11.41	37.43	269.37	72.50
10	11.50	37.74	251.22	83.70
11	12.58	41.26	295.09	79.08
12	12.85	42.17	92.41	81.65
13	13.41	43.99	99.27	83.95
14	14.53	47.66	97.80	84.82
15	15.32	50.27	89.57	82.34
16	16.05	52.67	93.21	82.57
17	17.47	57.31	83.40	83.86
18	18.71	61.38	89.57	68.17
19	19.13	62.75	79.09	67.38
20	19.44	63.78	65.61	66.12
21	20.33	66.71	46.34	67.37
22	20.56	67.44	32.38	63.32
23	20.79	68.21	46.92	72.29
24	25.38	83.28	89.57	69.25
25	26.98	88.53	105.73	77.63
26	27.68	90.82	51.59	73.86
27	28.67	94.07	352.55	65.47
28	29.28	96.07	142.87	16.07
29	30.66	100.6	89.57	50.19

All directions are with respect to magnetic north.

506

COLOG

BOREHOLE GEOPHYSICS & HYDROPHYSICS

A Division of Layne Christensen Company

11001 Etiwanda Ave., Fontana CA 92337
PH: (909) 390-2833 FAX (909) 390-6097

CO GEOLOGIC ASSOCIATES
WELL GLA-3S
FLD GREGORY CANYON
CTY
STE
FILING No

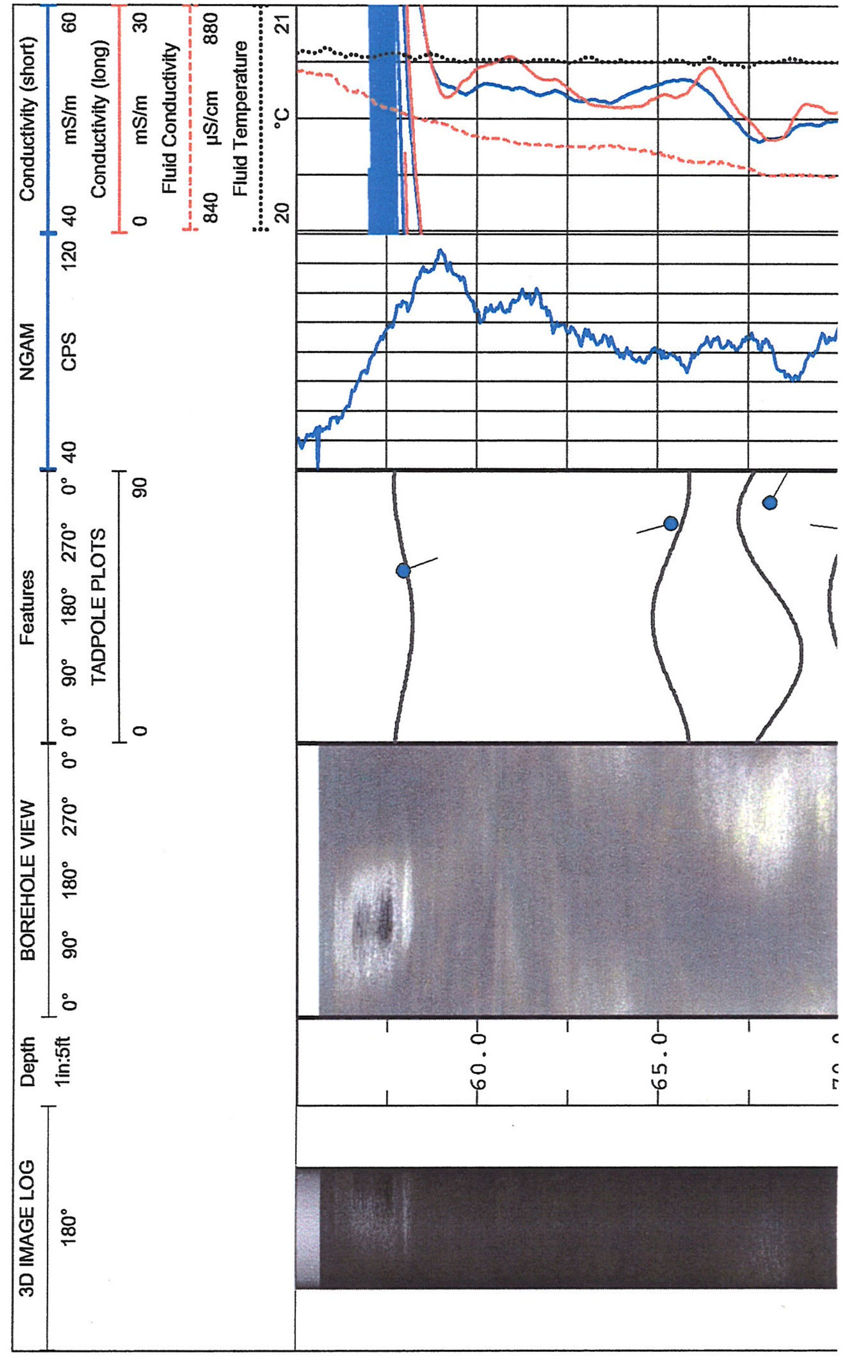
COMPANY	GEOLOGIC ASSOCIATES		
WELL ID	GLA-3S		
FIELD	PALA		
COUNTRY	USA	STATE	CA

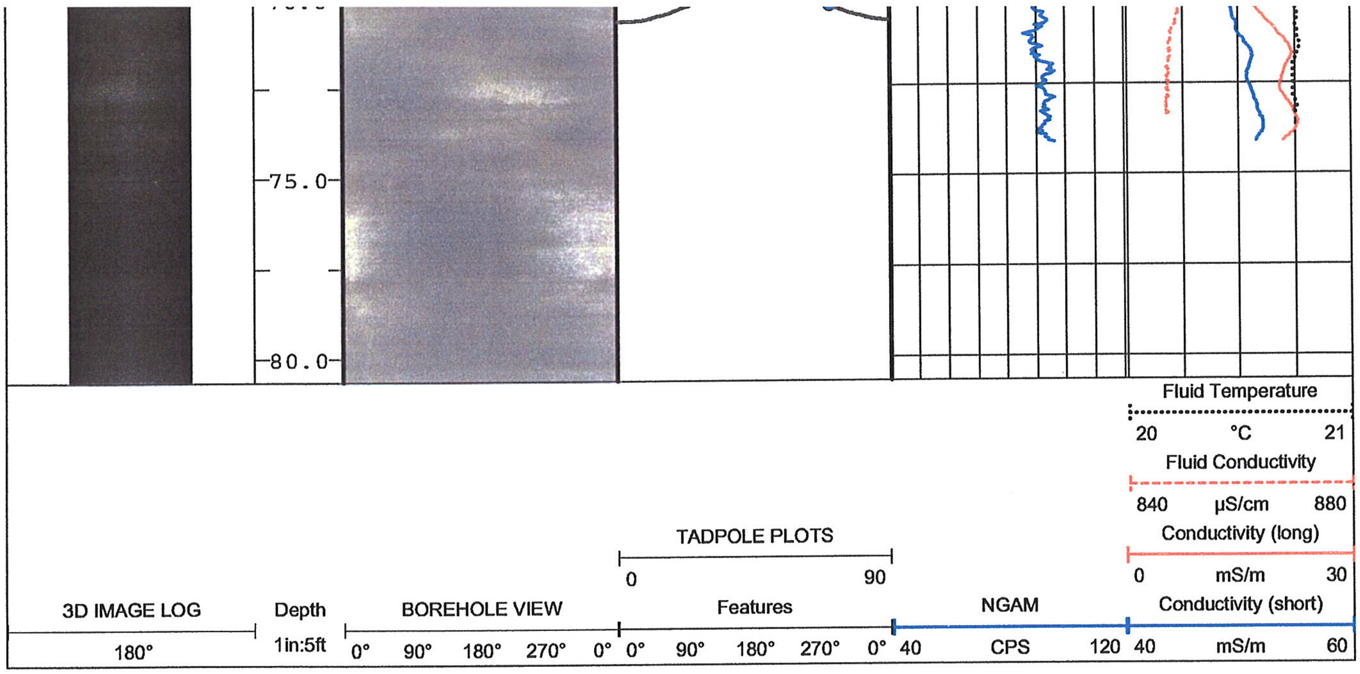
LOCATION	OTHER SERVICES
GREGORY CANYON LANDFILL	
SEC TWP RGE	

PERMANENT DATUM	GROUND SURFACE	ELEVATION	K.B.
LOG MEAS. FROM	GROUND SURFACE	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	GROUND SURFACE		G.L.

DATE	18/06/04	TYPE FLUID IN HOLE	
RUN No	1	SALINITY	
TYPE LOG	OPTV, GAMMA, T/FEC	DENSITY	
DEPTH-DRILLER	80'	LEVEL	
DEPTH-LOGGER	80'	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	80'		
TOP LOGGED INTERVAL	50'		
OPERATING RIG TIME			
RECORDED BY	J. ABREAU		
WITNESSED BY	B. LOPEZ		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO

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80.0
Fluid Temperature
20 °C 21
Fluid Conductivity
840 µS/cm 880
Conductivity (long)
0 mS/m 30
Conductivity (short)
40 mS/m 60
TADPOLE PLOTS
0 90
Features
0° 90° 180° 270° 0°
3D IMAGE LOG
180°
Depth
1in:5ft
BOREHOLE VIEW
0° 90° 180° 270° 0°
NGAM
40 CPS 120

Orientation Summary Table
Image Features
Wellbore: GLA-3S
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	17.67	57.97	159.91	56.97
2	19.92	65.37	343.74	72.40
3	20.76	68.11	118.34	79.34
4	21.40	70.22	7.40	70.44

All directions are with respect to magnetic north.

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509

COLOG

BOREHOLE GEOPHYSICS & HYDROPHYSICS

A Division of Layne Christensen Company

11001 Etiwanda Ave., Fontana CA 92337
PH: (909) 390-2833 FAX (909) 390-6097

WELL GW-1.7
FLD Gregory Canyon
CTY
STE
FILING No

COMPANY ROBERTSON GEOLOGGING TECHNOLOGY
WELL ID
FIELD
COUNTRY USA STATE

LOCATION

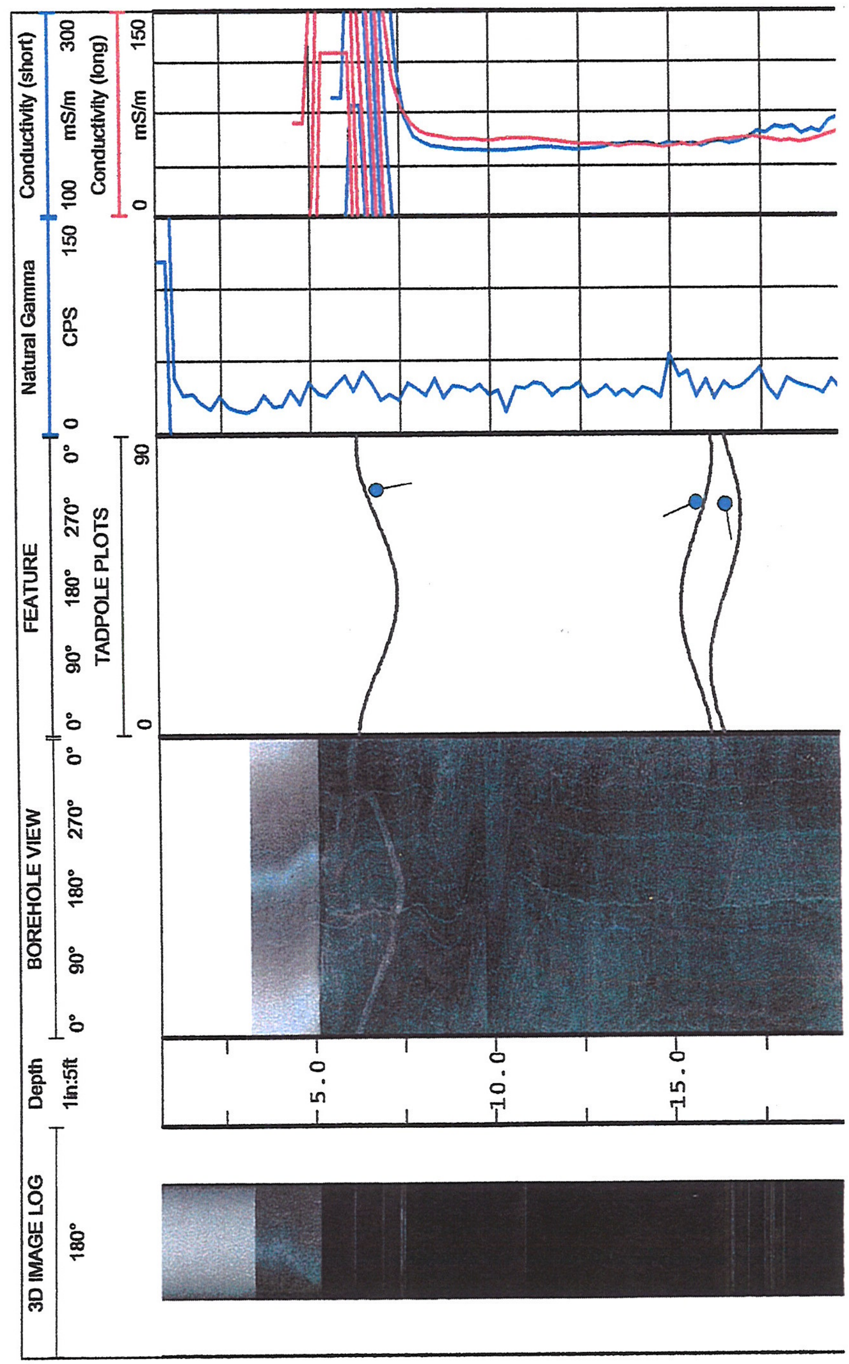
SEC TWP RGE

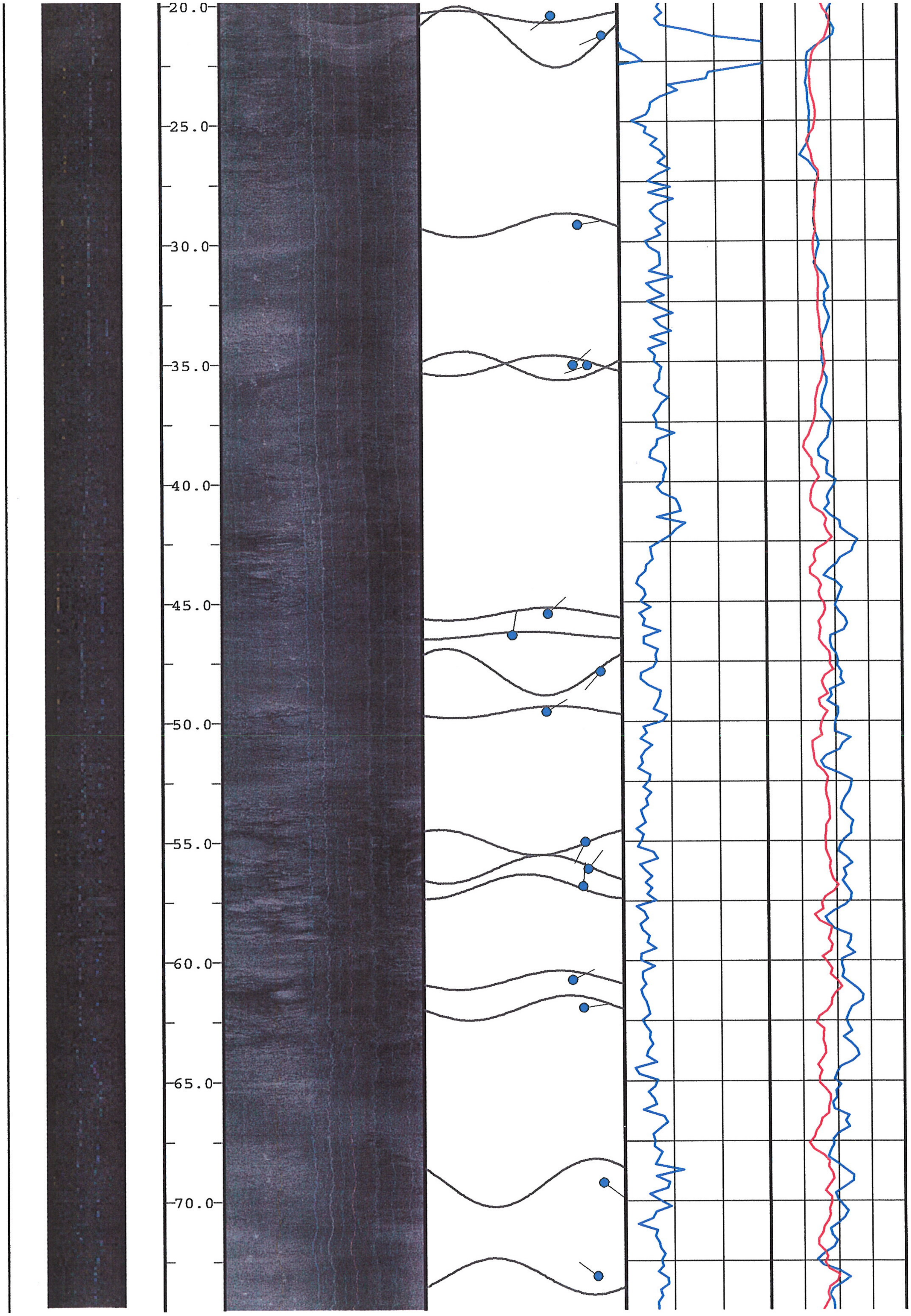
OTHER SERVICES

ERMANENT DATUM	ELEVATION	K.B.
OG MEAS. FROM	ABOVE PERM. DATUM	D.F.
RILLING MEAS. FROM		G.L.

ATE	21/06/04	TYPE FLUID IN HOLE	
UN No		SALINITY	
YPE LOG		DENSITY	
EPTH-DRILLER		LEVEL	
EPTH-LOGGER		MAX. REC. TEMP.	
TM LOGGED INTERVAL			
OP LOGGED INTERVAL			
PERATING RIG TIME			
ECORDED BY			
ITNESSED BY			

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO

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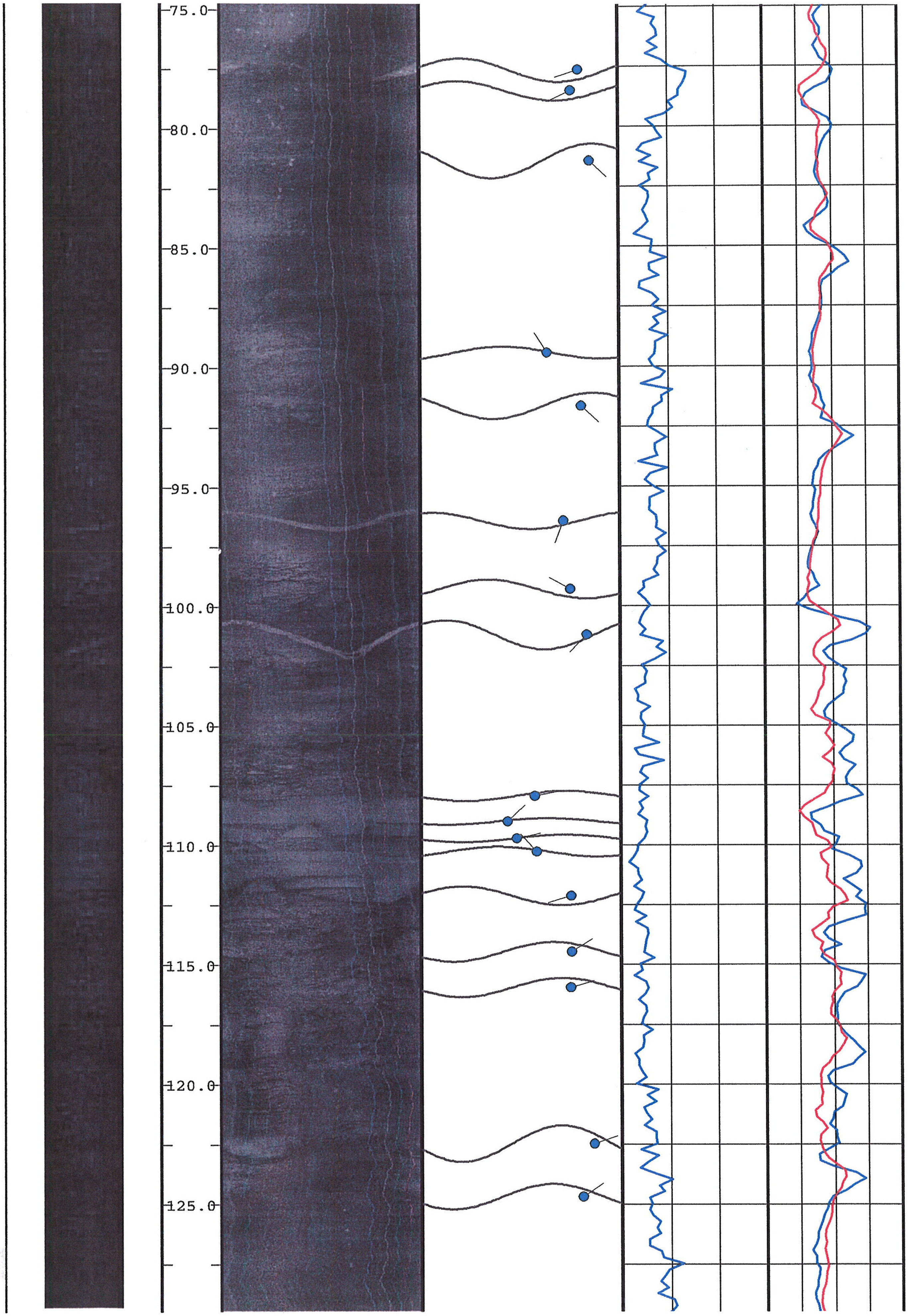
60.0
65.0
70.0



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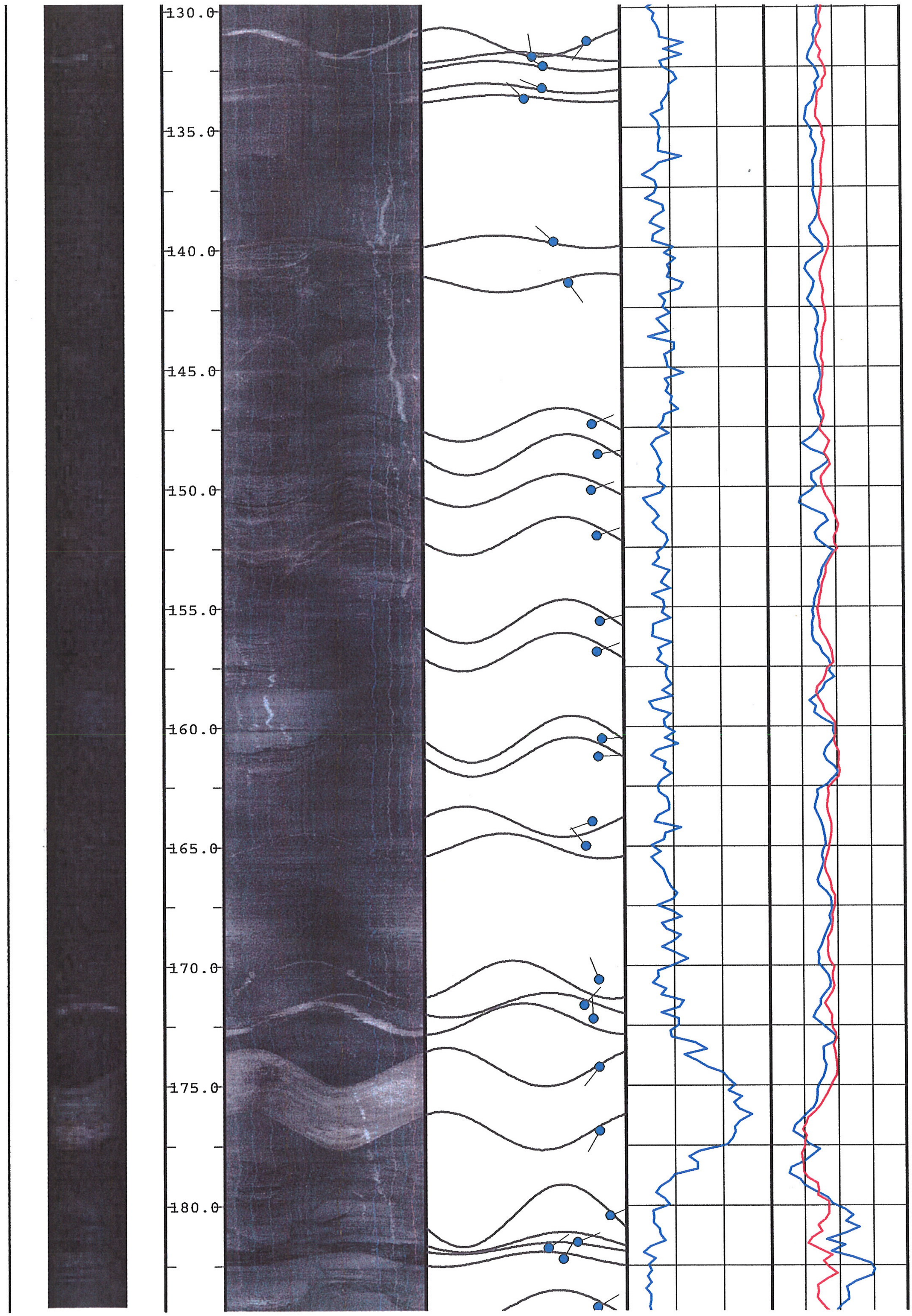

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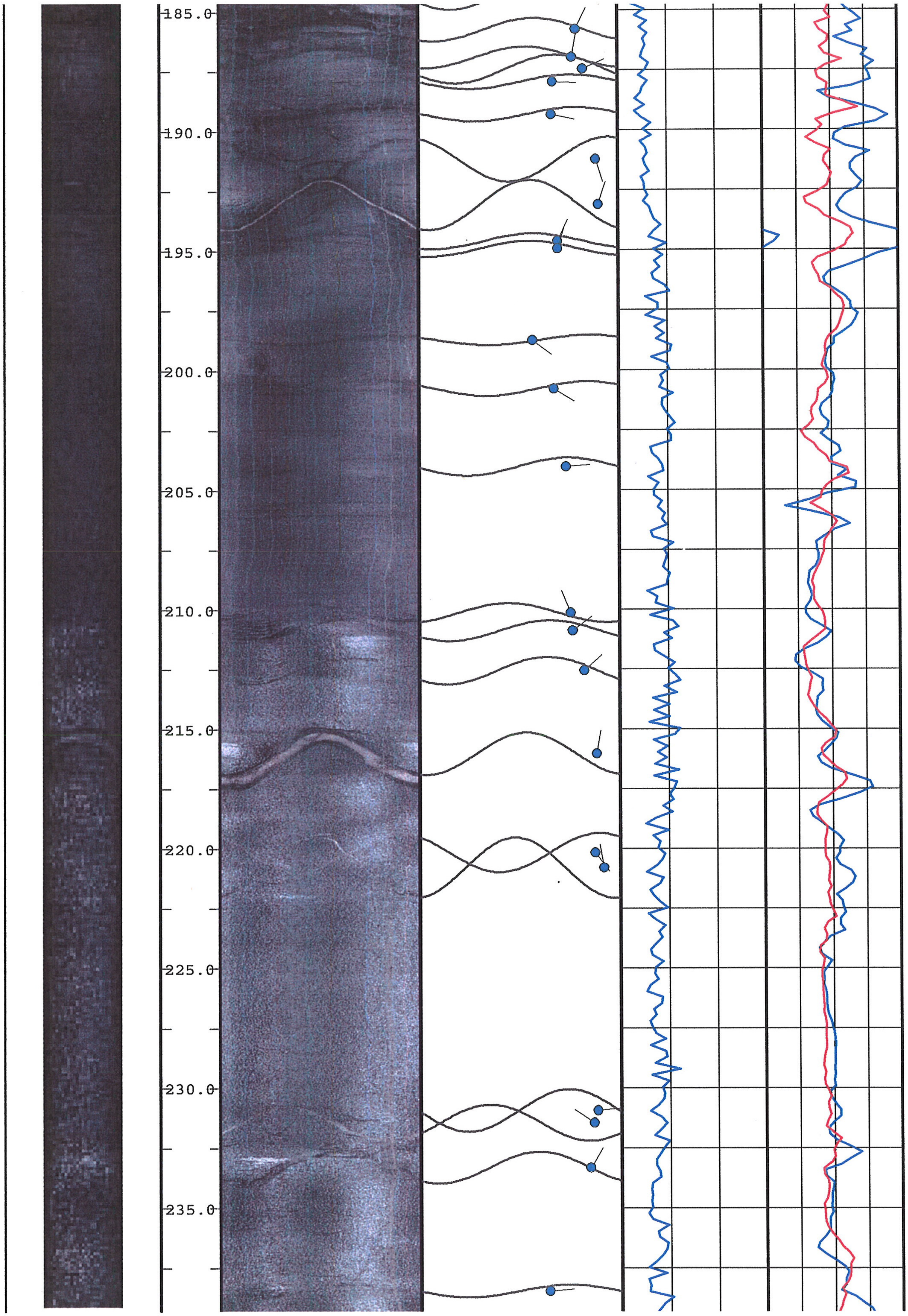
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215.0
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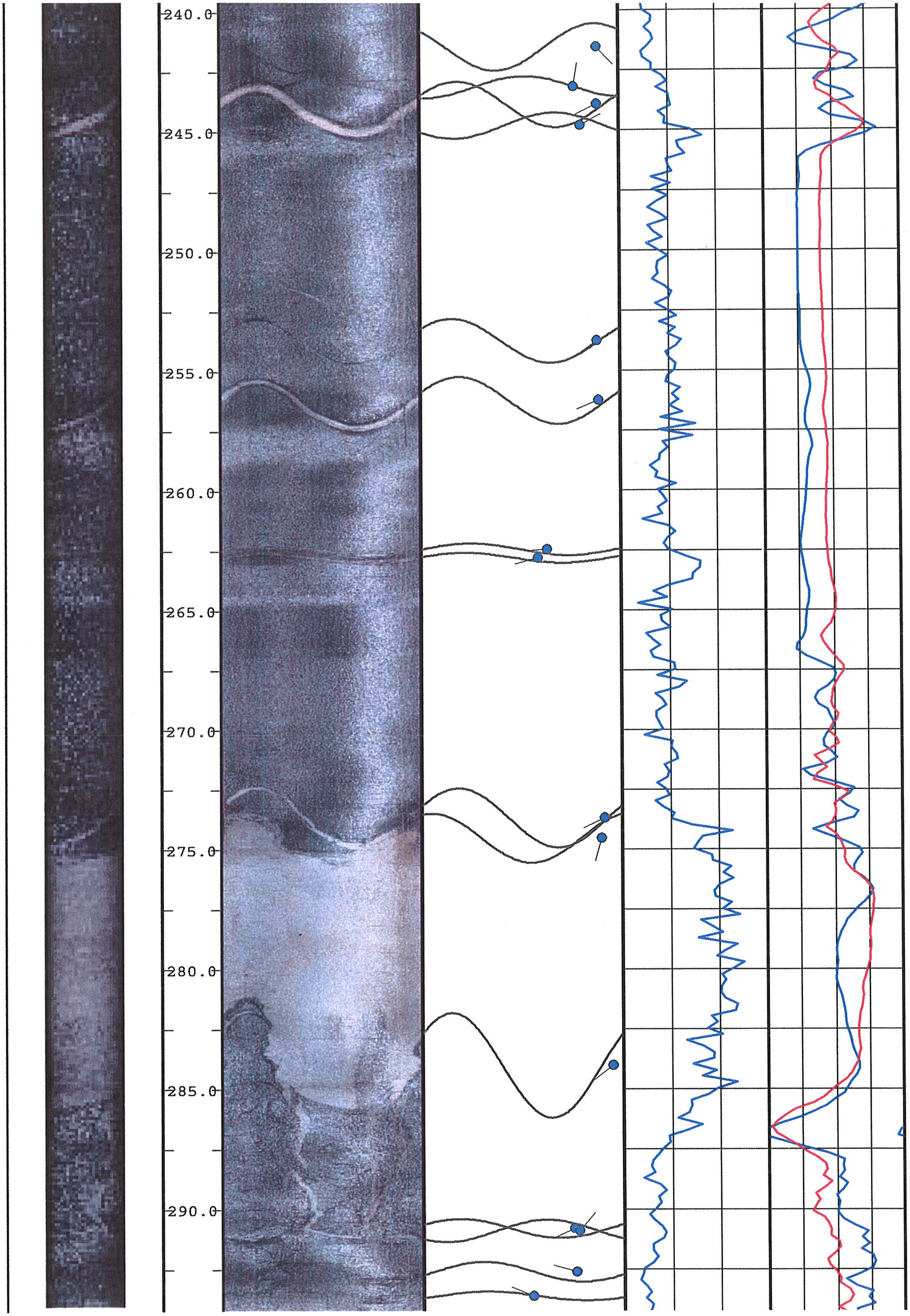
225.0
230.0
235.0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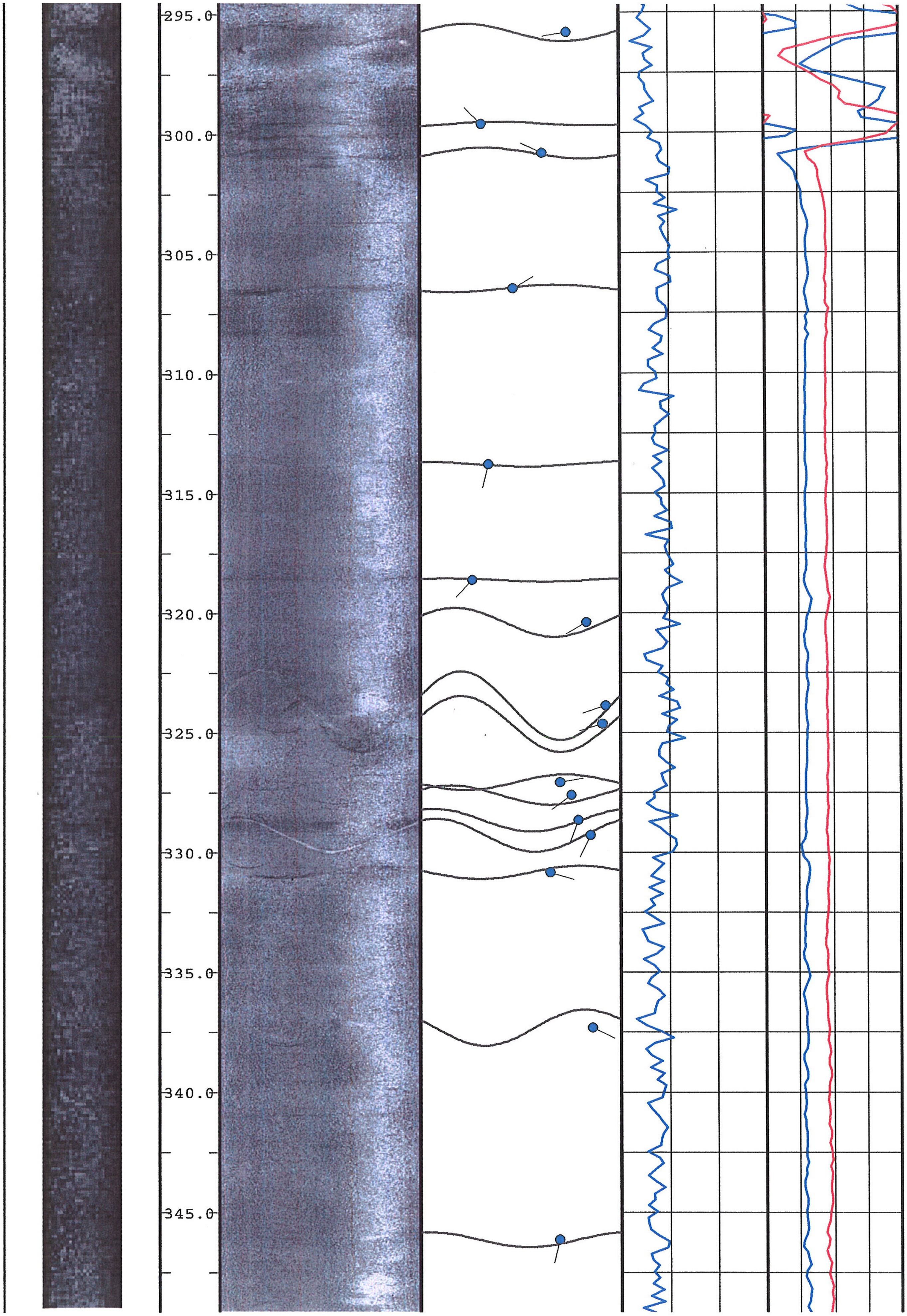
290.0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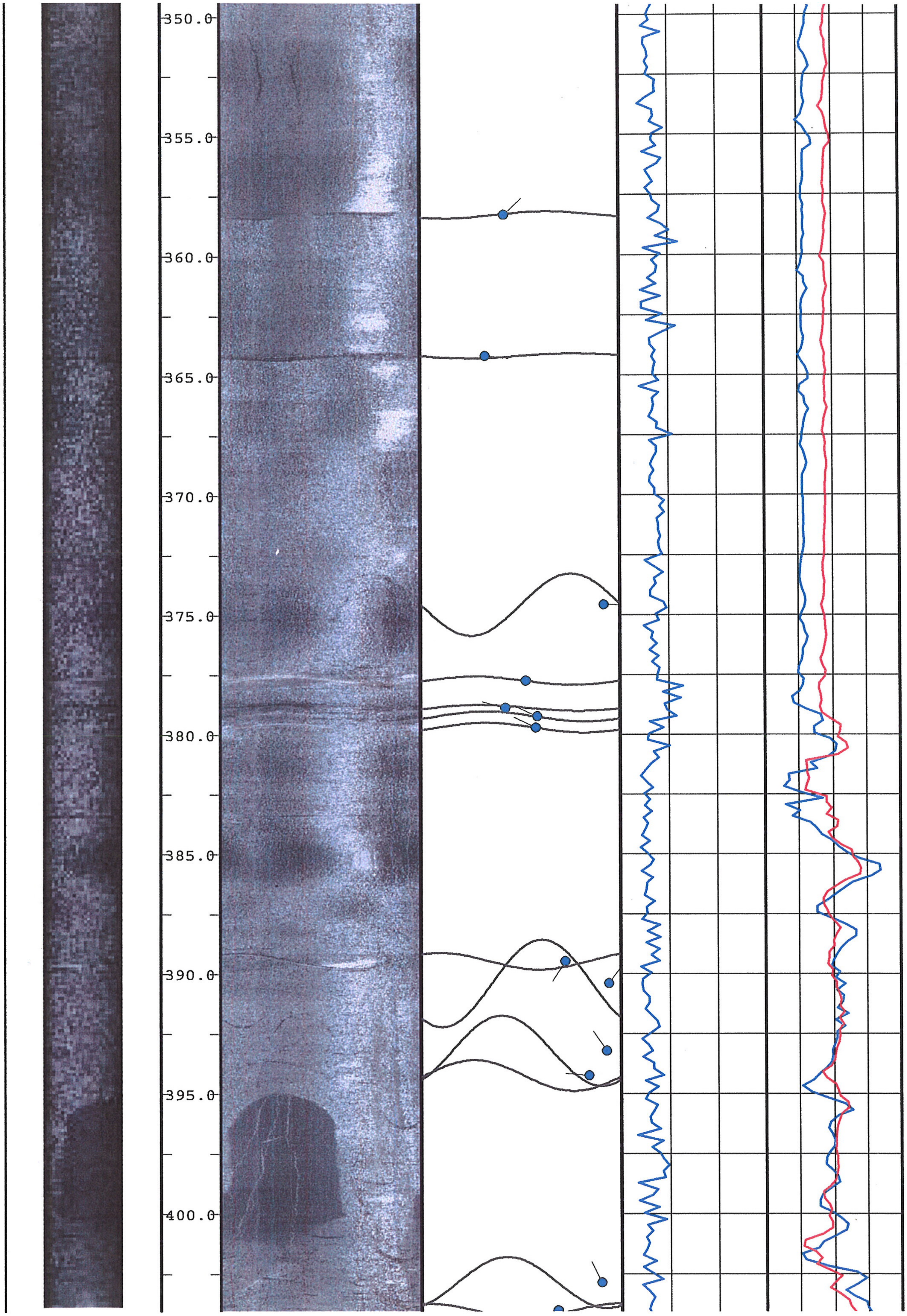
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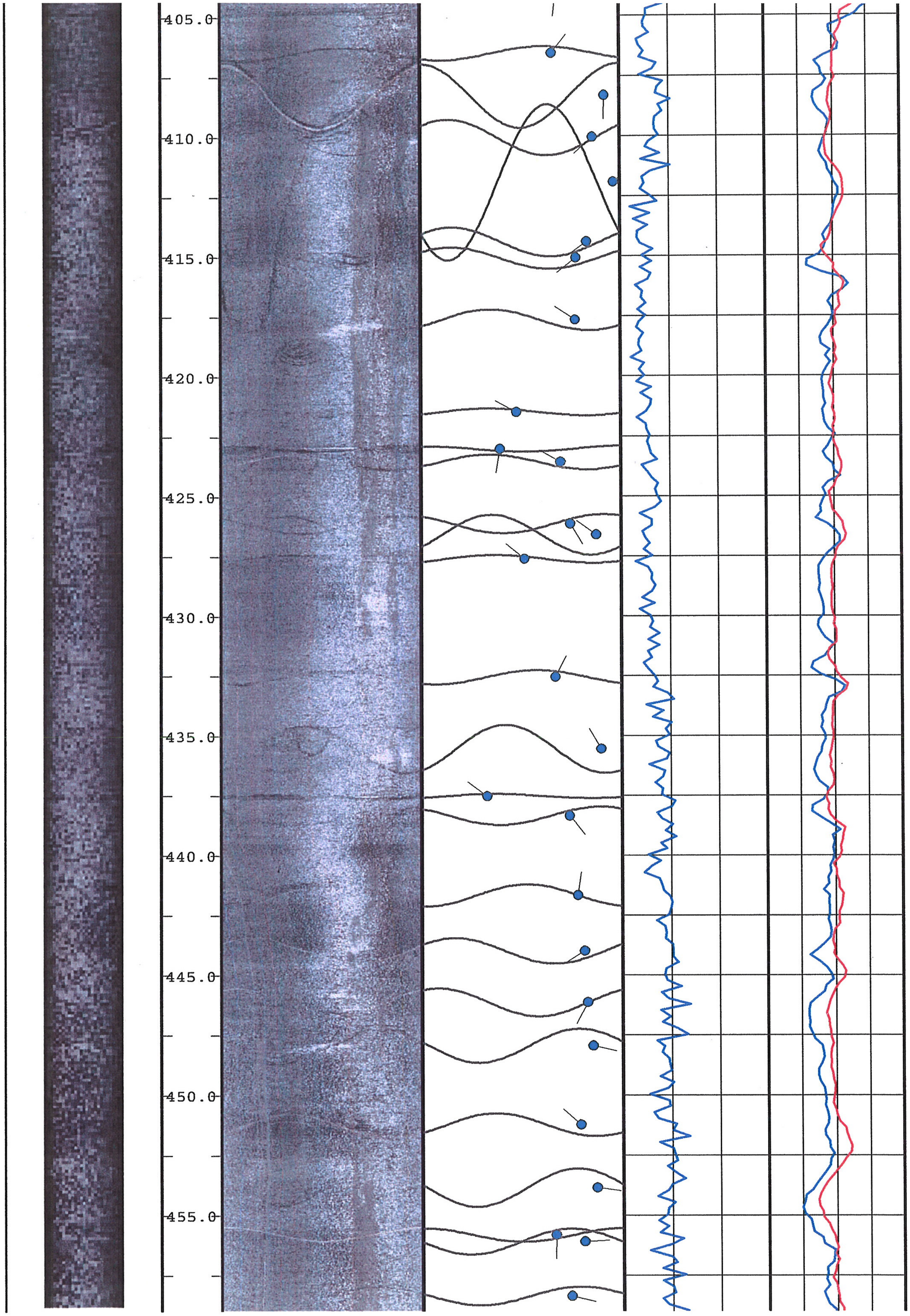
400.0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410.0
415.0
420.0
425.0
430.0
435.0
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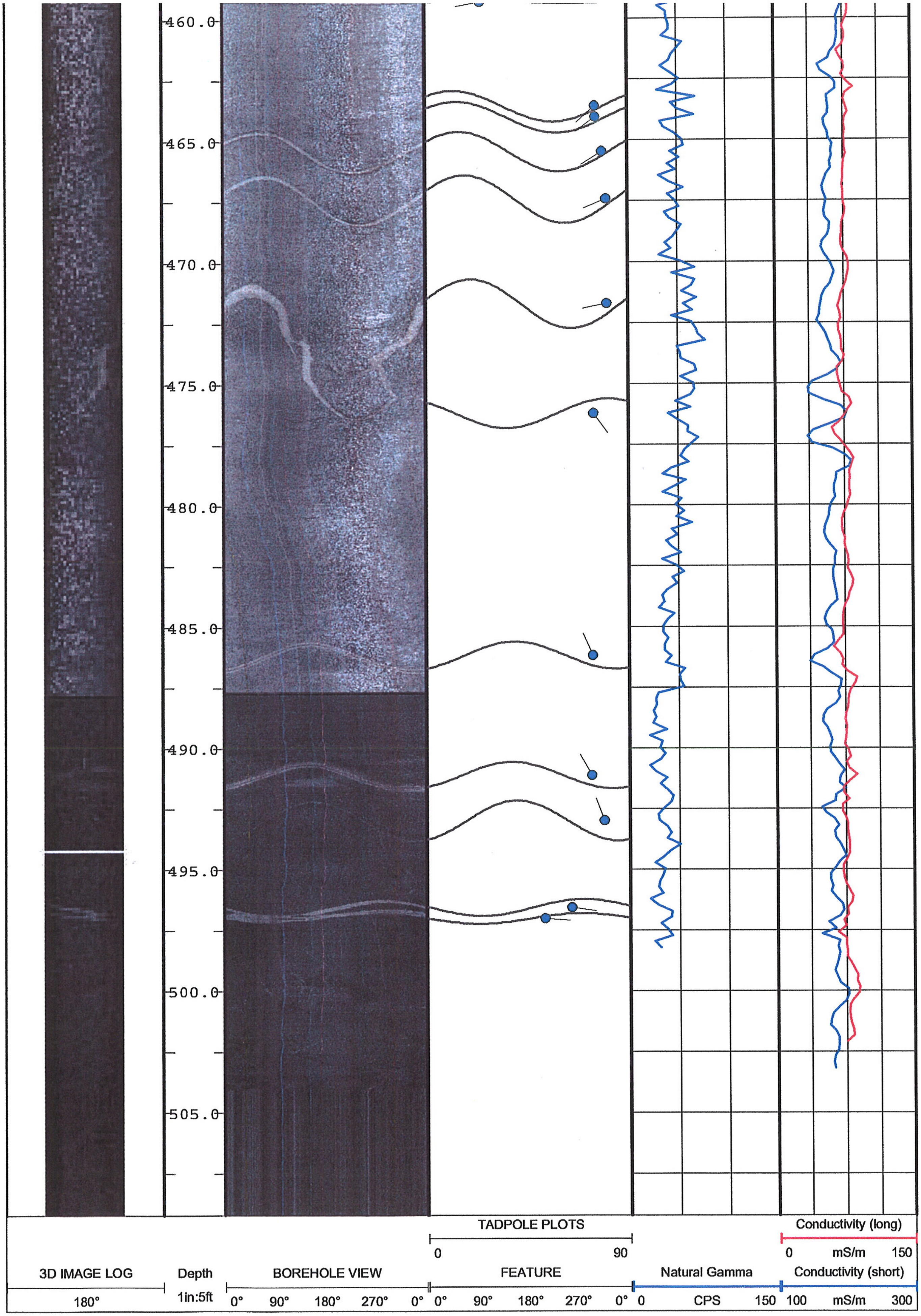
445.0
450.0
455.0


460.0
465.0
470.0
475.0
480.0
485.0
490.0
495.0
500.0
505.0
TADPOLE PLOTS
0
90
Conductivity (long)
0
mS/m
150
3D IMAGE LOG
180°
Depth
1in:5ft
BOREHOLE VIEW
0° 90° 180° 270° 0°
FEATURE
0° 90° 180° 270° 0°
Natural Gamma
0
CPS
150
Conductivity (short)
100
mS/m
300

518

Orientation Summary Table
Image Features
Wellbore: GLA-17
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
1	2.07	6.80	168.93	73.60
2	4.77	15.66	335.55	69.43
3	5.02	16.47	261.65	68.83
4	6.26	20.55	235.32	59.94
5	6.53	21.41	248.35	82.83
6	8.92	29.28	80.23	71.12
7	10.70	35.11	50.30	68.63
8	10.70	35.12	251.92	75.15
9	13.86	45.47	45.77	56.86
10	14.13	46.36	8.64	40.82
11	14.60	47.89	221.52	80.52
12	15.11	49.57	58.03	55.99
13	16.77	55.02	206.28	73.14
14	17.11	56.15	38.26	74.38
15	17.33	56.87	4.50	72.07
16	18.53	60.78	64.05	67.07
17	18.89	61.96	82.39	72.11
18	21.10	69.23	127.03	80.69
19	22.29	73.13	305.52	77.81
20	23.66	77.63	252.50	72.07
21	23.92	78.49	245.95	68.63
22	24.81	81.41	131.43	76.86
23	27.26	89.42	327.98	57.59
24	27.93	91.64	132.52	72.82
25	29.39	96.42	200.09	64.76
26	30.25	99.26	300.59	67.80
27	30.84	101.19	223.88	75.10
28	32.90	107.94	80.09	51.43
29	33.22	109.00	45.71	39.21
30	33.44	109.70	77.08	43.25
31	33.61	110.27	317.89	52.16
32	34.17	112.11	254.40	67.70
33	34.88	114.45	57.23	67.98
34	35.34	115.95	73.55	67.45
35	37.33	122.46	71.91	77.69
36	38.00	124.66	56.12	72.63
37	40.05	131.39	218.09	75.23
38	40.23	132.00	351.75	50.49
39	40.36	132.40	301.39	55.50
40	40.64	133.32	292.55	55.00
41	40.77	133.75	315.16	46.76
42	42.59	139.72	313.39	59.78
43	43.11	141.44	143.20	66.29
44	44.91	147.34	68.09	76.54

All directions are with respect to magnetic north.

519

Orientation Summary Table
Image Features
Wellbore: GLA-17
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
45	45.30	148.61	79.79	78.98
46	45.75	150.10	69.79	76.11
47	46.34	152.02	71.91	78.32
48	47.42	155.57	75.30	79.64
49	47.81	156.86	69.48	78.28
50	48.92	160.50	86.38	80.37
51	49.15	161.24	87.02	78.59
52	49.98	163.96	251.57	75.84
53	50.29	164.98	321.06	72.97
54	51.99	170.58	338.12	78.42
55	52.32	171.64	42.37	71.89
56	52.49	172.20	356.90	75.76
57	53.10	174.21	217.05	78.51
58	53.91	176.88	209.96	78.40
59	54.99	180.41	67.23	82.83
60	55.33	181.52	67.87	68.26
61	55.41	181.78	54.91	55.31
62	55.54	182.22	28.08	61.79
63	56.15	184.22	58.28	77.09
64	56.63	185.80	26.64	70.94
65	56.98	186.95	10.74	69.35
66	57.13	187.44	65.92	74.24
67	57.30	187.98	91.92	60.45
68	57.71	189.33	101.7	59.94
69	58.27	191.19	161.28	79.85
70	58.85	193.09	18.41	81.00
71	59.31	194.6	24.94	62.58
72	59.41	194.93	17.01	62.75
73	60.57	198.73	125.74	51.03
74	61.19	200.77	121.06	60.72
75	62.19	204.02	85.74	65.98
76	64.04	210.12	338.51	67.98
77	64.27	210.86	53.1	68.90
78	64.78	212.54	48.51	73.92
79	65.84	216.02	10.33	79.48
80	67.10	220.15	141.88	78.57
81	67.29	220.78	349.96	82.61
82	70.39	230.93	84.82	79.39
83	70.54	231.43	303.83	77.79
84	71.11	233.31	31.83	76.00
85	72.68	238.44	85.11	57.54
86	73.61	241.51	137.02	80.37
87	74.12	243.16	8.66	69.64
88	74.34	243.9	246.01	80.34

All directions are with respect to magnetic north.

520

Orientation Summary Table
Image Features
Wellbore: GLA-17
GREGORY CANYON
June 2004

Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
89	74.61	244.78	62.22	72.66
90	77.34	253.73	234.68	79.92
91	78.10	256.22	248.09	80.54
92	79.99	262.44	267.23	56.93
93	80.10	262.79	255.91	52.69
94	83.41	273.65	245.06	82.46
95	83.67	274.5	196.17	80.98
96	86.56	284	231.82	85.69
97	88.63	290.79	244.68	67.68
98	88.66	290.88	41.09	70.10
99	89.18	292.6	286.6	68.54
100	89.49	293.6	292.73	49.24
101	90.16	295.8	261.52	66.41
102	91.32	299.61	315.16	27.97
103	91.69	300.82	294.5	55.34
104	93.41	306.46	60.29	42.01
105	95.64	313.78	192.77	30.96
106	97.11	318.61	224.23	23.57
107	97.65	320.38	241.28	74.91
108	98.71	323.85	252.3	83.51
109	98.95	324.63	252.77	82.05
110	99.69	327.07	80.43	62.78
111	99.85	327.6	233.17	67.89
112	100.17	328.64	200.85	71.14
113	100.36	329.26	205.81	76.66
114	100.84	330.83	107.02	58.69
115	102.81	337.3	115.4	77.60
116	105.50	346.13	193.67	62.52
117	109.21	358.31	46.8	38.26
118	111.00	364.17	95.11	29.42
119	114.17	374.56	90.94	82.77
120	115.13	377.73	275.96	47.52
121	115.48	378.88	284.68	38.38
122	115.59	379.23	295.32	52.60
123	115.74	379.71	295.82	52.00
124	118.71	389.47	212.36	65.05
125	118.99	390.4	37.24	84.86
126	119.85	393.21	324.71	83.63
127	120.16	394.24	274.05	75.71
128	122.79	402.85	332.83	81.27
129	123.15	404.03	184.89	61.42
130	123.92	406.55	38.51	59.42
131	124.45	408.3	180.13	83.00
132	124.98	410.04	228.38	77.74

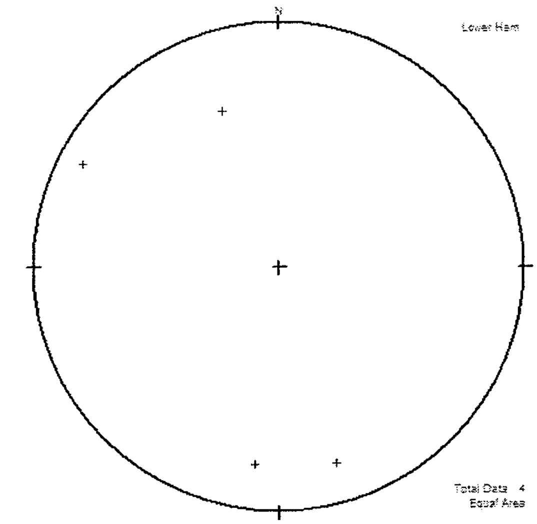
All directions are with respect to magnetic north.

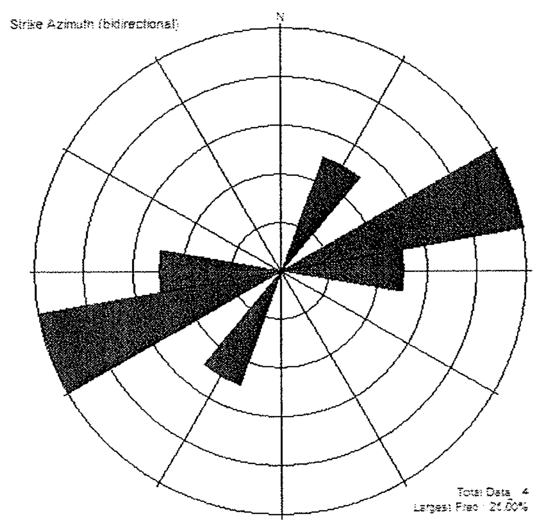
Orientation Summary Table
Image Features
Wellbore: GLA-17
GREGORY CANYON
June 2004

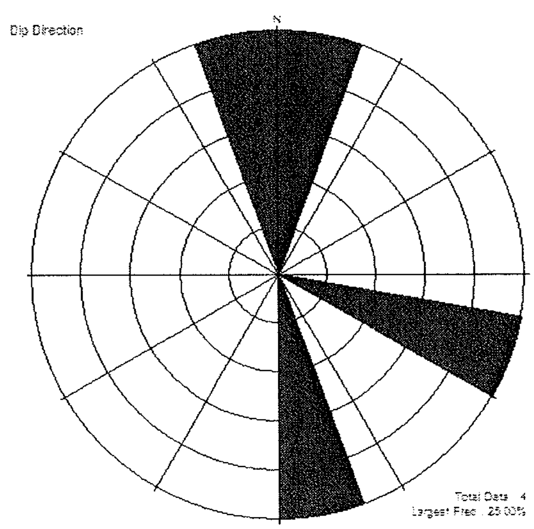
Feature No.	Depth (meters)	Depth (feet)	Dip Direction (degrees)	Dip Angle (degrees)
133	125.55	411.91	48.7	87.09
134	126.31	414.4	234.56	74.97
135	126.51	415.06	232.49	70.20
136	127.30	417.64	303.83	69.68
137	128.46	421.47	299.15	43.11
138	128.93	423	188.98	35.74
139	129.10	423.57	299.79	62.78
140	129.89	426.14	148.3	67.07
141	130.02	426.59	305.33	78.92
142	130.34	427.61	309.79	46.56
143	131.84	432.55	25.65	60.42
144	132.76	435.56	330.05	80.79
145	133.36	437.53	306.6	29.42
146	133.61	438.36	140.94	66.43
147	134.61	441.65	8.11	70.03
148	135.33	443.98	238.5	73.04
149	135.98	446.13	208.32	74.34
150	136.53	447.94	101.79	76.81
151	137.53	451.23	311.11	71.09
152	138.33	453.84	97.36	78.23
153	138.93	455.8	180.85	59.94
154	139.01	456.07	86.38	72.73
155	139.71	458.35	102.98	66.65
156	139.99	459.27	260	24.51
157	141.30	463.59	228.09	75.62
158	141.44	464.03	234.04	75.74
159	141.87	465.46	238.28	78.80
160	142.47	467.41	248.72	80.61
161	143.77	471.69	258.72	80.77
162	145.15	476.21	143.21	74.57
163	148.18	486.17	335.74	73.86
164	149.69	491.11	330.43	73.31
165	150.26	492.97	339.09	78.78
166	151.35	496.55	97.7	64.24
167	151.49	497.01	93.64	52.54

All directions are with respect to magnetic north.

Stereographic Pole-Plots
and Rose Diagrams
Well GLA-3S
Gregory Canyon Landfill

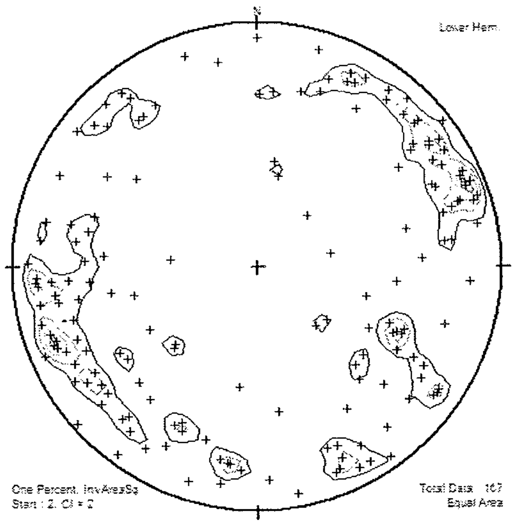


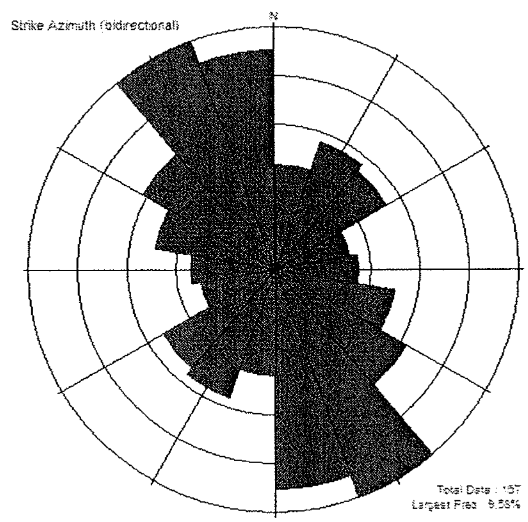


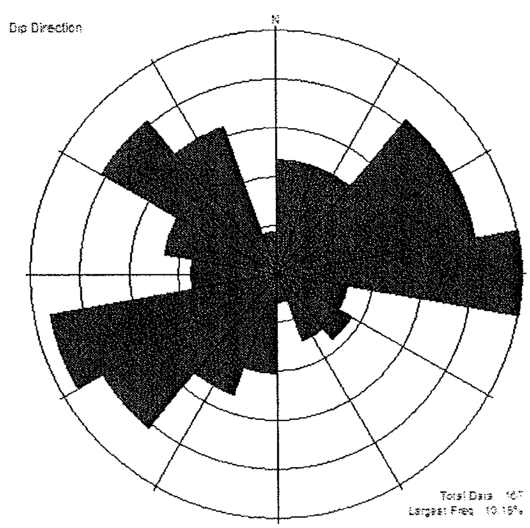


523

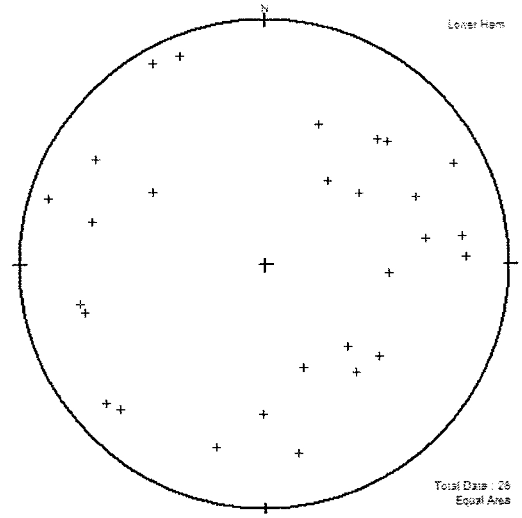
Stereographic Pole-Plots
and Rose Diagrams
Well GLA-17
Gregory Canyon Landfill

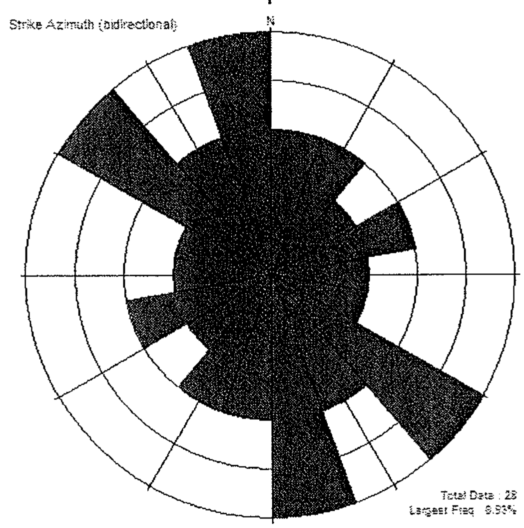


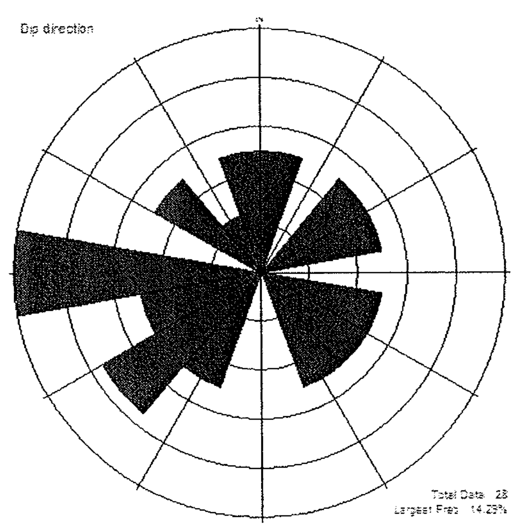




Stereographic Pole-Plots
and Rose Diagrams
Well GLA-A
Gregory Canyon Landfill

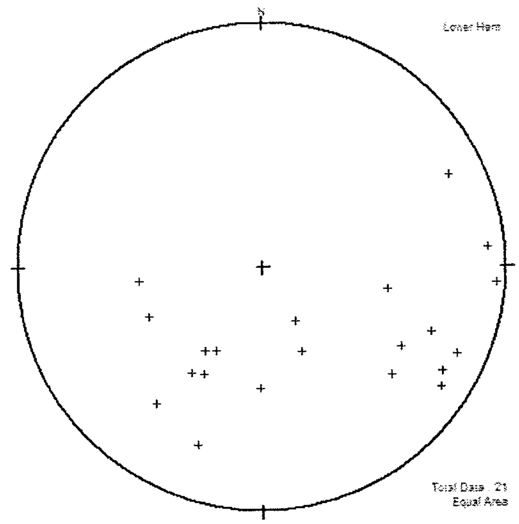


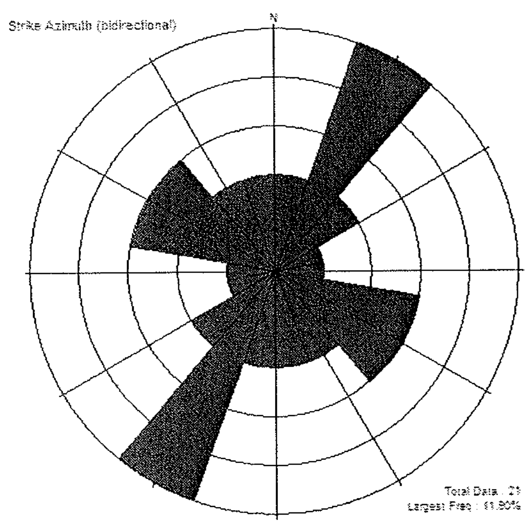


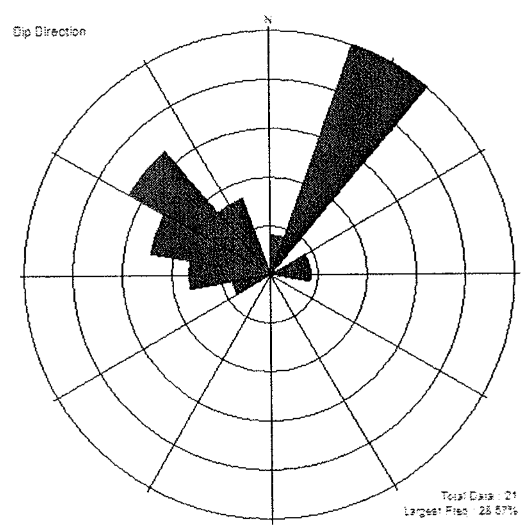


525

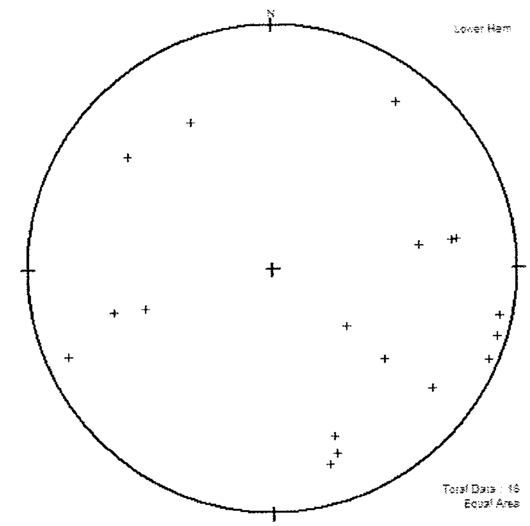
Stereographic Pole-Plots
and Rose Diagrams
Well GLA-B
Gregory Canyon Landfill

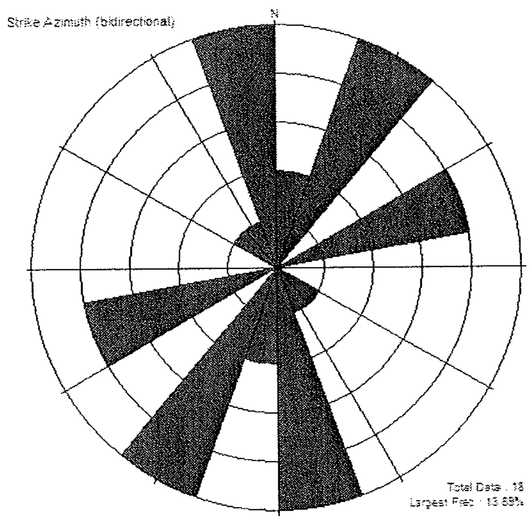


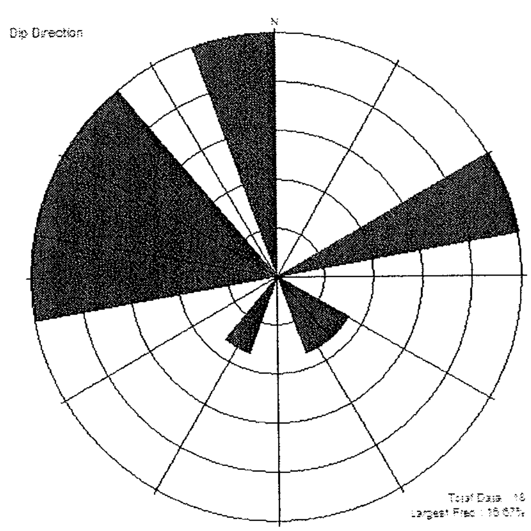




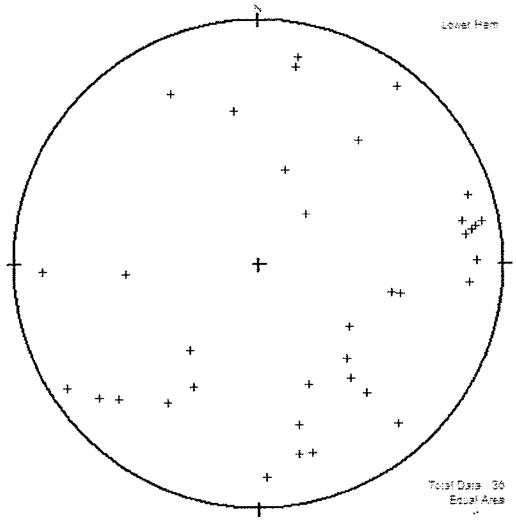
Stereographic Pole-Plots
and Rose Diagrams
Well GLA-C
Gregory Canyon Landfill

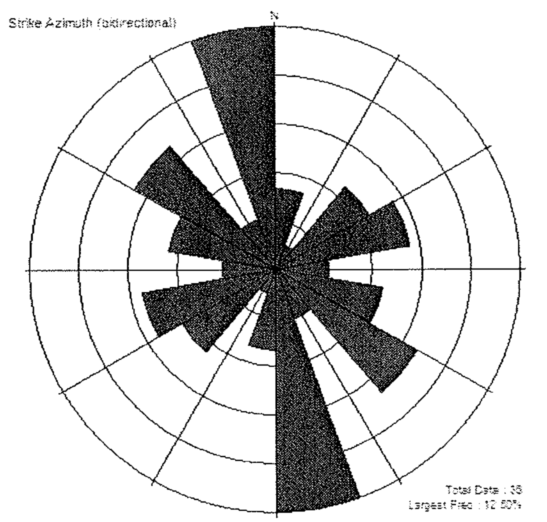


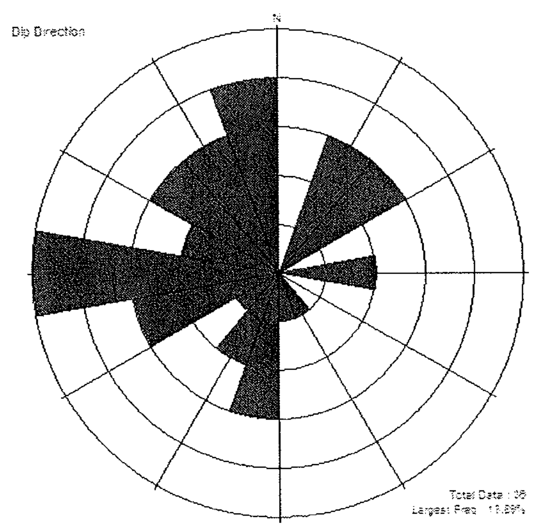




Stereographic Pole-Plots
and Rose Diagrams
Well GLA-D
Gregory Canyon Landfill

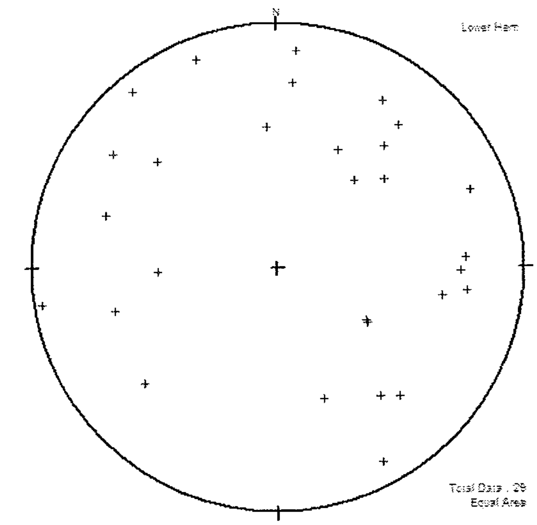


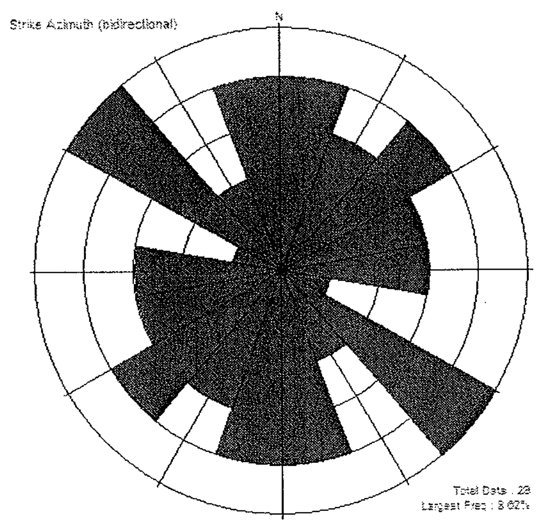


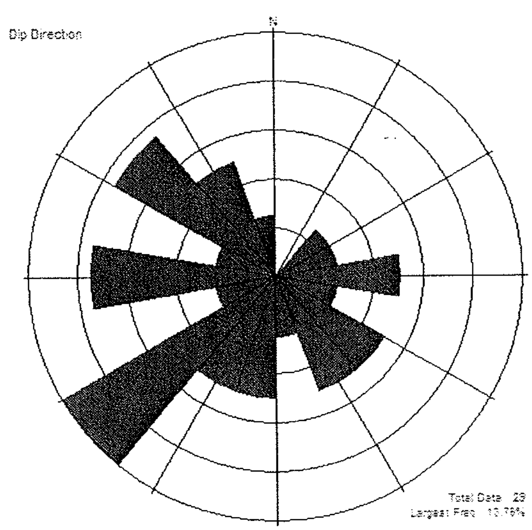


527

Stereographic Pole-Plots
and Rose Diagrams
Well GLA-E
Gregory Canyon Landfill

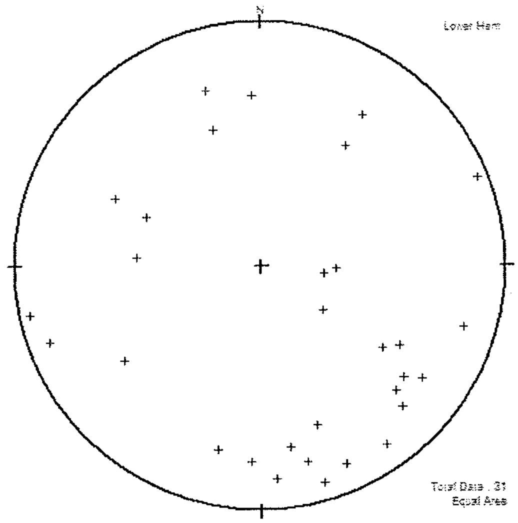


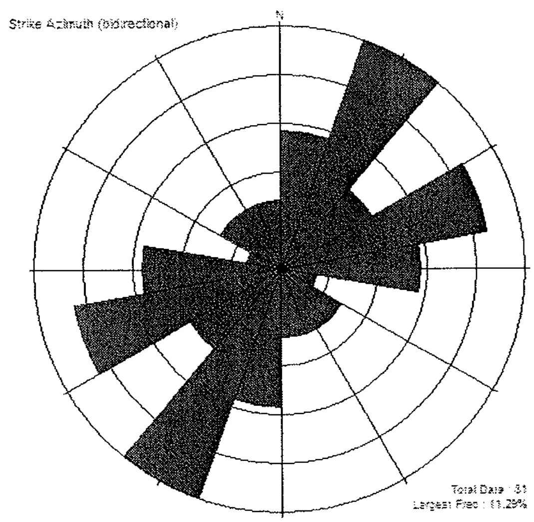


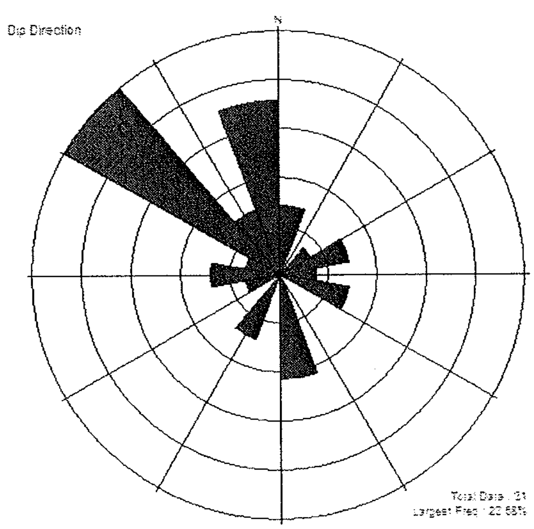


528

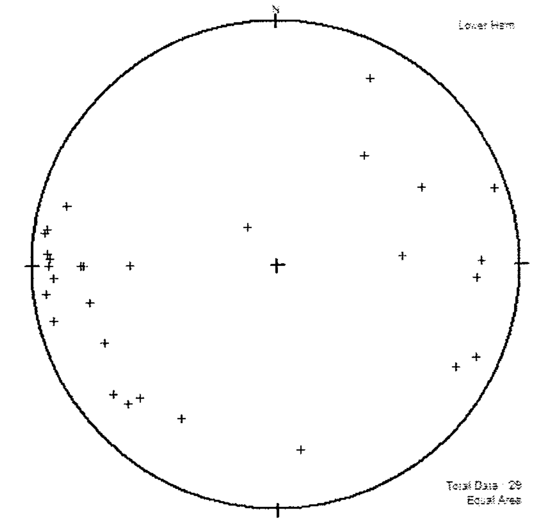
Stereographic Pole-Plots
and Rose Diagrams
Well GLA-F
Gregory Canyon Landfill

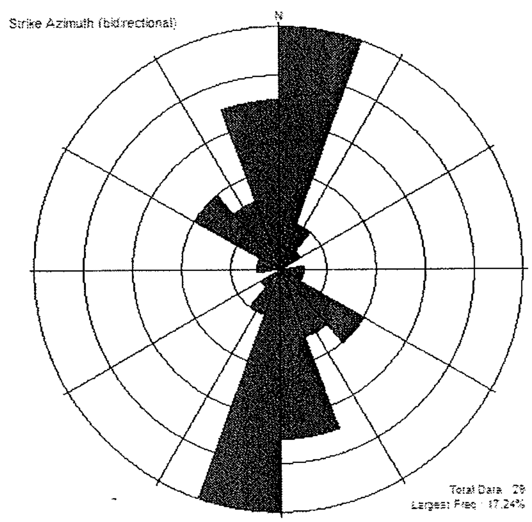


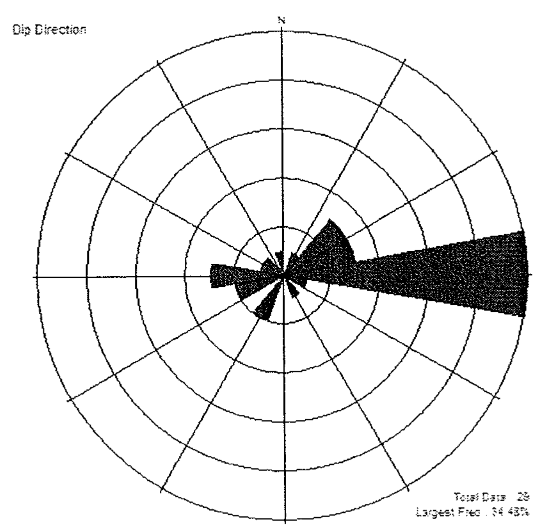




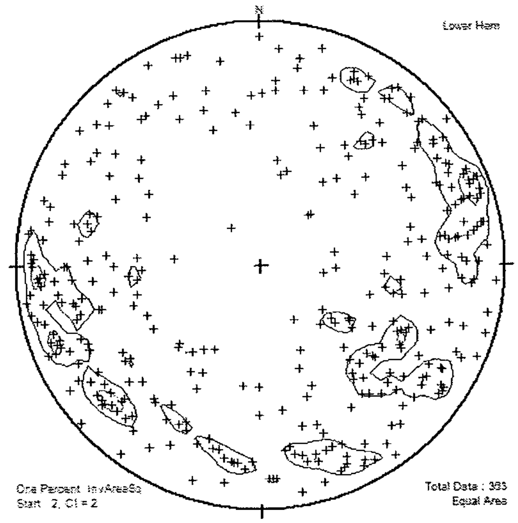
Stereographic Pole-Plots
and Rose Diagrams
Well GLA-G
Gregory Canyon Landfill

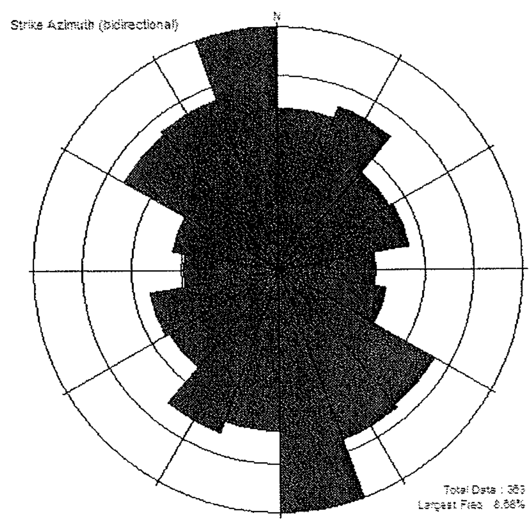


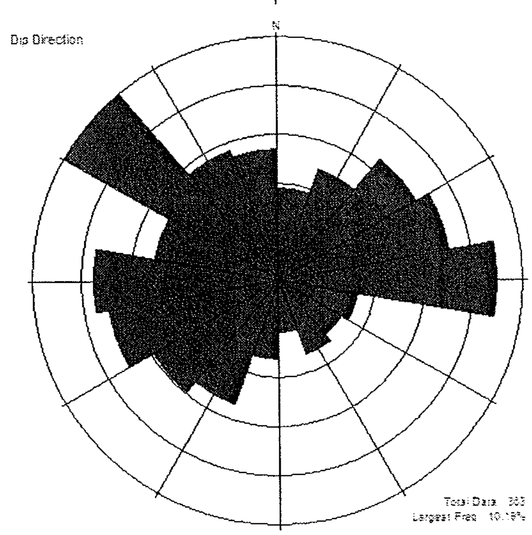




Stereographic Pole-Plots
and Rose Diagrams
Composite of All Wells
Gregory Canyon Landfill





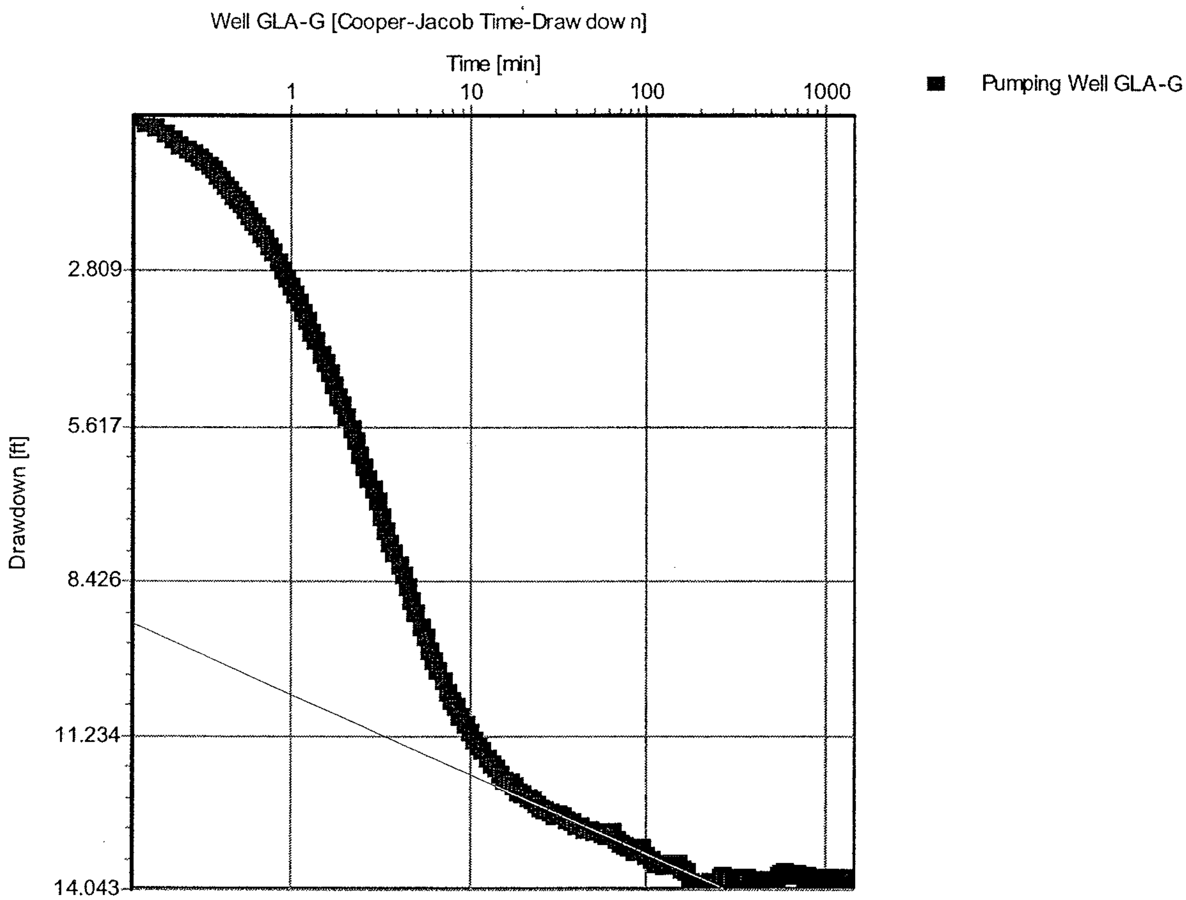


ATTACHMENT C

RESULTS OF AQUIFER PUMPING TESTS

532

GeoLogic Associates	Pumping Test Analysis Report
1360 Valley Vista Drive	Project: Gregory #2
Diamond Bar, California	Number:
91765	Client:



Pumping Test: **Well GLA-G**

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:	Transmissivity:	6.03E+1 [ft²/d]	Conductivity:	9.43E-1 [ft/d]
Test parameters:	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	Confined Aquifer	
	Screen length:	40 [ft]		
	Boring radius:	0.333 [ft]		
	Discharge Rate:	2.5 [U.S. gal/min]		

Comments:

Evaluated by:

Evaluation Date: 8/11/2004

533

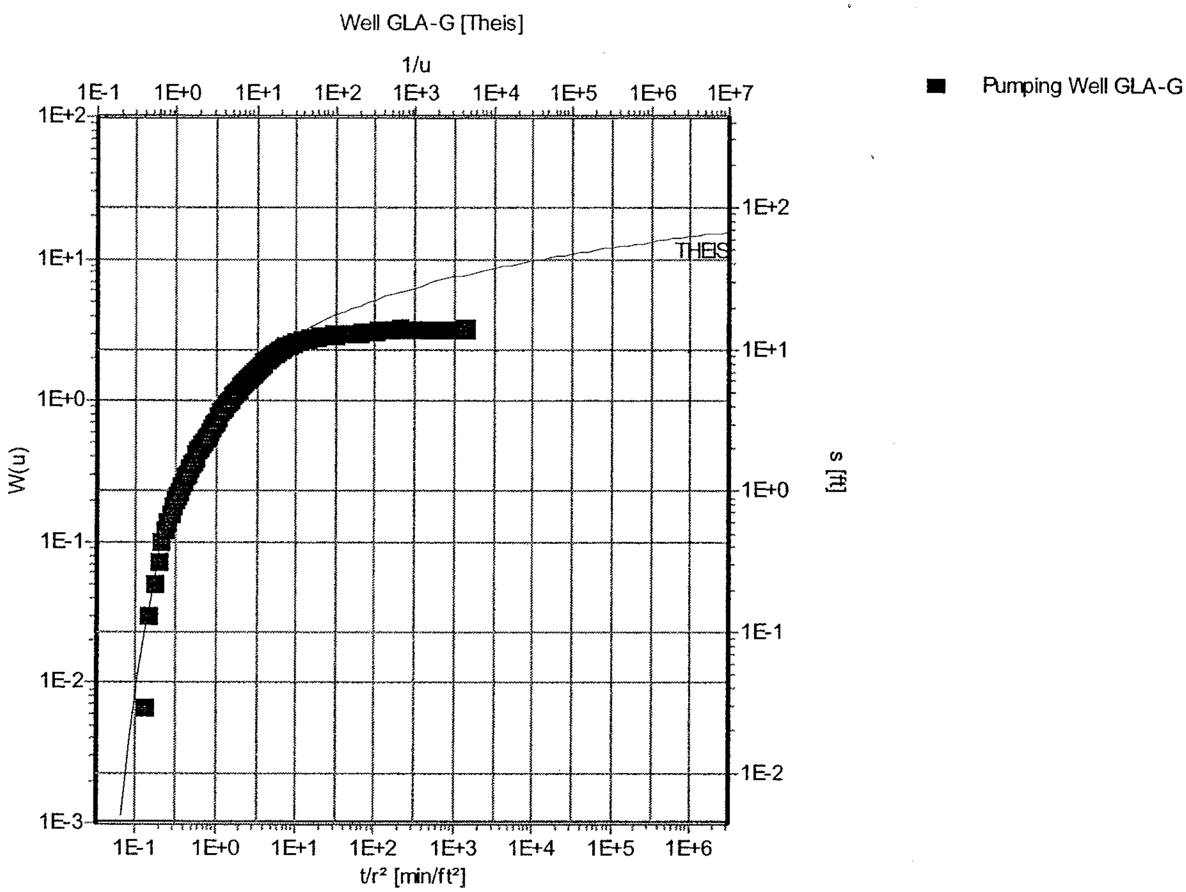
GeoLogic Associates
1360 Valley Vista Drive
Diamond Bar, California
91765

Pumping Test Analysis Report

Project: Gregory #2

Number:

Client:



Pumping Test: **Well GLA-G**

Analysis Method: **Theis**

Analysis Results:	Transmissivity:	8.77E+0 [ft²/d]	Conductivity:	1.37E-1 [ft/d]
	Storativity:	7.90E-3		

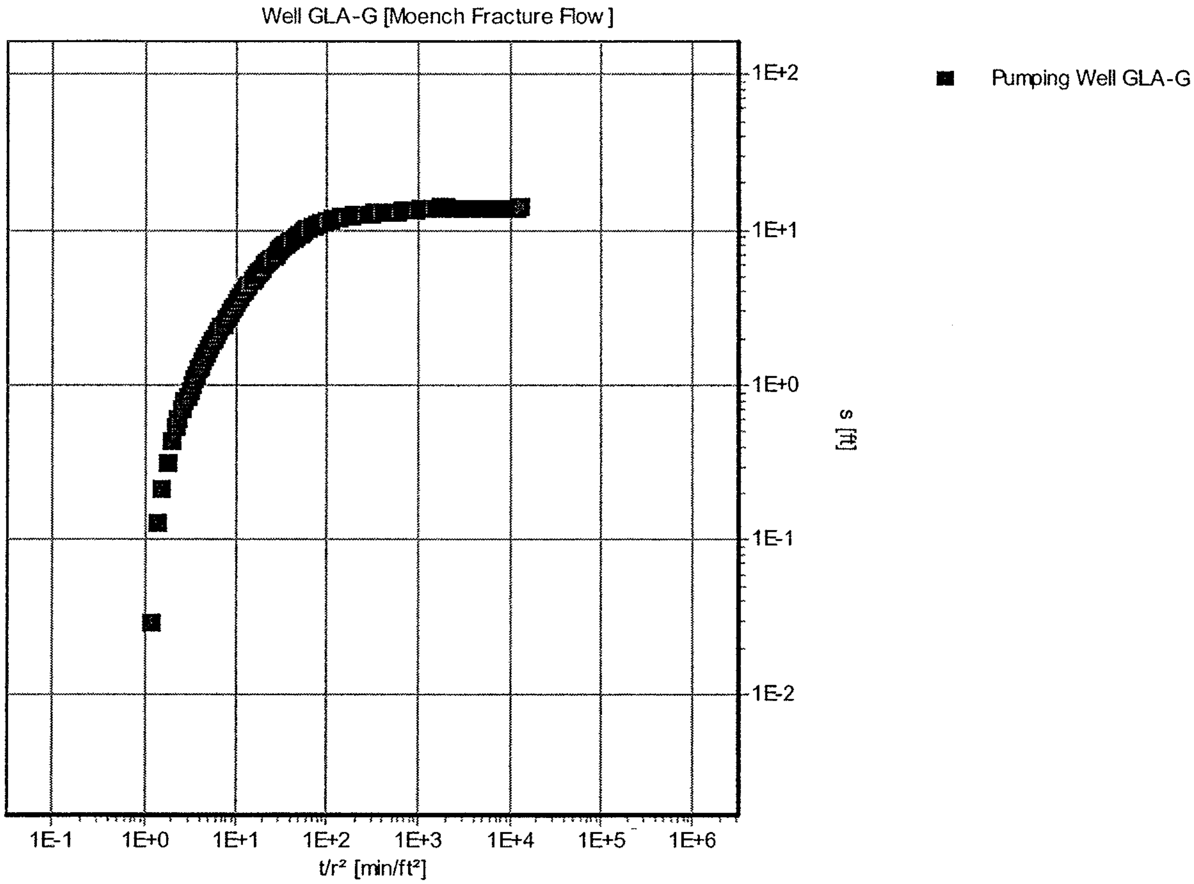
Test parameters:	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	Confined Aquifer	
	Screen length:	40 [ft]		
	Boring radius:	0.333 [ft]		
	Discharge Rate:	2.5 [U.S. gal/min]		

Comments:

Evaluated by:

Evaluation Date: 8/11/2004

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #2 Number: Client:



Pumping Test: **Well GLA-G**

Analysis Method: **Moench Fracture Flow**

Analysis Results:	Transmissivity:	2.36E+1 [ft²/d]	Conductivity:	3.69E-1 [ft/d]
	Storativity:	5.25E-2		

Test parameters:	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	b:	64 [ft]
	Screen length:	40 [ft]	Kv/Kh:	0.1
	Boring radius:	0.333 [ft]	C:	0.348
	Discharge Rate:	2.5 [U.S. gal/min]	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

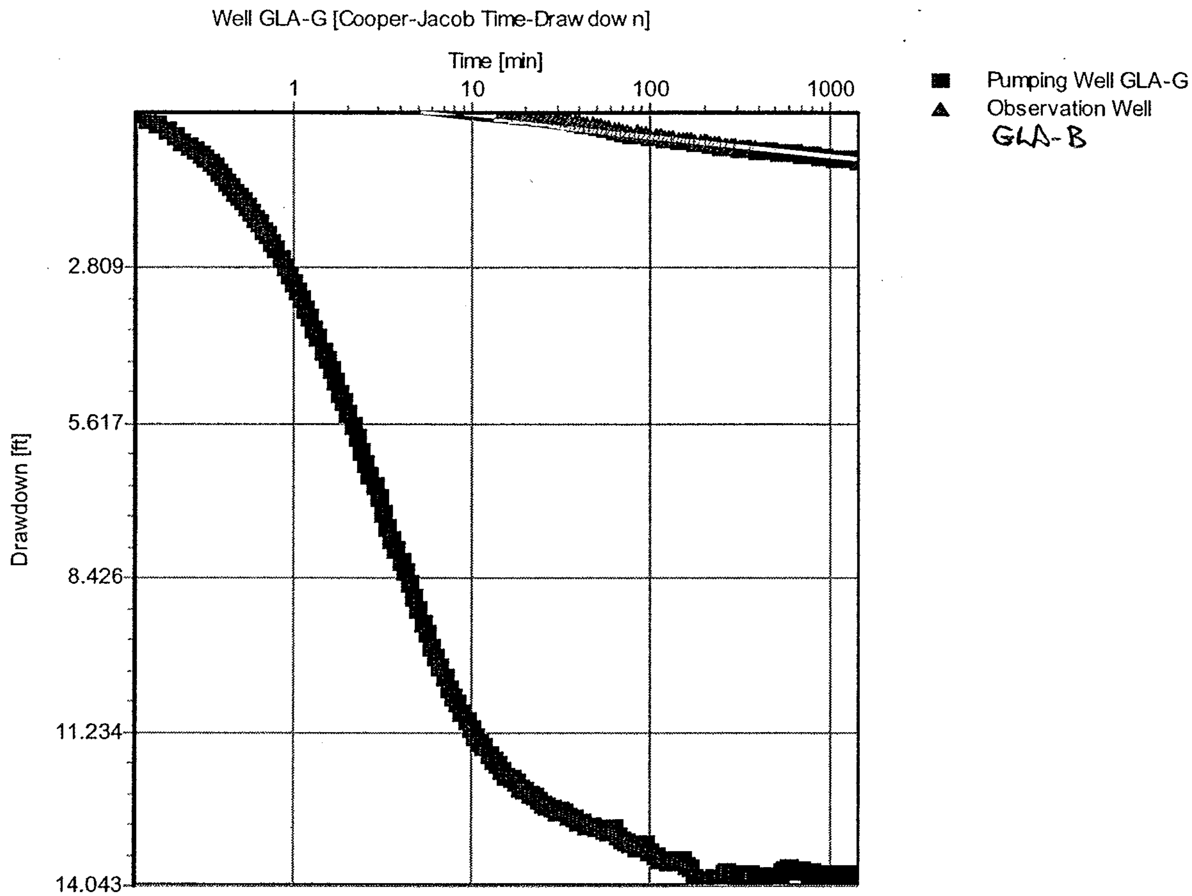
Comments:

Evaluated by: Mark Vincent

Evaluation Date: 8/11/2004

535

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #2 Number: Client:



Pumping Test: **Well GLA-G**

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:	Transmissivity:	2.54E+2 [ft²/d]	Conductivity:	3.96E+0 [ft/d]
Test parameters:	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	Confined Aquifer	
	Screen length:	40 [ft]		
	Boring radius:	0.333 [ft]		
	Discharge Rate:	2.5 [U.S. gal/min]		

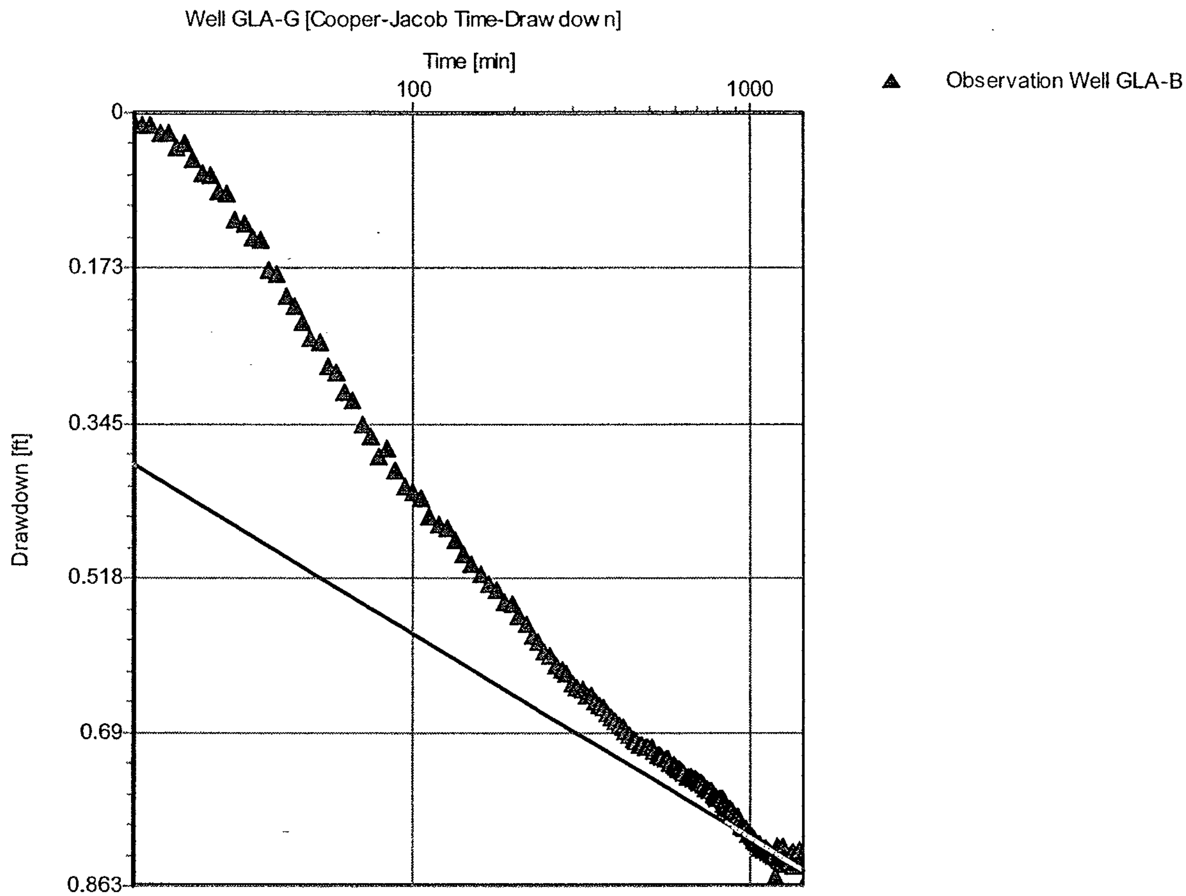
Comments:

Evaluated by:

Evaluation Date: 8/12/2004

536

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #2 Number: Client:



Pumping Test:	**Well GLA-G**			
Analysis Method:	**Cooper-Jacob Time-Drawdown**			
Analysis Results:	Transmissivity:	3.84E+2 [ft²/d]	Conductivity:	6.00E+0 [ft/d]
Test parameters:	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	Confined Aquifer	
	Screen length:	40 [ft]		
	Boring radius:	0.333 [ft]		
	Discharge Rate:	2.5 [U.S. gal/min]		

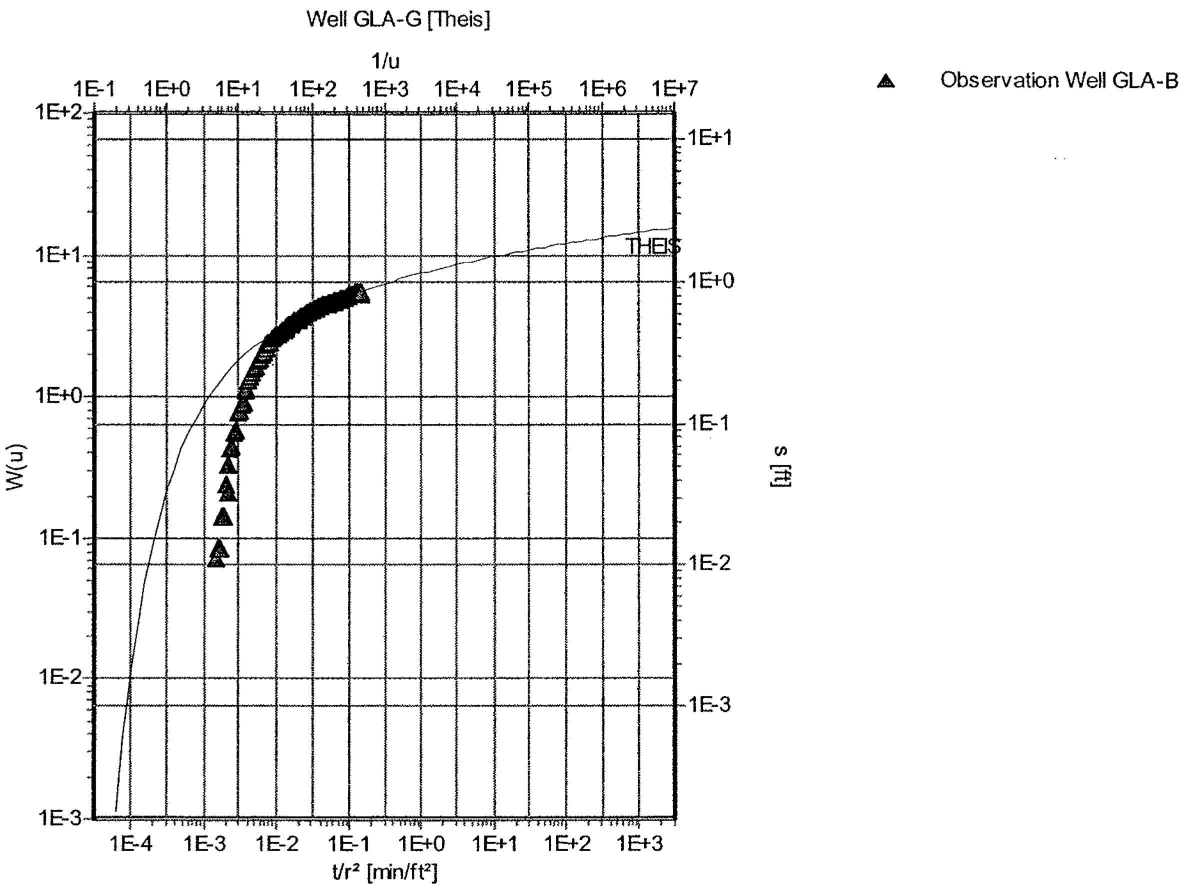
Comments:

Evaluated by:

Evaluation Date: 8/12/2004

537

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #2 Number: Client:



Pumping Test: **Well GLA-G**

Analysis Method: **Theis**

Analysis Results:	Transmissivity:	2.47E+2 [ft²/d]	Conductivity:	3.86E+0 [ft/d]
	Storativity:	2.13E-4		

Test parameters:	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	Confined Aquifer	
	Screen length:	40 [ft]		
	Boring radius:	0.333 [ft]		
	Discharge Rate:	2.5 [U.S. gal/min]		

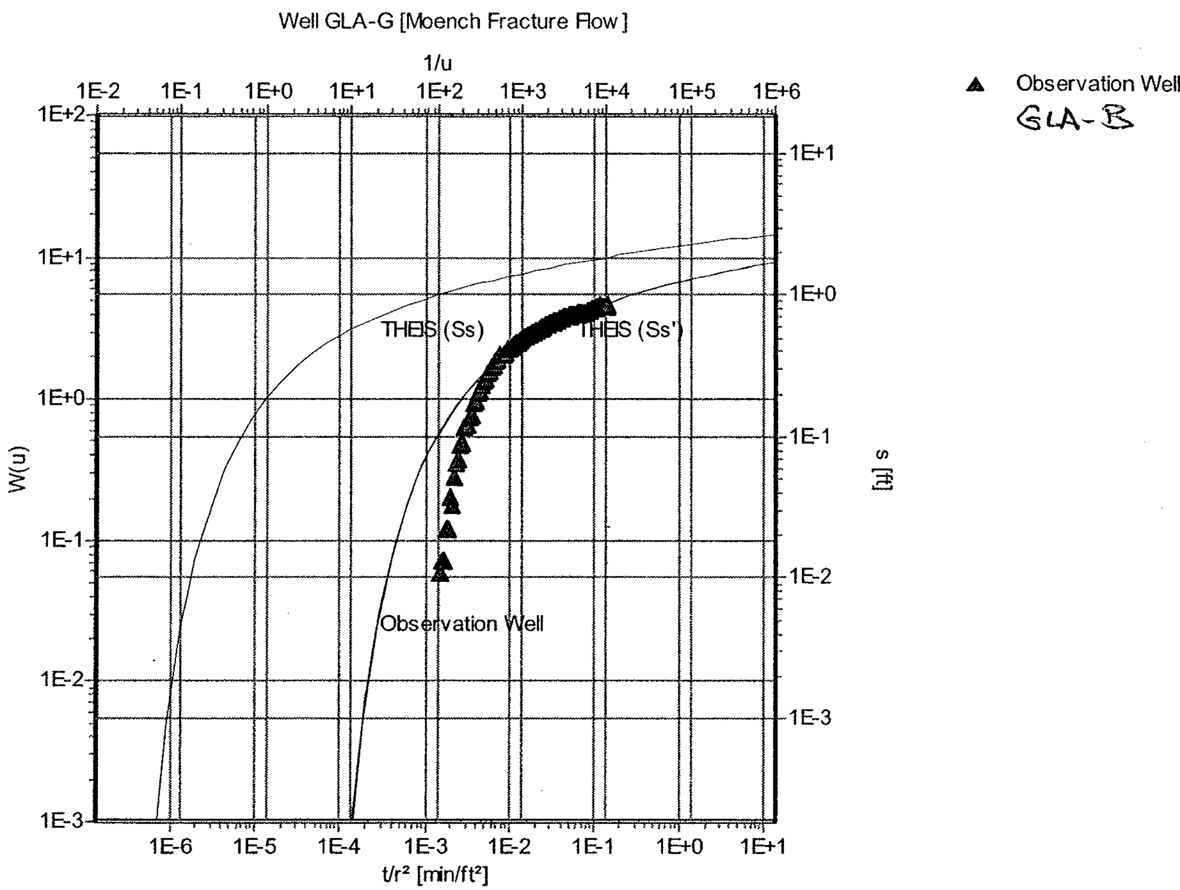
Comments:

Evaluated by: Mark Vincent

Evaluation Date: 8/12/2004

538

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report**
	Project: Gregory #2
	Number:
	Client:



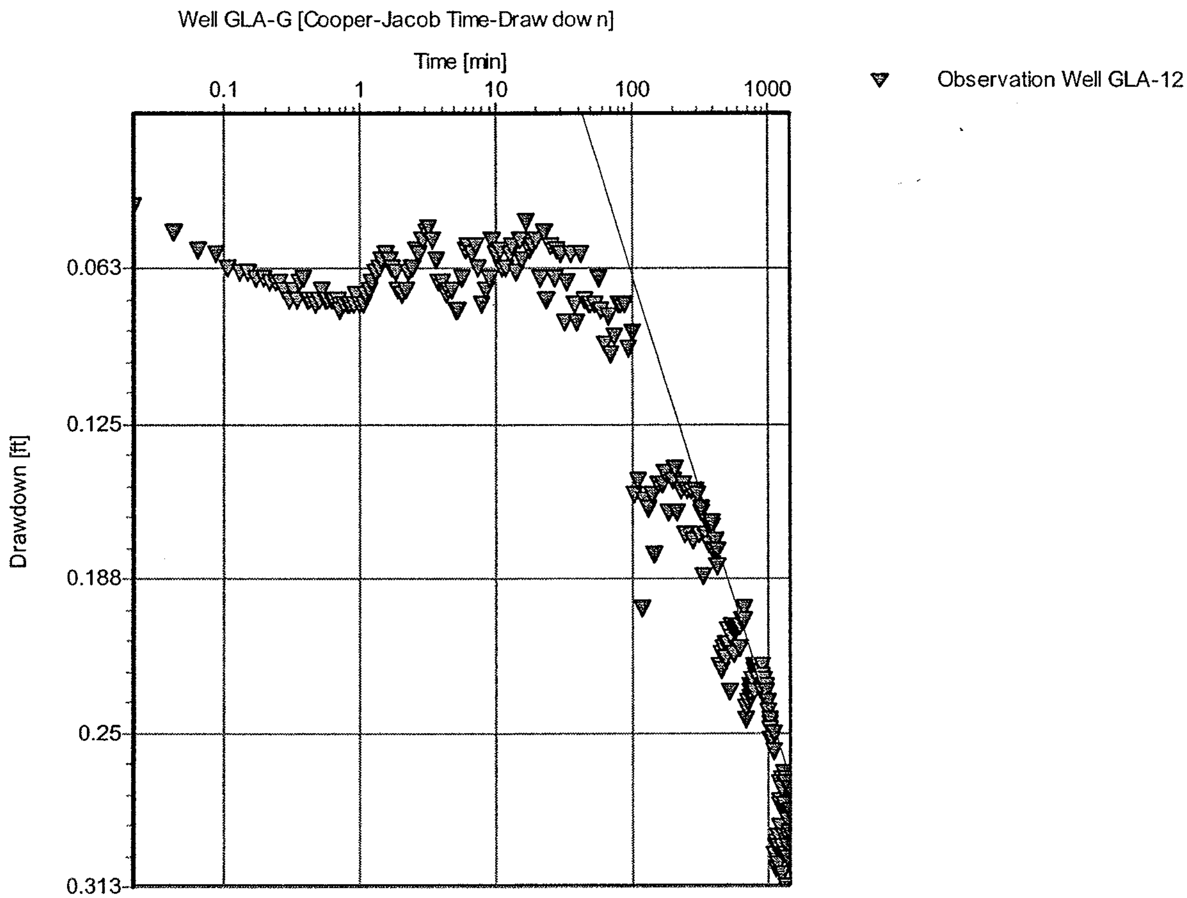
Pumping Test:	**Well GLA-G**			
Analysis Method:	**Moench Fracture Flow**			
Analysis Results:	Transmissivity:	2.08E+2 [ft²/d]	Conductivity:	3.26E+0 [ft/d]
	Storativity:	1.99E-6		
Test parameters:	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	b:	64 [ft]
	Screen length:	40 [ft]	Kv/Kh:	0.1
	Boring radius:	0.333 [ft]	C:	0.348
	Discharge Rate:	2.5 [U.S. gal/min]	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

Comments:

Evaluated by:

Evaluation Date: 8/12/2004

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #2 Number: Client:



Pumping Test: **Well GLA-G**

Analysis Method: **Cooper-Jacob Time-Drawdown**

Analysis Results:	Transmissivity:	5.00E+2 [ft²/d]	Conductivity:	7.82E+0 [ft/d]
	Storativity:	3.36E-3		

Test parameters:	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	Confined Aquifer	
	Screen length:	40 [ft]		
	Boring radius:	0.333 [ft]		
	Discharge Rate:	2.5 [U.S. gal/min]		

Comments:

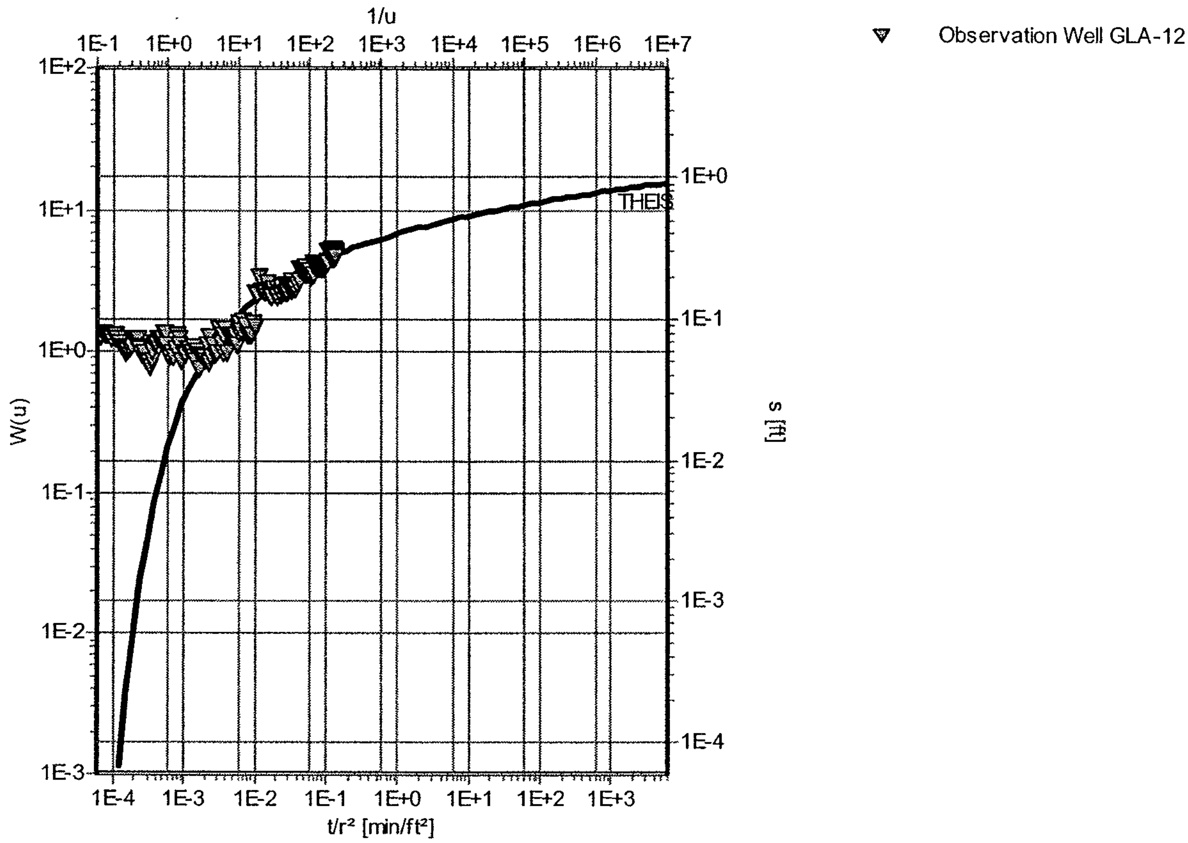
Evaluated by:

Evaluation Date: 8/24/2004

540

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #2 Number: Client:

Well GLA-G [Theis]



Pumping Test: **Well GLA-G**

Analysis Method: **Theis**

Analysis Results:	Transmissivity:	6.50E+2 [ft²/d]	Conductivity:	1.02E+1 [ft/d]
	Storativity:	1.09E-3		

Test parameters:	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	Confined Aquifer	
	Screen length:	40 [ft]		
	Boring radius:	0.333 [ft]		
	Discharge Rate:	2.5 [U.S. gal/min]		

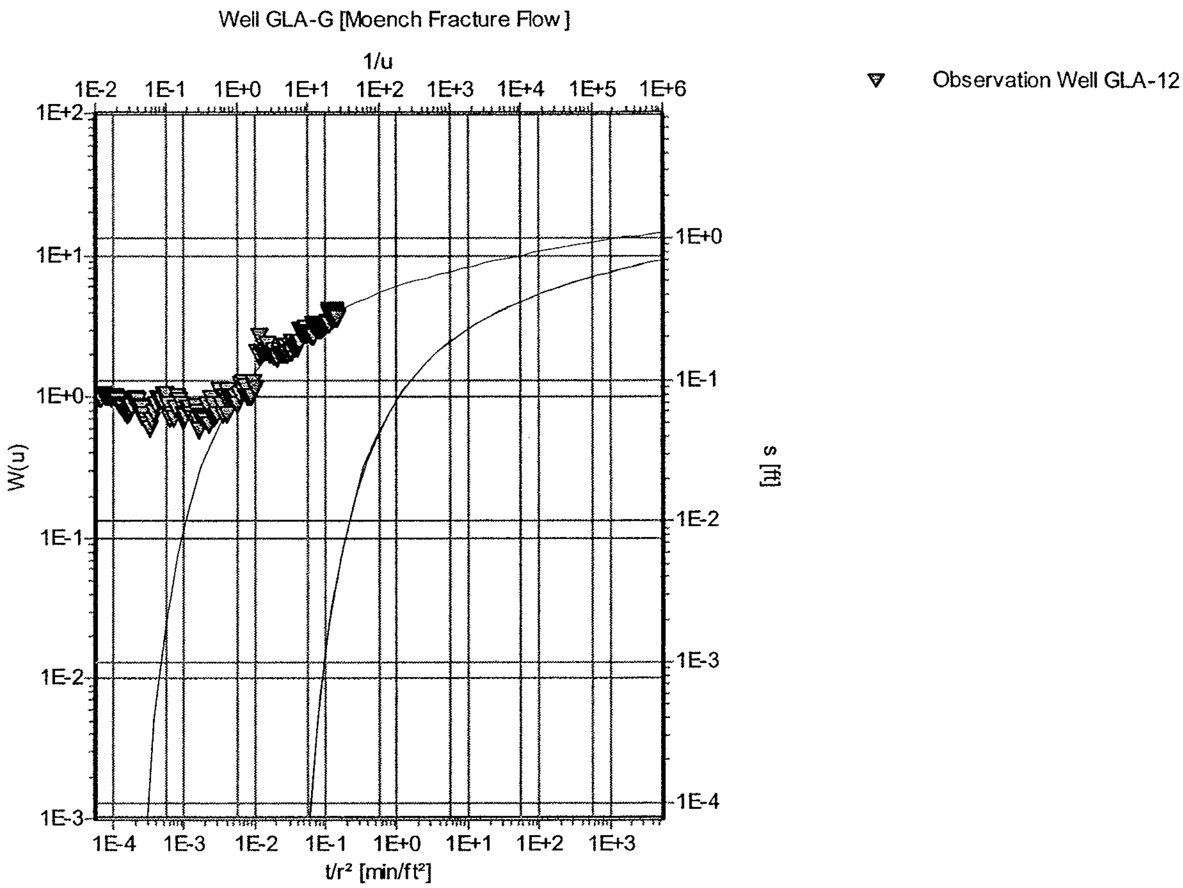
Comments:

Evaluated by:

Evaluation Date: 8/24/2004

541

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #2 Number: Client:



Pumping Test: **Well GLA-G**

Analysis Method: **Moench Fracture Flow**

Analysis Results:	Transmissivity:	5.05E+2 [ft²/d]	Conductivity:	7.89E+0 [ft/d]
	Storativity:	1.95E-3		

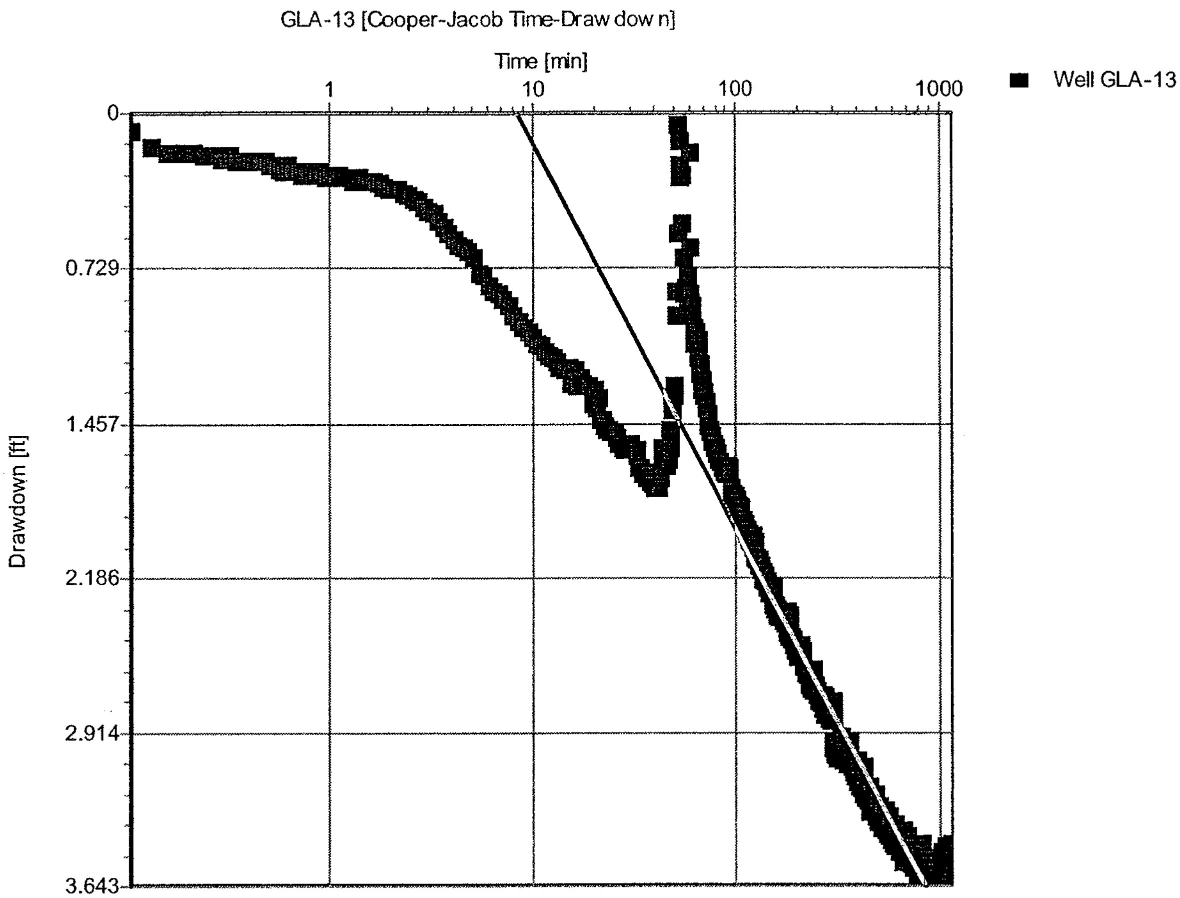
Test parameters:	Pumping Well:	Pumping Well GLA-G	Aquifer Thickness:	64 [ft]
	Casing radius:	0.1667 [ft]	b:	64 [ft]
	Screen length:	40 [ft]	Kv/Kh:	0.1
	Boring radius:	0.333 [ft]	C:	0.348
	Discharge Rate:	2.5 [U.S. gal/min]	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

Comments:

Evaluated by:

Evaluation Date: 8/24/2004

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #3 Number: Client:



Pumping Test: **GLA-13**

Analysis Method: **Cooper-Jacob Time-Drawdown**

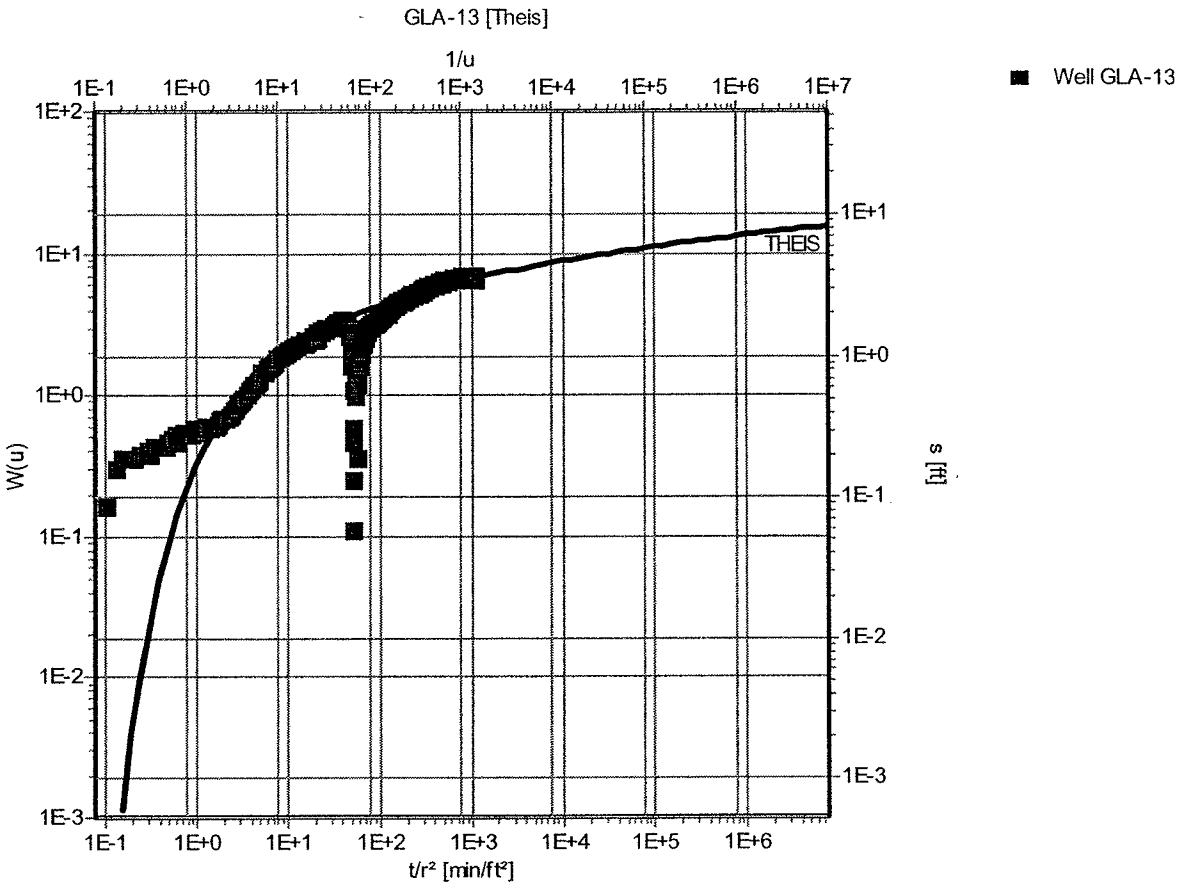
Analysis Results:	Transmissivity:	8.77E+1 [ft²/d]	Conductivity:	4.79E+0 [ft/d]
Test parameters:	Pumping Well:	Well GLA-13	Aquifer Thickness:	18.3 [ft]
	Casing radius:	0.083 [ft]	Confined Aquifer	
	Screen length:	20 [ft]		
	Boring radius:	0.354 [ft]		
	Discharge Rate:	4.5 [U.S. gal/min]		

Comments: Analysis based on visual match to later part of GLA-13 pump test.

Evaluated by: Mark Vincent

Evaluation Date: 8/13/2004

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report**
	Project: Gregory #3
	Number:
	Client:



Pumping Test: **GLA-13**

Analysis Method: **Theis**

Analysis Results:	Transmissivity:	1.31E+2 [ft²/d]	Conductivity:	7.14E+0 [ft/d]
	Storativity:	2.80E-1		

Test parameters:	Pumping Well:	Well GLA-13	Aquifer Thickness:	18.3 [ft]
	Casing radius:	0.083 [ft]	Confined Aquifer	
	Screen length:	20 [ft]		
	Boring radius:	0.354 [ft]		
	Discharge Rate:	4.5 [U.S. gal/min]		

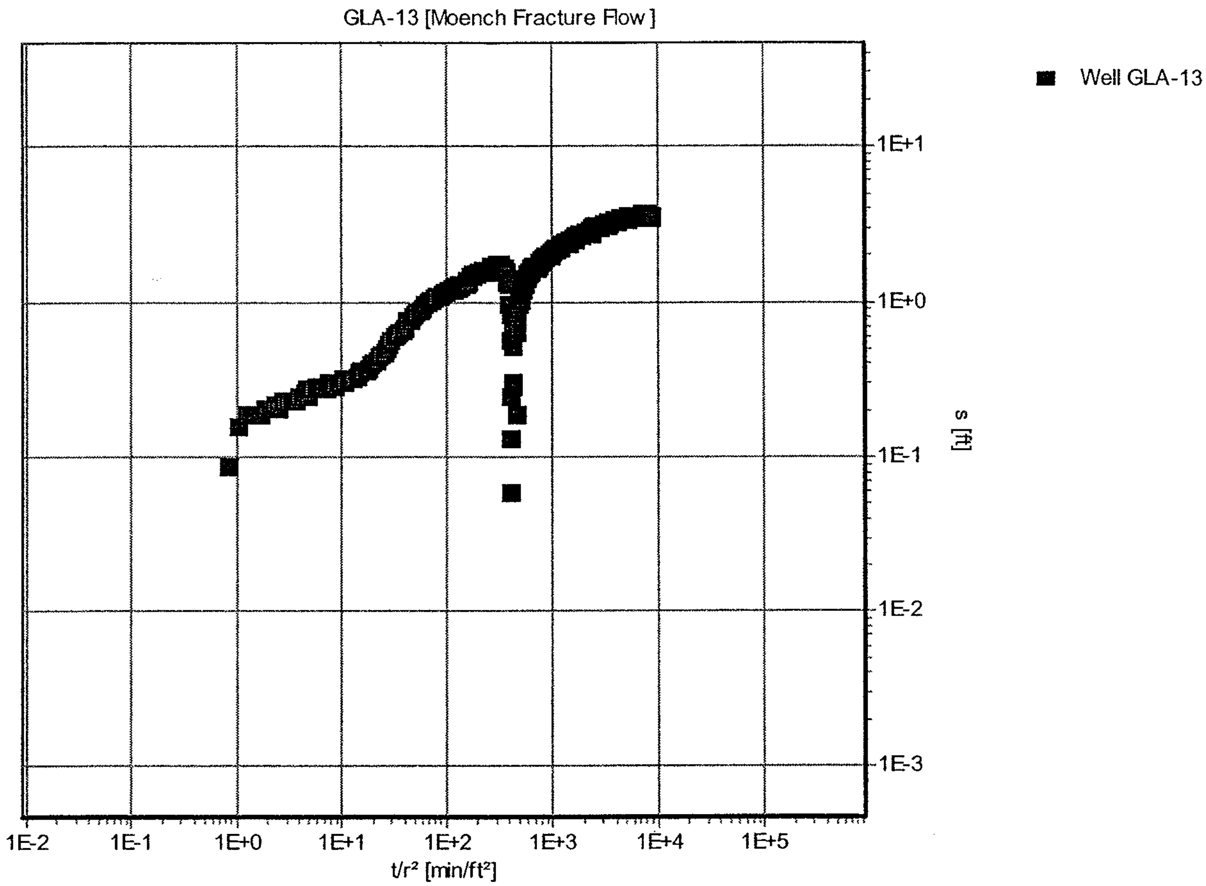
Comments:

Evaluated by:

Evaluation Date: 8/13/2004

544

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #3 Number: Client:



Pumping Test: **GLA-13**

Analysis Method: **Moench Fracture Flow**

Analysis Results:	Transmissivity:	1.50E+2 [ft²/d]	Conductivity:	8.19E+0 [ft/d]
	Storativity:	9.72E-2		

Test parameters:	Pumping Well:	Well GLA-13	Aquifer Thickness:	18.3 [ft]
	Casing radius:	0.083 [ft]	b:	18.3 [ft]
	Screen length:	20 [ft]	Kv/Kh:	0.1
	Boring radius:	0.354 [ft]	C:	0.394
	Discharge Rate:	4.5 [U.S. gal/min]	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

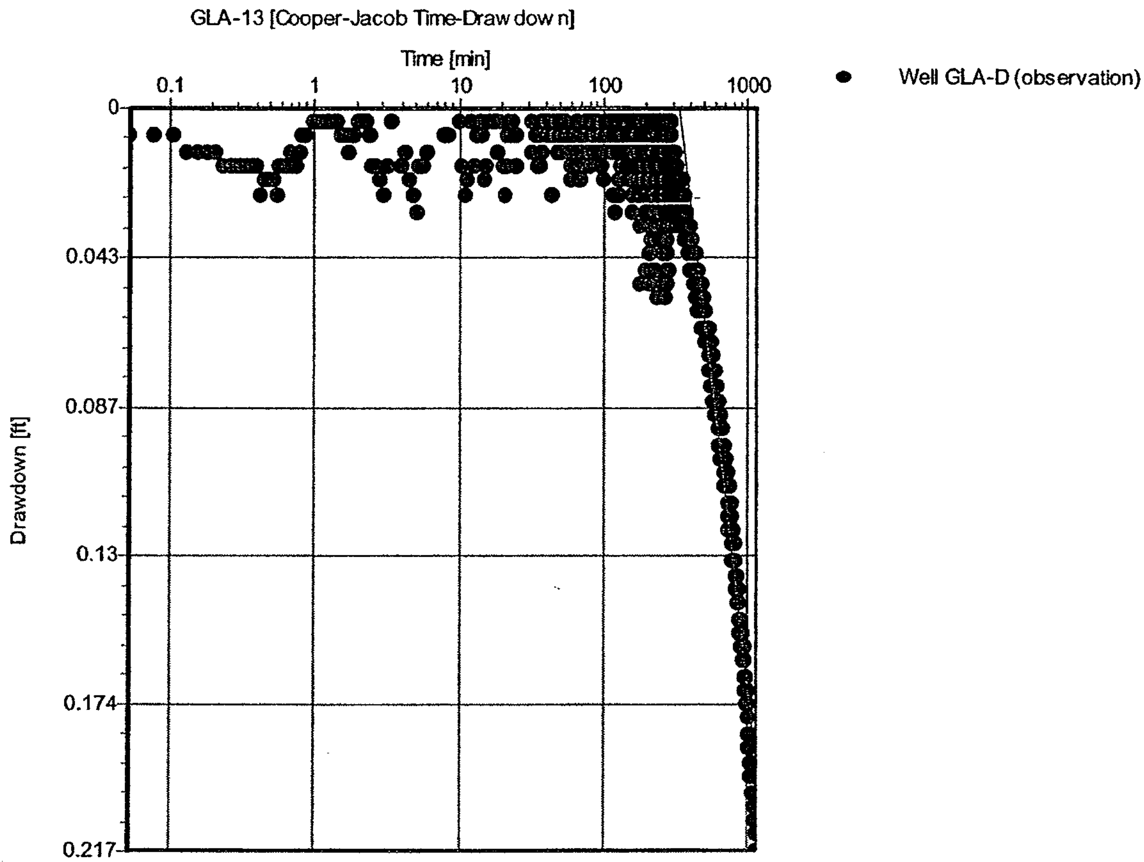
Comments:

Evaluated by:

Evaluation Date: 8/13/2004

545

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #3 Number: Client:



Pumping Test: **GLA-13**

Analysis Method: **Cooper-Jacob Time-Drawdown**

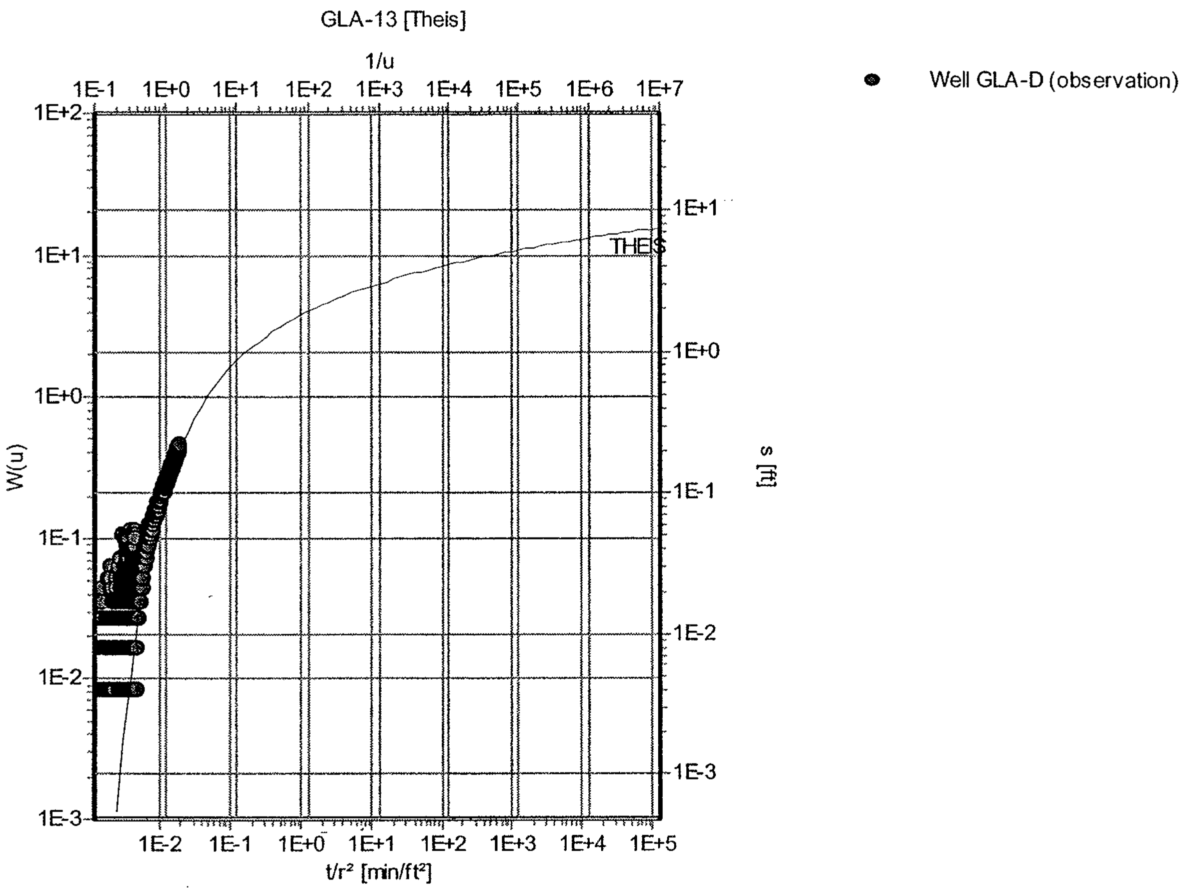
Analysis Results:	Transmissivity:	4.51E+2 [ft²/d]	Conductivity:	2.46E+1 [ft/d]
Test parameters:	Pumping Well:	Well GLA-13	Aquifer Thickness:	18.3 [ft]
	Casing radius:	0.083 [ft]	Confined Aquifer	
	Screen length:	20 [ft]		
	Boring radius:	0.354 [ft]		
	Discharge Rate:	4.5 [U.S. gal/min]		

Comments:

Evaluated by:

Evaluation Date: 8/24/2004

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #3 Number: Client:



Pumping Test: **GLA-13**

Analysis Method: **Theis**

Analysis Results:	Transmissivity:	1.44E+2 [ft²/d]	Conductivity:	7.87E+0 [ft/d]
	Storativity:	5.04E-3		

Test parameters:	Pumping Well:	Well GLA-13	Aquifer Thickness:	18.3 [ft]
	Casing radius:	0.083 [ft]	Confined Aquifer	
	Screen length:	20 [ft]		
	Boring radius:	0.354 [ft]		
	Discharge Rate:	4.5 [U.S. gal/min]		

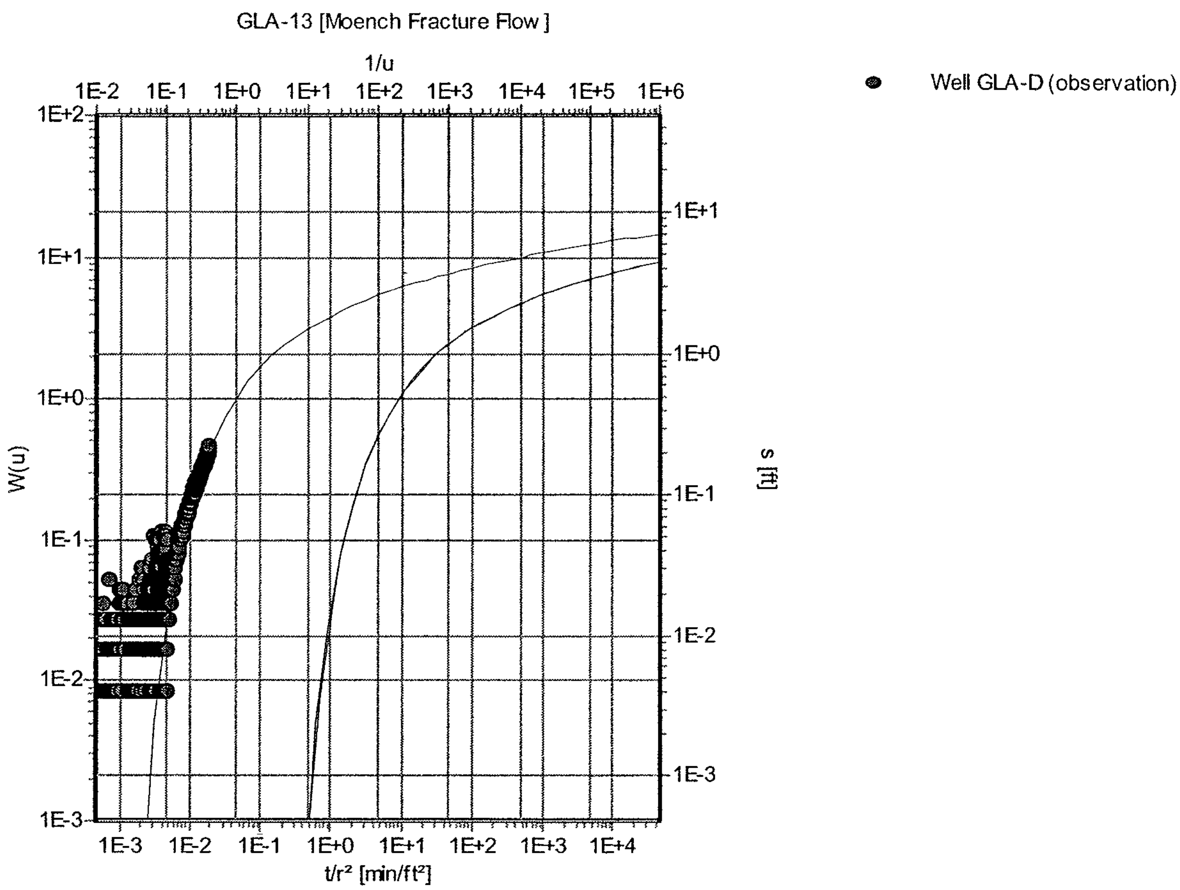
Comments:

Evaluated by: Mark Vincent

Evaluation Date: 8/13/2004

547

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Pumping Test Analysis Report** Project: Gregory #3 Number: Client:



Pumping Test: **GLA-13**

Analysis Method: **Moench Fracture Flow**

Analysis Results:	Transmissivity:	1.44E+2 [ft²/d]	Conductivity:	7.87E+0 [ft/d]
	Storativity:	4.68E-3		

Test parameters:	Pumping Well:	Well GLA-13	Aquifer Thickness:	18.3 [ft]
	Casing radius:	0.083 [ft]	b:	18.3 [ft]
	Screen length:	20 [ft]	Kv/Kh:	0.1
	Boring radius:	0.354 [ft]	C:	0.394
	Discharge Rate:	4.5 [U.S. gal/min]	K(block)/K(Skin):	0.1
	Ss(blk)/Ss(fract):	200	K(block)/K(fracture):	0.1

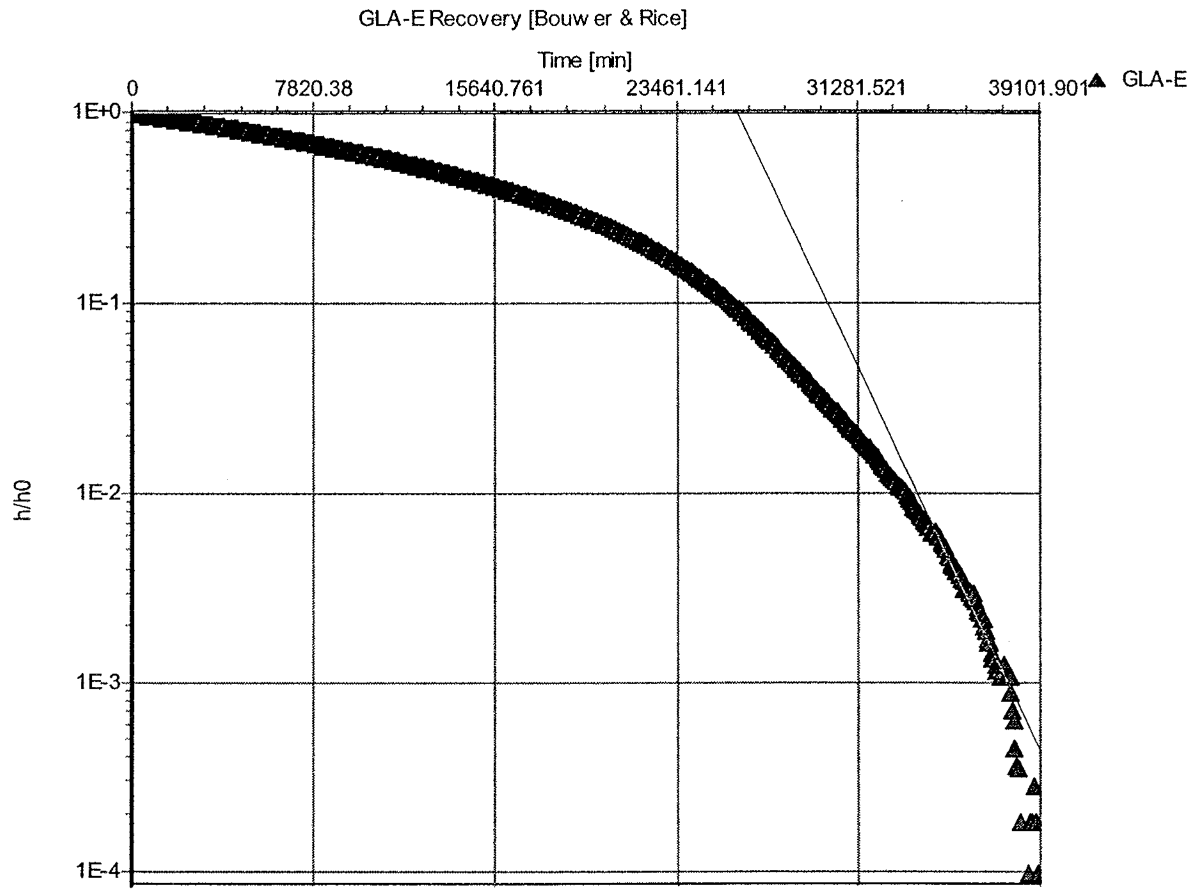
Comments:

Evaluated by:

Evaluation Date: 8/24/2004

548

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Slug Test Analysis Report**
	Project: Gregory #4 Bail Tests
	Number:
	Client: Gregory Canyon Ltd.



Slug Test: **GLA-E Recovery**

Analysis Method: **Bouwer & Rice**

Analysis Results: Conductivity: 3.07E-3 [ft/d]

Test parameters:				
	Test Well:	GLA-E	Aquifer Thickness:	73 [ft]
	Casing radius:	0.354 [ft]	Gravel Pack Porosity (%)	25
	Screen length:	73 [ft]		
	Boring radius:	0.354 [ft]		
	r(eff):	0.354 [ft]		

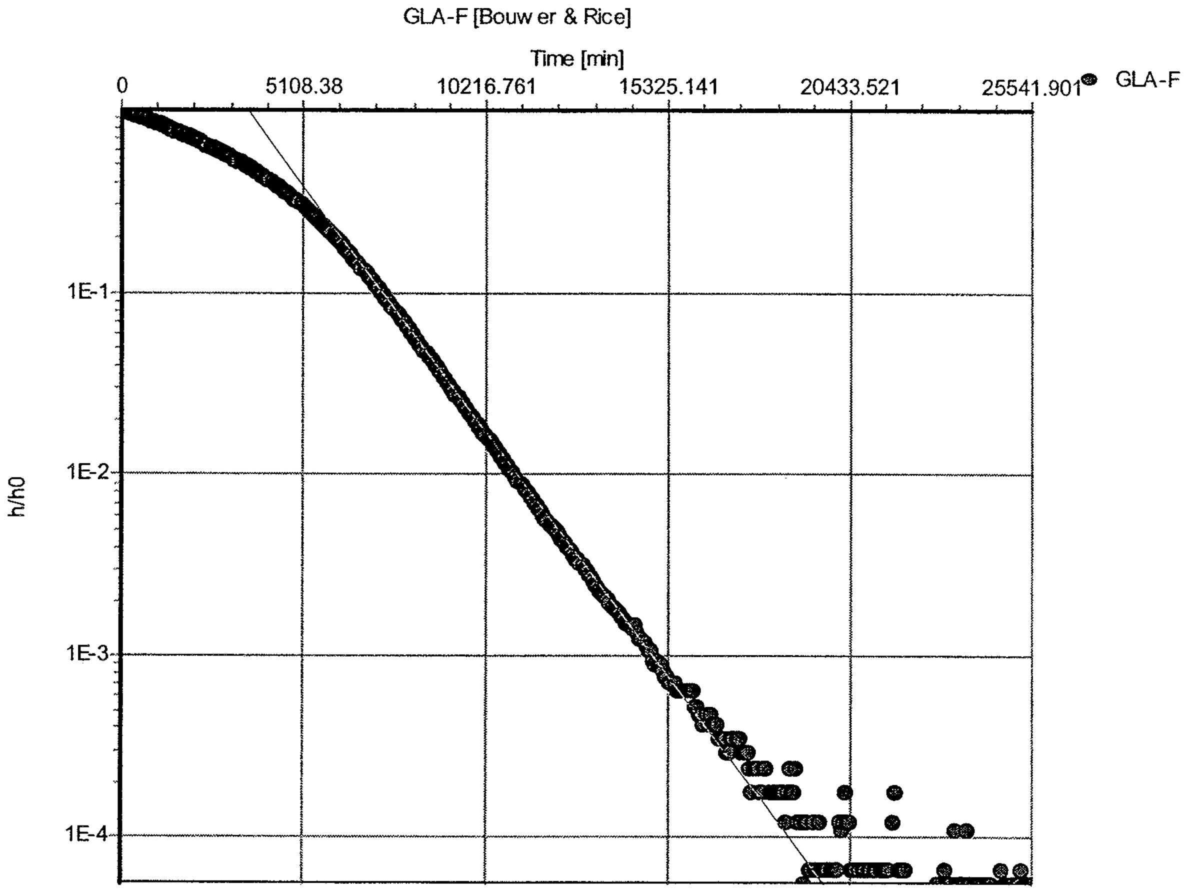
Comments:

Evaluated by:

Evaluation Date: 8/30/2004

549

GeoLogic Associates 1360 Valley Vista Drive Diamond Bar, California 91765	**Slug Test Analysis Report** Project: Gregory #4 Bail Tests Number: Client: Gregory Canyon Ltd.



Slug Test: **GLA-F**

Analysis Method: **Bouwer & Rice**

Analysis Results:		Conductivity:	2.55E-3 [ft/d]

Test parameters:	Test Well:	GLA-F	Aquifer Thickness:	95.5 [ft]
	Casing radius:	0.354 [ft]	Gravel Pack Porosity (%)	25
	Screen length:	95.5 [ft]		
	Boring radius:	0.354 [ft]		
	r(eff):	0.354 [ft]		

Comments: Curve matching by user.

Evaluated by: Mark Vincent

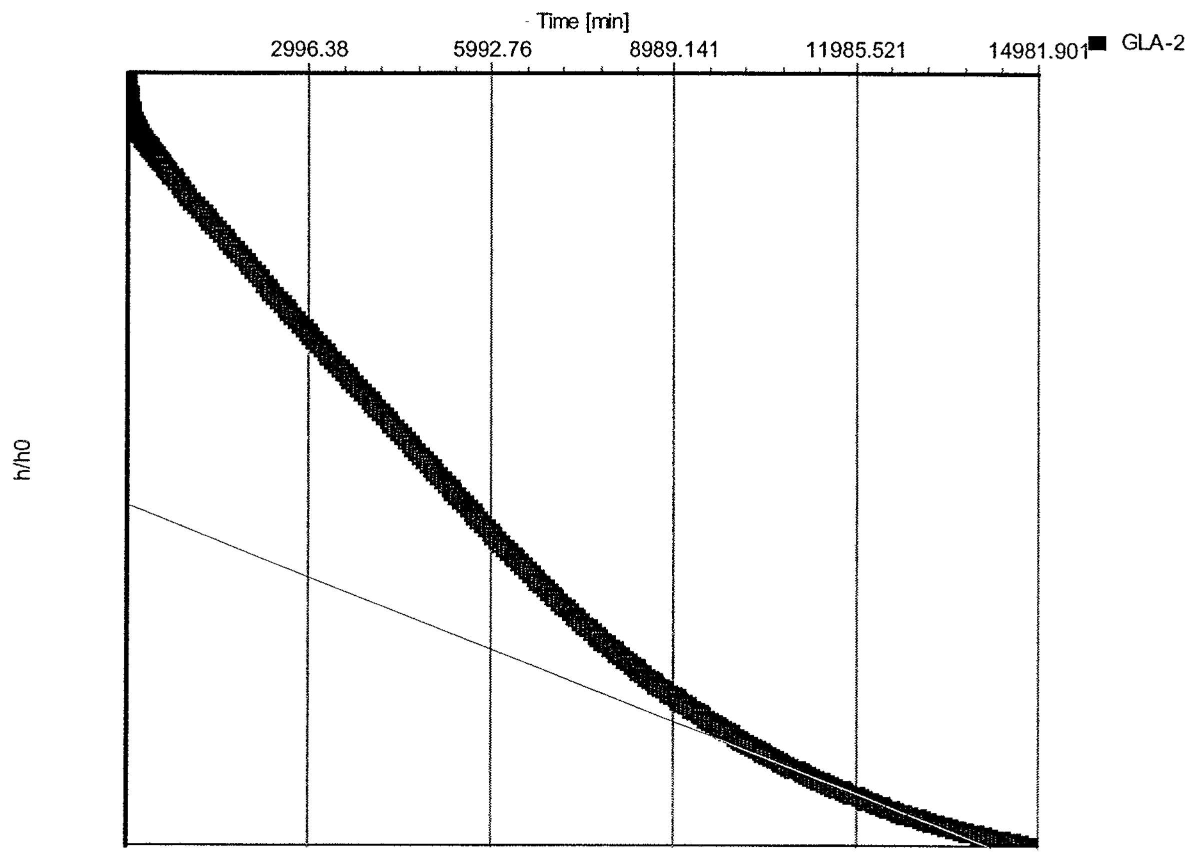
Evaluation Date: 8/25/2004

550

GeoLogic Associates
1360 Valley Vista Drive
Diamond Bar, California
91765

Slug Test Analysis Report	
Project:	Gregory #4 Bail Tests
Number:	
Client:	Gregory Canyon Ltd.

GLA-2x [Bouwer & Rice]



Slug Test: **GLA-2x**

Analysis Method: **Bouwer & Rice**

Analysis Results: Conductivity: 1.75E-5 [ft/d]

Test parameters:				
	Test Well:	GLA-2	Aquifer Thickness:	20.5 [ft]
	Casing radius:	0.167 [ft]	Gravel Pack Porosity (%)	25
	Screen length:	25 [ft]		
	Boring radius:	0.354 [ft]		
	r(eff):	0.229 [ft]		

Comments: Curve match by user for late part of data set.

Evaluated by: Mark Vincent

Evaluation Date: 8/25/2004

APPENDIX C-2

TECHNICAL MEMORANDUM – REVIEW OF ISSUES RELATED TO PROPOSED GREGORY CANYON LANDFILL

Technical Memorandum

Date: June 24, 2009

To: Mr. William Hutton
Law Offices of E. William Hutton
6303 Owensmouth Ave
Woodland Hills, CA 91367

From: Dr. David Huntley
Professor Emeritus of Geological Sciences
San Diego State University

Subject: Review of issues related to proposed Gregory Canyon Landfill (Privileged and Confidential)

As requested, I have undertaken an overview of the groundwater conditions and proposed groundwater monitoring plan for the proposed Gregory Canyon Landfill to provide an independent, outside review of the adequacy of, or possible weaknesses in, that plan. I have been provided the 1997 Phase 5 Hydrogeologic Investigation; Appendix C of the 2003 Geologic, Hydrologic, and Geotechnical Investigations Report; Appendix C of the 2004 Supplemental Hydrogeologic Investigation Report; the 2007 Water Supply Report; and the 2007 Water Quality Monitoring Report; all prepared by GeoLogic Associates. In addition, I have been provided San Diego Regional Water Quality Control Board (RWQCB) Tentative Order R9-2009-04, Tentative Monitoring and Reporting Program R9-2009-04, and the Technical Report for Order R9-2009-04.

It should be noted that this review focused on the "big picture". The RWQCB raised concerns about the adequacy of the downgradient (point of compliance) monitoring program and noted that I raised similar concerns about monitoring the groundwater in and around the proposed Campo Landfill, placed in a similar fractured rock environment. Accordingly, much of my review was focused on that issue. This memo does not address any, more detailed, opinions that I might have about the analyses described in the above reports, except those that related to the "big picture" issues that are the subject of this memorandum.

Adequacy of Point of Compliance Monitoring

As of the date of this memorandum the point of compliance monitoring is comprised of wells GMW-1, GLA-2, GLA-12, GLA-13, GLA-14, GLA-A, GLA-B, GLA-C, GLA-D, GLA-E, GLA-F and GLA-G in the fractured rock system, and well GMW-3 in the alluvium, with sentry wells GLA-16 and SLRMWD #34R. The

RWQCB, in their technical report related to the tentative order, expresses three concerns:

1. The hydrogeologic setting at Gregory Canyon is comprised of three systems – an alluvial system located downgradient of the footprint of the landfill, a weathered bedrock aquifer that underlies and is north (downgradient) of the footprint of the landfill, and a fractured rock system that, in turn, underlies the weathered bedrock. The proposed monitoring plan treats the weathered bedrock and underlying bedrock systems as one, so monitoring is not capable of distinguishing between the two.

2. Much of the aquifer testing was conducted in wells that are completed in both the weathered and un-weathered bedrock, though most research and texts recommend separately testing individual aquifers in a multiple aquifer system.

3. Monitoring of groundwater quality from point-source releases of contaminants, such as a breach in a liner, in a fractured rock system is very difficult.

In my opinion, these concerns are worthy of consideration. In particular, groundwater flow is markedly different in weathered and un-weathered bedrock. Weathered bedrock acts much more like an intergranular porous medium, with directions of groundwater flow defined more by the gradient and less by discrete avenues of permeability. Directions of groundwater flow are largely defined by discrete pathways in a fractured rock system. Therefore, a monitoring network is more likely to pick up indications of releases in weathered bedrock than in a fractured rock system. Wells that are completed in both weathered bedrock and in slightly fractured rock are likely to be providing information about the weathered bedrock system and may provide little or no information about the underlying fractured bedrock. It is much preferable to have wells separately completed in weathered and un-weathered bedrock. Further, aquifer testing of wells completed in both weathered and slightly fractured un-weathered bedrock is likely to provide little or no information about the fractured, un-weathered bedrock.

A review of the well logs and, more importantly, the geophysical and tracer logs conducted by Colog, provides some insight about which zones are likely to be monitored by the proposed wells. Wells GLA-A, GLA-E, GLA-2, GLA-F, GLA-D, and GLA-13 are all screened only in the fractured rock to the west of the thalweg of Gregory Canyon. Weathered bedrock is above the water table in all of those wells, so monitoring of weathered bedrock west of GLA-13 is not possible or appropriate.

The only monitoring well along the canyon thalweg is GMW-1, which is completed only in weathered bedrock. This appears to be an oversight, as the canyon thalweg parallels the primary fracture orientation and appears as a lineament in aerial photos. I recommend:

1. That a well completed only in unweathered, fractured rock be drilled at this location to a depth sufficient to intersect conductive fractures.

2. In addition, the water table appears to be above the weathered bedrock/alluvium interface at that location, so a monitoring well in alluvium should be placed there as well.

3. Because no monitoring wells are completed in weathered bedrock west of the canyon thalweg, I recommend that a well be drilled between GLA-3 and GLA-13 and screened only in weathered bedrock.

To the east of the canyon thalweg, wells GLA-C, GLA-B, and GLA-G appear to be completed only in weathered bedrock (the well log of GLA-G appears to identify materials consistent with weathered bedrock to the total depth of the well, though cross-section AA' shows unweathered bedrock at the base). Only well GLA-12 appears to be screened in unweathered, fractured bedrock (though cross-section AA' shows the well completed in weathered bedrock, the well log shows unweathered bedrock at 30 ft of depth, above the screened interval of the well and above the water table). Therefore, the weathered bedrock appears to be adequately monitored east of the canyon thalweg. However, the un-weathered fractured rock system is largely unmonitored east of the canyon thalweg. I recommend:

1. Additional wells be drilled and completed in the unweathered and fractured bedrock between GMW-1 and GLA-12.

2. These wells should be spaced and drilled to depths that, based on fracture geometry (fracture spacing and orientation) are very likely to intersect most productive fractures.

Completion of additional monitoring wells based on the above recommendations should provide additional assurance that the monitoring well network will detect any significant release. However, as I commented on the proposed Campo Landfill, there is simply no way in a fractured rock system that anyone can guarantee that any releases will be detected by a monitoring well network. It should be noted, however, that the relation between the landfill and potential receptors is different at Gregory Canyon Landfill than at the proposed Campo Landfill. At the proposed Campo Landfill, the most sensitive receptors were groundwater users dependent upon wells that are completed in the fractured rock system. One of the characteristics of solute transport in fractured rock is that velocities can be surprisingly high, due to moderate permeabilities and low porosities, and there is little dilution of solutes along the flow path. Therefore, wells intersecting fractures that have become contaminated by a release may be impacted quite soon after the release and at concentrations nearly the same as concentrations in the source area.

At Gregory Canyon, there are no receptor wells completed in fractured rock downgradient of the proposed landfill before groundwater flows into the alluvial aquifer of the San Luis Rey River Valley. Potential receptor wells are all completed in the alluvium. And while solutes can travel very rapidly in fractures and with little dilution, the flux is relatively low. Contaminants flowing through fractures with a low flux to an alluvial system are subject to a lot of dilution. For example, a series of fractures over a width of 50 ft with an effective hydraulic conductivity of 0.1 ft/day, subject to a gradient of 0.1 ft/day will transmit 0.5 ft^3/day/ft of depth to the alluvial aquifer at the base of Gregory Canyon. That alluvial aquifer, under a gradient of 0.01 and with a hydraulic conductivity of 20 ft/day will transmit 10 ft^3/day/ft of depth over a 50 ft wide section. That means that concentrations of VOCs on the order of 20 ug/l in the fractured rock system would be diluted to concentrations of 1 ug/l or less over a distance of 50 ft in the alluvial system. Research over the past decade indicates that the primary pathway in fractured rock systems is actually the intersection of fractures (a line), not the length of the fracture (a plane), so additional dilution would occur because of the vertical interval of contamination in the fractured rock system is much smaller than the corresponding interval in the alluvial aquifer. It is very likely that, if any release occurs to the fracture rock system, contaminants would be rapidly diluted to below the detection limit in the adjacent alluvial system. I am unaware of any alluvial aquifer which has been contaminated by releases to an adjacent fractured rock aquifer.

Summary of Recommendations

1. Additional groundwater monitoring wells should be completed in the fractured rock (unweathered) system at GMW-1 and between GMW-1 and GLA-12. The number of wells between GMW-1 and GLA-12 should be based on the proposed depth and the spacing and orientation of fractures in nearby boreholes, but should be spaced such that there is a reasonable assurance of intersecting permeable fractures.

2. An additional well completed in the weathered bedrock should be placed between GLA-3 and GLA-13.

3. An additional monitoring well should be completed in the alluvium at GMW-1 or downgradient of GMW-1 but as close to GMW-1 that alluvium becomes saturated.

APPENDIX D

STORMWATER POLLUTION PREVENTION PLAN
AND
MONITORING PROGRAM AND REPORTING REQUIREMENTS

STORMWATER POLLUTION PREVENTION PLAN

FOR:

GREGORY CANYON LANDFILL (GCLF)

PREPARED FOR:

GREGORY CANYON LANDFILL, LTD.
249 SOUTH HIGHWAY 101, #377
SOLANA BEACH, CA 90275

PROJECT SITE LOCATION/ADDRESS:

NORTH SAN DIEGO COUNTY, APPROXIMATELY 3 MILES EAST OF INTERSTATE 15 (I-15) AND TWO MILES SOUTH OF PALA, CA

CONSTRUCTION CONTRACTOR:

HERZOG ENVIRONMENTAL, INC.

CONSTRUCTION CONTRACTOR’S STORMWATER POLLUTION PREVENTION MANAGER:

TO BE DETERMINED

LANDFILL OPERATIONS CONTRACTOR:

HERZOG ENVIRONMENTAL, INC

OPERATIONS CONTRACTOR'S STORMWATER POLLUTION PREVENTION MANAGER:

TO BE DETERMINED

SWPPP PREPARED BY:

URS
1615 MURRAY CANYON ROAD, SUITE 1000
SAN DIEGO, CA 92108-4314
619.294.9400 FAX: 619.293.7920

SWPPP PREPARATION DATE:

MARCH 10, 2008

AMENDMENT NO. 1 PREPARED BY:

BRYAN A. STIRRAT & ASSOCIATES
1360 VALLEY VISTA DRIVE
DIAMOND BAR, CA 91765
909.860.7777
SEPTEMBER, 2010

WDID NO.: 937C310923

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Attachments

Acronym	Definition
AMSL	Above Mean Sea Level
BGS	Below Ground Surface
BMP	Best Management Practices
COC	Change of Custody
DSA	Disturbed Soil Area
EIR	Environmental Impact Report
GCLF	Gregory Canyon Landfill
I-15	Interstate 15
JTD	Joint Technical Document
LCRS	Leachate Collection and Removal System
MCY	Million Cubic Yards
MPRR	Monitoring Program Report Requirement
MS4	Municipal Separate Storm Sewer System
NONC	Notice of Non-Compliance
NPDES	National Pollutant Discharge Elimination System
PCC	Portland Cement Concrete
PSD	Perimeter Storm Drain
QA/QC	Quality Assurance/Quality Control
RWQCB	Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SDCWA	San Diego County Water Authority
SDG&E	San Diego Gas & Electric
SPPL	Storm water Pollution Prevention Leader
SR 76	State Route 76
SWPPM	Storm Water Pollution Prevention Manager
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
WDR	Waste Discharge Requirements
WPCD	Water Pollution Control Drawing

A Stormwater Pollution Prevention Plan (SWPPP) must be developed and implemented for construction projects and industrial operations in accordance with the following:

- State Water Resources Control Board (SWRCB) Order No. 2009-009-DWQ, National Pollutant Discharge Elimination System (NPDES) Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Stormwater Runoff Associated with Construction Activity (General Permit);
- State Water Resources Control Board (State Water Board) Water Quality Order No. 97-03-DWQ National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001 (General Permit) Waste Discharge Requirements (WDRs) for Discharges of Stormwater Associated with Industrial Activities Excluding Construction Activities

The purpose of the SWPPP is to identify potential pollutant sources that may affect the quality of discharges associated with construction and industrial activities, to identify non-stormwater discharges, and to design the use and placement of Best Management Practices (BMPs) to effectively prohibit the entry of pollutants from the construction and industrial site into the storm drain system during construction and operation. Erosion and sediment source control BMPs must be considered for both active and inactive (previously disturbed) construction areas. BMPs for wind erosion and dust control are also included.

This SWPPP document was prepared for permitting purposes only based upon information and conceptual plans provided in the Project Environmental Impact Report (EIR) and Joint Technical Document (JTD). This SWPPP contains the minimum BMPs and monitoring plans that should be implemented during the construction phase and initial operation phase. The SWPPP should be updated to reflect final grading and improvement plans and detailed long-term operational information. The SWPPP will require modification and amendment as the project progresses and as conditions warrant, and will require annual certification by the owner of compliance with the SWRCB NPDES permits.

SECTION 1 SWPPP CERTIFICATIONS AND APPROVAL

1.1 INITIAL SWPPP CERTIFICATION BY PREPARER

Project Name: Gregory Canyon Landfill

Project Number: ______________________

"I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Matthew C. Moore

Preparer's Signature

March 10, 2008

Date

Matthew C. Moore, PE, CPESC

Preparer's Name and Title

619-294-9400

Telephone Number

1.1 OWNER APPROVAL AND CERTIFICATION OF INITIAL SWPPP

Owner's (or Authorized Representative)
Approval and Certification of the
Storm Water Pollution Prevention Plan

Project Name: Gregory Canyon Landfill

Project Number: ______________________

"I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Owner (or Authorized Representative) Signature

2/19/08
Date

Jerry A. Riessen, President
Name and Title

(415)391-2833
Telephone Number

1.3 ANNUAL COMPLIANCE CERTIFICATION

By July 1 of each year, the Owner shall complete an Annual Certification of Compliance stating compliance with the terms and conditions of the Permit and the SWPPP. The blank Annual Certification of Compliance Form is included in Attachment M. Completed Annual Certifications of Compliance and Approvals can be found in the following pages.

SECTION 2 SWPPP AMENDMENTS

2.1 SWPPP AMENDMENT CERTIFICATION AND APPROVAL

This SWPPP shall be amended:

- Whenever there is a change in construction or operations which may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4); or
- If any condition of the Permits is violated or the general objective of reducing or eliminating pollutants in stormwater discharges has not been achieved. If the RWQCB determines that a Permit violation has occurred, the SWPPP shall be amended and implemented within 14-calendar days after notification by the RWQCB;
- Annually, prior to the defined rainy season; and
- When deemed necessary by the Owner.

The following items will be included in each amendment:

- Who requested the amendment.
- The location of proposed change.
- The reason for change.
- The original BMP proposed, if any.
- The new BMP proposed.

The amendments for this SWPPP, along with the Owner's Certification and the Owner approval, can be found in the following pages. Amendments are listed in the Amendment Log in section 2.2.

SWPPP Amendment No. 1

Project Name: Gregory Canyon Landfill

Project Number:

Preparer Certification of the Stormwater Pollution Prevention Plan Amendment

"I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Virginia L. Becerra
Preparer's Signature

Sept. 15, 2010
Date

Virginia L. Becerra, Senior Regulatory Compliance Specialist
Preparer's Name and Title

909-860-7777
Telephone Number

Owner (or Owner's Authorized Representative) Approval of the Stormwater Pollution Prevention Plan Amendment

"I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Owner (or Authorized Representative) Signature

9/15/10
Date

Project Manager
Name and Title

760-471-2365
Telephone Number

2.2 AMENDMENT LOG

Project Name: Gregory Canyon Landfill

Project Number:

Amendment No.	Date	Brief Description of Amendment	Prepared By
1	September 2010	Update to new General Construction Permit 2009-0009-DWQ requirements	Virginia Becerra, Bryan A. Stirrat & Assoc.

SECTION 3 PROJECT DESCRIPTION

3.1 PROJECT DESCRIPTION

The proposed Gregory Canyon Landfill (GCLF) site is located in northern San Diego County approximately three miles east of Interstate 15 (I-15) and two miles southwest of the community of Pala (Exhibit 3-1). SR 76 and the San Luis Rey River run east-west through the project site. The majority of the project site lies to the south of SR 76 but part of the western portion of the site lies to the north of SR 76. The eastern portion of the project site makes up the western slope of Gregory Mountain. The Canyon itself is located approximately in the center of the project site. The site comprises portions of Sections 4 and 5 of Township 10 South and Sections 32 and 33 of Township 9 South, Range 2 West of USGS 7.5' Pala Quadrangle.

Elevations on the project site within the canyon range from approximately 1,200 feet above mean sea level (amsl) at the head of the canyon at the south, to 300 feet amsl at the mouth of the canyon in the San Luis Rey River drainage (Exhibit 3-2). Much of the canyon is steep, rugged terrain containing numerous boulder outcrops on the eastern side with only a few isolated boulders on the west canyon wall. The canyon flattens somewhat at the mouth where it meets the alluvial deposits of the San Luis Rey River drainage. A prominent knoll extends into the drainage channel on the west side of the canyon mouth.

The GCLF project includes the construction, operation, and closure of a lined landfill, as well as an access road and bridge from SR 76 to the landfill; a scale area; a recyclable goods collection center; a facilities and operation area; two borrow/stockpile areas; a leachate collection and removal system including storage tanks; a visitors' center; an administration building; a maintenance office; a shop and yard; a fueling station/storage area; surface water control facilities, including desilting basins; a water treatment plant; a recycled water tank; a leachate tank; groundwater monitoring wells; a landfill gas collection and recovery system; and a groundwater subdrain collection system. In addition to construction, operation, and closure of the landfill, the project includes widening of SR 76 at the proposed access road and relocation of the existing SDG&E power lines and easement.

Approximately 308 acres of the 1,770-acre site, or 17 percent, will be used for landfill activities. Table 1-1 provides an approximate breakdown of project element acreages.

Table 1-1. Project Element Acreages

Project Element	Approximate Size (acres)
Landfill Footprint	196.3 [a]
Site Facilities Area	11.9
Access Road and Bridge	4.1
Borrow/Stockpile Area—A	22.4
Borrow/Stockpile Area—B	64.5 [b]
Borrow/Stockpile Area Haul Road	3.1
Desilting Basin—East	1.8
Desilting Basin—West	3.7
	TOTAL 307.8

[a] Includes 13.1 acres for the three SDG&E transmission pads
[b] Includes approximately 10 acres to the east of the SDCWA easement
Source: Bryan A. Stirrat & Assoc., 2000

3.1.1 Landfill Construction

Construction of the refuse area containment system will require the mass excavation and removal of native material to generate a northerly sloping bottom area with interior side slopes on the west, south and east. The waste containment system will be constructed in three gross fill phases, as needed to provide continuous refuse disposal capacity through the landfill's projected service life. Initial excavation activities within the refuse footprint will involve the removal of approximately 3.7 million cubic yards (mcy) including all of the alluvial and colluvium so that the landfill will be constructed directly on unyielding bedrock. About 7.9 mcy of material will be excavated within the refuse footprint over the life of the landfill. During the mass excavation of the landfill refuse area, it is anticipated that some of the coarse material will not be usable as "soil" for cover and fill during the project. Part of this material, broadly classified as "rock", will be used as a base for internal roadways, drainage structures, etc. with the remainder stored within the southwestern portion of the landfill footprint area. The stored rock material will be processed using a crusher and screens while building the pads for relocation of the SDG&E poles. The bottom area of the footprint will be graded to drain northerly at a minimum gradient of three percent. The interior side slopes will be cut at a gradient no steeper than 1:1 (horizontal to vertical). The elevations of the finished bottom subgrade or floor area for the refuse footprint range between approximately 370 feet amsl at the northwestern corner to about 440 amsl at the southern portion. From the existing contours to the finished bottom contours, the depth of excavation ranges from near zero to a maximum of about 160 feet deep at the southern end of the canyon.

3.1.2 Borrow/Stockpile Areas

Approximately 87 acres of borrow/stockpile area will be provided in two locations to the west of the proposed landfill footprint. Borrow/Stockpile Area A, which is about 22 acres in size, will be located west of the landfill footprint adjacent to the western property boundary. The maximum elevation of Borrow/Stockpile Area A will be 500 feet, which will be about 100 to 180 feet above the existing grade depending on the location. For example, Borrow/Stockpile Area A will rise about 100 feet above the existing topography to the north and south, about 50 feet above the existing grade to the east and about 180 feet above the lowest point to the west. Borrow/Stockpile Area B, which is about 65 acres in size, will be located immediately to the west of the southern portion of the landfill footprint. Borrow/Stockpile Area B will have two decks, with a maximum elevation of 1,020 feet. Borrow/Stockpile Area B ranges from 60 to 120 feet above existing grades to the north, 160 feet above existing grades to the west, 100 feet above existing grades to the east and from 60 to 100 feet above existing grades to the south.

The borrow/stockpile areas will be used to store or excavate material that will be needed in the daily operation or closure of the landfill. For borrow purposes, excavation in the designated areas will be a maximum of 150 feet to maintain positive drainage. During the initial excavation of Phase I of the refuse footprint, a portion of the excavated material will be used for engineered fill necessary to construct the site facilities area and a toe buttress, with the remainder of the material being stockpiled in the landfill footprint or Borrow/Stockpile Area A. Borrow/Stockpile Area A will be used for stockpiling during the initial construction after which the area will be revegetated with native plant species. Stockpile area A will not be used again until the last few years of GCLF's operating life at which time material will be used from Stockpile area A for daily cover. Soil will also be obtained from Borrow Area A during years 23 and 24 for construction of final cover at the landfill. In subsequent excavation phases, material will be used directly at the active face of the landfill or stockpiled within the footprint or in Borrow/Stockpile Area B.

The borrow/stockpile haul road, connecting Borrow/Stockpile Area A with the landfill footprint, will be 20 feet wide and will run along the base of the adjacent hillside with turn-out locations for heavy equipment at three points along the route. Most of the alignment of the haul road follows an existing dirt road on the site. Access to the larger Borrow/Stockpile Area B will be within the defined limits of the landfill footprint. The maximum slope of the borrow/stockpile haul roads will be 15 percent. Proper drainage control will be maintained in the borrow/stockpile areas. Surface water control features will include grading of the flatter deck areas to promote lateral runoff of precipitation into drainage control facilities such as downdrains and bench drains on the slopes. Surface waters will be conveyed from the borrow/stockpile areas and discharged into the existing natural drainage courses. Discharge rates will be equal to or less than natural flow conditions.

Borrow/Stockpile Area B will drain to the southwest into a natural drainage course. The drainage course for Borrow/Stockpile Area A runs northwesterly. The drainage control facilities will direct the surface runoff into the existing streams. At the western end of the Borrow/Stockpile Area B, a desilting basin will be constructed to minimize the flow of silt from the borrow/stockpile area. These desilting basins will be designed to accommodate the soil loss from the borrow/stockpile areas. The pre-developed drainage condition of the proposed borrow/stockpile areas will be maintained as closely as possible once operations are discontinued. As discussed above, exposed areas will be revegetated with native plant species to prevent erosion. Erosion and sediment control measures for the stockpile areas are described in Section 5.

3.1.3 Access Road and Bridge

The project includes modifications to SR 76 at the access road entrance to improve sight distance and to facilitate truck movements. The improvements, which are approximately 1,700 linear feet, will realign SR

76 to the south of the existing alignment. In addition, the improvements will widen the roadway to provide for an eastbound deceleration lane and a westbound left turn lane.

The proposed access road from SR 76, which will extend through the abandoned Lucio dairy to the site facilities area, will include a bridge over the San Luis Rey River. The access road from SR 76 to the bridge will be about 910 linear feet, with two travel lanes and a shoulder on each side. The access road from the bridge into the site facilities area will be about 985 linear feet. The access road will be paved with asphalt curbs.

A bridge will be constructed across the San Luis Rey River. The side slopes at the end buttresses (or abutments) will be at a 3:1 slope and stabilized with rip rap to prevent erosion of the bridge abutments.

3.1.4 Site Facilities

Upon entering the site facilities area, vehicles will pass through the fee booth and scales. The administrative office building will be located adjacent to the booths. The site facilities area will also include a maintenance building. A diesel storage tank within a concrete containment wall will be located on the south side of the building for refueling of equipment. A portable emergency showerhead designated to contain rinse water will also be provided outside the maintenance building.

A recyclable drop-off area is proposed on the east side of the maintenance building. The recyclable area will have bins for drop-off of source separated recyclable material, such as newsprint, white paper, tin, aluminum, and glass. Hazardous materials will be prohibited at GCLF. However, a hazardous materials storage area, located in the southeastern portion of the site facilities area, will be maintained for use if such materials are found in loads coming to the landfill. A full time spotter, trained to identify potential hazardous waste, will observe unloading activities during all refuse hours of operation.

Two leachate holding tanks and one subdrain water tank will be located in the southwestern corner of the site facilities area. A water tank will be located just north of the paved area. The water tank will be supplied from on-site groundwater wells. Within the site facilities area the project will implement dry management controls of sediment (i.e., sweeping and/or chemical stabilization) as well as the use of absorbents for oil and gas releases.

A portable chemical toilet will be located at the northern end of the site facilities area. The applicant will contract with a sewage disposal service to remove effluent from the chemical toilet for off-site treatment and disposal. The project will also include storm drain swales and a structural stormwater treatment device to protect surface water quality.

3.1.5 Other Project Components

The project will dedicate a minimum of 1,313 acres of the project site as permanent open space for long-term preservation of sensitive habitat and species. The project includes the relocation of a portion of the existing SDG&E transmission lines and easement because two towers are located within the proposed landfill footprint.

3.2 SITE DRAINAGE

The primary function of the surface water drainage control system will be to divert and convey stormwater flows in a controlled manner, to minimize erosion, and to inhibit the potential infiltration of surface water run-on or precipitation into the refuse disposal areas. The drainage control system for the GCLF will consist of perimeter drainage channels, buried perimeter drainage pipes, drainage berms, downdrains, energy dissipaters, desilting basins, and infiltration areas. The proposed surface water drainage control system for the GCLF will be designed to accommodate a 100-year, 24-hour storm event.

3.2.1 Landfill Drainage

On-site drainage features will be designed to separately control/divert stormwater run-on from surrounding areas and those portions of the landfill which are or will be undisturbed for some time and runoff from the disturbed/developed areas of the landfill including the site support facilities. Stormwater on the landfill deck will sheet flow until it is intercepted by berms located along the edges of the deck. The deck berms will direct flows to downdrains. Exterior benches will collect stormwater from the upgradient slope and divert flows to the bench downdrain inlets. The downdrains will be perpendicular to slope contours and located atop, and anchored into, the landfill surface. Downdrains will be extended up completed side slopes of the landfill as the filling progresses and also accommodate inlets at each bench. The gradient of these downdrains will follow the surface of the refuse slope and will maintain a minimum three percent grade across the benches. The downdrains will outlet into a buried perimeter drainage pipe system which will discharge into the desilting basins. The desilting basins will reduce the amount of silt ultimately discharged from the landfill site. The desilting basins are intended to control the amount of silt ultimately discharged from the disturbed portions of the landfill site as well as the rate of discharge.

As discussed above, stormwater run-on from the surrounding areas and those undisturbed portions of the refuse footprint will be directed into the open perimeter storm drain (PSD) channels. The PSD system will discharge downstream of the desilting basins into energy dissipation devices and then flow into infiltration areas for percolation. The PSD system will consist of reinforced concrete trapezoidal drainage channels placed around the landfill footprint perimeter. A portion of the eastern channel will be constructed during the initial construction phase to accommodate flows from the upper eastern slopes of the canyon. Construction of the final western perimeter channel will begin during the Phase II excavation. The western channel will be four feet wide at the base and 5.5 feet deep with a one to one side slope. The perimeter channels will handle flows from the off-site surrounding areas and the undisturbed areas within the refuse footprint. The perimeter channels will discharge at a location near the discharge outfall of the desilting basins, utilize the same infiltration areas. Discharge velocities will be maintained at less than or equal to predevelopment conditions through the use of energy dissipaters. The remainder of the PSD channels will be completed as the landfill is developed moving up canyon. The PSD is intended to control run-on (from areas adjacent to the landfill) that might otherwise flow onto the landfill as well as serving as a conveyance for runoff from the undisturbed areas within the refuse footprint downstream of the desilting basins. All collected stormwater flows from the PSD will be discharged at a location near the discharge outfall of the desilting basins.

Stormwater run-on will be diverted around the Site Facilities Area. Runoff within the Site Facilities area will ultimately drain into two swales in the northwest corner and then to a structural treatment device prior to discharge off the Site Facilities Area.

Interim drainage control features will consist of compacted earth berms constructed around the perimeter of the deck and the working face area, to divert water around the refuse fill and into the downdrains and buried perimeter drainage pipes. Silt fences and gravel bags may also be used to dissipate energy and remove silt upstream of the basins.

3.2.2 Borrow/Stockpile Area Drainage

Surface water control features within the borrow/stockpile areas will include grading of the flatter deck areas to promote lateral runoff of precipitation into such proposed drainage control facilities as downdrains and bench drains on the slopes. Surface waters will be conveyed from the borrow/stockpile areas and discharged into the existing natural drainage courses. Erosion control measures such as vegetation, desilting basins, sand bags, straw matting and/or rip-rap will be utilized to reduce downstream siltation potential. Discharge rates will be equal to or less than natural flow conditions.

Borrow/Stockpile Area B will drain to the southwest into a natural drainage course. The drainage course for Borrow/Stockpile Area A runs northwesterly. The drainage control facilities will direct the surface runoff into the existing streams. At the west end of the Borrow/Stockpile Area B, a desilting basin will constructed to minimize the flow of silt from the borrow/stockpile areas. These desilting basins will be designed to accommodate the soil loss from the borrow/stockpile areas. Interim drainage and erosion control features (e.g., silt fences) will be constructed for all borrow/stockpile areas, as necessary. The pre-developed drainage conditions of the area will be maintained as closely as possible once operations are discontinued in each of the borrow/stockpile areas.

3.3 CONSTRUCTION SITE HYDROLOGIC ESTIMATES

The following are estimates of the construction site hydrologic parameters:

Total site area	308	acres
Percentage impervious area before construction	<1	%
Runoff coefficient before construction (1)	0.353	
Percentage impervious area after construction	4	%
Runoff coefficient after construction (1)	0.373	
Anticipated stormwater flow on to the construction site (2)	~ 270	cfs

(1) Calculations are shown in Attachment D

(2) 10-year, 6-hour Rational Method runoff to Perimeter Drains (conservative calculation for design purposes). Calculations are provided in Attachment E

The impervious areas of the project will total approximately 13 acres and include:

- Leachate and subdrain storage tanks
- Site facilities area
  - Scales/Fee Booths
  - Recyclable goods center
  - Groundwater treatment facility
  - Administration/Visitor Center
  - Maintenance building
  - Household hazardous waste storage area
- Main access and haul roads
- Equipment and storage area

3.4 PROJECT CONSTRUCTION & WATER POLLUTION CONTROL IMPLEMENTATION SEQUENCING AND SCHEDULE

3.4.1 Initial Construction

The initial construction period for Phase I will be approximately eighteen months in duration and will include the following:

- Removal of the existing dairy buildings and residences on the site
- Removal of the manure to minimize or eliminate odors and/or potential impacts to water quality
- Construction of the access road and bridge
- Improvements to SR 76 at the access road
- Construction of the site facilities, including the scalehouses, maintenance building, water tank, and desilting basins
- Installation of the leachate and subdrain water storage tanks and the reverse osmosis system
- Excavation of approximately 25 acres of Phase I of the landfill footprint
- Installation of the subdrain system, leachate collection and removal system (LCRS) and composite liner within the excavated area
- Preparation of the Borrow/Stockpile Area A
- Clearance and grading of turnouts along the internal haul road between Borrow/Stockpile Area A and the landfill footprint
- Installation of additional monitoring wells (if required by RWQCB) or repair of existing monitoring wells

3.4.2 Generalized Water Pollution Control Implementation Sequence

The final SWPPP shall provide a written and graphical project schedule. The schedule shall clearly show how the rainy season relates to soil-disturbing and re-stabilization activities. The schedule shall contain an adequate level of detail to show major activities sequenced with implementation of construction site BMPs, including:

- Project start and finish dates
- Rainy season dates
- Annual certifications
- Mobilization dates
- Mass clearing and grubbing/roadside clearing dates
- Major grading/excavation dates
- Special dates named in other permits such as Fish and Game and Army Corps of Engineers Permits
- Dates for submittal of SWPPP Amendments required by the contract documents
- Annual submittal of rainy season implementation schedule if required by the Owner or Permittee
- Dates for implementation of pre-rainy season temporary soil stabilization and temporary sediment control BMPs, if required by the contract documents
- Rainy season implementation schedule
- Deployment of temporary soil stabilization BMPs
- Deployment of temporary sediment control BMPs
- Deployment of wind erosion control BMPs
- Deployment of tracking control BMPs
- Deployment of non-stormwater BMPs
- Deployment of waste management and materials pollution control BMPs
- Non-rainy season implementation schedule
- Deployment of temporary soil stabilization BMPs
- Deployment of temporary sediment control BMPs
- Deployment of wind erosion control BMPs
- Deployment of tracking control BMPs
- Deployment of non-stormwater BMPs
- Deployment of waste management and materials pollution control BMPs

- Paving, saw-cutting, and any other pavement related operations
- Major planned stockpiling operations
- Dates for other significant long-term operations or activities that may plan non-stormwater discharges such as dewatering, grinding, etc.
- Final stabilization activities staged over time for each area of the project

3.4.3 Operation Phases

GCLF will be a canyon fill to be developed in consecutive phases over the site's life. The conceptual engineering design proposes four excavation and fill phases or sequences. The development sequence is based on the master excavation plan, phasing plans, final grading plan, and established design criteria. Within each excavation, landfilling will occur in smaller stages depending on site conditions and capital expenditure scheduling. The phased waste placement necessitates that the operator maintain minimum deck and sideslope gradients and construct temporary deck access roads.

The stormwater drainage control facilities and the infrastructure for the ultimate configuration will be progressively constructed as waste filling is completed. Interim drainage and sediment control structures along with the erosion prevention measures will be constructed/implemented and periodically relocated as waste filling progresses. This will provide continuous stormwater collection and conveyance in a controlled manner and minimizing erosion, enhancing sediment control, limiting ponding, and the potential for leachate generation and/or surface water contamination.

3.5 CONTACT INFORMATION AND LIST OF RESPONSIBLE PARTIES

The Contractor is required to show the Name, Address and Telephone number(s) of the person(s) responsible for SWPPP management/implementation, water pollution control and Permit compliance during construction. This person shall be called the Stormwater Pollution Prevention Manager (SWPPM).

Construction and Operation phase contact information and list of responsible parties will be provided in the SWPPP once construction and operation contractors have been selected.

The SWPPM assigned to the project shall have primary responsibility and significant authority for the implementation, maintenance, inspection and amendments to the approved SWPPP. The SWPPM will be available at all times throughout the duration of the project. Duties of the SWPPM include but are not limited to:

- Ensuring full compliance with the SWPPP and the Permit
- Implementing all elements of the SWPPP, including but not limited to:
  - Implementation of prompt and effective erosion and sediment control measures
  - Implementing all non-stormwater management, and materials and waste management activities such as: monitoring discharges (dewatering, diversion devices); general site clean-up; vehicle and equipment cleaning, fueling and maintenance; spill control; ensuring that no

materials other than stormwater are discharged in quantities which will have an adverse effect on receiving waters or storm drain systems; etc.

- Pre-storm inspections
- Storm event inspections
- Post-storm inspections
- Routine inspections as specified in the project's specifications or described in the SWPPP
- Updates/Amendments to the SWPPP, as needed
- Preparing annual compliance certification for owner's, or owner's authorized representative, signature
- Ensuring elimination of all unauthorized discharges
- The SWPPM shall be assigned authority by the Contractor to mobilize crews in order to make immediate repairs to the control measures
- Coordinate with the Contractor to assure all of the necessary corrections/repairs are made immediately, and that the project complies with the SWPPP, the Permit and approved plans at all times
- Submitting Notices of Discharge and reports of Illicit Connections or Illegal Discharges

SECTION 4 REFERENCES, PLANS, AND PERMITS

The following documents are made a part of this SWPPP by reference:

- State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES) Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Stormwater Runoff Associated with Construction Activity (General Permit);
- State Water Resources Control Board (State Water Board) Water Quality Order No. 97-03-DWQ National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001 (General Permit) Waste Discharge Requirements (WDRs) for Discharges of Stormwater Associated with Industrial Activities Excluding Construction Activities
- California Stormwater BMP Handbook – Construction, January 2003

Attachment N contains a list of project permits. Attachment N also includes copies of local, state, and federal plans and permits related to water quality. Following is a list of the plans and permits that are or will be included (when issued) in Attachment N:

- State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES) Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Stormwater Runoff Associated with Construction Activity (General Permit);
- State Water Resources Control Board (State Water Board) Water Quality Order No. 97-03-DWQ National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001 (General Permit) Waste Discharge Requirements (WDRs) for Discharges of Stormwater Associated with Industrial Activities Excluding Construction Activities
- San Diego Regional Water Quality Control Board Waste Discharge Requirements for GCLF (pending)
- San Diego Regional Water Quality Control Board Clean Water Act Section 401 Water Quality Certification (pending)
- US Army Corps of Engineers, Clean Water Act Section 404 Permit (pending)
- US Fish and Wildlife Service Section 7 Consultation (pending)
- California Department of Fish and Game Streambed Alteration Agreement (pending)
- San Diego County Public Works Department Bridge Permit (future)
- San Diego County Public Works Department Water Course Alteration Permit (future)
- San Diego County Public Works Department Grading Permit (future)
- San Diego County Public Works Department Building Permit (future)

SECTION 5 BMP SELECTION AND IMPLEMENTATION

5.1 OBJECTIVES

This Stormwater Pollution Prevention Plan (SWPPP) has six main construction phase objectives (note that none of the following objectives relate to the post-construction periods or activities):

- Identify all pollutant sources, including sources of sediment that may affect the quality of stormwater discharges associated with construction activity (stormwater discharges) from the construction site, and
- Identify non-stormwater discharges, and
- Identify, construct, implement in accordance with a time schedule, and maintain Best Management Practices (BMPs) to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site during construction, and
- Develop a maintenance schedule for BMPs installed during construction designed to reduce or eliminate pollutants after construction is completed (post-construction BMPs).
- Identify a sampling and analysis strategy and sampling schedule for discharges from construction activity which discharge directly into water bodies listed on Attachment 3 of the Permit (Clean Water Act Section 303(d) [303(d)] Water Bodies listed for Sedimentation).
- For all construction activity, identify a sampling and analysis strategy and sampling schedule for discharges that have been discovered through visual monitoring to be potentially contaminated by pollutants not visually detectable in the runoff.

This SWPPP conforms to the required elements of the General Permit No. CAS000002 issued by the State of California, State Water Resources Control Board (SWRCB). This SWPPP will be modified and amended to reflect any amendments to the Permit or any changes in construction or operations that may affect the discharge of pollutants from the construction site to surface waters, groundwaters, or the municipal separate storm sewer system (MS4). The SWPPP will also be amended if it is in violation of any condition of the Permit or has not achieved the general objective of reducing pollutants in stormwater discharges. The SWPPP shall be readily available on-site for the duration of the project.

5.2 VICINITY MAP

The construction project vicinity map and site map showing the project location, surface water boundaries, geographic features, construction site perimeter, and general topography, is located in Attachment A.

5.3 POLLUTANT SOURCE IDENTIFICATION AND BMP SELECTION

A solid waste landfill is unique from other types of developments in that the construction of additional lined areas is phased throughout much of its operating life. Therefore, it is difficult to make a clear distinction between construction BMPs and post-construction (industrial) BMPs. For purposes of the following discussion, landfill activities are divided into two periods, initial construction and the operating period. Because construction would occur during the operating period, some of the initial construction BMPs would remain applicable but to a more limited extent, since this construction would be limited to the landfill footprint area.

5.3.1 Inventory of Materials and Activities that May Pollute Stormwater

The following is a list of construction materials that will be used and activities that will be performed that will have the potential to contribute pollutants, other than sediment, to stormwater runoff (control practices for each activity are identified in the Water Pollution Control Drawings (WPCDs) and/or in Sections 5.3.4 through 5.3.9:

- Vehicle fluids, including oil, grease, petroleum, and coolants
- Asphaltic emulsions associated with asphalt-concrete paving operations
- Cement materials associated with PCC concrete paving operations, drainage structures, median barriers, and bridge construction
- Base and subbase material
- Joint and curing compounds
- Concrete curing compounds
- Paints
- Solvents, thinners, acids
- Sandblasting materials
- Mortar mix
- Raw landscaping materials and wastes (topsoil, plant materials, herbicides, fertilizers, mulch, pesticides)
- BMP materials (sandbags, liquid copolymer)
- Treated lumber (materials and waste)
- PCC rubble
- Masonry block rubble
- General litter

Construction activities that have the potential to contribute sediment to stormwater discharges include:

- Clear and grub operations
- Grading operations
- Soil transport operations
- Utility excavation operations
- Landscaping operations

Attachment C lists all Best Management Practices (BMPs) that have been selected for implementation in this project. Implementation and location of BMPs are shown on the WPCDs in Attachment B. Narrative descriptions of BMPs to be used during the project are listed by category in each of the following SWPPP sections. Attachment Q includes a list, and/or copies of the fact sheets of all the BMPs selected for this project.

5.3.2 Existing (pre-construction) Control Measures

There are no significant existing (pre-construction) control measures encountered within the project site.

5.3.3 Nature of Fill Material and Existing Data Describing the Soil

The following soils and geology information was taken from the GCLF EIR. Various geologic units occur within the project site. In the lower portions of Gregory Canyon, a thin veneer of unconsolidated residual soils, colluvial, and alluvial deposits mantles a substrate of weathered tonalite.

Surficial soils

The topsoil units encountered in the area vary in thickness from about six inches to three feet, and are composed of silty sand, silty sand with clay, and silty sand with cobbles and boulders. In general, the steeper, upper slope areas of the canyon are expected to have slightly thinner soil accumulations than the intermediate or lower slope areas. Underlying the topsoil are residual soil horizons or weathered rocks.

Colluvium

Colluvium forms a veneer over most of the surface of the project site. In most instances it is formed by silty sand with rock fragments that range in size from gravel to very large boulders. Finer-grained deposits, largely devoid of rock fragments, were encountered in test pits located at the southern end of the canyon. In this area, older colluvium, consisting of clayey sand to sandy clay with varying contents of rock fragments and slight to moderate cementation was encountered.

Rock fragments exposed at the surface of the colluvial veneer vary from gravel- to boulder-size material. Boulders of leucogranodiorite, some in excess of 20 feet in maximum dimension, are present along much of the eastern sideslopes. The thickness of the colluvial deposits in the proposed project area is highly variable with interpretations indicating thicknesses from 2 to 50 feet. In general, the upper slope areas are likely to be underlain by thin (less than 10 foot thick) colluvial deposits and surficial soils formed on highly weathered crystalline rock. Debris chutes and drainage channels are expected to be locally backfilled with colluvium of moderate thickness (10 to 20 feet). Colluvial deposits are expected to be thickest near the lower portion of the slopes.

Alluvium

Two alluvial units have been mapped at lower elevations near the mouth of Gregory Canyon. The younger subunit (Qal-1) consists of overbank deposits from the active San Luis Rey River channel, interbedded with channel deposits from the Gregory Canyon drainage. These deposits are relatively thin and contain gravels, cobbles and boulders, supported by a sandy silt matrix. The older alluvial subunit

(Qal-2) is a terrace remnant of older alluvium in the Gregory Canyon drainage. The alluvial wedge pinches out to the south. The wedge thickens to the north until it eventually merges with the channel deposits of the San Luis Rey River. Well GMW-2, near the mouth of the canyon, traversed through a 50-foot section of alluvial deposits before reaching the underlying bedrock.

<u>Groundwater</u>

Because groundwater recharge is inconsistent and seasonal, historical depth-to-water measurements from the period 1965 to 1990 for the alluvial aquifer indicate that groundwater levels for a particular well may fluctuate from the ground surface to approximately 25 feet below ground surface (bgs) in the center of the river valley. Groundwater dewatering maybe required during construction if high groundwater table exists at the time of excavation for footings or abutments.

Existing land uses on the site include open space, agricultural uses (dairy), residential development, a San Diego Gas & Electric (SDG&E) high voltage electrical transmission line on the east side of the site, and buried pipelines of the San Diego Aqueduct through the central portion of the site. Existing site features that, as a result of past usage, may contribute pollutants to stormwater (e.g., toxic materials that are known to have been treated, stored, disposed, spilled, or leaked onto the construction site) include: agricultural uses (dairy), residential development, and the SDG&E transmission line. Sampling of groundwater and surface water has occurred over many years and is ongoing. These data are submitted annually to the RWQCB.

5.3.4 Guidance for Selection of Erosion and Sediment Control BMPs

The following guidance in Sections 5.3.4 and 5.3.5 is taken from the Caltrans Construction Stormwater Pollution Prevention Plan and Water Pollution Control Program Preparation Manual, 2007.

5.3.4.1 Disturbed Soil Area (DSA)

Disturbed soil areas (DSAs) are areas of exposed, erodible soil that are within the construction limits and that result from construction activities. The following are not considered DSAs:

- Areas where temporary soil stabilization, erosion control, or slope protection have been applied and associated drainage facilities are in place and functional.
- Roadways, construction roads, access roads or contractor's yards that have been stabilized by the placement of compacted sub-base or base material or paved surfacing.
- Areas where construction has been completed in conformance with the contract plans and permanent erosion control is in place and functional.

Soil stabilization is considered functional when a uniform vegetative cover equivalent to 70 percent of the native background vegetation coverage has been established or equivalent stabilization measures have been employed.

5.3.4.2 Active Areas and Non-Active Areas

Active Areas are construction areas where soil-disturbing activities have already occurred and continue to occur or will occur during the ensuing 21 days.

Non-Active Areas are construction areas (formerly active areas) that will be idle for at least 21 days.

5.3.4.3 Slope Length and Benches

Slope length is measured or calculated along the continuous inclined surface. Each discrete slope is between one of the following: top to toe, top to bench, bench to bench, and bench to toe.

Benches are drainage facilities that intercept surface flow and convey the resulting concentrated flow away from a slope. For the purpose of determining slope lengths, fiber rolls or other appropriate BMPs can be considered equivalent to a bench.

5.3.4.4 Rainy Season

The rainy season begins October 1st and ends May 31st.

5.3.4.5 Temporary Soil Stabilization and Sediment Control Implementation Guidance

Stormwater pollution control measures are required to be implemented on a year-round basis at an appropriate level. The requirements must be implemented in a proactive manner during all seasons while construction is ongoing. The temporary soil stabilization and sediment controls BMPs specified in this section are based on rainfall patterns (time frames, intensities, and amounts), general soil types, the seasons, slope inclinations and slope lengths. Appropriate water pollution control includes the implementation of an effective combination of both soil stabilization and sediment control BMPs.

The following subsections describe both general principles and specific guidance for selecting and implementing temporary soil stabilization and sediment control BMPs.

5.3.4.6 Scheduling

Construction scheduling shall consider the amount and duration of soil exposed to erosion by wind, rainfall, runoff, and vehicle tracking and seek to minimize disturbed soil area during the rainy season. A schedule shall be prepared that shows the sequencing of construction activities with the installation and maintenance of soil stabilization and sediment control BMPs.

5.3.4.7 Preservation of Existing Vegetation

Preserving existing vegetation to the maximum extent possible and for as long as possible on a construction site reduces or eliminates erosion in those areas. To facilitate this practice, on a year-round basis temporary fencing shall be provided prior to commencement of clearing and grubbing operations or other soil-disturbing activities in areas where no construction activity is planned or construction will occur at a later date.

5.3.4.8 Stormwater Run-on and Concentrated Flows

The diversion of stormwater run-on and conveyance of concentrated flows must be considered in determining the appropriateness of the BMPs chosen. BMPs to divert or manage concentrated flows in a non-erodible fashion may be required on a project-by-project basis to divert off-site drainage through or around the construction site or to properly manage construction site stormwater runoff.

5.3.4.9 Disturbed Soil Area Management

The DSA management guidelines are based on rainfall patterns (time frames, intensities, and amounts), general soil types, the seasons, slope inclinations, and slope lengths. All of these factors must be considered in order to develop the appropriate levels of soil stabilization and sediment control measures.

5.3.4.10 DSA Protection by Temporary Soil Stabilization and Temporary Sediment Controls

The specific temporary soil stabilization and sediment control practices for DSA protection in each area are determined from Tables 5-3.1 and 5-3.2 (for non-active disturbed soil areas and active disturbed soil areas, respectively). Based on consultation with experts, the slope length and slope inclination are seen as the most important criteria for soil stabilization and sediment control requirements, as these factors have the largest potential impact on the erosion rate. As indicated in these tables, the temporary soil stabilization and sediment controls at a construction site will increase with increasing slope length and slope inclination combination.

DSAs shall be protected as follows:

- Temporary control practices for non-active DSAs shall be implemented in accordance with Table 5.3-1.
- Temporary control practices for active DSAs shall be implemented in accordance with Table 5.3-2.
- For non-active DSAs, limit the erosive effects of stormwater flow on slopes by implementing BMPs such as fiber rolls to break up the slope lengths as follows:
  - Slope inclination 1:4 (V:H) and flatter: BMPs shall be placed on slopes at intervals no greater than 20 ft.
  - Slope inclination between 1:4 (V:H) and 1:2 (V:H): BMPs shall be placed on slopes at intervals no greater than 15 ft.
  - Slope inclination 1:2 (V:H) or greater: BMPs shall be placed on slopes at intervals no greater than 10 ft.
- For non-active DSAs, permanent erosion control shall be applied to areas deemed complete during the project's defined seeding window.
- Provide construction site BMPs in addition to those specified in Tables 5.3-1 and 5.3-2 to convey concentrated flows in a non-erodible fashion.

- Do not use fiber rolls on slopes where soil conditions do not warrant (slopes prone to surface failure).

5.3.4.11 Soil Stockpiles

Temporary soil stockpiles shall be protected with temporary soil stabilization and/or sediment controls when required.

5.3.4.12 Sediment/Desilting Basins

The nature of linear projects and constrained construction areas may prohibit the use of sediment/desilting basins at some locations. The required sediment/desilting basin shall be constructed in accordance with the project plans and in conjunction with other soil stabilization and sediment control measures.

Table 5-1. Non-Active Disturbed Soil Area Erosion and Sediment Control BMP Implementation

REQUIRED COMBINATION OF TEMPORARY SOIL STABILIZATION AND TEMPORARY SEDIMENT CONTROLS AND BARRIERS (1) NON-ACTIVE DISTURBED SOIL AREAS (2)					
Season	**Temporary BMP**	**Slope (V:H)(4)**			
		≤ 1:20	**> 1:20 ≤ 1:4**	**> 1:4 ≤ 1:2**	**> 1:2**
Rainy (3)	Soil Stabilization (5)	X	X	X	X
	Sediment Barrier (5)		X	X	X
	Desilting Basin (6)				
Non-Rainy	Soil Stabilization (5)				
	Sediment Barrier (5)				X (7)
	Desilting Basin (6)				

(1) Sediment controls and barriers include all temporary sediment control construction BMPs identified in the CASQA Construction BMP Handbook. Linear barrier systems are equivalent to what are referred to in the General Construction Permit as perimeter controls. The intent is to prevent the transport of sediment at the downslope edge of disturbed soil areas.

(2) Unless otherwise noted, implementation of controls should be applied within 14 days of cessation of soil disturbing activities or one day prior to all predicted rain events, whichever occurs first.

(3) The maximum slope length is 100 ft for slope inclinations between 1:20 (V:H) and 1:2 (V:H) and 50 ft for steeper slopes, otherwise slope benching or other techniques shall be employed.

(4) Unless otherwise noted, the temporary BMP is required for the slope inclinations indicated on slope lengths greater than 10 ft.

(5) The indicated temporary BMP is required on all slope lengths.

(6) Required in addition to the temporary sediment barrier, where feasible. Feasibility will depend on site-specific factors such as available right-of-way within the project limits, topography, soil type, disturbed soil area within watershed, and climate conditions.

(7) Implementation of controls not required except at least 24 hours prior to all predicted rain events.

Table 5-2. Active Disturbed Soil Area Erosion and Sediment Control BMP Implementation

REQUIRED COMBINATION OF TEMPORARY SOIL STABILIZATION AND TEMPORARY SEDIMENT CONTROLS AND BARRIERS (1) ACTIVE DISTURBED SOIL AREAS (2)				
Season	**Temporary BMP**	**Slope (V:H)(3)**		
		≤ 1:20	**> 1:20 ≤ 1:2**	**> 1:2**
Rainy	Soil Stabilization			
	Sediment Barrier		X	X
	Desilting Basin (4)			X
Non-Rainy	Soil Stabilization			
	Sediment Barrier			
	Desilting Basin			

(1) Sediment controls and barriers include all temporary sediment control construction BMPs identified in the CASQA Construction BMP Handbook. Linear barrier systems are equivalent to what are referred to in the General Construction Permit as perimeter controls. The intent is prevent the transport of sediment at the downslope edge of disturbed soil areas.

(2) Implementation of soil stabilization controls are not required except prior to predicted rain.

(3) Unless otherwise noted, the temporary BMP is required for the slope inclinations indicated on slope lengths greater than 10 ft.

(4) Required in addition to the temporary sediment barrier, where feasible. Feasibility will depend on site-specific factors such as available right-of-way within the project limits, topography, soil type, disturbed soil area within watershed, and climate conditions.

5.3.5 Guidance for Implementation of Other BMPs

5.3.5.1 Mobile Operations

Mobile operations common to the construction of a project include asphalt recycling, concrete mixing, crushing and the storage of materials. BMPs shall be implemented year-round, as appropriate, to control the individual situations these mobile operations can create.

5.3.5.2 Wind Erosion Controls

Wind erosion controls shall be considered year-round for all disturbed soils on the project site that are subject to wind erosion and when significant wind and dry conditions are anticipated during construction of the project.

5.3.5.3 Tracking Controls

Tracking controls shall be implemented year-round, as needed, to reduce the tracking of sediment and debris from the construction site. At a minimum, entrances and exits shall be inspected daily, and controls implemented as needed.

5.3.5.4 Construction Site Management (Non-Stormwater and Waste Management and Materials Pollution Controls)

The objective of the construction site management (non-stormwater and waste management and materials pollution controls) is to reduce the discharge of materials other than stormwater to the stormwater drainage system or to receiving waters. These controls shall be implemented year-round for all applicable activities, material usage, and site conditions.

5.3.6 Erosion Control

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in stormwater runoff. Erosion control BMPs to protect the soil surface by covering and/or binding soil particles. This project will incorporate erosion control measures required by the contract documents, and other measures selected by the Contractor, SWPPP Manager, or Owner. This project will implement the following practices for effective temporary and final erosion control during construction:

1) Preserve existing vegetation where required and when feasible.

2) Apply temporary erosion control to remaining active and non-active areas as required by the California Stormwater BMPs Handbook – Construction, and the contract documents. Reapply as necessary to maintain effectiveness.

3) Implement temporary erosion control measures at regular intervals throughout the defined rainy season to achieve and maintain the contract's disturbed soil area requirements. Implement erosion control prior to the defined rainy season.

4) Stabilize non-active areas as soon as feasible after the cessation of construction activities.

5) Control erosion in concentrated flow paths by applying erosion control blankets, erosion control seeding, and lining swales as required in the contract documents.

6) Apply seed to areas deemed substantially complete by the Owner during the defined rainy season.

7) At completion of construction, apply permanent erosion control to all remaining disturbed soil areas.

Sufficient erosion control materials will be maintained on-site to allow implementation in conformance with Permit requirements and described in this SWPPP. This includes implementation requirements for active areas and non-active areas that require deployment before the onset of rain.

Implementation and locations of temporary erosion control BMPs are shown on the Water Pollution Control Drawings (WPCDs) in Attachment B and/or described in this section. The BMP Consideration Checklist in Attachment C indicates the BMPs that will be implemented to control erosion on the construction site; these are:

Initial Phase I Construction (Access Road, Bridge, and Site Facilities area)

- EC-1, Scheduling
- EC-2, Preservation of Existing Vegetation
- EC-3 or EC-4, Hydraulic Mulch or Hydroseeding (on cut and fill slopes outside the active landfill footprint
- EC-6 Straw Mulch (for stockpile area erosion control coverage)
- EC-9, Earth Dikes and Drainage Swales (along toe of roadway and at Site Facilities area)
- EC-10, Velocity Dissipation Devices (at proposed downdrain or culvert outlets)
- EC-12, Streambank Stabilization (rock riprap at bridge abutments)

Note that additional erosion control BMPs may be required or used in place of those recommended above such as EC-5 Soil Binders (for stockpile areas or short term disturbed soil area erosion control), and EC-7 Geotextiles and Mats

Operation Phase

- EC-1, Scheduling
- EC-2, Preservation of Existing Vegetation
- EC-3 or EC-4, Hydraulic Mulch or Hydroseeding (on final slopes)
- EC-6 Straw Mulch (for Borrow/Stockpile Areas A and B)
- EC-9, Earth Dikes and Drainage Swales (drainage swales/channels along landfill perimeter and terrace/bench drains on final fill face)
- EC-10, Velocity Dissipation Devices (at proposed downdrain or pipe outlets)
- EC-11, Slope Drains (on exterior landfill slopes)

Note that additional erosion control BMPs may be required or used in place of those recommended above such as EC-5 Soil Binders (for stockpile areas or short term disturbed soil area erosion control), EC-6 Straw Mulch, EC-7 Geotextiles and Mats.

5.3.7 Sediment Control

Sediment controls are structural measures that are intended to complement and enhance the selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. This project will incorporate sediment control measures required by the contract documents, and other measures selected by the Contractor, SWPPP Manager, or Owner.

Sufficient quantities of temporary sediment control materials will be maintained on-site throughout the duration of the project, to allow implementation of temporary sediment controls in the event of predicted rain, and for rapid response to failures or emergencies, in conformance with other Permit requirements and as described in this SWPPP. This includes implementation requirements for active areas and non-active areas before the onset of rain.

Implementation and locations of temporary sediment control BMPs are shown on the Water Pollution Control Drawings (WPCDs) in Attachment B. The BMP Consideration Checklist in Attachment C indicates all the BMPs that will be implemented to control sediment on the construction site; these are:

Initial Phase I Construction (Access Road, Bridge, and Site Facilities area)

- SE-1, Silt Fence (along toes of slope along access road and at bridge abutments and Site Facility Area)
- SE-2, Sediment Basin (East and West desilting basins will act as temporary sediment basins during contruction. Additional sediment basins will be located within the initial landfill excavation area.)
- SE-4, Check Dams (Check dams will be used within drainage and bioswales until vegetation is established)
- SE-5, Fiber Rolls (Fiber rolls will be used along the toe of slope along the access road, as well as on cut/fill slopes over 10 feet in height)
- SE-6, Gravel Bag Berm (gravel bag berms will be used along the access road until such time as the road is paved and the AC curb is installed. Gravel bag berms can be used for SE-4 Check Dams and SE-10 Storm Drain Inlet Protection)
- SE-7, Street Sweeping and Vacuuming (Street sweeping will occur once the access road and site facility area has been paved)
- SE-10, Storm Drain Inlet Protection (Storm drain inlet protection will be provided during construction for the proposed access road and site facility area storm drain inlets).

Operations Phase

- SE-2, Sediment Basin (Temporary sediment basins will be located within the interior of the landfill as applicable during the operation phase)
- SE-4, Check Dams (Check dams will be used within the extension of the perimeter drains until they are lined with concrete)

- SE-7, Street Sweeping and Vacuuming (Street sweeping will occur once the access road and site facility area has been paved)
- Other BMPs maybe required during the final stabilization of portions of the landfill prior to the establishment of permanent vegetation. BMPs that may be required during this phase include silt fence, fiber rolls, gravel bags, and storm drain inlet protection.

Landfill Area

Site operations will rely on erosion control BMPs to minimize transport of sediment offsite. Pipe and channel downdrains are proposed at an average of 600-foot intervals to intercept and convey runoff from the deck and benches before their flow velocities become erosive. All run-on from the surrounding areas and the undisturbed areas of the site will be captured by the perimeter drainage channels and discharge at a location near the discharge outfall of the desilting basins. These stormwater flows will be discharged utilizing energy dissipaters to match pre-development velocities. In addition the site will be operated with an effective combination of erosion and sediment control to minimize erosion and sediment transport through the use of hydroseeding, mulching, erosion control mats, fiber rolls, silt fences, and other devices.

Once an area has been graded to the final level, establishment of native vegetation on the final fill area will be implemented. Once an area reaches a state of 70-percent coverage of pre-development conditions, stormwater flows from that area will be diverted to the perimeter drainage channel, which discharge downstream of the desilting basin.

A Notice of Termination can be filed for areas when the following conditions are met:

- All soil disturbing activities are completed.
- A uniform cover with 70% coverage has been established or:
- Equivalent stabilization measures have been employed including the use of geoblankets, channel liners, soil cement, fiber matrices, or other erosion resistant soil coverings or treatments.

Stockpile Areas

The primary erosion and sediment control measures that will be implemented within the borrow/stockpile areas include track walking of all disturbed surfaces in conjunction with straw mulching, include the use of silt fences, gravel bags, and fiber rolls. The erosion control measures which will be conducted concurrent with sediment control will include track walking of all disturbed surfaces in conjunction with straw mulching and seeding of native plant species continued until native vegetation establishment reaches 70 percent of the predevelopment state. Secondary sediment control will consist of desilting basins. Energy dissipating measures such as rip-rap will be utilized to reduce downstream siltation potential as well as discharge velocities to the natural drainage courses. The dirt loaded trucks traveling to the stockpile areas will be watered down by water trucks.

5.3.8 Tracking Control

The following BMPs have been selected to reduce sediment tracking from the construction site onto private or public roads:

- SE-7, Street Sweeping and Vacuuming
- TR-1, Stabilized Construction Entrance/Exit
- TR-2, Stabilized Construction Roadway

5.3.9 Wind Erosion Control

The following BMPs have been selected to control dust from the construction site:

- WE-1, Wind Erosion Control
- WM-3, Stockpile Management

The onsite roads leading to and from the entrance facilities to the unloading area will be paved, and/or chemically stabilized tightly compacted dirt roads.

Operations Phase

The mass excavation of the GCLF refuse area will also require the removal of rock. The rock will be used to build drainage features, as a base for internal haul roads, etc. Some of the rock material will be processed further using a crusher and screens before they can be reused. Rock crushing will occur within the southern portion of the landfill footprint. Dust control operations will be employed to reduce the amount of dust. Water trucks will be used to spray water on soil cover and rock processing areas when conditions exist which may result in the formation of fugitive dust.

5.3.10 Non-Stormwater Control

An inventory of construction activities and potential non-stormwater discharges is provided in Section 5.3.1. The BMP Consideration Checklist in Attachment C and the following list indicates the BMPs that have been selected to control non-stormwater pollution. Implementation and locations of some non-stormwater control BMPs are shown on the Water Pollution Control Drawings (WPCDs) in Attachment B.

- NS-1, Water Conservation Practices
- NS-2, Dewatering Operations (Dewatering maybe required for construction of the bridge and excavation within the landfill footprint).
- NS-3, Paving and Grinding Operations
- NS-4, Temporary Stream Crossing (a temporary crossing will be used across San Luis Rey River until such time as the bridge is completed).
- NS-5, Clear Water Diversion (San Luis Rey River bridge construction may require a temporary clear water diversion)
- NS-6, Illicit Connection/Illegal Discharge Detection and Reporting
- NS-8, Vehicle and Equipment Cleaning
- NS-9, Vehicle and Equipment Fueling
- NS-10, Vehicle and Equipment Maintenance
- NS-11, Pile Driving Operations
- NS-12, Concrete Curing

- NS-13, Concrete Finishing
- NS-14, Material Over Water

During construction and operations GCLF will have a variety of heavy equipment stored on-site. During operations (and potentially during construction), all minor service, such as oil changes, lubrication, and fueling will be handled on site. Maintenance fueling areas will be operated in compliance with all State and County requirements for hazardous material storage and handling.

5.3.11 Waste Management and Materials Pollution Control

An inventory of construction activities, materials, and wastes is provided in Section 5.3.1. The BMP Consideration Checklist in Attachment C and the following list indicates the BMPs that have been selected to handle materials and control construction site wastes.

- WM-1, Material Delivery and Storage
- WM-2, Material Use
- WM-3, Stockpile Management
- WM-4, Spill Prevention and Control
- WM-5, Solid Waste Management
- WM-6, Hazardous Waste Management
- WM-8, Concrete Waste Management
- WM-9, Sanitary/Septic Waste Management
- WM-10, Liquid Waste Management

Operations phase landfill customers will be processed through the entrance area on the site facilities area and then directed by landfill personnel to the active unloading area using onsite access roads. The refuse will be unloaded as directed by equipment operations and/or load checkers. There will be no site specific industrial stormwater treatment control facilities onsite other than those post construction stormwater treatment facilities identified in Section 5.6.

GCLF will operate as a Class III non-hazardous solid waste facility and acceptance of hazardous wastes will be prohibited. An extensive program will be in-place to exclude hazardous waste from entering the site. However, any hazardous waste found at the site will be temporarily stored in a secured, designated hazardous waste storage area. This storage area will be located in the southeast corner of the site facilities area. The area will be specifically designed for the handling and storage of hazardous wastes, including secondary containment and approved storage containers which are safe and convenient for storing identified wastes.

Onsite hazardous waste storage will be limited to 90 days or as required by applicable State laws and regulations prior to being transported to a permitted treatment, storage and disposal facility (TSDF). The "Accumulation Start Date" on the California hazardous waste label of each overpack drum containing hazardous waste will be monitored on a regular basis. Prior to shipment off site, all materials will be overpacked and manifested with a licensed hazardous waste hauler/disposer.

5.3.12 Operation Specific BMPs

The following BMPs address operation specific BMPs (those BMPs specific to the operation of the landfill and not the initial construction phase which consists of the construction of the access road, bridge, and site facilities area).

5.3.12.1 Preventive Maintenance

Operations will include preventive maintenance practices which provide environmental protection. At a minimum, preventive maintenance involves the periodic inspection and maintenance of facility berms, slope storm drains, other drainage structures, desilting basins, the hazardous waste storage area, and other working areas. The desiltation basins will be cleaned out annually before the rainy season and inspected monthly for excessive debris build-up and/or damage requiring repair. The goal of the inspections shall be to identify conditions which could lead to polluted stormwater discharges and erosion/sedimentation problems at GCLF. In addition, any equipment being used at the facility will be properly maintained to reduce the possibility of oil and/or fuel leaks.

5.3.12.2 Good Housekeeping

Goodhousekeeping practices are designed to maintain, to the greatest extent practicable, a clean and orderly environment. Well-maintained working areas and equipment storage areas will reduce the possibility of pollutants mixing with stormwater.

5.3.12.3 Operational Practices

GCLF operating procedures focus on minimizing the possibility of a polluted stormwater discharge. At a minimum the following non-structural BMPs will be implemented:

- Load checking program to check for unauthorized loads and hazardous waste.
- Daily inspection and removal of trash from access roads and perimeter fences.
- Daily inspection of onsite equipment for leaks and improperly functioning equipment
- To the greatest extent practicable, the working face of the landfill will be built up in such a way as to reduce polluted stormwater discharge in a storm event period prior to placing the daily cover.
- The operator will maintain a stockpile of cover soil immediately adjacent to the working face at all times to quickly cover the area should a storm event occur.
- The operator will conduct continuous inspections of the integrity of the cover material over the refuse disposal areas. Any defective conditions will be repaired thoroughly.

5.3.12.4 Equipment and Material Storage Practices

Proper equipment and material storage practices will be employed at GCLF to reduce or eliminate the potential for polluted stormwater discharge. The following practices will be employed as a routine practice:

- Any hazardous materials found in the refuse fill area will be transferred to the hazardous waste storage area.
- The hazardous waste storage area, at a minimum, shall be inspected weekly to check on its structural integrity.
- Any container stored onsite, either temporarily or permanently, shall be stored in accordance with the manufacturer's instructions to avoid damaging the containers from improper weight distribution.
- Where possible, containers will be stored on pallets to prevent rust or corrosion.
- Open containers will be stored in enclosed areas or covered to eliminate the potential for stormwater contact.
- All containers, drums and bags will be stored away from the active disposal areas and direct traffic routes to reduce the possibility for accidental spills.
- Maintenance and fueling areas will be maintained in compliance with all Sate and County requirements for hazardous material storage and handling.
- Operational equipment stored onsite will be located in an area where the possibility of polluting the stormwater is minimized.
- The exposed paved portions of the site facilities area will be dry swept for soil /sediment removal and laborers sill be utilized to pick up loose litter.
- Equipment maintenance will be conducted under a structure or within a paved, bermed area to contain any spills.
- Spills will be controlled with berms and adsorbents.

5.3.12.5 Spill Prevention and Response

GCLF will have an Emergency Notification Plan and a Post-Closure Emergency Response Plan. Under the Emergency Notification Plan, the following agencies will be notified in the event of a spill: Fire Department/Ambulance/Medical; Gregory Canyon Landfill, LLC.; County of San Diego Department of Environmental Health, Hazardous Materials Divisions, State of California Office of Emergency Services Hazardous Materials Unit, National Response Center. Although specific emergency response actions will depend on the actual hazard conditions, the general actions undertaken will include the following:

- Removal of unauthorized persons from the spill/leak area.
- Notification of response coordinator by use of radio or pager.
- Immediate response by trained personnel properly equipped with protective devices.
- Mitigation of the hazard.
- Containment and removal of the waste from the area.
- Documentation of the incident.

5.3.13 Cost Breakdown for Temporary Construction Water Pollution Control

A blank cost breakdown form is provided in Attachment O. This form may be used by the construction contractor to itemize the water pollution control items that have been developed for the initial construction phase of the project.

5.4 WATER POLLUTION CONTROL DRAWINGS (WPCDS)

The Water Pollution Control Drawings can be found in Attachment B of the SWPPP.

5.5 CONSTRUCTION BMP MAINTENANCE, INSPECTION, AND REPAIR

Inspections will be conducted as follows:

- Prior to a forecast storm
- After a rain event that causes runoff from the construction site
- At 24-hour intervals during extended rain events
- At any other time(s) or intervals of time specified in the contract documents

Completed inspection checklists will be kept with the SWPPP.

A tracking or follow-up procedure shall follow any inspection that identifies deficiencies in BMPs. A program for Maintenance, Inspection and Repair of BMPs is shown in Attachment G.

5.6 POST-CONSTRUCTION STORMWATER MANAGEMENT

5.6.1 Post-Construction Control Practices

The post-construction BMPs for the project are identified in the Stormwater Management Plan for the project. A post-construction BMP site map is provided in Attachment B. The following are the post-construction BMPs that are to be used at this construction site after all construction is complete:

- Landfill
  - Outfall 1 - East Desilting Basin: This outfall is the existing main canyon outlet point. Runoff from the eastside landfill operating area will be directed to a desilting basin which will provide both silt removal and some peak flowrate attenuation benefits. Runoff from the upper east canyon will be directed to the outlet in a perimeter drainage channel. To mitigate for the potential for increased flowrates and volumes, runoff from the landfill and upper canyon will be directed with energy dissipation to an existing natural depression/infiltration area immediately east of the main canyon thalweg. The existing area has the required volume and infiltration rates to infiltrate proposed flow volumes to mimic natural conditions.
  - Outfall 2 - West Desilting Basin: There is currently no existing defined outfall at the outlet from this desilting basin. Runoff from the west side of the landfill will be directed to a desilting basin that will provide both silt removal and peak flowrate attenuation benefits.

Runoff from the upper southwest canyon will be directed with energy dissipation to the outlet in a perimeter drainage channel. Flows discharging the basin and from the perimeter drainage channel will be directed to the upland areas downstream of the desilting basin. Flows from the desilting basin would be directed to level spreaders/energy dissipators prior to discharge to the flat, highly permeable upland area. This design will allow for infiltration of all surface runoff from the west side of the landfill prior to reaching the San Luis Rey River. The required infiltration area is approximately 4.2 acres.

- Site Facilities Area: Within the site facilities area vehicular activities associated with routine operation and the receipt of refuse for disposal could result in trace petroleum hydrocarbons and tracking of sediments onto the paved surfaces of the site facilities area including the queuing area for the fee booths and scales, main haul road, landfill equipment maintenance and re-fueling areas. The source control BMPs to be implemented specific to the site facilities areas would include dry measures such as cleaning the paved surfaces of sediment with a street sweeper and the use of absorbents for leaks and spills from vehicular activities. The equipment maintenance area has been designed to eliminate contact with stormwater by conducting operations in a covered area and diverting flows around the entire site facilities area. In addition, the hazardous waste storage facility, which is located in the site facilities area, would be enclosed with secondary containment. Treatment control BMPs will consist of bio-filters around the draining perimeter of the facility as the primary LID BMP, supplemented by a structural media filtration device (Stormfilter Vault or equivalent device) at the downstream end of the swales to provide an additional level of water quality treatment prior to discharge off the site facilities area:
- Access Road and Bridge:
  - Outfall 4 - Bridge (South): Runoff from the access road and bridge will be directed to roadway curb inlets. One of the inlets will contain media filtration cartridges (6'x12' Curb Inlet Stormfilter device or equivalent) to filter the stormwater from both sides of the access road prior to discharge to the 36-inch cross culvert and finally to an energy dissipation/infiltration area. Flows in excess of the water quality design flow will sheet flow out into the relatively flat floodplain terrace area where infiltration will occur.
  - Outfall 5 - Bridge (North): Runoff from the access road and bridge will be directed to a curbside structural pre-infiltration filter device (Kristar SwaleGard Culvert Pre-Filter or equivalent device) prior to discharge to small energy dissipation/infiltration areas. Flows in excess of the water quality design flow will sheet flow out into the relatively flat floodplain terrace area where infiltration will occur.

5.6.2 Operation/Maintenance after Project Completion

The post-construction BMPs that are described above will be funded and maintained by Gregory Canyon Landfill, Ltd.

5.7 TRAINING

Section 3.5 will include the name of the Contractor’s Stormwater Pollution Prevention Manager (SWPPM) once selected. The training for the SWPPPM will be included in this section in future amendments to this SWPPP. The minimum training requirements include (Source: CASQA Construction Handbook):

- SWPPP organization, content and use;
- Pollution control objectives and manager responsibilities;
- BMP locations and inspection procedures;
- Monitoring procedures; and
- Good housekeeping practices.

The training log showing formal and informal training of various Contractor personnel is provided in Attachment I for future use.

This initial SWPPP was prepared by URS Corporation, under the direction of Matt Moore, PE, CPESC.

5.8 LIST OF SUBCONTRACTORS

All contractors and subcontractors will be notified of the requirement for stormwater management measures during the project. A list of contractors will be maintained and included in the SWPPP. If subcontractors change during the project, the list will be updated accordingly. The subcontractor notification letter and log is included in the SWPPP as Attachment J.

SECTION 6 INITIAL CONSTRUCTION MONITORING PROGRAM AND REPORTS

6.1 SITE INSPECTIONS

The SWPPM will inspect the site prior to a forecast storm, within 48 hours of a qualifying rain event (produces precipitation of ½ inch or more) that causes runoff from the construction site, at 24-hour intervals during extended rain events, and as specified in the contract documents. The results of all inspections and assessments will be documented. Copies of the completed inspection checklists will be maintained with the SWPPP. Site inspections conducted for monitoring purposes will be performed using the inspection checklist shown in Attachment H.

The name(s) and contact number(s) of the assigned inspection personnel will be listed in this section when determined prior to construction.

6.2 NON COMPLIANCE REPORTING

If a discharge occurs or if the project receives a written notice of non-compliance, the Contractor will immediately notify the Owner and will file a written report to the Owner within 7 days of the discharge or notice. The Owner is responsible for filing a written report to the Regional Water Quality Control Board (RWQCB) within 30 days or identification of non-compliance. Corrective measures will be implemented immediately following the discharge, notice or order. A sample Notice of Non-Compliance (NONC) form is provided in Attachment K. All discharges will be documented on a Discharge Reporting Log using the example form in Attachment T.

The report to the Owner and to the RWQCB will contain the following items:

- The date, time, location, nature of operation, and type of unauthorized discharge, including the cause or nature of the notice or order,
- The control measures (BMPs) deployed before the discharge event, or prior to receiving notice or order,
- The date of deployment and type of control measures (BMPs) deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent re-occurrence, and
- An implementation and maintenance schedule for any affected BMPs

6.3 RECORD KEEPING AND REPORTS

Records shall be retained for a minimum of three (3) years for the following items:

- Site inspections (Attachment H)
- Compliance certifications

- Summary of all analytical results (including method detection limits and analytical techniques or methods used)
- QA/QC records and results
- Records of any corrective actions and follow-up activities that resulted from analytical results, visual observations, or inspections.
- Approved SWPPP document and amendments

6.4 SAMPLING AND ANALYSIS FOR SEDIMENT

This project does not have the potential to discharge directly to a water body listed as impaired due to Sedimentation/Siltation and/or Turbidity pursuant to Clean Water Act, Section 303(d). The project discharges to infiltration areas and does not discharge directly to the San Luis Rey River, and therefore, is not required to implement a sampling and analysis plan for sediment.

6.5 SAMPLING AND ANALYSIS PLAN FOR NON-VISIBLE POLLUTANTS

This Sampling and Analysis Plan (SAP) for Non-Visible Pollutants describes the sampling and analysis strategy and schedule for monitoring non-visible pollutants in stormwater discharges from the project site and off-site activities directly related to the project, in accordance with the requirements of Attachment C, Section I.7 of the General Permit.

6.5.1 Scope of Monitoring Activities

The following construction materials, wastes or activities, as identified in Section 5.3.1, are potential sources of non-visible pollutants to stormwater discharges from the project. Storage, use, and operational locations are shown on the WPCDs in Attachment B.

- Vehicle fluids, including oil, grease, petroleum, and coolants
- Asphaltic emulsions associated with asphalt-concrete paving operations
- Cement materials associated with PCC concrete paving operations, drainage structures, median barriers, and bridge construction
- Base and subbase material
- Joint and curing compounds
- Concrete curing compounds
- Paints
- Solvents, thinners, acids
- Sandblasting materials
- Mortar mix

- Raw landscaping materials and wastes (topsoil, plant materials, herbicides, fertilizers, mulch, pesticides)
- BMP materials (sandbags, liquid copolymer)
- Treated lumber (materials and waste)
- PCC rubble
- Masonry block rubble
- General litter

There are no known existing site features that are contaminated with non-visible pollutants.

The project does not have the potential to receive stormwater run-on with the potential to contribute existing condition non-visible pollutants to stormwater discharges from the project.

The site has ongoing sampling of groundwater and surface water. The data is submitted to the RWQCB annually.

Sampling for non-visible pollutants will be conducted when (1) a breach, leakage, malfunction, or spill is observed; and (2) the leak or spill has not been cleaned up prior to the rain event; and (3) there is the potential for discharge of non-visible pollutants to surface waters or drainage system.

6.5.2 Monitoring Strategy

Sampling Schedule

Samples for the applicable non-visible pollutant(s) and a sufficiently large uncontaminated background sample shall be collected during the first two hours of discharge from rain events that result in a sufficient discharge for sample collection. Samples shall be collected during daylight hours (sunrise to sunset) and shall be collected regardless of the time of year, status of the construction site, or day of the week.

In conformance with the U.S. Environmental Protection Agency definition, a minimum of 72 hours of dry weather will be used to distinguish between separate rain events.

Collection of discharge samples for non-visible pollutant monitoring will be triggered when any of the following conditions are observed during the required inspections conducted before or during rain events:

- Materials or wastes containing potential non-visible pollutants are not stored under watertight conditions. Watertight conditions are defined as (1) storage in a watertight container, (2) storage under a watertight roof or within a building, or (3) protected by temporary cover and containment that prevents stormwater contact and runoff from the storage area.
- Materials or wastes containing potential non-visible pollutants are stored under watertight conditions, but (1) a breach, malfunction, leakage, or spill is observed, (2) the leak or spill is not cleaned up prior to the rain event, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.

- An operational activity, including but not limited to those in Section 6.5.1, with the potential to contribute non-visible pollutants (1) was occurring during or within 24 hours prior to the rain event, (2) applicable BMPs were observed to be breached, malfunctioning, or improperly implemented, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.
- Soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied, and there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.
- Stormwater runoff from an area contaminated by historical usage of the site has been observed to combine with stormwater runoff from the site, and there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.

Sampling Locations

Sampling locations are based on proximity to planned non-visible pollutant storage, occurrence or use; accessibility for sampling, personnel safety; and other factors in accordance with the applicable requirements in the Permit. Planned sampling locations are shown on the WPCDs in Attachment B and include the following:

- Within the San Luis Rey River at the upstream property boundary
- At each of the outfalls shown on the post-construction BMP map in Attachment B (Outfalls 1 through 5).
- At the upstream end of the perimeter drainage channel (before flows from the active landfill area enter the PSD)

6.5.3 Monitoring Preparation

If samples on the project site will be collected by Contractor sampling personnel the following contact information will be provided for the sampling personnel:

Name/Telephone Number:
Name/Telephone Number:
Alternate(s)/Telephone Number:
Alternate(s)/Telephone Number:

Prior to the rainy season, all sampling personnel and alternates will review the SAP. Qualifications of designated Contractor personnel describing environmental sampling training and experience will be provided in Attachment I.

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool-temperature environment that will not come into contact with rain or direct sunlight. Sampling personnel will be available to collect samples in accordance with the sampling schedule.

Supplies maintained at the project site will include, but are not limited to, surgical gloves, sample collection equipment, coolers, appropriate number and volume of sample bottles, identification labels, re-sealable storage bags, paper towels, personal rain gear, ice, Sampling Activity Log forms, and Chain of Custody (COC) forms. The Contractor will obtain and maintain the field-testing instruments, as identified in Section 6.5.6, for analyzing samples in the field by Contractor sampling personnel.

Safety practices for sample collection will be in accordance with the Health and Safety Plan that will be prepared for the project prior to construction.

If samples on the project site will be collected by an environmental consultant the following contact information will be provided:

Company Name:

Address:

Telephone Number:

Point of Contact:

Qualifications of designated Contractor personnel describing environmental sampling training and experience will be provided in Attachment I.

SWPPM will contact the environmental consultant at least 24 hours prior to a predicted rain event and if one of the triggering conditions is identified during an inspection before, during, or after a storm event to ensure that adequate sample collection personnel, supplies and field test equipment for monitoring non-visible pollutants are available and will be mobilized to collect samples on the project site in accordance with the sampling schedule.

The environmental consultant will obtain and maintain the field-testing instruments, as identified in Section 6.5.6, for analyzing samples in the field by their sampling personnel.

6.5.4 Analytical Constituents

Identification of Non-Visible Pollutants

Table 6-1 lists the specific sources and types of potential non-visible pollutants on the project site and the applicable water quality indicator constituent(s) for that pollutant.

Table 6-1. Potential Non-Visible Pollutants and Water Quality Indicator Constituents

Pollutant Source	Pollutant	Water Quality Indicator Constituent
Example: Vehicle batteries	Lead, Sulfate or pH	Lead, sulfate or pH
Portable toilets	Bacteria	Total fecal coliform
Concrete & Masonry, including acid wash, curing compounds and/or concrete rinse water	pH	Alkalinity, pH or VOC
Painting, including resins, thinners, paint strippers, solvents, adhesives and/or sealants	Phenols or VOCs	SVOCs or VOCs
Cleaning detergents, bleaches, and/or solvents	Phosphates, residual chlorine or VOCs	VOCs
Landscaping activities including pesticides, herbicides, fertilizers, lime and gypsum, aluminum sulfate and/or sulfur	Acidity/alkalinity, nitrates or phosphates	TDS or pH
Treated wood	Copper, arsenic or selenium	Metals
Soil amendments& dust control	Lime, gypsum, magnesium chloride, calcium chloride or natural brines	pH, BOD, or TDS
*Hazardous waste	Heavy metals	Metals

Source: Construction Stormwater Sampling and Analysis Guidance Document, October 2001, California Stormwater Quality Task Force

*Note: Even though the landfill will take all measures possible to avoid accepting hazardous waste, it is still possible that some hazardous waste could be included with typical household trash.

6.5.5 Sample Collection and Handling

Sample Collection Procedures

Samples of discharge will be collected at the designated sampling locations shown on the WPCDs for observed breaches, malfunctions, leakages, spills, operational areas, soil amendment application areas, and historical site usage areas that triggered the sampling event.

Grab samples will be collected and preserved in accordance with the methods identified in the Table 6-2, “Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants,” provided in Section 6.5.6. Only personnel trained in proper water quality sampling will collect samples.

Samples will be collected by placing a separate lab-provided sample container directly into a stream of water downgradient and within close proximity to the potential non-visible pollutant discharge location. This separate lab-provided sample container will be used to collect water, which will be transferred to sample bottles for laboratory analysis. The upgradient and uncontaminated background samples shall be collected first prior to collecting the downgradient to minimize cross-contamination. The sampling personnel will collect the water upgradient of where they are standing. Once the separate lab-provided sample container is filled, the water sample will be poured directly into sample bottles provided by the laboratory for the constituent(s) being monitored.

To maintain sample integrity and prevent cross-contamination, sampling collection personnel will:

- Wear a clean pair of surgical gloves prior to the collection and handling of each sample at each location.
- Not contaminate the inside of the sample bottle, by not allowing it to come into contact with any material other than the water sample.
- Discard sample bottles or sample lids that have been dropped onto the ground prior to sample collection.
- Not leave the cooler lid open for an extended period of time once samples are placed inside.
- Not sample near a running vehicle where exhaust fumes may impact the sample.
- Not touch the exposed end of a sampling tube, if applicable.
- Avoid allowing rainwater to drip from rain gear or other surfaces into sample bottles.
- Not eat, smoke, or drink during sample collection.
- Not sneeze or cough in the direction of an open sample bottle.
- Minimize the exposure of the samples to direct sunlight, as sunlight may cause biochemical transformation of the sample to take place.
- Decontaminate sampling equipment prior to sample collection using a TSP-soapy water wash, distilled water rinse, and final rinse with distilled water.
- Dispose of decontamination water/soaps appropriately; i.e., not discharge to the storm drain system or receiving water.

Sample Handling Procedures

Immediately following collection, sample bottles for laboratory analytical testing will be capped, labeled, documented on a Chain of Custody form provided by the analytical laboratory, sealed in a re-sealable storage bag, placed in an ice-chilled cooler, at as near to 4 degrees Celsius as practicable, and delivered within 24 hours to the following California state-certified laboratory:

Laboratory Name:

Address:

Telephone Number:

Point of Contact:

If samples will be analyzed in the field, immediately following collection, samples for field analysis will be tested in accordance with the field instrument manufacturer's instructions and results recorded on the Sampling Activity Log.

Sample Documentation Procedures

All original data documented on sample bottle identification labels, Chain of Custody forms, Sampling Activity Logs, and Inspection Checklists will be recorded using waterproof ink. These will be considered accountable documents. If an error is made on an accountable document, the individual will make corrections by lining through the error and entering the correct information. The erroneous information will not be obliterated. All corrections will be initialed and dated. Copies of the Sampling Activity Log and Chain of Custody form are provided in Attachment R.

Sampling and field analysis activities will be documented using the following:

- Sample Bottle Identification Labels: Sampling personnel will attach an identification label to each sample bottle. At a minimum, the following information will be recorded on the label, as appropriate:
  - Project name
  - Project number
  - Unique sample identification number and location.
  - [Project Number]-[Six digit sample collection date]-[Location]
  - (*Example:* 0G5304-081801-Inlet472).
  - Quality assurance/quality control (QA/QC) samples shall be identified similarly using a unique sample number or designation
  - (*Example:* 0G5304-081801-DUP1).
  - Collection date/time (No time applied to QA/QC samples
  - Analysis constituent

- Sampling Activity Logs: A log of sampling events will identify:
  - Sampling date
  - Separate times for collected samples and QA/QC samples recorded to the nearest minute
  - Unique sample identification number and location
  - Analysis constituent
  - Names of sampling personnel
  - Weather conditions (including precipitation amount)
  - Field analysis results
  - Other pertinent data

- Chain of Custody (COC) forms: All samples to be analyzed by a laboratory will be accompanied by a COC form provided by the laboratory. Only the sample collectors will sign the COC form over to the lab. COC procedures will be strictly adhered to for QA/QC purposes.

- Stormwater Quality Construction Inspection Checklists: When applicable, the Contractor's stormwater inspector will document on the checklist that samples for non-visible pollutants were taken during a rain event.

6.5.6 Sample Analysis

Samples will be analyzed for the applicable constituents using the analytical methods identified in Table 6-2, "Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants" in this section.

For samples collected for field analysis, collection, analysis and equipment calibration will be in accordance with the field instrument manufacturer's specifications.

The following table will be completed to indicate the field instrument(s) to be used to analyze the corresponding constituents:

Field Instrument	Constituent

- The instrument(s) will be maintained in accordance with manufacturer's instructions.
- The instrument(s) will be calibrated before each sampling and analysis event.
- Maintenance and calibration records will be maintained with the SWPPP.

6.5.7 Quality Assurance and Quality Control

For an initial verification of laboratory or field analysis, duplicate samples will be collected at a rate of 10 percent or 1 duplicate per sampling event. The duplicate sample will be collected, handled, and analyzed using the same protocols as primary samples. A duplicate sample will be collected at each location immediately after the primary sample has been collected. Duplicates will be collected where contamination is likely, not on the background sample. Duplicate samples will not influence any evaluations or conclusions; however, they will be used as a check on laboratory quality assurance.

6.5.8 Data Management and Reporting

A copy of all water quality analytical results and QA/QC data will be included in the on-site SWPPP within 5 days of sampling (for field analyses) and within 30 days (for laboratory analyses).

Lab reports and COCs will be reviewed for consistency between lab methods, sample identifications, dates, and times for both primary samples and QA/QC samples. All data, including COC forms and Sampling Activity Logs, shall be kept with the SWPPP.

Table 6-2. Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants

Constituent	Analytical Method	Minimum Sample Volume	Sample Bottle	Sample Preservation	Reporting Limit	Maximum Holding Time
VOCs-Solvents	EPA 8260B	3 x 40 mL	VOA-glass	Store at 4˚ C, HCl to pH<2	1 µg/L	14 days
SVOCs	EPA 8270C	1 x 1 L	Glass-Amber	Store at 4˚ C	10 µg/L	7 days
Pesticides/PCBs	EPA 8081A/8082	1 x 1 L	Glass-Amber	Store at 4˚ C	0.1 µg/L	7 days
Herbicides	EPA 8151A	1 x 1 L	Glass-Amber	Store at 4˚ C	Check Lab	7 days
BOD	EPA 405.1	1 x 500 mL	Polypropylene	Store at 4˚ C	1 mg/L	48 hours
COD	EPA 410.4	1 x 250 mL	Glass-Amber	Store at 4˚ C, H_2SO_4 to pH<2	5 mg/L	28 days
DO	SM 4500-O G	1 x 250 mL	Glass-Amber	Store at 4˚ C	Check Lab	8 hours
pH	EPA 150.1	1 x 100 mL	Polypropylene	None	Unitless	Immediate
Alkalinity	SM 2320B	1 x 250 mL	Polypropylene	Store at 4˚ C	1 mg/L	14 days
Metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Na, Th, Va, Zn)	EPA 6010B/7470A	1 x 250 mL	Polypropylene	Store at 4˚ C, HNO_3 to pH<2	0.1 mg/L	6 months
Metals (Chromium VI)	EPA 7199	1 x 500 mL	Polypropylene	Store at 4˚ C	1 µg/L	24 hours

Notes:
°C – Degrees Celsius
BOD – Biological Oxygen Demand
COD – Chemical Oxygen Demand
DO – Dissolved Oxygen
EPA – Environmental Protection Agency
HCl – Hydrogen Chloride
H_2SO_4 – Hydrogen Sulfide
HNO_3 – Nitric Acid
L – Liter
mg/L – Milligrams per Liter
µg/L – Micrograms per Liter
mL – Milliliter
PCB – Polychlorinated Biphenyl
SVOC – Semi-Volatile Organic Compound
SM – Standard Method
TPH – Total Petroleum Hydrocarbons
TRPH – Total Recoverable Petroleum Hydrocarbons
VOA – Volatile Organic Analysis
VOC – Volatile Organic Compound

6.5.9 Data Evaluation

An evaluation of the water quality sample analytical results, including figures with sample locations, the water quality analytical results, and the QA/QC data, will be included in the on-site SWPPP.

Should the runoff/downgradient sample show an increased level of the tested constituent relative to the background sample, the BMPs, site conditions, and surrounding influences will be assessed to determine the probable cause for the increase. As determined by the site and data evaluation, appropriate BMPs will be repaired or modified to mitigate discharges of non-visual pollutant concentrations. Any revisions to the BMPs will be recorded as an amendment to the SWPPP.

6.5.10 Change of Conditions

Whenever SWPPP monitoring, pursuant to Section B of the General Permit, indicates a change in site conditions that might affect the appropriateness of sampling locations or introduce additional non-visible pollutants of concern, testing protocols will be revised accordingly. All such revisions will be recorded as amendments to the SWPPP.

6.6 NON-STORM WATER DISCHARGE MONITORING

The following visual monitoring procedures will be performed to fulfill the non-storm water discharge monitoring portion of the construction monitoring program:

- Visually observe (inspect) each drainage area for the presence of (or indications of prior) unauthorized and authorized non-storm water discharges and their sources.

- Conduct one (1) visual observation (inspection) quarterly in each of the following periods: January-March, April-June, July-September, and October-December. Visual observation (inspections) are only required during daylight hours (sunrise to sunset).

- Ensure that visual observations (inspections) document the presence or evidence of any non-storm water discharge (authorized or unauthorized), pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.) and source. On-site records shall be maintained indicating the personnel performing the visual observation (inspections), the dates and approximate time each drainage area and non-storm water discharge was observed, and the response taken to eliminate unauthorized non-storm water discharges and to reduce or prevent pollutants from contacting non-storm water discharges.

SECTION 7 OPERATIONS PHASE MONITORING PROGRAM AND REPORTING REQUIREMENTS PLAN (MPRR)

7.1 BACKGROUND

This operations phase Monitoring Program and Reporting Requirements Plan (MPRR) will be implemented for GCLF by Gregory Canyon Landfill, LLC as a component in compliance with State Water Resources Control Board (State Water Board) Water Quality Order No. 97-03-DWQ National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001 (General Permit) Waste Discharge Requirements (WDRs) for Discharges of Stormwater Associated with Industrial Activities Excluding Construction Activities. The MPRR will be implemented after the initial construction phase of the project (Access Road, Bridge, and Site Facilities Area construction).

7.1.1 Objectives

The objectives of the MPRR are:

- To monitor the quality of stormwater discharge relative to effluent limitations (if any), discharge prohibitions, and receiving water limitations;
- To evaluate and make recommendations for revising the SWPPP for this facility; and,
- To evaluate through stormwater monitoring, the BMPs used at this facility to control pollutant discharges in stormwater run-off;
- To comply with all other requirements of the Industrial General Permit.

7.1.2 MPRR Review and Revisions

As the MPRR is implemented, a report documenting the results of monitoring will be prepared annually. These results will serve as the basis for revising the SWPPP and in-turn this MPRR to meet the objectives above. Any future changes required by the regulatory agency or changes in regulations will be made within 60 days of the request unless the extension is request by GCLF and approved by the RWQCB. A MPRR Revision Form will be completed. A copy of this form is provided in Attachment U.

7.1.3 MPRR Location and Public Access

The MPRR will be maintained on-site at GCLF's administration office. A coy of the MPRR will also be maintained at the landfill operator's office at the site. The RWQCB may also request a copy of the MPRR.

7.1.4 Monitoring Requirements

Quantitative monitoring will be conducted for individual monitoring. GCLF will conduct its own quantitative sampling and testing. In addition to quantitative monitoring, the operator will conduct a visual monitoring program of the site.

GCLF will estimate the volume of stormwater discharge from the facility during the selected significant storm event. A significant storm event is defined as a storm that causes a discharge of stormwater and is preceded by a minimum of three (3) working days of dry weather.

Quantitative monitoring and visual observations will be performed only if a significant storm event occurs during the scheduled operating hours of the facility. If visual observations are not performed because the significant storm event occurs outside this time period, it will be documented in the annual monitoring report.

7.2 FACILITY DESCRIPTION AND SAMPLING LOCATIONS

Section 3 of this SWPPP provides a description of the facility, and Attachment A provides a site map. Attachment B provides an exhibit showing proposed monitoring locations.

7.3 QUANTITATIVE MONITORING REQUIREMENTS

The Industrial General Permit requires site operators to monitor two significant storm events each year during the west season (October 1 to May 31). This section sets forth the requirements for quantitative sampling and testing at GCLF.

7.3.1 Individual Monitoring Program

In the event that individual monitoring is required in the future, and individual MPRR will be prepared. However, it is not proposed at this time.

7.3.2 Analytical Requirements

GCLF is not subject to stormwater effluent limitations as mandated in 40 Code of Federal Regulations (CFR), Subchapter N. In addition, GCLF will be a new facility, and therefore has not had any known or recorded releases of hazardous chemicals. Subsequently, initial stormwater analyses will be limited to the water quality parameters listed in the Industrial General Permit and additional toxic chemicals and other pollutants likely to be present in significant quantities in the stormwater discharge as follows:

Water Quality Parameters

- Oil and Grease or Total Organic;
- pH;
- Total Suspended Solids (TSS);
- Specific Conductance (SC); and
- Iron

Additional Parameters

- Heavy Metals;

- Petroleum Hydrocarbons;
- Pesticides; and
- Herbicides

The additional parameters are to be monitored to check for certain pollutants expected to be present in an active landfill. If significant quantities of a pollutant within the "additional parameters" are not detected in samples from two consecutive storm events, subsequent analyses of that pollutant will be eliminated until the pollutant is likely to be present again.

An insignificant quantity of a pollutant is defined as one which will not cause or threaten to cause pollution, contamination, nuisance; will not adversely impact human health or the environment; and will not cause or contribute to a violation of and applicable water quality standard for a receiving water body.

7.3.3 Rationale for Quantitative Sampling

The analytical requirements discussed in Section 7.3.2 are outlined in the Industrial General Permit and will be used as screening tools to identify pollutants that could potentially impact waters of the U.S. and State. These analyses check for chemicals which may occur in residential, commercial, and construction waste deposited at the facility.

Table 7.3-1 lists the required sample preservation and sample analysis procedures. All samples taken will be grab samples. Table 7.3-2 includes the grab sample bottle requirements. Composite samples are not required by the General Permit and therefore will not be taken.

Analyses will be conducted according to test procedures specified in 40CFR, Part 136. Sampling will be conducted in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater." Analyses will be conducted at a laboratory certified by the State Department of Health Services.

7.4 VISUAL MONITORING REQUIREMENTS

A visual monitoring program will be implemented for this facility to observe stormwater run-off from the site. This program will be conducted even if this facility is not required to conduct quantitative sampling and testing. Visual observations will be conducted during both wet and dry seasons.

7.4.1 Dry Season Observations

During the dry season (June 1 to September 30), visual observations will be conducted at least twice for the presence of non-stormwater discharges at all stormwater discharge locations at the facility. The observations will be used to determine the presence of stains, sludges, odors, and other abnormal conditions. The date, location, and description of each visual observation will be documented and submitted to the RWQCB with the annual monitoring report.

7.4.2 Wet Season Observations

During the wet season, visual observations will be conducted monthly whether or not there is a significant storm event. The presence of floating and suspended materials, oil and grease, discoloration, turbidity, and odor will be documented. If visual observations are not able to be made because of adverse climatic conditions, the reason for not conducting the visual observations will be stated in the annual monitoring report to the SWRCB.

Visual observations will only be performed if a significant storm event occurs during the scheduled operation hours and ends two hours prior to the scheduled closure of the facility. If visual observations are not performed because the significant storm event occurs outside this time period, this will be documented in the annual monitoring report. Visual observations will also be performed for stored or contained stormwater at the time of discharge.

7.5 ESTIMATING VOLUME OF STORMWATER RUNOFF

Stormwater runoff flowrates and volumes will be estimated by using the total rainfall amount for the storm event and estimated runoff coefficients for the facility. Runoff coefficients represent the percentage of total rainfall that will be considered runoff from the facility. As such, the coefficients reflect the ground surface or cover material. To estimate runoff volume and rates, it will be assumed that paved areas and other impervious structures such as roofs have a runoff coefficient of 0.90. Therefore, 90 percent of rainfall is conveyed from these areas as runoff. For pervious surfaces, it can be assumed that the runoff coefficient of 0.5 will be used. The total volume of discharge for the event is then estimated by:

Total runoff volume (cubic-feet) = total rainfall (ft) x [facility pervious area x 0.5]

The total volume of runoff will be estimated for each outfall where sampling occurs. An estimated average flow rate will then be calculated during the period of measurable runoff.

Average flow rate = total runoff volume / duration of storm event.

7.6 PRE-SAMPLING ACTIVITIES

The following tasks will be conducted during the wet season to ensure that personnel, equipment, services, and procedures are in place to collect quantitative stormwater samples at GCLF during a significant storm event.

- The National Weather Service will be contacted or the weather broadcasts will be monitored to determine when a significant storm event is forecast to occur.
- Install a rain gauge on-site for rainfall measurements.
- Designate trained personnel to implement the MPRR during a significant storm event.
- The analytical laboratory will be consulted regarding quality assurance requirements (other than those discussed in this section) and the containers, preservatives, and sample volumes necessary for the analyses.

- Obtain a sufficient number of containers with preservatives from the laboratory to collect grab samples for each sampling location. Section 7.9.2 discusses the implementation of Quality Assurance/Quality Control (QA/QC) procedures for additional sample collection. Tables 7-1 and 7-2 show the Sample Preservation and Analysis Procedures and Grab Sample Bottle Requirements, respectively.
- On the day prior to the arrival of a significant storm event, transportation of the samples to the laboratory and notification of the laboratory when the samples will arrive will be arranged.
- Clarify personnel roles and responsibilities, assemble the necessary equipment (Section 7.7.1) and ensure that sampling logistics are understood by all sampling personnel.

7.7 SAMPLING PROCEDURES AND EQUIPMENT

7.7.1 Equipment and Supplies

The minimum equipment and supplies required for stormwater sampling are listed below:

- A set of grab sample storage bottles and preservatives, as listed in Table 7-2.
- QA/QC duplicate sets of sample bottles if needed (See Section 7.9.2)
- Coolers, ice packs, tape, and vermiculite for transporting filled sample storage bottles to the certified analytical laboratory. At least one 48-quart cooler will be required for the grab samples. An additional cooler may be needed for shipment of QA/QC duplicate grab samples.
- Portable pH meter.
- Thermometer in degrees Centigrade.
- Sample collection device (e.g., breaker with handle0 if it is not possible to collect samples directly into storage bottles.
- Squirt bottle of deionized rinse water to rinse pH probe and other equipment.
- Surgical rubber gloves.
- Field notebooks with waterproof pages, and pen with waterproof ink.
- Stopwatch or watch for Volatile Organic Compounds 9VOC0 sample timing.
- Grease pencil or other marking device.
- Flashlight for sampling at dawn or dusk.
- Chain-of-custody forms to log and document sample transport from the site to the certified analytical laboratory.

Sampling equipment used to collect or transfer samples (e.g., beaker with arm, or graduated cylinder) will be decontaminated before and after each use, and rinsed with run-off prior to sample collection. A sample Chain-of Custody/Sampling Analysis Request Form is included in Attachment V.

Table 7-1. Sample Collection, Preservation and Analysis Procedures for Industrial MPPR

Constituent	Analytical Method	Minimum Sample Volume	Sample Bottle	Sample Preservation	Number of Grab Bottles	Maximum Holding Time
Oil and Grease(3)	EPA 413.1	1 x 1 L	Glass	Store at 4˚ C, HCl to pH<2	1	28 days
Total Organic Carbon, TOC (3)	EPA 415.1	100 mL	Glass-Amber (with Teflon Lined Cap)	Store at 4˚ C, HCl to pH<2		28 days
Total Suspended Solids, TSS	EPA 160.2	300 mL	Plastic or Glass	Store at 4˚ C	1	7 days
Specific Conductance	EPA 120.1	500 ML	Plastic or Glass	Store at 4˚ C	0	28 days
pH	EPA 150.1	100 mL	Polypropylene	None	1	Immediate
Metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Na, Th, Va, Zn)	EPA 6010B/7470A	1 x 1L	Polypropylene or Glass	Store at 4˚ C, HNO_3 to pH<2	1	6 months
Metals (Chromium VI)	EPA 7199	1 x 1 L	Polypropylene or Glass	Store at 4˚ C		24 hours
Petroleum Hydrocarbons	EPA 418.1	1 x 1 L	Glass	Store at 4˚ C	1	28 days
Pesticides/PCBs	EPA 8081A/8082	1 x 1 L	Glass-Amber with Teflon lined Cap	Store at 4˚ C	1	7 days
Herbicides	EPA 8151A	1 x 1 L	Glass-Amber	Store at 4˚ C	1	7 days

7.7.2 Field Measurements

PH and temperature will be recorded at the time the samples are collected. To ensure accurate readings, the pH meter will be calibrated using buffer solutions of known pH. Following calibration a sufficient volume of stormwater runoff will be collected in a clean, empty container (not one of the sample storage bottles) and the temperature of the discharge will be obtained with a thermometer. The pH meter will be adjusted to this temperature before the pH of the sample is obtained. The temperature and the pH reading will be recorded in a field notebook, and both the pH and temperature probes will be rinsed with deionized water before and after each use.

7.7.3 Grab Sampling Procedures

Grab samples shall be collected within the first 30 minutes of stormwater discharge. If this is impractical, the samples will be taken within the next 30 minutes, and the reason for not collecting a sample during the first 30-minute period will be provided in the annual monitoring report. After sampling, sample storage bottles will be labeled wit the information specified in Section 7.8.2. If grab samples cannot be taken within the first hour, the sampling event will be terminated and documented for the annual monitoring report.

7.8 COMPLETION OF SAMPLING

Additional steps required to complete sampling and sample shipment will be coordinated with the laboratory. These steps are outlined below.

7.8.1 Sample Control

Procedures for identifying, preserving, packaging, handling, shipping, and storing of samples obtained in the field are described in the following sections. The objectives of the procedures are to ensure that all samples can be readily identified and preserve their original condition at the time of sampling.

7.8.2 Identification

Samples will be identified at the time of collection by marking the tag or label attached to the sample container (e.g., jar, bottle, bag). Sample identification will include the following:

- Facility name and location;
- Unique sample number;
- Sampling location;
- Sample date;
- Individual performing the sampling;
- Preservation or conditioning employed;
- Time of sampling; and
- Sample temperature.

7.8.3 Preparation, Packing, and Shipping

Samples will be properly preserved in containers compatible with the intended analysis. Polyethylene or glass containers are usually required, and samples must be cooled to about 4 degrees Centigrade. Samples will be placed in ice chests containing adequate amounts of ice, and the chests will be sealed, addressed, and identified as appropriate.

If the samples have been consigned to a commercial carrier, field personnel will notify the laboratory of the shipment by telephone. If the samples are transported by field personnel, the laboratory will be notified of the estimate time or arrival. A sample Chain-of-Custody/Sampling Analysis Request Form (see Attachment V) will show the information that will be provided to the laboratory. The form will be completed at the site by field personnel and shipped with the samples to the laboratory. The Sampling Analysis portion of the form is used to define analytical requirements and to help ensure that sample holding times are not exceeded. The Chain-of-Custody portion of the form is discussed below.

7.8.4 Chain-of-Custody Procedures

An essential consideration in obtaining accurate chemical analyses is the ability to demonstrate that the samples were obtained from the locations stated and that they reached the laboratory without alteration. Therefore, evidence of collection, shipment, laboratory receipt, and laboratory custody until disposal must be documented. Chain-of-custody procedures will be used to document each sample and the individuals responsible for sample collection, shipment, and receipt.

The following procedures will be followed for all samples subject to chemical analysis:

- The sample container will be sealed in the field. The custody of samples that do not arrive at the laboratory with seals intact will be considered invalid.
- A chain-of-custody record will be initiated in the field for each container and will accompany the sample container to the laboratory.
- Each time custody of the sample changes, the new custodian will sign and date the Chain-of-Custody form (see Attachment 3). Sample transfer will be carried out by person-to-person exchange of custody documents and samples.
- Upon sample destruction or disposal, the custodian responsible for disposal will complete the chain-of-custody form (see Attachment 3), file a copy, and send a copy to the facility or to the designated representative for recordkeeping purposes.
- The custody of individual sample containers will be documented by indicating appropriate chain-of-custody information on each sample tag or label.

7.9 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

The goal of the QA/QC component of this monitoring program is to assure that all elements of the program are implemented and that all monitoring is conducted by trained personnel. Thus, this QA/QC will be divided into two parts: personnel and procedures.

7.9.1 Personnel

The Stormwater Pollution Prevention Leader (SPPL) or his/her designee will be in charge of managing the MPRR. The SPPL will be adequately trained to obtain a thorough understanding of the objectives, requirements, and procedures of this MPRR.

At least one person will conduct the following tasks:

- Conduct visual observations;
- Prepare for a sampling event;
- Procure the necessary supplies;
- Coordinate sampling activities with laboratory personnel for sample analyses;
- Collect samples and conduct field measurements;
- Package and ship samples to laboratory;
- Organize and document all records; and,
- Prepare the annual report.

GCLF will be responsible for training and documenting this training. This documentation will be retained by GCLF and will include:

- Name of the trained person;
- Assigned responsibilities to this person;
- Qualifications of this person to complete the assignments;
- Time and place of training; and,
- Duration and subjects of training.

7.9.2 Procedures

In order to provide for the successful implementation of this monitoring program, certain measures and procedures are built into this program and must be followed. GCLF will be responsible for the implementation of the following QA/QC procedures:

- Any instruments, such as a pH meter, will be calibrated prior to each sampling event according to the procedures recommended by the manufacturer. The time and place of calibration, the person conducting the calibration, and the calibration results will be recorded in a field notebook.
- A duplicate set of samples will be taken for pollutant analyses to evaluate the reliability of laboratory tests. These samples will be collected, analyzed, and documented the same way as the other samples. This will be done for one significant storm event every other year.

- Within two weeks after the results of laboratory analyses are received, the SPPL will review the documentation of all pertinent records, and ensure that they conform to the record keeping provisions in this MPRR.
- On October 1 of each subsequent year, the SPPL will arrange for sampling any storm event that is reasonably expected to produce a significant discharge to ensure that two storm events of the wet season are sampled and analyzed.
- Within 24 hours after each sampling event, the SPPL will determine if the storm event that has been sampled was indeed a significant storm event. Sampling of a non-significant storm event will not constitute compliance with the General Permit.

7.10 EFFECTIVENESS OF MONITORING PROGRAM

The results of the MPRR will be evaluated continually to see if the BMPs being implemented at the facility are achieving significant reductions in polluted stormwater discharge. If reductions are not materializing, then it may be necessary to implement additional BMPs and modify the SWPPP with a time schedule for implementation.

7.11 RETENTION OF RECORDS AND ANNUAL REPORT

7.11.1 Retention of Records

Records of all stormwater monitoring information and copies of all reports required by the General Permit will be retained for a period of at least five years from the date of the sample, visual observation, measurement, or report. These records shall include:

- The date, exact place, and time of quantitative sampling, visual observation, and/or flow measurements.
- The name of individual(s) who performed the above tasks.
- Flow measurement or estimates and standard visual observations.
- The date(s) analyses were performed and the time analyses were initiated.
- The analytical techniques or methods used and the results of such analyses
- QA/QC control results.
- Records of non-stormwater discharge, if any.
- All calibration and maintenance records of instruments used.
- All original strip chart recordings for continuous monitoring instruments, if used.

7.11.2 Annual Report

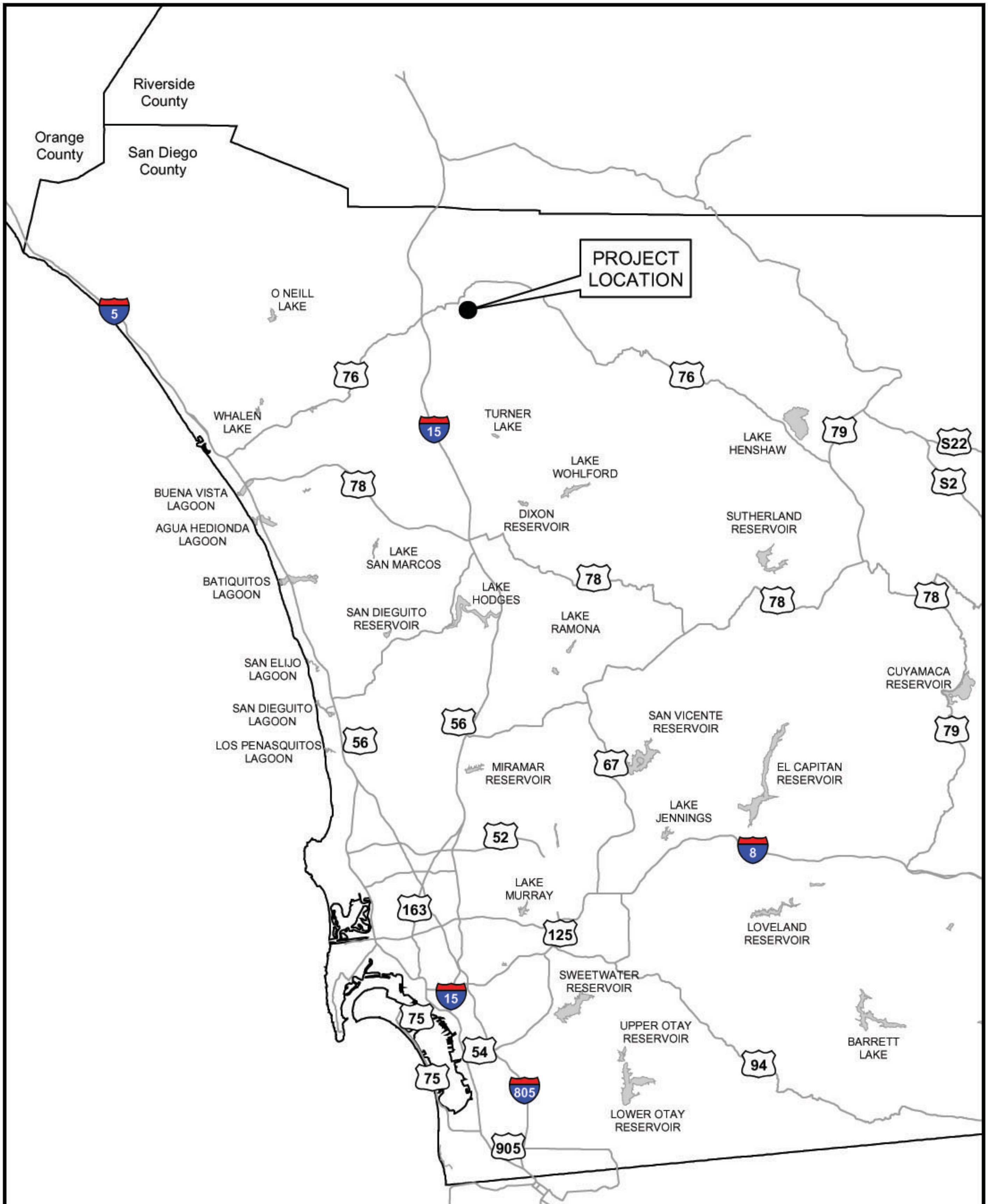
All stormwater monitoring results will be reported by July 1 of each year to the Executive Officer of the RWQCB and to the appropriate municipal stormwater management agency if requested. The report will include copies or summaries of all the retained documents except for original strip charts, calibration and maintenance records of instruments used. The report will be signed and certified in accordance with Standard Provisions 9 and 10 of Section C of the General Permit. The certification will state that the SWPPP and MPRR for the facility have been implemented and are in compliance with the requirements of the General Permit.

7.12 ANNUAL SITE INSPECTION

An annual site inspection will be conducted at GCLF as required under the SWPPP. The purpose of the site inspection is to identify those areas contributing to the discharge of stormwater and to evaluate whether the BMPs implemented under the SWPPP are effective. The record of the inspection will include the date of inspection, the individual(s) performing the inspection, and the record of observations.

Upon completion of the annual inspection, the certification and inspection records must be signed and certified in accordance with Standard Provisions 9 and 10 of Section C of the General Permit. Any non-compliance will be reported in accordance with the General Permit.

Attachment A
Vicinity Map



N

SOURCES: SANDAG
(Roads, Lakes, Rivers),
CDFG (Counties Boundaries).

PROJECT LOCATION
GREGORY CANYON LTD. LLC

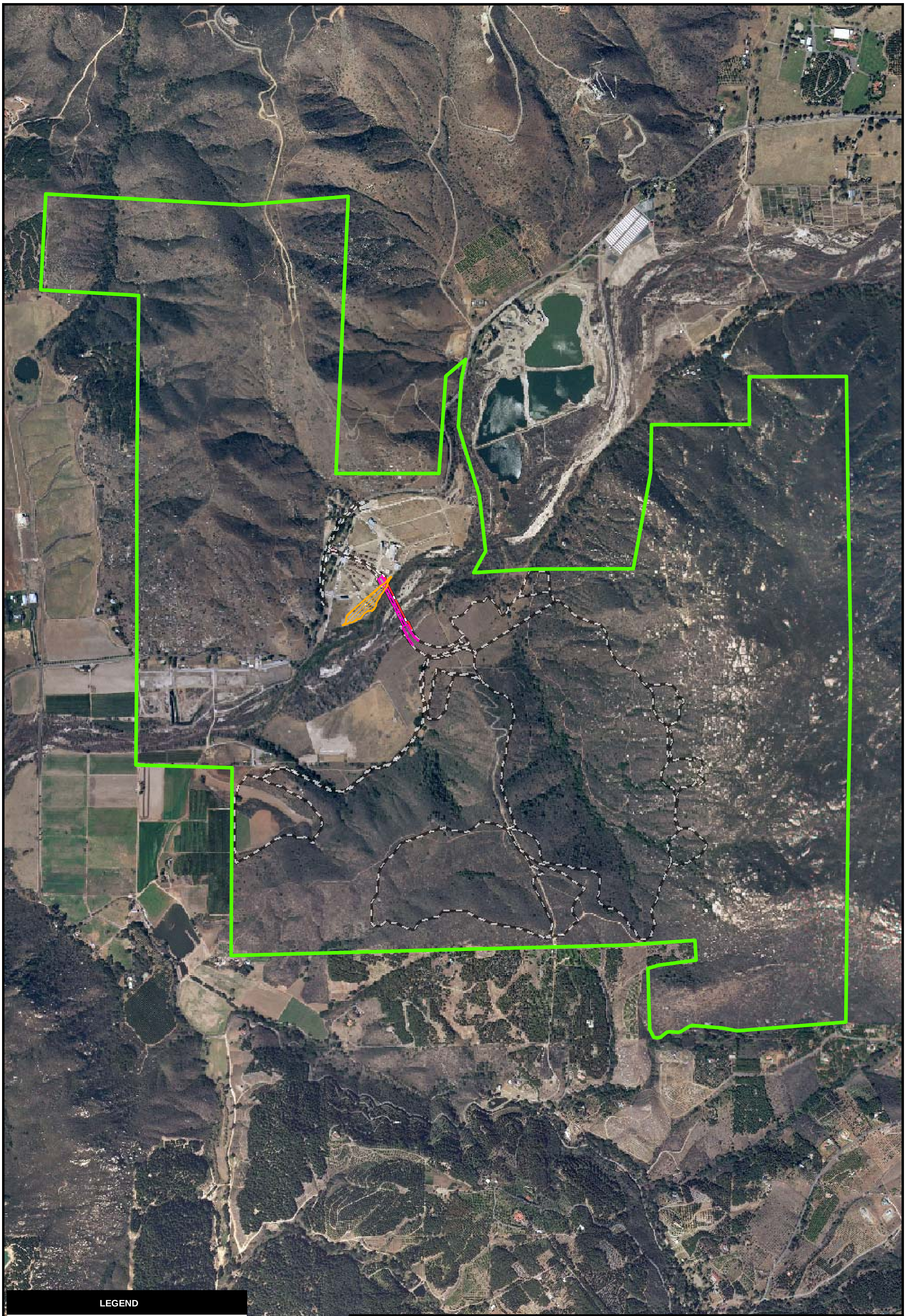
URS

4.25 0 4.25 8.5 Miles

SCALE: 1" = 8.5 miles (1:538,560)

CHECKED BY: MS	DATE: 9-20-05	FIG. NO:
PM: BM	PROJ. NO: 27654025.00020	1

G:\gis\projects\1577\27654025\mxd\Fig1_Project_Location.mxd



LEGEND

- Gregory Canyon, Ltd. LLC Project Boundary
- Landfill Footprint Boundary
- Bridge Footprint Boundary
- Bridge Access/Work Area Boundary
- Bridge Grading Area and Riparian Habitat Restoration

SOURCES: LENSKA (2002 Aerial Photograph), HELIX (Project Boundary, 1999), Herzog (Bridge Design, 2004), Nolte & Assoc. (bridge grading 2005).

N

URS

625 0 625 1250 Feet

SCALE: 1" = 1,250' (1:15,000)

PROJECT OVERVIEW
GREGORY CANYON, LTD. LLC SITE

CHECKED BY TM	DATE: 12-12-07	FIG. NO:
PM: WM	PROJ. NO: 27654025.00020	2

G:\gis\projects\1577\27654025\mxd\Fig2_bridge_vegetation_for_hydrology_report.mxd

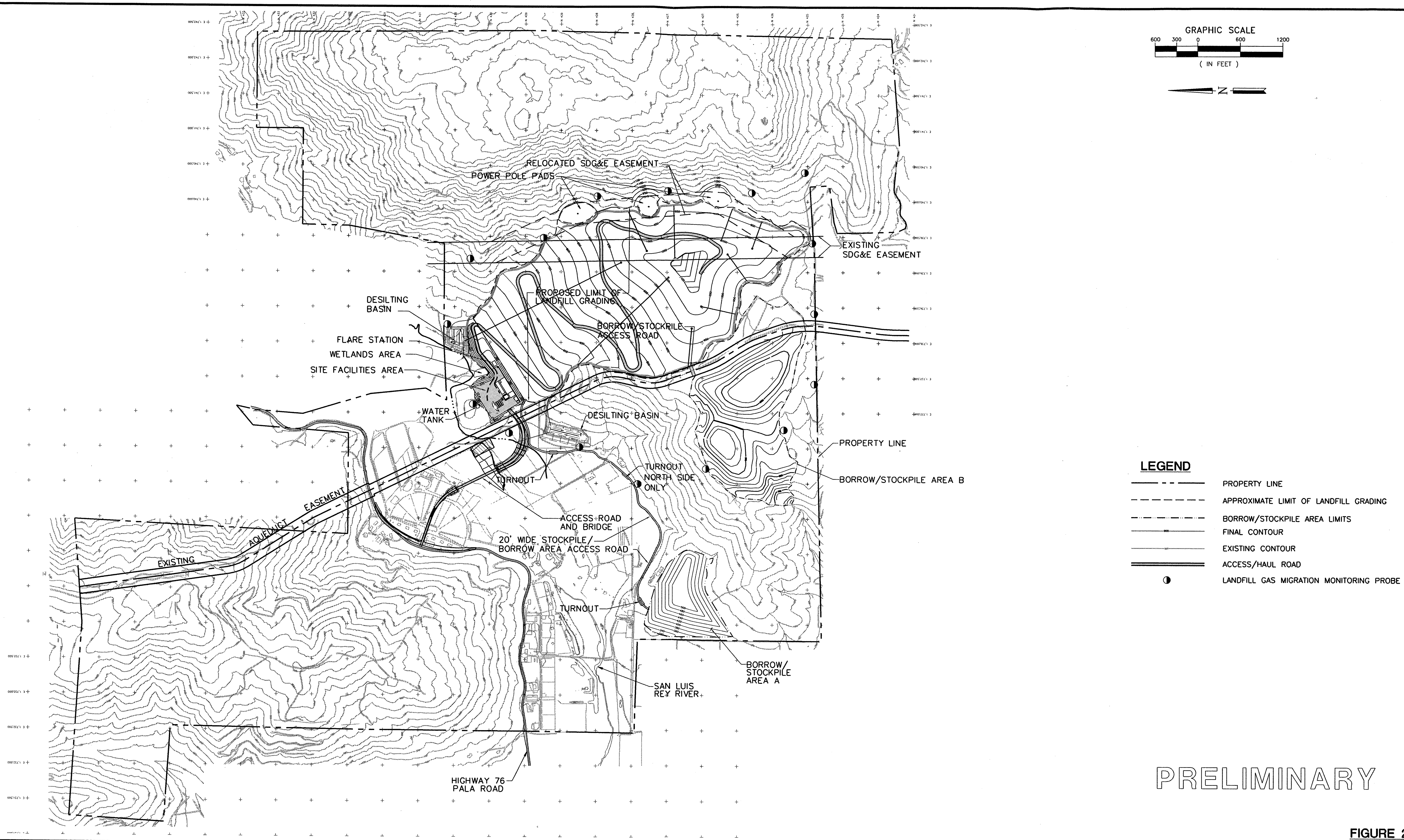


FIGURE 2

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL
SITE MAP

DESIGNED BY : E.L.S.	SCALE : AS SHOWN	
DRAWN BY : M.T.B.	DATE : 3-2002	FILE NO.: 26047DB.DWG
CHECKED BY :	DATE :	DRAWING 2
APPROVED BY :	DATE :	

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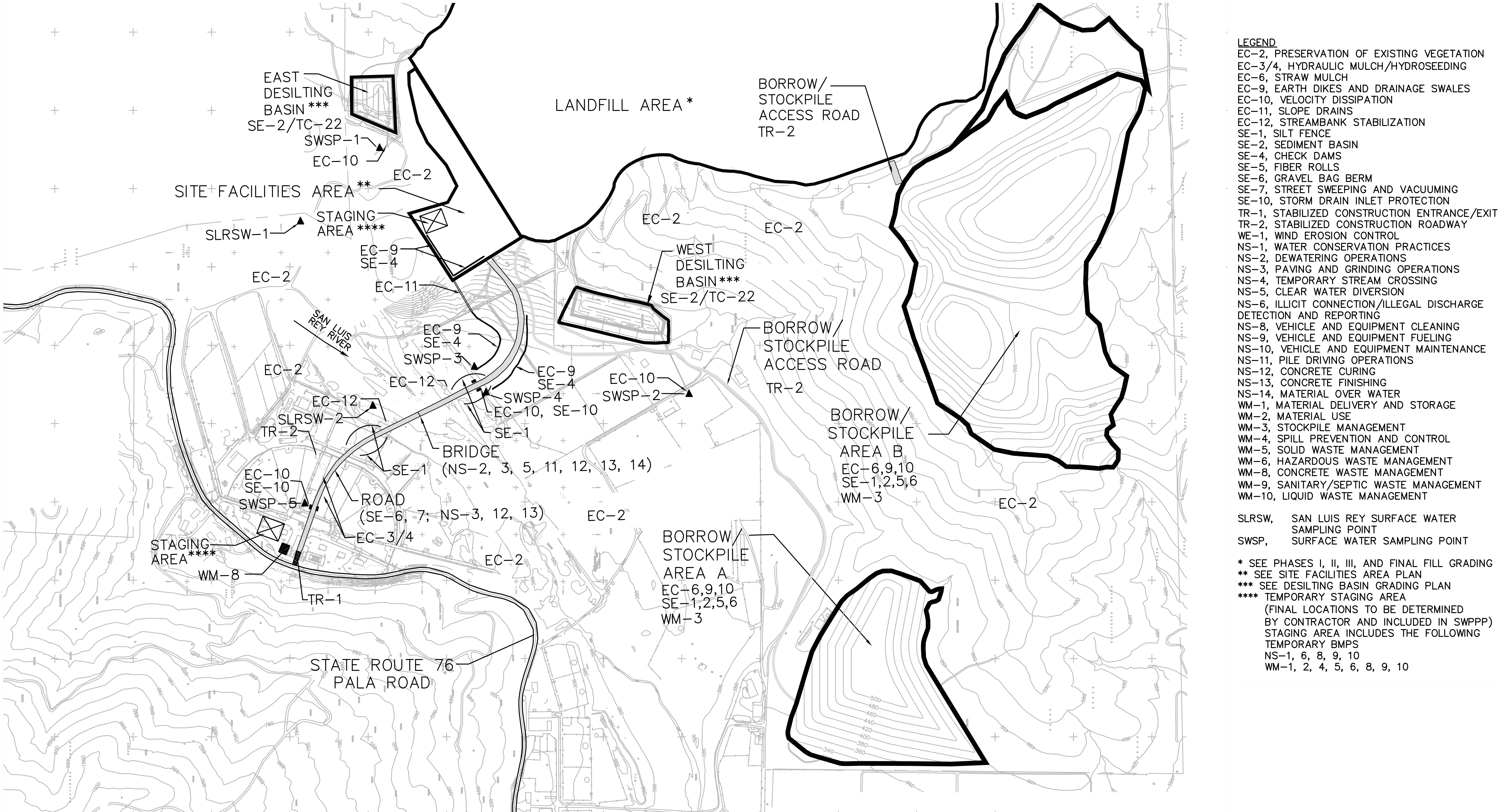
Attachment B

Water Pollution Control Drawings (WPCDs)

Initial Construction Phase WPCDs
Treatment Control BMP Location Map and Details
Project Drainage, Hydrology, and Floodplain Maps
Project Grading Plans

Initial Construction Water Pollution Control Drawings (WPCDs)

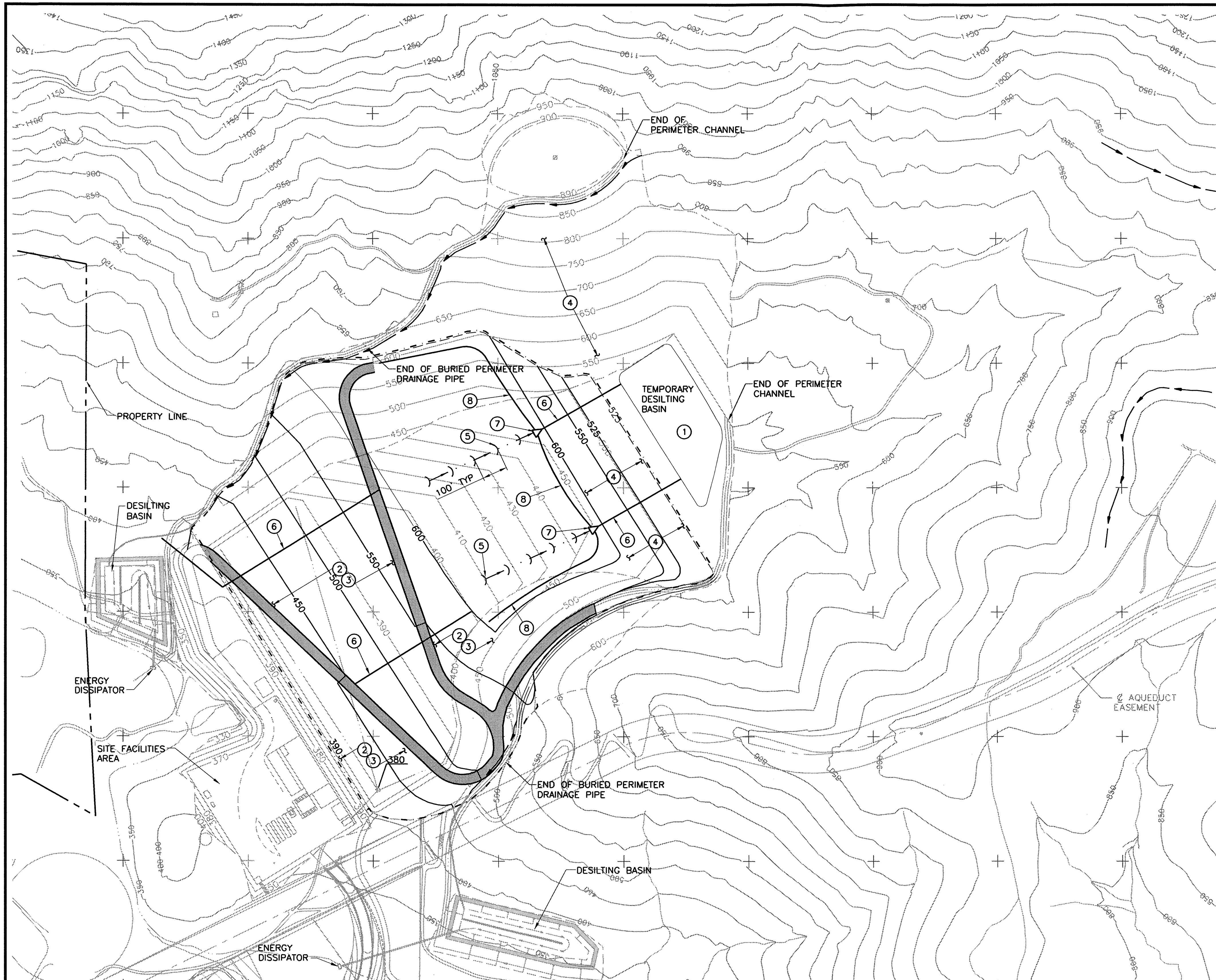


CONSTRUCTION SWPPP BMP MAP
OVERLAIN ON TOPO
GREGORY CANYON, LTD. LLC SITE

URS

300 0 300 600 Feet
SCALE: 1"= 600'

CHECKED BY: MM	DATE: 02-22-08	FIG. NO:
PM: WPM	PROJ. NO: 27654025.00020	1



BMP NOTES

1. CONSTRUCT TEMPORARY DESILTING BASIN
2. INSTALL STRAW MULCH 6/10A
3. APPLY HYDROSEED TO PROMOTE VEGETATION
4. TRACKING OF SLOPES 7/10A
5. INSTALL BIO LOG CHECK DAMS 4/10A
6. INSTALL METAL FLUME DOWNDRAIN 11/10A
7. INSTALL TOP DECK INLET 5/10A
8. INSTALL TOP DECK BERM 5/10A

LEGEND

- PROPERTY LINE
- 600 EXISTING GROUND CONTOUR
- 600 PROPOSED GROUND CONTOUR
- TOP/TOE OF SLOPE
- ACCESS/HAUL ROAD
- POWER POLES
- LIMIT OF PHASE I FILL
- BURIED PERIMETER DRAIN PIPE
- PERIMETER TRAP CHANNEL

PRELIMINARY

FIGURE 21

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
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(909) 860-7777

GREGORY CANYON LANDFILL

PHASE I FILL PLAN AND TYPICAL BMP IMPLEMENTATION

DESIGNED BY : T.W.	SCALE : AS SHOWN	
DRAWN BY : J.P.J.	DATE : 10-2001	FILE NO. 171047DB.DWG
CHECKED BY :	DATE :	DRAWING 10
APPROVED BY :	DATE :	

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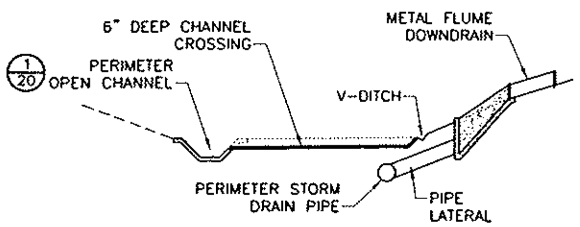
NOTE:

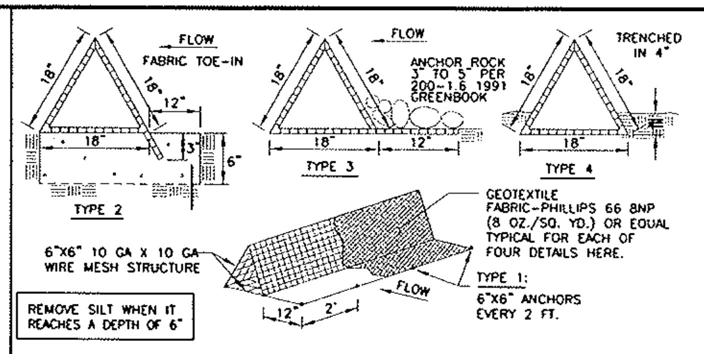
1) THE PERIMETER OPEN CHANNEL SHALL CONVEY RUNOFF FROM NATURAL UNDISTURBED AREAS AND DISTURBED AREAS THAT HAVE ESTABLISHED VEGETATION FOR MORE THAN TWO YEARS. RUNOFF FROM THIS CHANNEL SHALL BYPASS PROPOSED DESILTING BASINS.

2) THE PERIMETER STORM DRAIN PIPE SHALL CONVEY RUNOFF FROM DISTURBED AREAS AND WILL DISCHARGE TO PROPOSED DESILTING BASINS.

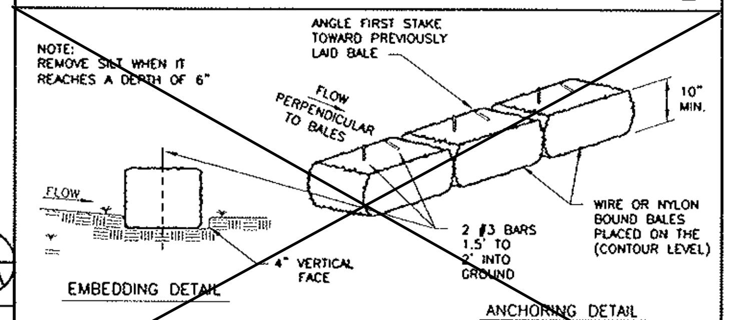
3) RUNOFF FROM THE METAL FLUME MAY BE DIVERTED TO THE CHANNEL CROSSING AND INTO THE PERIMETER OPEN CHANNEL ONCE THE TRIBUTARY AREAS TO THE METAL FLUME HAVE ESTABLISHED VEGETATION FOR MORE THAN TWO YEARS.



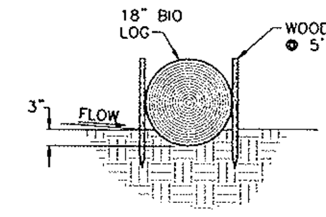
SECTION B-B
NTS
1 / 10A



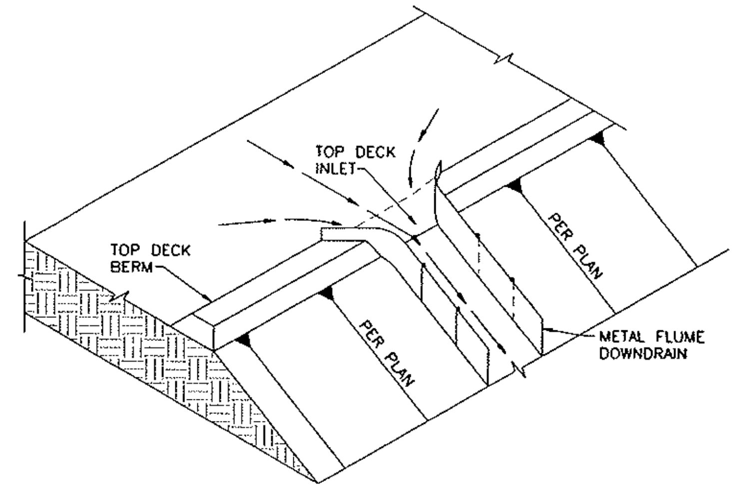
TRIANGULAR SEDIMENT FILTER DIKE
NTS
2 / 10A



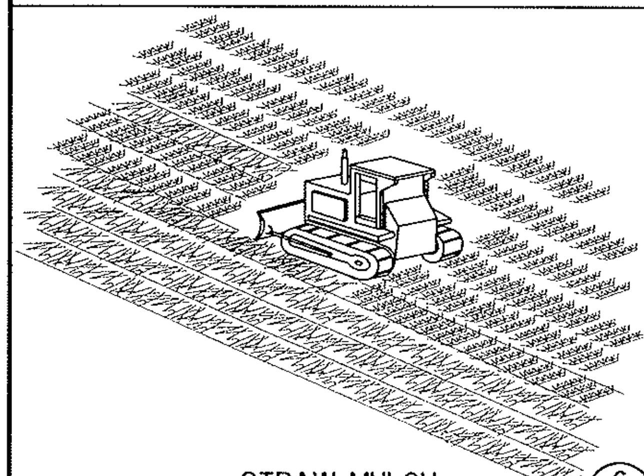
HAY BALE DIKE
NTS
3 / 10A



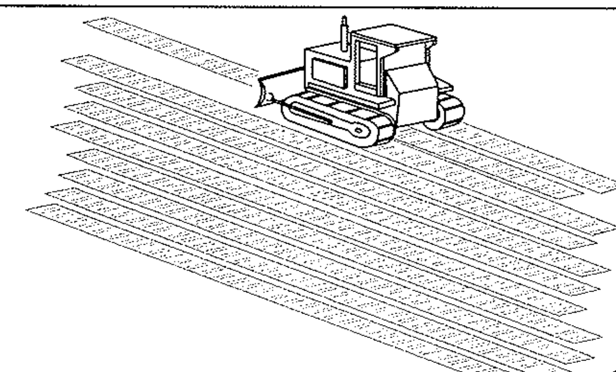
BIO LOG
NTS
4 / 10A



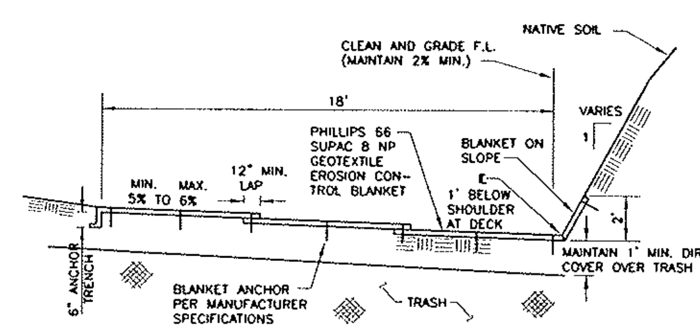
TOP DECK INLET AND BERM
NTS
5 / 10A



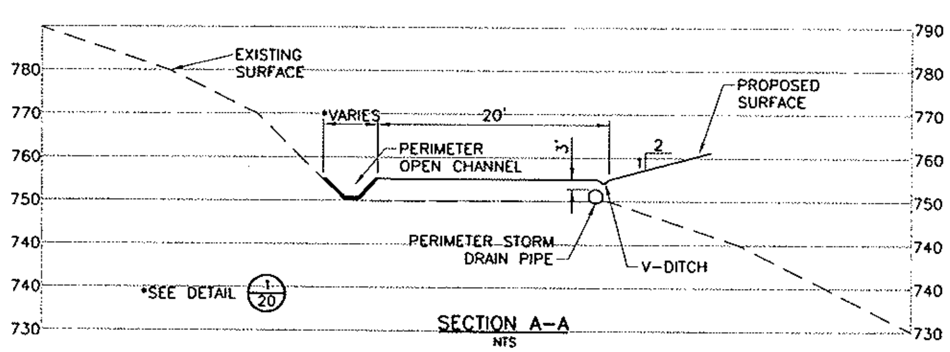
STRAW MULCH
NTS
6 / 10A



TRACKING
NTS
7 / 10A

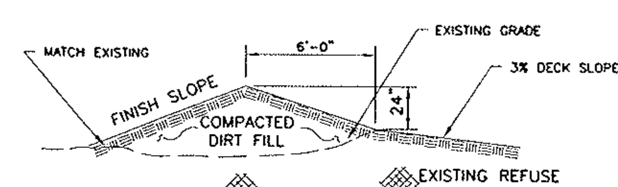


EROSION CONTROL BLANKET
NTS
8 / 10A

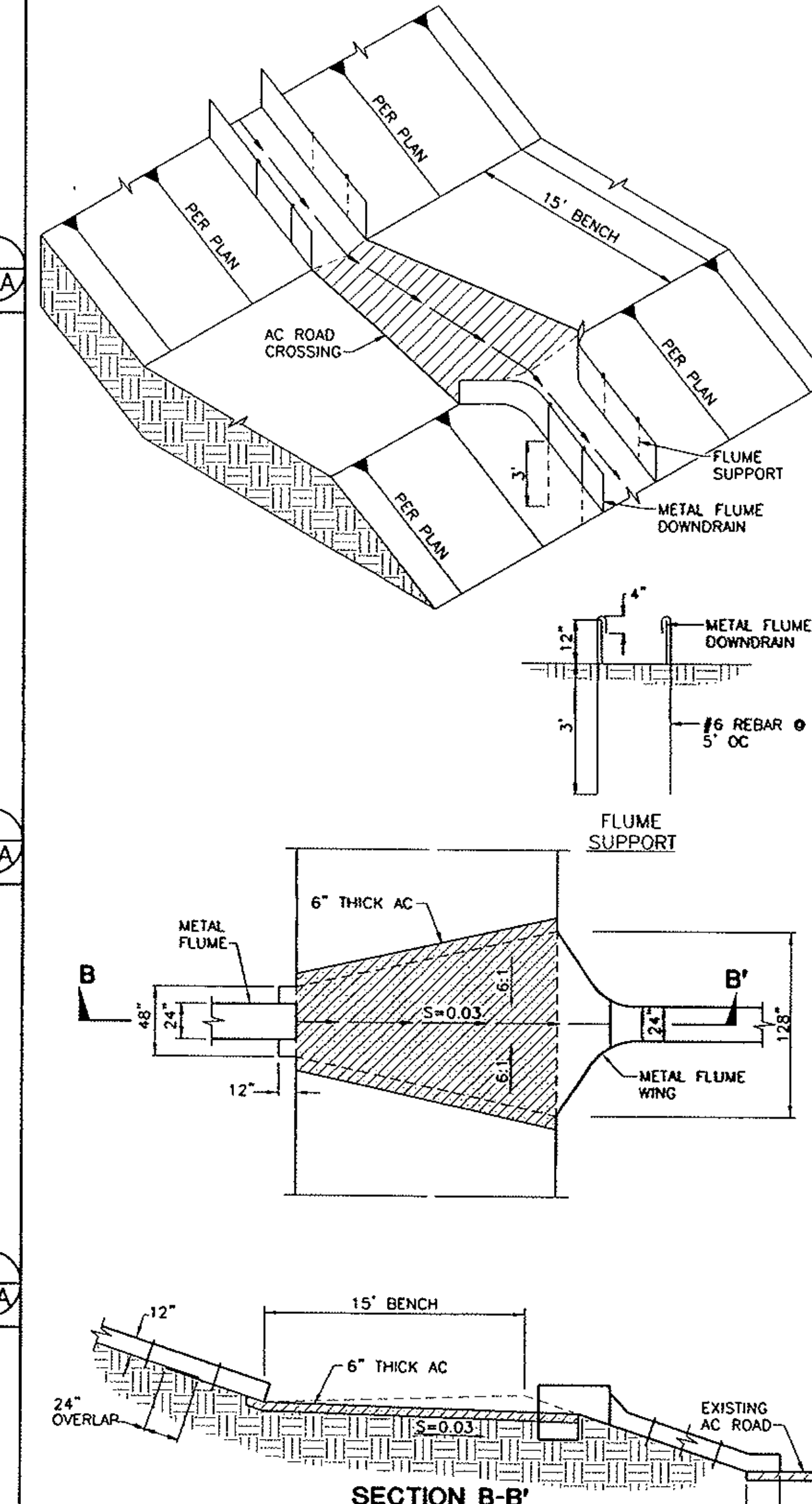


TYP. BERM @ TOP OF FILL SLOPES
NTS
9 / 10A

THIS BERM SHALL BE CONSTRUCTED (OR EXISTING BERMS REPAIRED) WHERE CALLED FOR ON PLANS, TO PREVENT SLOPE EROSION IN CASE OF LOCALIZED REFUSE SETTLEMENT.



TYP. BERM @ TOP OF FILL SLOPES
NTS
10 / 10A



PRELIMINARY

TYPICAL BENCH CROSSING DETAIL
NTS
FIGURE 21A
11 / 10A

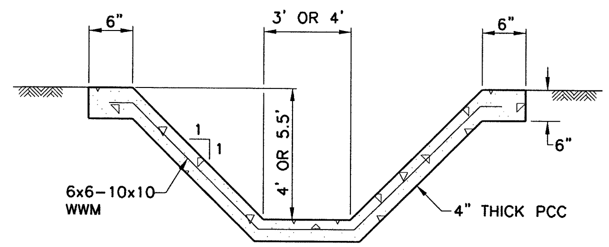
NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

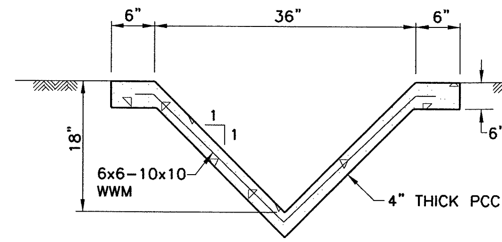
GREGORY CANYON LANDFILL
BMP DETAILS AND SECTIONS

DESIGNED BY : A.C.R.	SCALE : AS SHOWN	
DRAWN BY : C.A.L.	DATE : 4-2002	FILE NO.: 294020B.DWG
CHECKED BY :	DATE :	DRAWING 11
APPROVED BY :	DATE :	

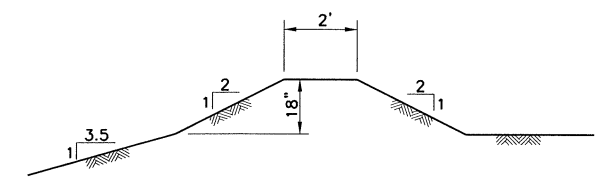
FOR PERMIT PURPOSES ONLY - NOT FOR CONSTRUCTION



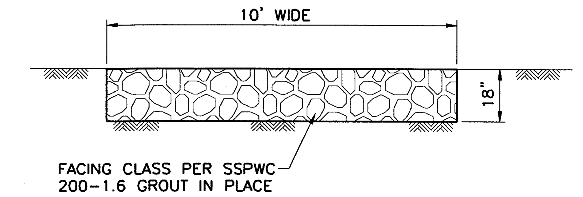
PCC TRAPEZOIDAL CHANNEL
NTS
1/20



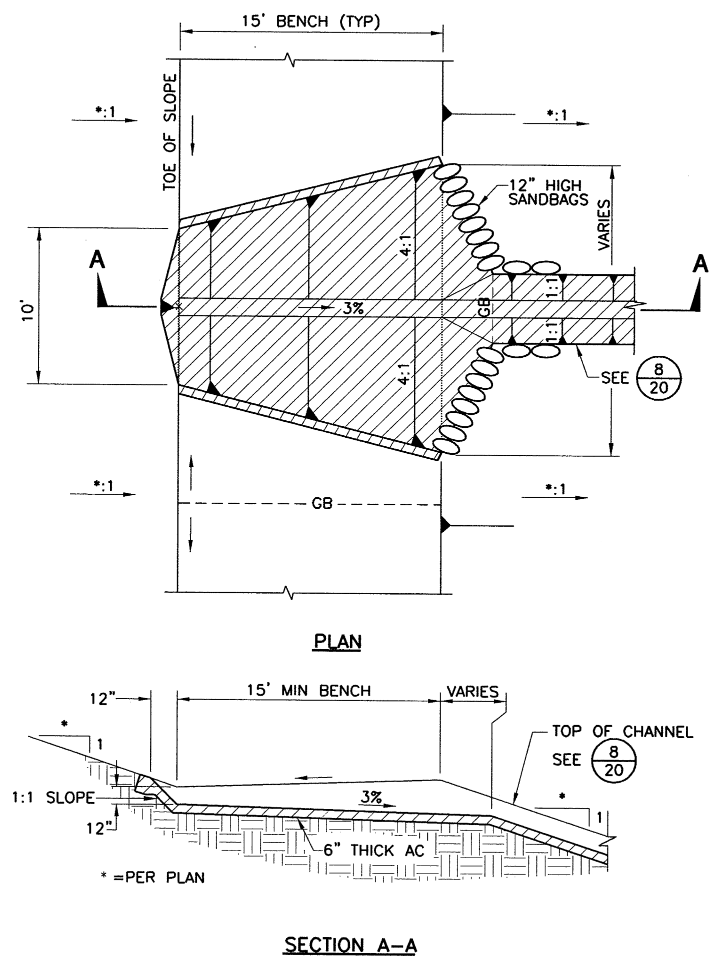
PCC V-DITCH
NTS
2/20



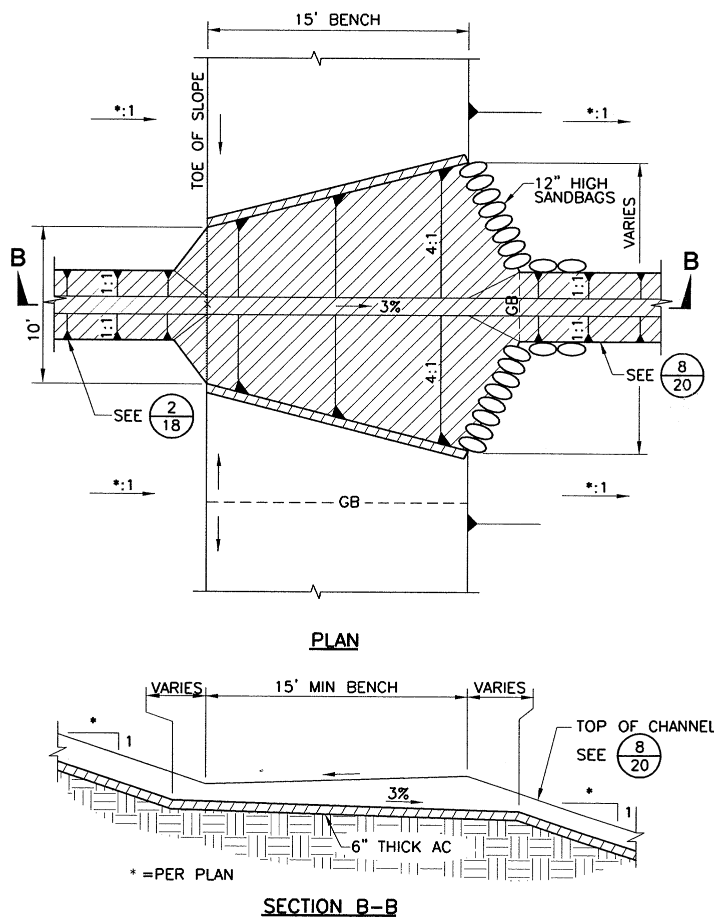
TOP DECK EARTHEN BERM
NTS
3/20



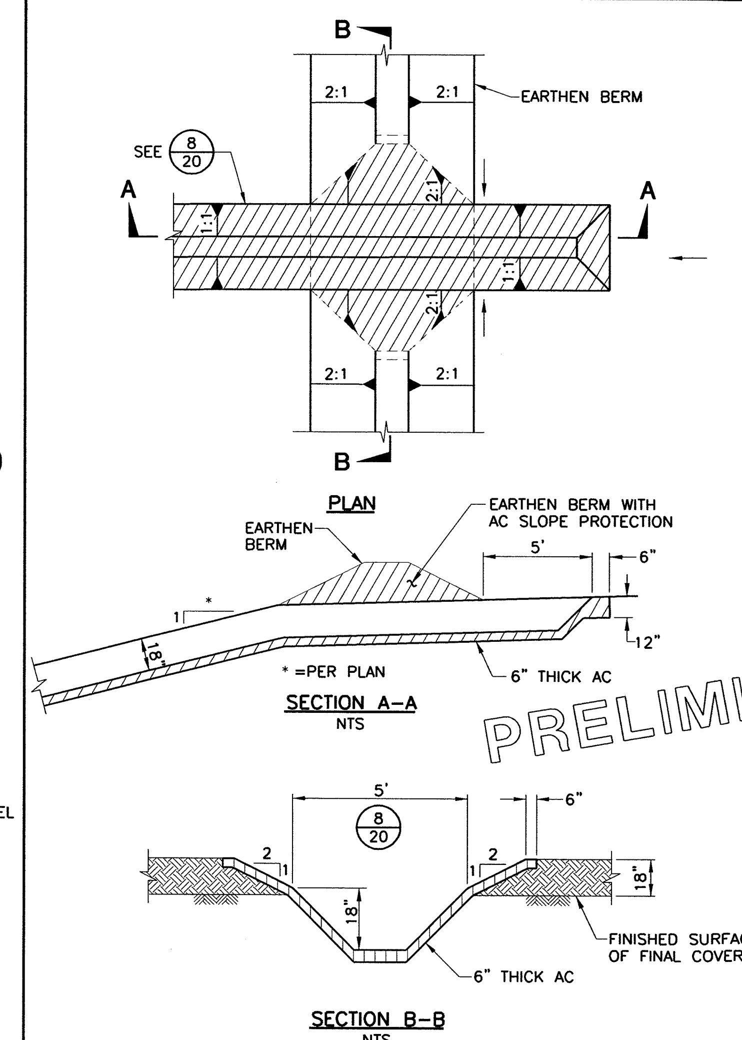
GROUTED RIPRAP
NTS
4/20



TYPICAL BENCH INLET
NTS
5/20

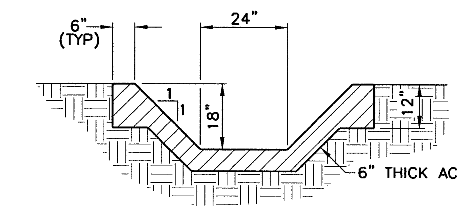


AC DOWNDRAIN BENCH CROSSING
NTS
6/20

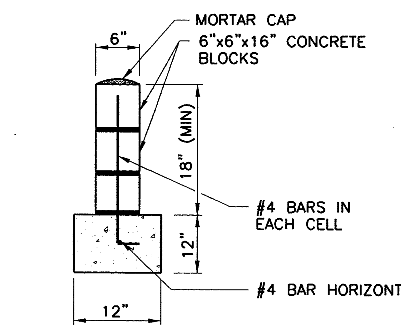


TOP DECK INLET
NTS
7/20

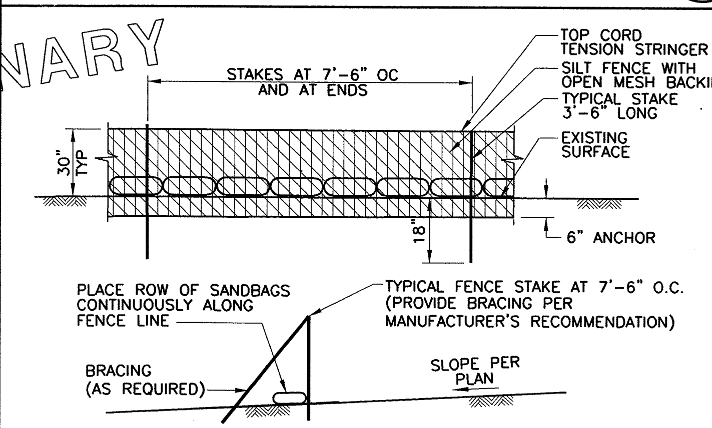
PRELIMINARY



AC DOWNDRAIN TRAPEZOIDAL CHANNEL
NTS
8/20



SPLASH WALL
NTS
9/20



SILT FENCE DETAIL
NTS
10/20

FIGURE 19

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL
DETAIL SHEET

DESIGNED BY : G.V.N.	SCALE : AS SHOWN	
DRAWN BY : T.J.S.	DATE : 8-1998	FILE NO.: 29158DB
CHECKED BY :	DATE :	
APPROVED BY :	DATE :	DRAWING 21

H:\dwg\gregory\2001\29158db.dwg 05/20/2003 13:09

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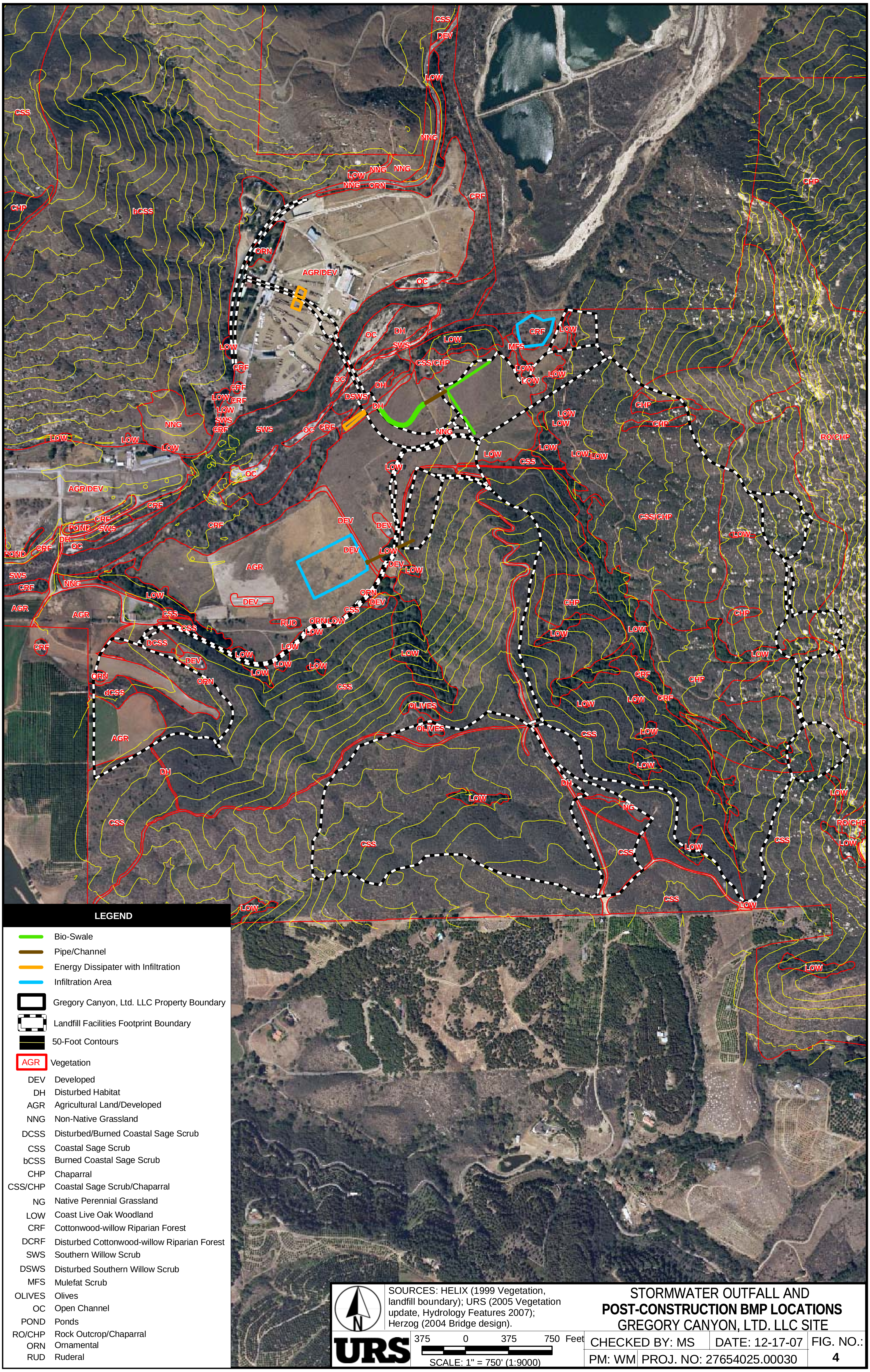
Treatment Control BMP Location Map and Details



LEGEND

- Bio-Swale
- Pipe/Channel
- Energy Dissipater with Infiltration
- Infiltration Area
- Gregory Canyon, Ltd. LLC Property Boundary
- Landfill Facilities Footprint Boundary
- 50-Foot Contours
- AGR Vegetation

DEV	Developed
DH	Disturbed Habitat
AGR	Agricultural Land/Developed
NNG	Non-Native Grassland
DCSS	Disturbed/Burned Coastal Sage Scrub
CSS	Coastal Sage Scrub
bCSS	Burned Coastal Sage Scrub
CHP	Chaparral
CSS/CHP	Coastal Sage Scrub/Chaparral
NG	Native Perennial Grassland
LOW	Coast Live Oak Woodland
CRF	Cottonwood-willow Riparian Forest
DCRF	Disturbed Cottonwood-willow Riparian Forest
SWS	Southern Willow Scrub
DSWS	Disturbed Southern Willow Scrub
MFS	Mulefat Scrub
OLIVES	Olives
OC	Open Channel
POND	Ponds
RO/CHP	Rock Outcrop/Chaparral
ORN	Ornamental
RUD	Ruderal

SOURCES: HELIX (1999 Vegetation, landfill boundary); URS (2005 Vegetation update, Hydrology Features 2007); Herzog (2004 Bridge design).

375 0 375 750 Feet

SCALE: 1" = 750' (1:9000)

URS

STORMWATER OUTFALL AND
POST-CONSTRUCTION BMP LOCATIONS
GREGORY CANYON, LTD. LLC SITE

CHECKED BY: MS	DATE: 12-17-07	FIG. NO.:
PM: WM	PROJ. NO: 27654025.00030	**4**

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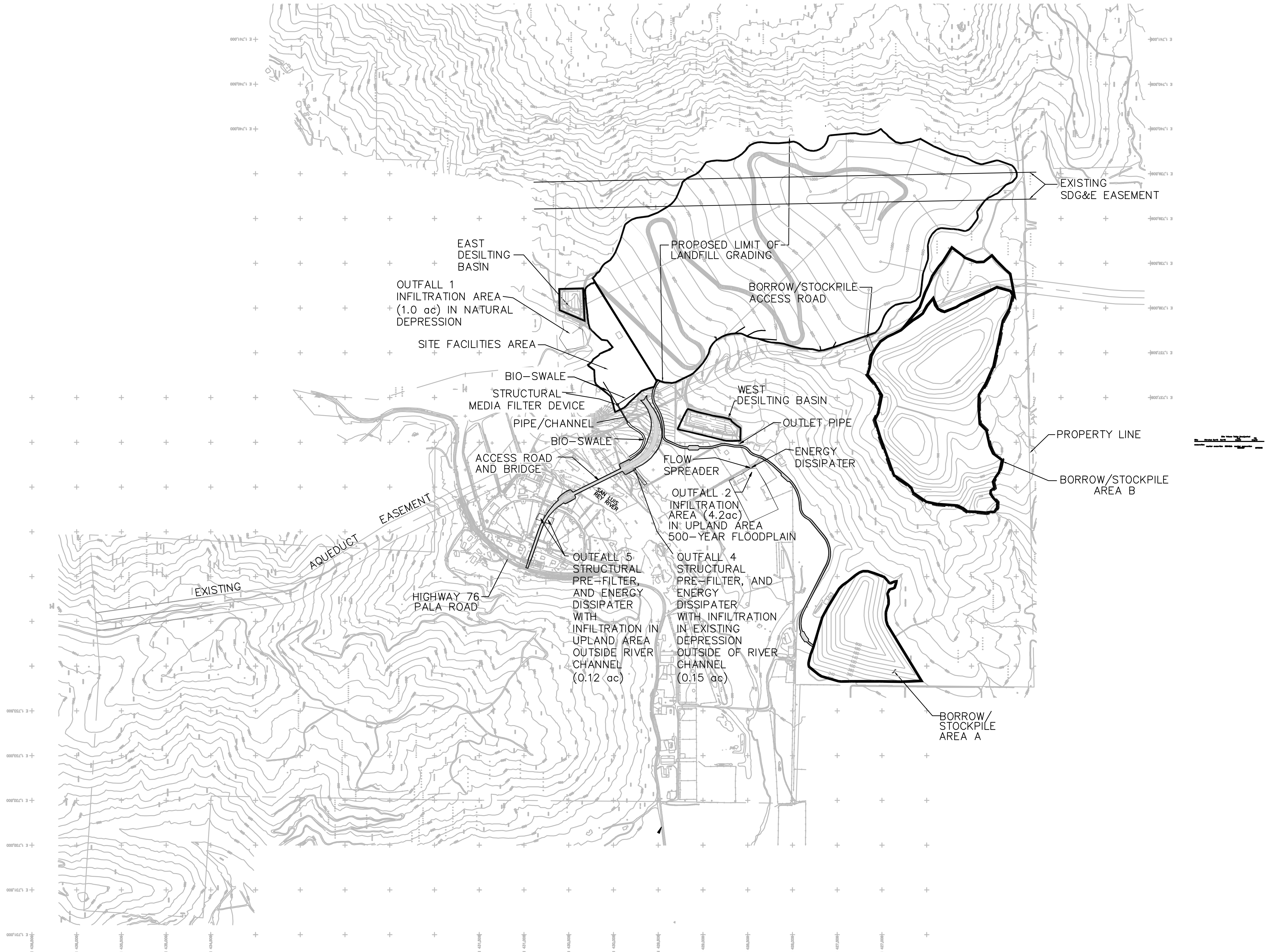


STORMWATER OUTFALL AND BMP LOCATIONS
OVERLAIN ON TOPO
GREGORY CANYON, LTD. LLC SITE

URS

600 0 600 1200 Feet SCALE: 1"= 1200'	CHECKED BY: MM	DATE: 01-18-07	FIG. NO:
	PM: WPM	PROJ. NO: 27654025.00020	3

J:\27654025 Gregory Canyon LF 404\040 Technical\Gregory_Cyn_Hydrology\AutoCad\2007\HYDROLOGY.dwg Jan 17, 2008 - 9:32am

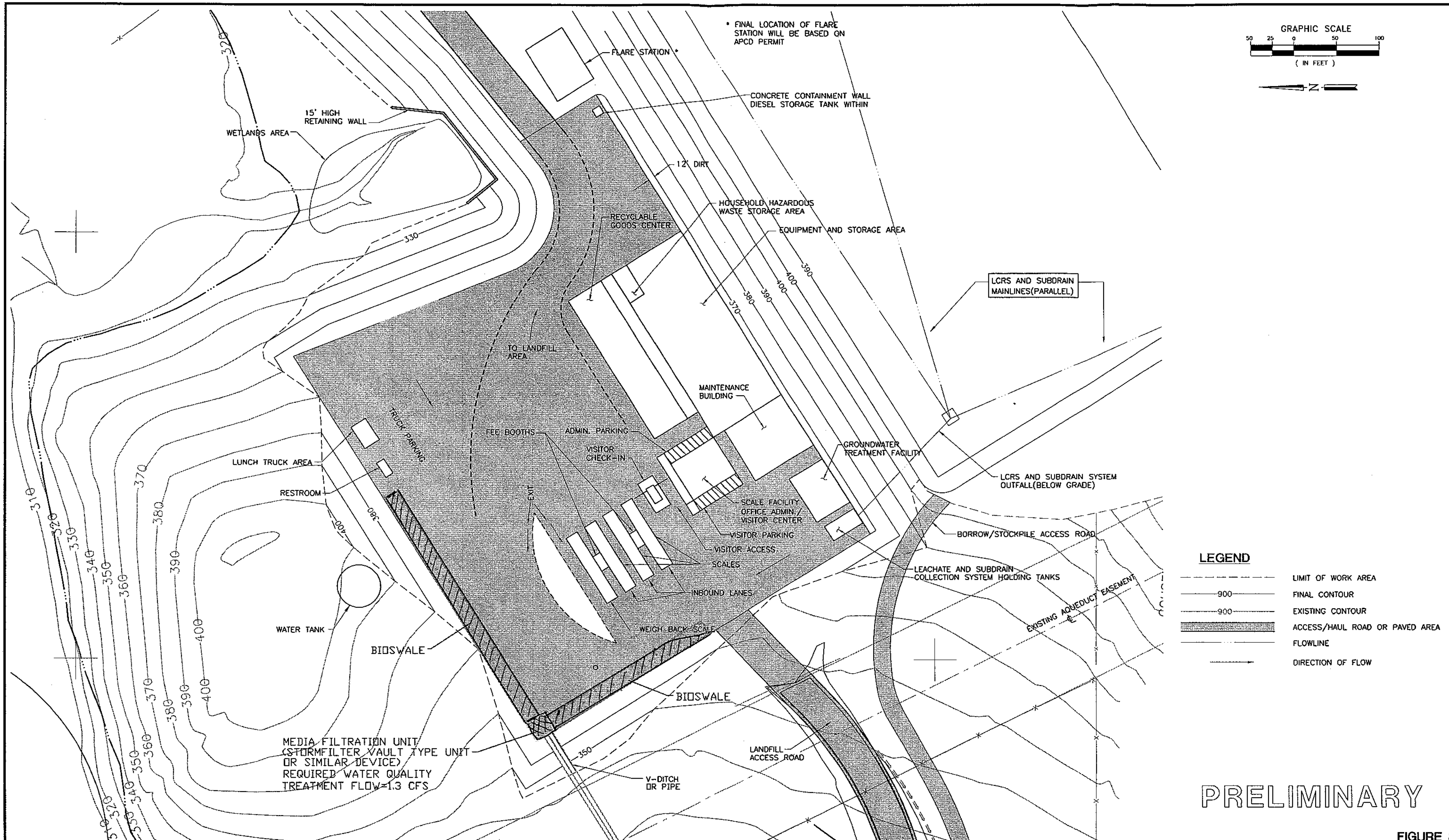


FIGURE 8

NO.	REVISION DESCRIPTION	BY:

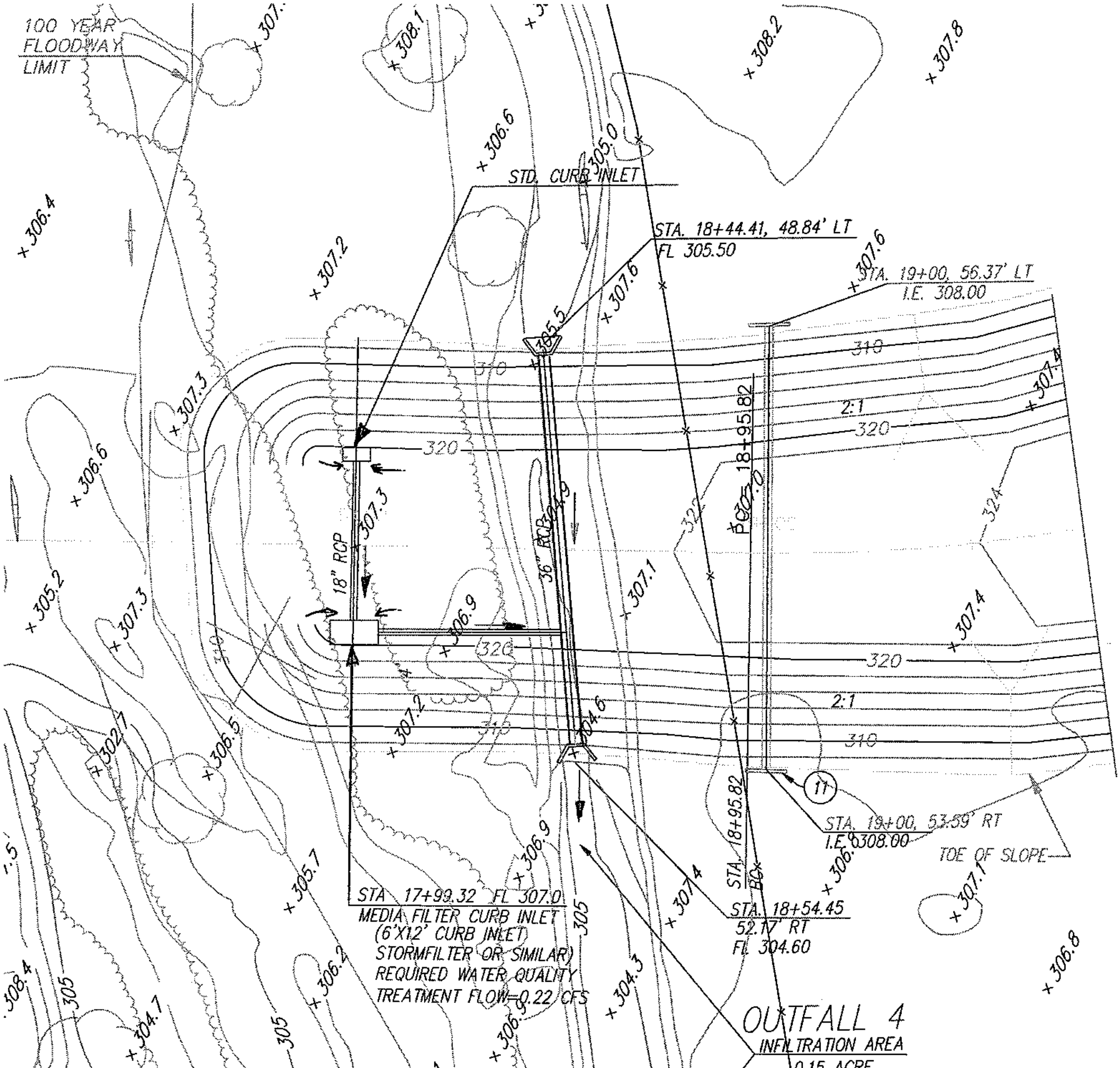
BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

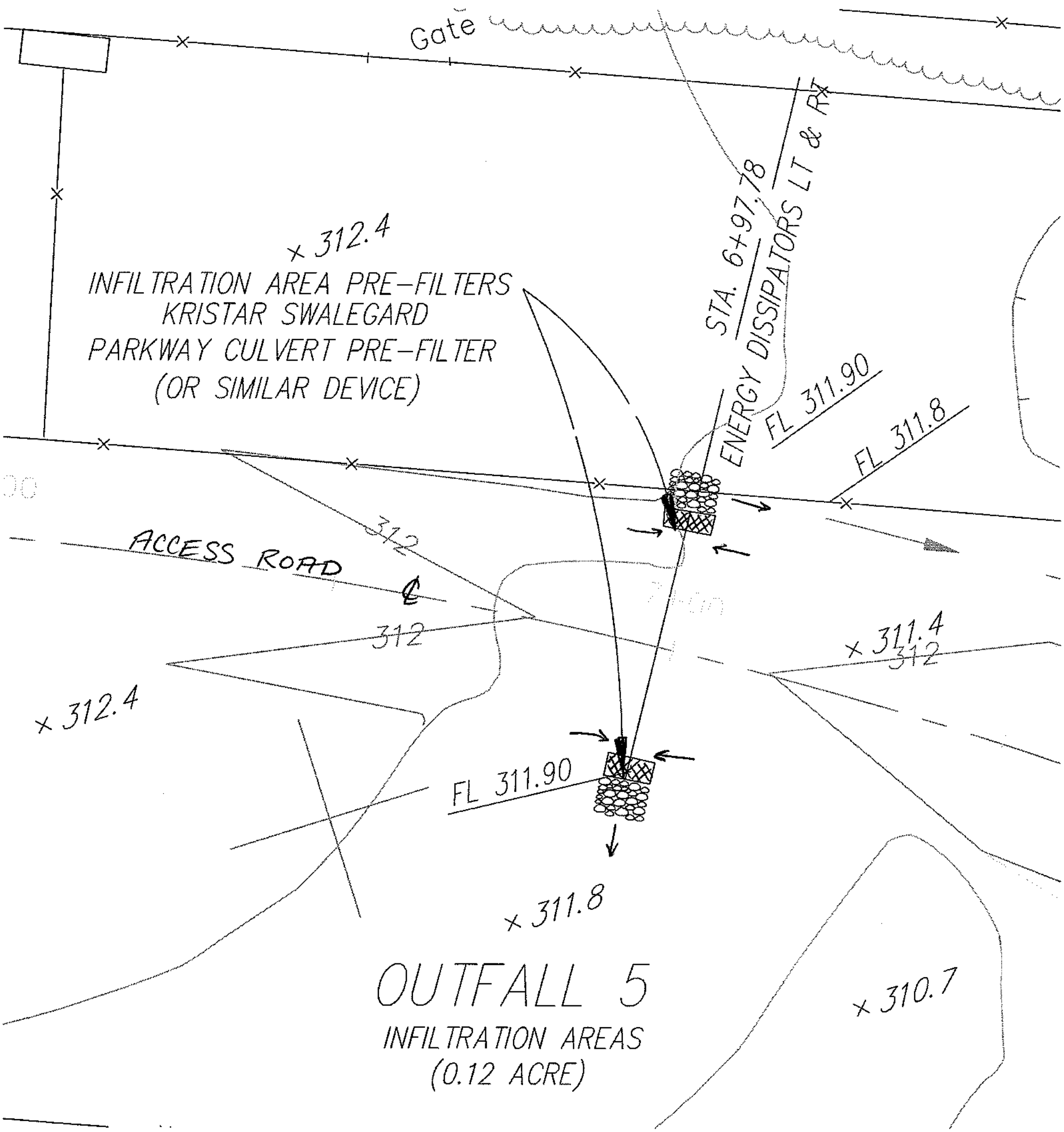
GREGORY CANYON LANDFILL

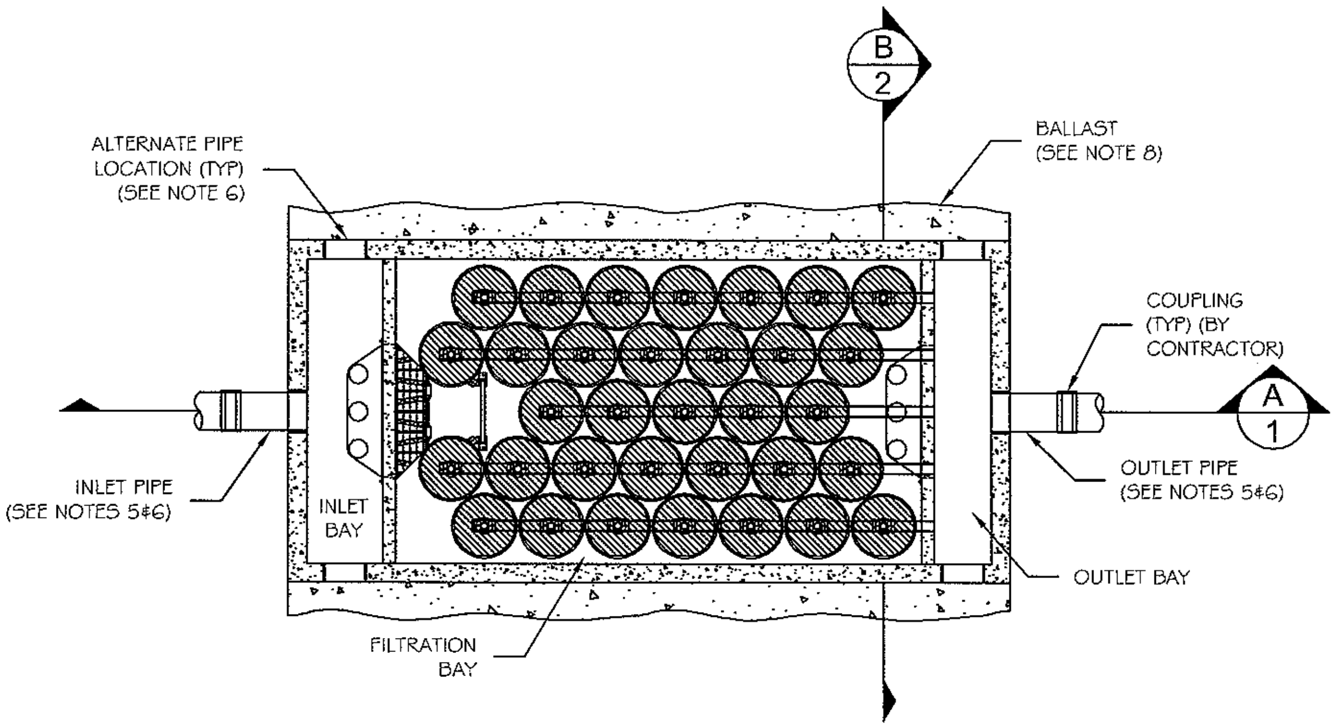
SITE FACILITIES PLAN

DESIGNED BY : E.L.S.	SCALE : AS SHOWN	
DRAWN BY : M.T.B./J.P.J.	DATE : 5-2003	FILE NO.: 26048DB.DWG
CHECKED BY :	DATE :	DRAWING 3
APPROVED BY :	DATE :	

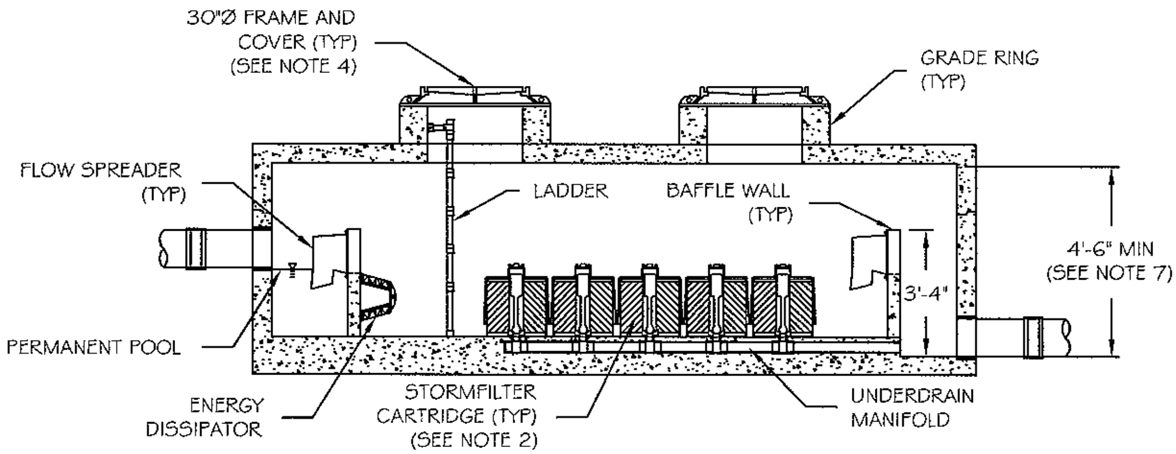
FOR PERMIT PURPOSES ONLY - NOT FOR CONSTRUCTION


100 YEAR FLOODWAY LIMIT
STD. CURB INLET
STA. 18+44.41, 48.84' LT
FL 305.50
STA. 19+00, 56.37' LT
I.E. 308.00
18" RCP
36" RCP
2:1
320
310
STA. 19+00, 53.59' RT
I.E. 308.00
TOE OF SLOPE
STA 17+99.32 FL 307.0
MEDIA FILTER CURB INLET
(6'X12' CURB INLET)
STORMFILTER OR SIMILAR)
REQUIRED WATER QUALITY
TREATMENT FLOW=0.22 CFS
STA. 18+54.45
52.17' RT
FL 304.60
STA. 18+95.82
PC
BC
OUTFALL 4
INFILTRATION AREA
0.15 ACRE


Gate
× 312.4
INFILTRATION AREA PRE-FILTERS
KRISTAR SWALEGARD
PARKWAY CULVERT PRE-FILTER
(OR SIMILAR DEVICE)
STA. 6+97.78
ENERGY DISSIPATORS LT & RT
FL 311.90
FL 311.8
ACCESS ROAD
312
312
× 311.4
312
× 312.4
FL 311.90
× 311.8
OUTFALL 5
INFILTRATION AREAS
(0.12 ACRE)
× 310.7



8' x 18' STORMFILTER - PLAN VIEW (1/1)



8' x 18' STORMFILTER - SECTION VIEW (A/1)

THE STORMWATER MANAGEMENT
StormFilter®
U.S. PATENT No. 5,322,629,
No. 5,707,527, No. 6,027,639
No. 6,649,048, No. 5,624,576,
AND OTHER U.S. AND FOREIGN
PATENTS PENDING

OUTFALL 3 FILTRATION DEVICE

CONTECH® STORMWATER SOLUTIONS INC.
contechstormwater.com

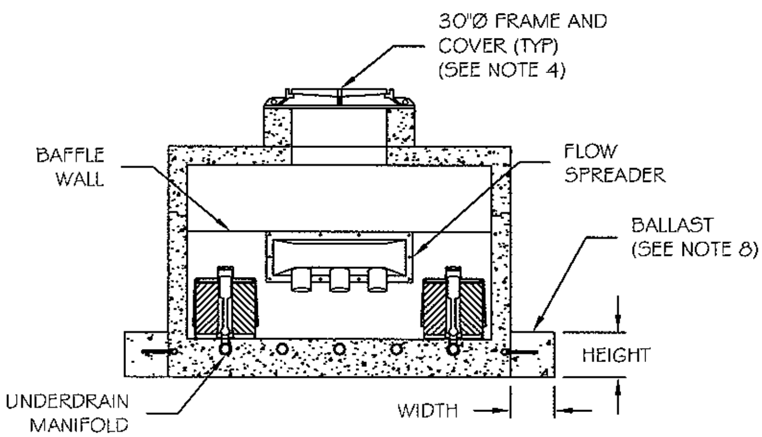
8' x 18' PRECAST STORMFILTER
PLAN AND SECTION VIEWS
STANDARD DETAIL

DRAWING 1
1/2

DATE: 09/29/05	SCALE: NONE	FILE NAME: SF818-PC-DTL	DRAWN: MJW	CHECKED: ARG

GENERAL NOTES

1) STORMFILTER BY CONTECH STORMWATER SOLUTIONS; PORTLAND, OR (800) 548-4667; SCARBOROUGH, ME (877) 907-8676; ELKRIDGE, MD (866) 740-3318.
2) FILTER CARTRIDGE(S) TO BE SIPHON-ACTUATED AND SELF-CLEANING. STANDARD DETAIL DRAWING SHOWS MAXIMUM NUMBER OF CARTRIDGES. ACTUAL NUMBER REQUIRED TO BE SPECIFIED ON SITE PLANS OR IN DATA TABLE BELOW.
3) PRECAST VAULT TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C857 AND C858. DETAIL DRAWING REFLECTS DESIGN INTENT ONLY. ACTUAL DIMENSIONS AND CONFIGURATION OF STRUCTURE WILL BE SHOWN ON PRODUCTION SHOP DRAWING.
4) STRUCTURE AND ACCESS COVERS TO MEET AASHTO H-20 LOAD RATING.
5) STORMFILTER REQUIRES 2.3 FEET OF DROP FROM INLET TO OUTLET. IF LESS DROP IS AVAILABLE, CONTACT CONTECH STORMWATER SOLUTIONS.
6) INLET AND OUTLET PIPING TO BE SPECIFIED BY ENGINEER AND PROVIDED BY CONTRACTOR. PRECAST STORMFILTER VAULT EQUIPPED WITH EITHER CORED OPENINGS OR KNOCKOUTS AT INLET AND OUTLET LOCATIONS.
7) PROVIDE MINIMUM CLEARANCE FOR MAINTENANCE ACCESS. IF A SHALLOWER SYSTEM IS REQUIRED, CONTACT CONTECH STORMWATER SOLUTIONS FOR OTHER OPTIONS.
8) ANTI-FLOTATION BALLAST TO BE SPECIFIED BY ENGINEER AND PROVIDED BY CONTRACTOR, IF REQUIRED. BALLAST TO BE SET ALONG ENTIRE LENGTH OF BOTH SIDES OF THE STRUCTURE.
9) ALL STORMFILTERS REQUIRE REGULAR MAINTENANCE. REFER TO OPERATION AND MAINTENANCE GUIDELINES FOR MORE INFORMATION.



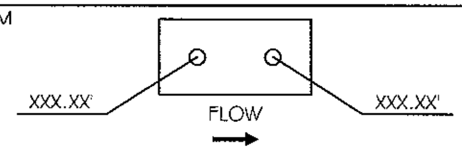
8' x 18' STORMFILTER - SECTION VIEW B/2

8' x 18' PRECAST STORMFILTER DATA

STRUCTURE ID	XXX
WATER QUALITY FLOW RATE (cfs)	X.XX
PEAK FLOW RATE (cfs)	X.XX
RETURN PERIOD OF PEAK FLOW (yrs)	XXX
# OF CARTRIDGES REQUIRED	XX
CARTRIDGE FLOW RATE (15 OR 7.5 gpm)	XX
MEDIA TYPE (CSF, PERLITE, ZPG)	XXXXX

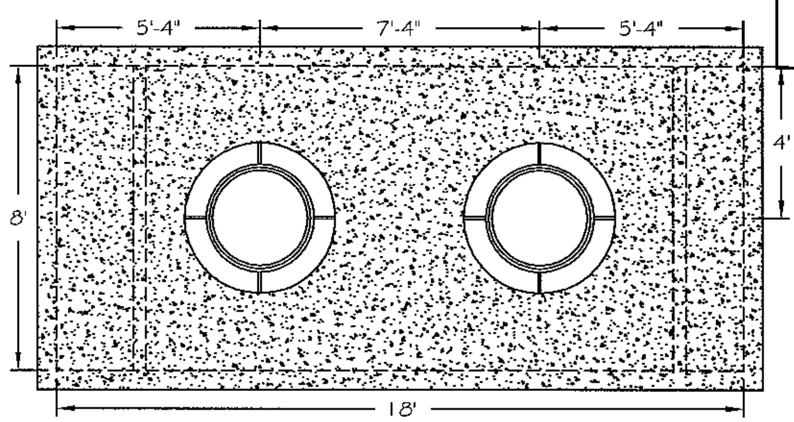
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	XXX.XX'	XXX	XX"
INLET PIPE #2	XXX.XX'	XXX	XX"
OUTLET PIPE	XXX.XX'	XXX	XX"

RIM



LADDER		YES/NO
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	XX"	XX"

NOTES/SPECIAL REQUIREMENTS:



8' x 18' STORMFILTER - TOP VIEW 1/2

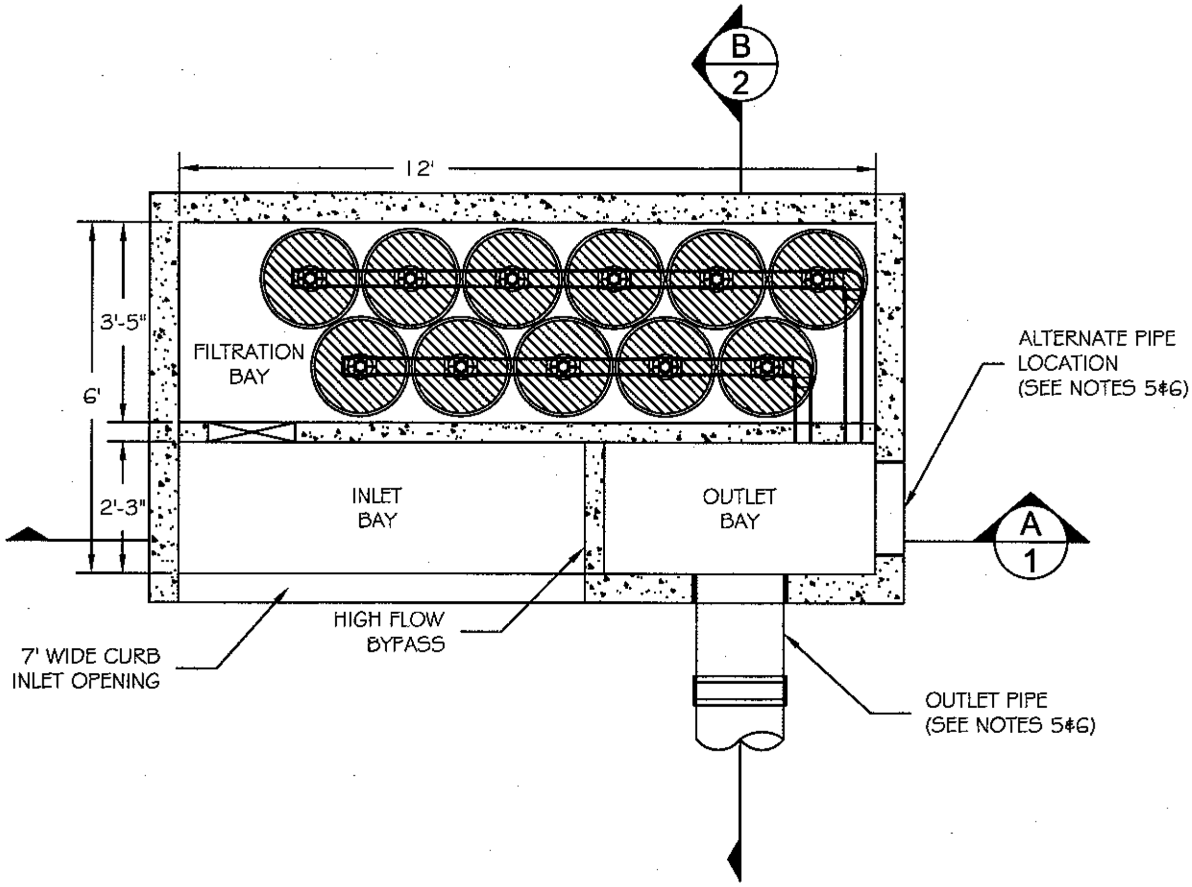
THE STORMWATER MANAGEMENT StormFilter® U.S. PATENT No. 5,322,629, No. 5,707,527, No. 6,027,639 No. 6,649,048, No. 5,624,576, AND OTHER U.S. AND FOREIGN PATENTS PENDING

CONTECH® STORMWATER SOLUTIONS
contechstormwater.com

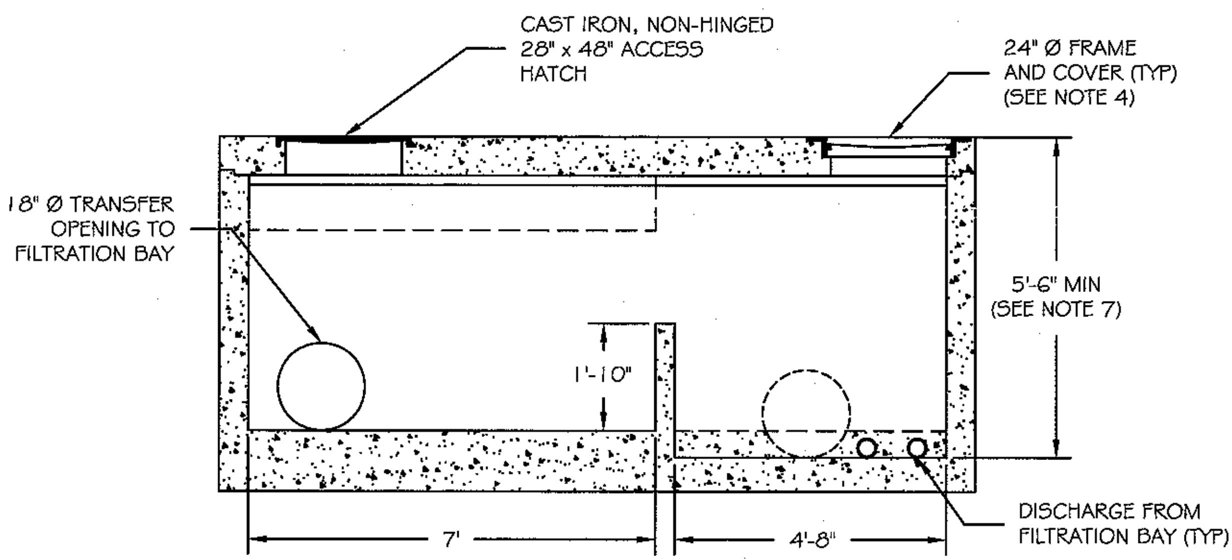
8' x 18' PRECAST STORMFILTER
TOP AND SECTION VIEWS, NOTES AND DATA
STANDARD DETAIL

DRAWING 2
2/2

DATE: 09/29/05	SCALE: NONE	FILE NAME: SF818-PC-DTL	DRAWN: MJW	CHECKED: ARG



CURB INLET STORMFILTER - PLAN VIEW 1/1



CURB INLET STORMFILTER - SECTION VIEW A/1

THE STORMWATER MANAGEMENT StormFilter®
U.S. PATENT No. 5,322,629, No. 5,707,527, No. 6,027,639 No. 6,649,048, No. 5,624,576, AND OTHER U.S. AND FOREIGN PATENTS PENDING

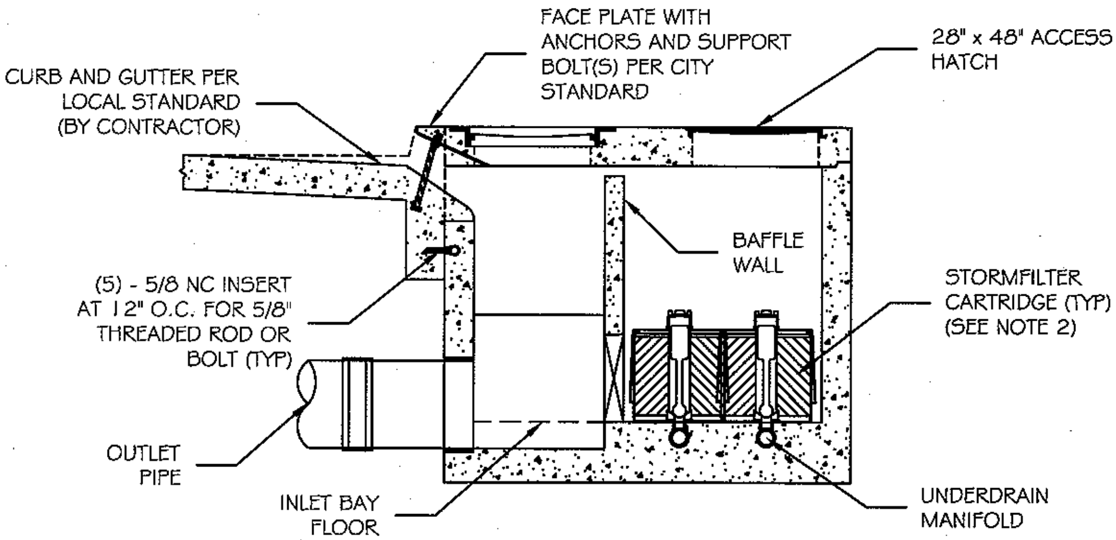
OUTFALL 4 INFILTRATION PRE-FILTER

CONTECH® STORMWATER SOLUTIONS INC.
contechstormwater.com

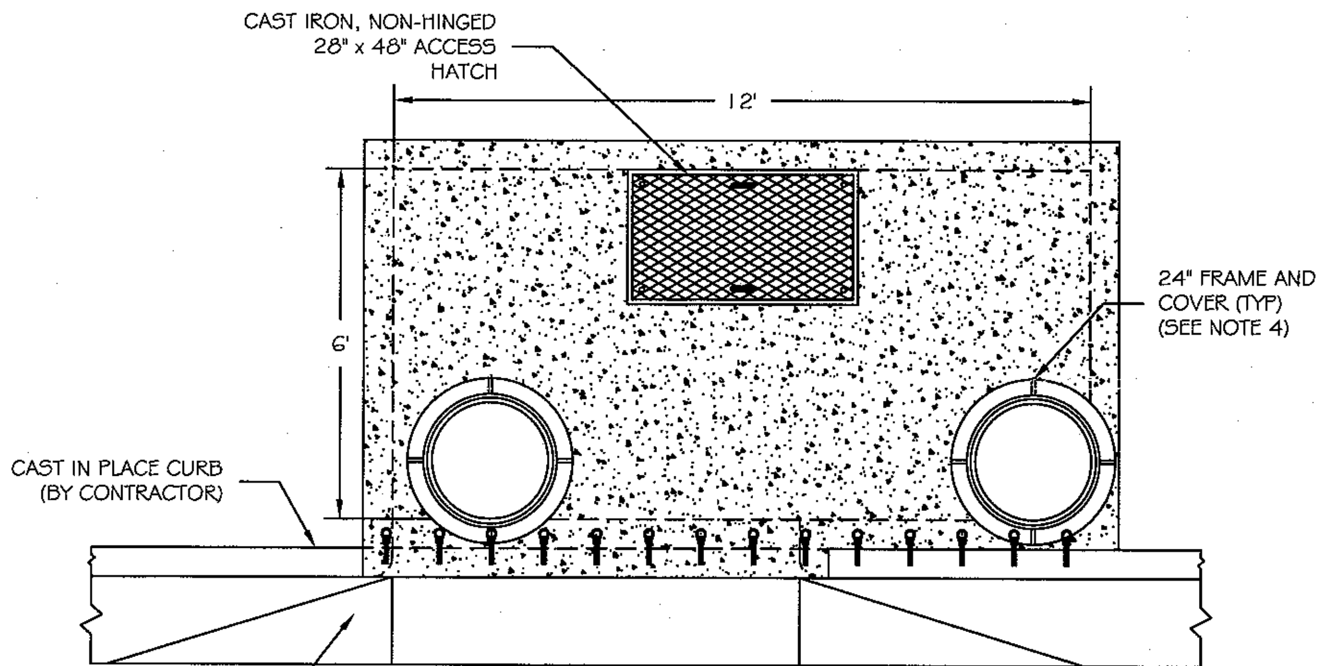
6' x 12' CURB INLET STORMFILTER
PLAN AND SECTION VIEWS
STANDARD DETAIL

DRAWING 1
1/3

DATE: 12/12/05	SCALE: NONE	FILE NAME: CISF11-612PC-DTL	DRAWN: MJW	CHECKED: ARG



CURB INLET STORMFILTER - SECTION VIEW B/2



CURB INLET STORMFILTER - TOP VIEW 1/2

THE STORMWATER MANAGEMENT StormFilter®
U.S. PATENT No. 5,322,629, No. 5,707,527, No. 6,027,639 No. 6,649,048, No. 5,624,576, AND OTHER U.S. AND FOREIGN PATENTS PENDING

CONTECH® STORMWATER SOLUTIONS INC.
contechstormwater.com

6' x 12' CURB INLET STORMFILTER TOP AND SECTION VIEWS STANDARD DETAIL

DRAWING 2
2/3

DATE: 12/12/05 | SCALE: NONE | FILE NAME: CISF11-612PC-DTL | DRAWN: MJW | CHECKED: ARG

GENERAL NOTES

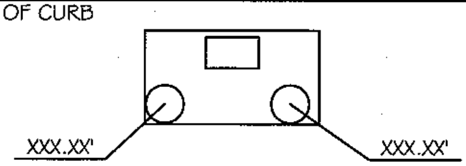
1) STORMFILTER BY CONTECH STORMWATER SOLUTIONS; PORTLAND, OREGON (800) 548-4667; SCARBOROUGH, ME (877) 907-8676; LINTHICUM, MD (866) 740-3318.
2) FILTER CARTRIDGE(S) TO BE SIPHON-ACTUATED AND SELF-CLEANING. STANDARD DETAIL DRAWING SHOWS MAXIMUM NUMBER OF CARTRIDGES. ACTUAL NUMBER REQUIRED TO BE SPECIFIED ON SITE PLANS OR IN DATA TABLE BELOW.
3) PRECAST VAULT TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C857 AND C858. DETAIL DRAWING REFLECTS DESIGN INTENT ONLY. ACTUAL DIMENSIONS AND CONFIGURATION OF STRUCTURE WILL BE SHOWN ON PRODUCTION SHOP DRAWING.
4) STRUCTURE AND ACCESS COVERS TO MEET AASHTO H-20 LOAD RATING.
5) INLET AND OUTLET PIPING TO BE SPECIFIED BY ENGINEER AND PROVIDED BY CONTRACTOR. PRECAST STORMFILTER VAULT EQUIPPED WITH EITHER CORED OPENINGS OR KNOCKOUTS AT INLET AND OUTLET LOCATIONS.
6) MAXIMUM CURB INLET OPENING IS 7 FEET. MIRROR IMAGE AVAILABLE. INLET SIDE SPECIFIED IN DATA TABLE BELOW.
7) PROVIDE MINIMUM CLEARANCE FOR MAINTENANCE ACCESS. IF A SHALLOWER SYSTEM IS REQUIRED, CONTACT CONTECH STORMWATER SOLUTIONS FOR OTHER OPTIONS.
8) ANTI-FLOTATION BALLAST TO BE SPECIFIED BY ENGINEER AND PROVIDED BY CONTRACTOR, IF REQUIRED. BALLAST TO BE SET ALONG ENTIRE LENGTH OF BOTH SIDES OF THE STRUCTURE.
9) ALL STORMFILTERS REQUIRE REGULAR MAINTENANCE. REFER TO OPERATION AND MAINTENANCE GUIDELINES FOR MORE INFORMATION.

6' x 12' PRECAST CURB INLET STORMFILTER DATA

STRUCTURE ID	XXX
INLET SIDE (LEFT OR RIGHT)	X
WATER QUALITY FLOW RATE (cfs)	X.XX
PEAK FLOW RATE (cfs)	X.XX
RETURN PERIOD OF PEAK FLOW (yrs)	XXX
# OF CARTRIDGES REQUIRED	XX
CARTRIDGE FLOW RATE (15 OR 7.5 gpm)	XX
MEDIA TYPE (CSF, PERLITE, ZPG)	XXXXX

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE	XXX.XX'	XXX	XX"
OUTLET PIPE	XXX.XX'	XXX	XX"

TOP OF CURB



WEIR CREST ELEVATION		XXX.XX'
HEAD OVER WEIR, H (ft)		X.XX'
WSE at Qpeak		XXX.XX'
ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	XX"	XX"

NOTES/SPECIAL REQUIREMENTS:

THE STORMWATER MANAGEMENT StormFilter®
U.S. PATENT No. 5,322,629, No. 5,707,527, No. 6,027,639 No. 6,649,048, No. 5,624,576, AND OTHER U.S. AND FOREIGN PATENTS PENDING

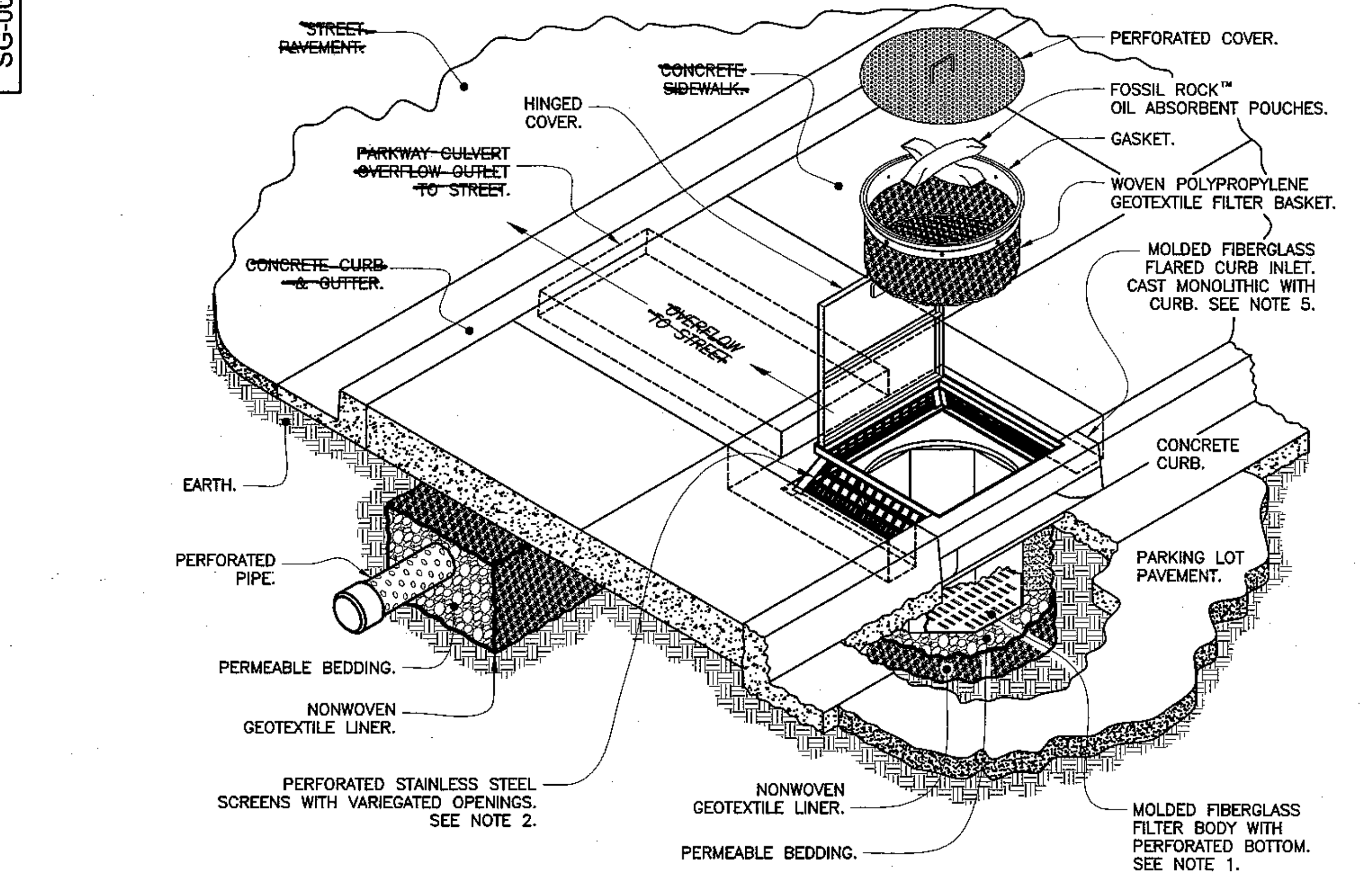
CONTECH® STORMWATER SOLUTIONS INC.
contechstormwater.com

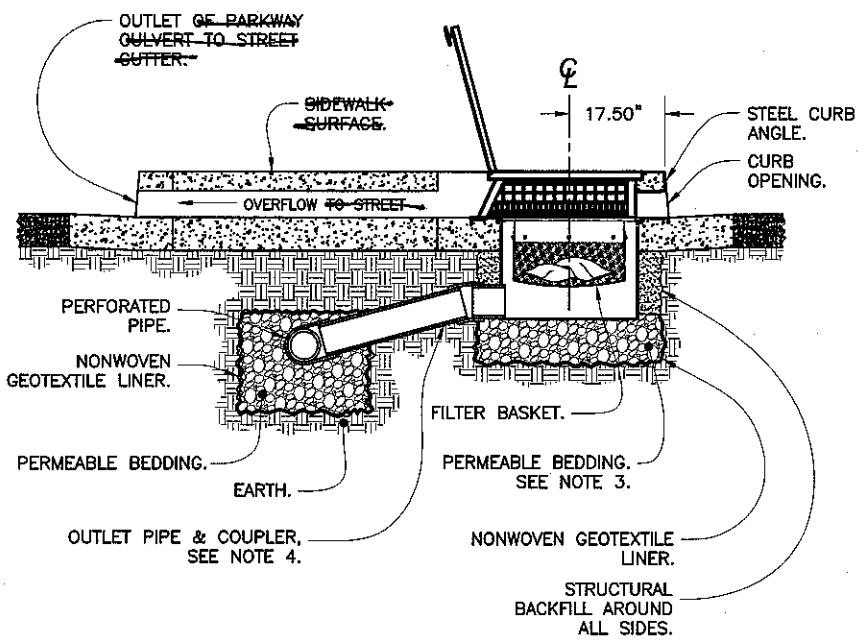
6' x 12' CURB INLET STORMFILTER
NOTES AND DATA
STANDARD DETAIL

DRAWING 3
3/3

DATE: 12/12/05 | SCALE: NONE | FILE NAME: CISF11-612PC-DTL | DRAWN: MJW | CHECKED: ARG

SG-0002





NOTES:

1. SwaleGard® body shall be fabricated from petroleum resistant fiberglass, per UL-MH19409.

2. Metal components shall be fabricated from either mild steel, (hot dipped galvanized per ASTM A123), or stainless steel Type 304.

3. Install SwaleGard® on permeable bedding, (drain rock or sand) and nonwoven geotextile filter cloth. Bedding shall be a minimum depth of 12 inches beneath the bottom of fiberglass body.

4. SwaleGard® pre-filter is supplied with sump outlet pipe connection (4 inch diameter). Outlet pipe assembly can be configured to accommodate sub-surface flow (as shown), or flow to swale surface. (See Grassy Swale drawing number SG-0001).

5. SwaleGard® is available with standard 24 inch wide curb opening (as shown) or with 48 inch wide opening for higher flow areas.

6. Contact manufacturer for use within high ground water areas, or in areas with low perk rates (impervious ground conditions).

U.S. PATENT NUMBER 6,905,599

OUTFALL 5 INFILTRATION PRE-FILTER

TITLE

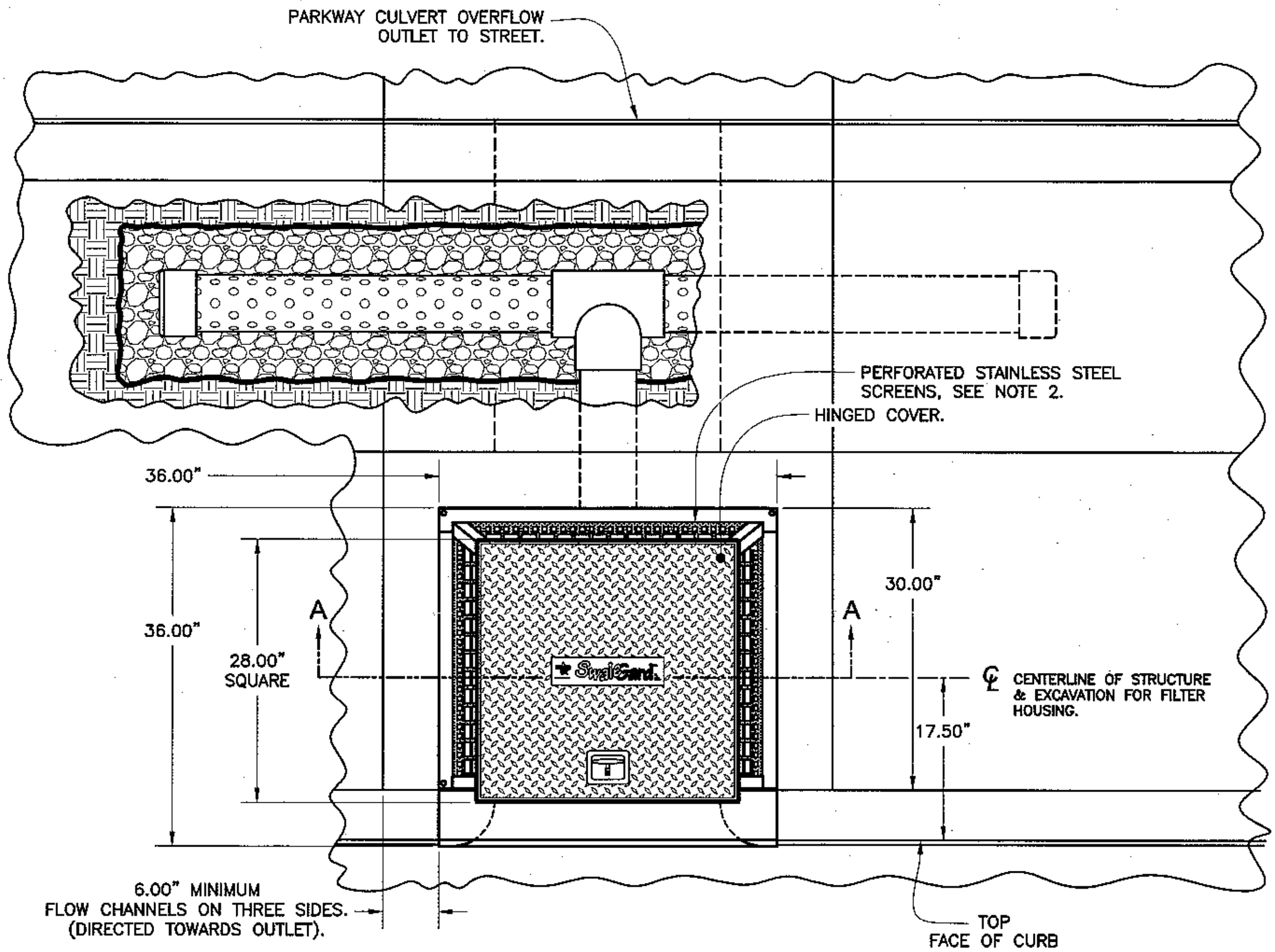
SwaleGard®

PARKWAY CULVERT PRE-FILTER

KRISTAR
KriStar Enterprises, Inc.
P.O. Box 6419, Santa Rosa, CA 95406
Ph: 800.579.8819, Fax: 707.524.8186, www.kristar.com

DRAWING NO.	REV	ECO	DATE	
SG-0002	B	0022 3/14/07	JPR 9/18/06	SHEET 1 OF 2

SG-0002



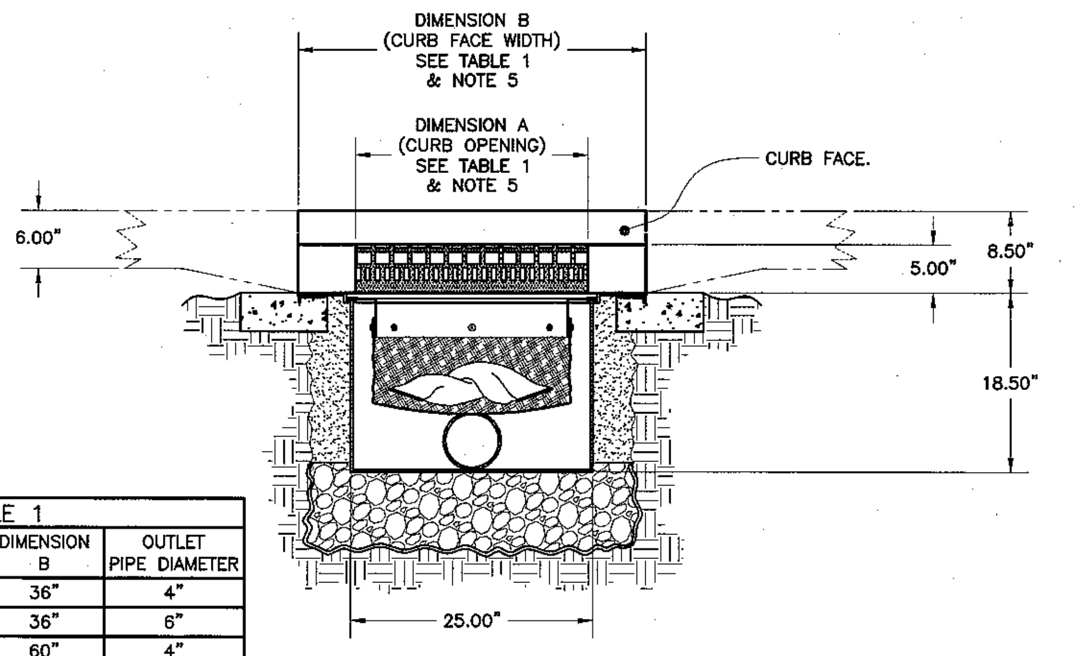


TABLE 1			
MODEL NUMBER	DIMENSION A	DIMENSION B	OUTLET PIPE DIAMETER
FF–PC24–4	24"	36"	4"
FF–PC24–6	24"	36"	6"
FF–PC48–4	48"	60"	4"
FF–PC48–6	48"	60"	6"

SECTION A-A
(SECTION IS FROM BELOW CURB OPENING & FRAME ONLY)

U.S. PATENT NUMBER 6,905,599

TITLE

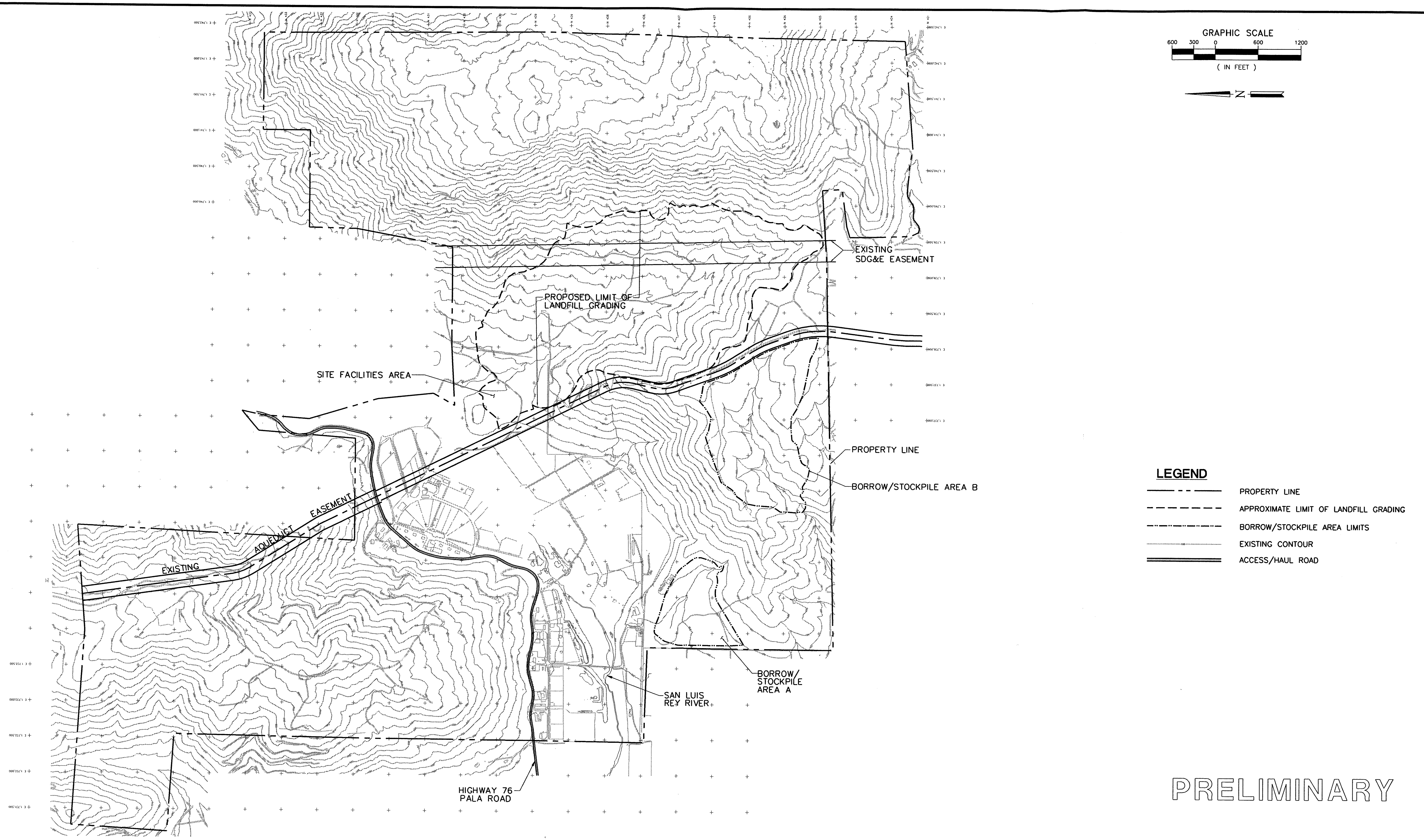
SwaleGard®

PARKWAY CULVERT PRE-FILTER

KriStar Enterprises, Inc.
P.O. Box 6419, Santa Rosa, CA 95406
Ph: 800.579.8819, Fax: 707.524.8186, www.kristar.com

DRAWING NO.	REV	ECO	DATE	
SG-0002	B	0022 3/14/07	JPR 9/18/06	SHEET 2 OF 2

Drainage, Hydrology, and Floodplain Maps



NOTE: AERIAL SURVEY TOPOGRAPHY FLOWN IN 1991

FIGURE 27A

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL
PRE-DEVELOPMENT TOPOGRAPHY

DESIGNED BY : E.L.S.	SCALE : AS SHOWN	
DRAWN BY : J.P.J.	DATE : 10-2002	FILE NO.: 1717430B.DWG
CHECKED BY :	DATE :	
APPROVED BY :	DATE :	DRAWING 28

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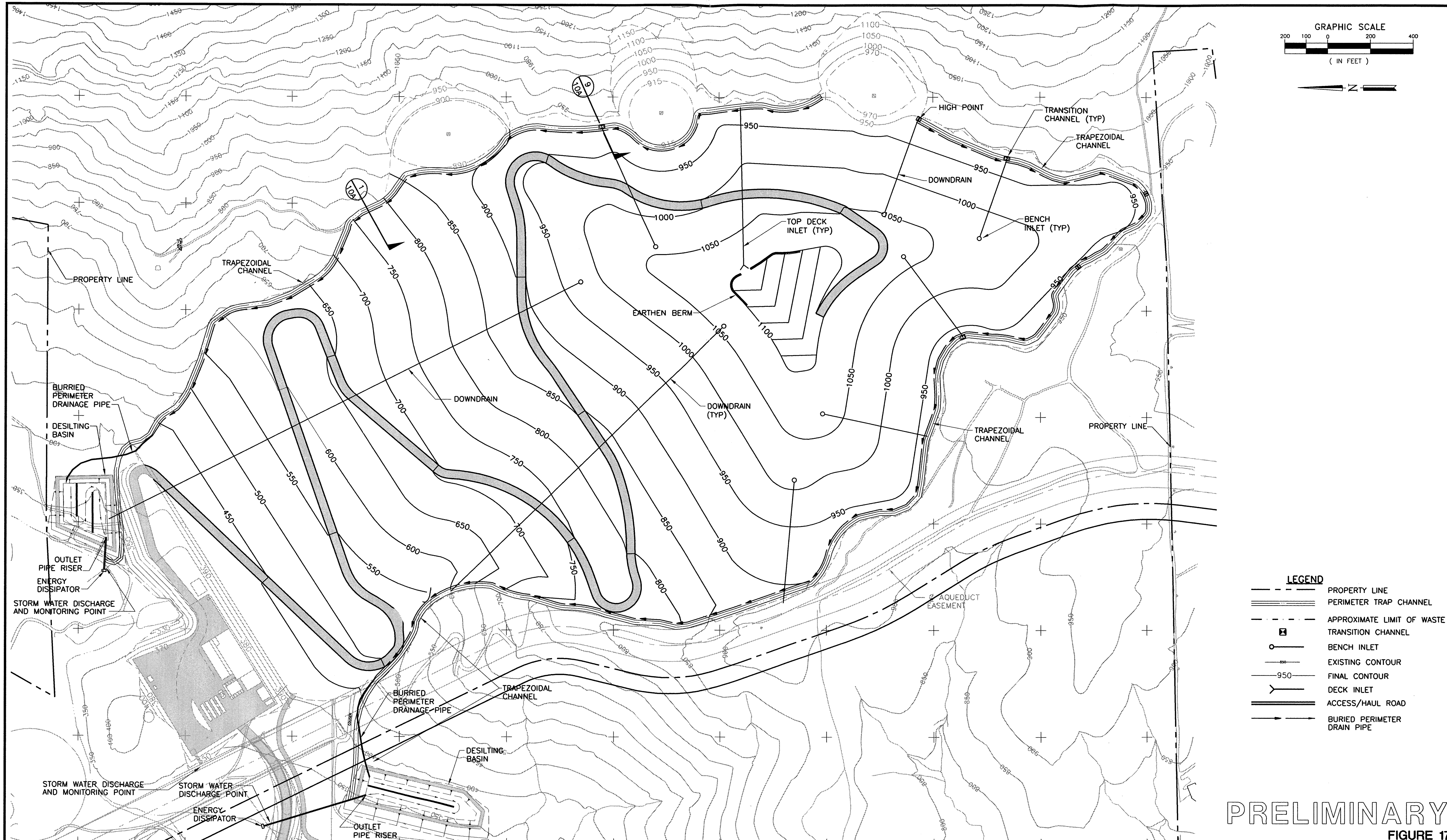


FIGURE 17

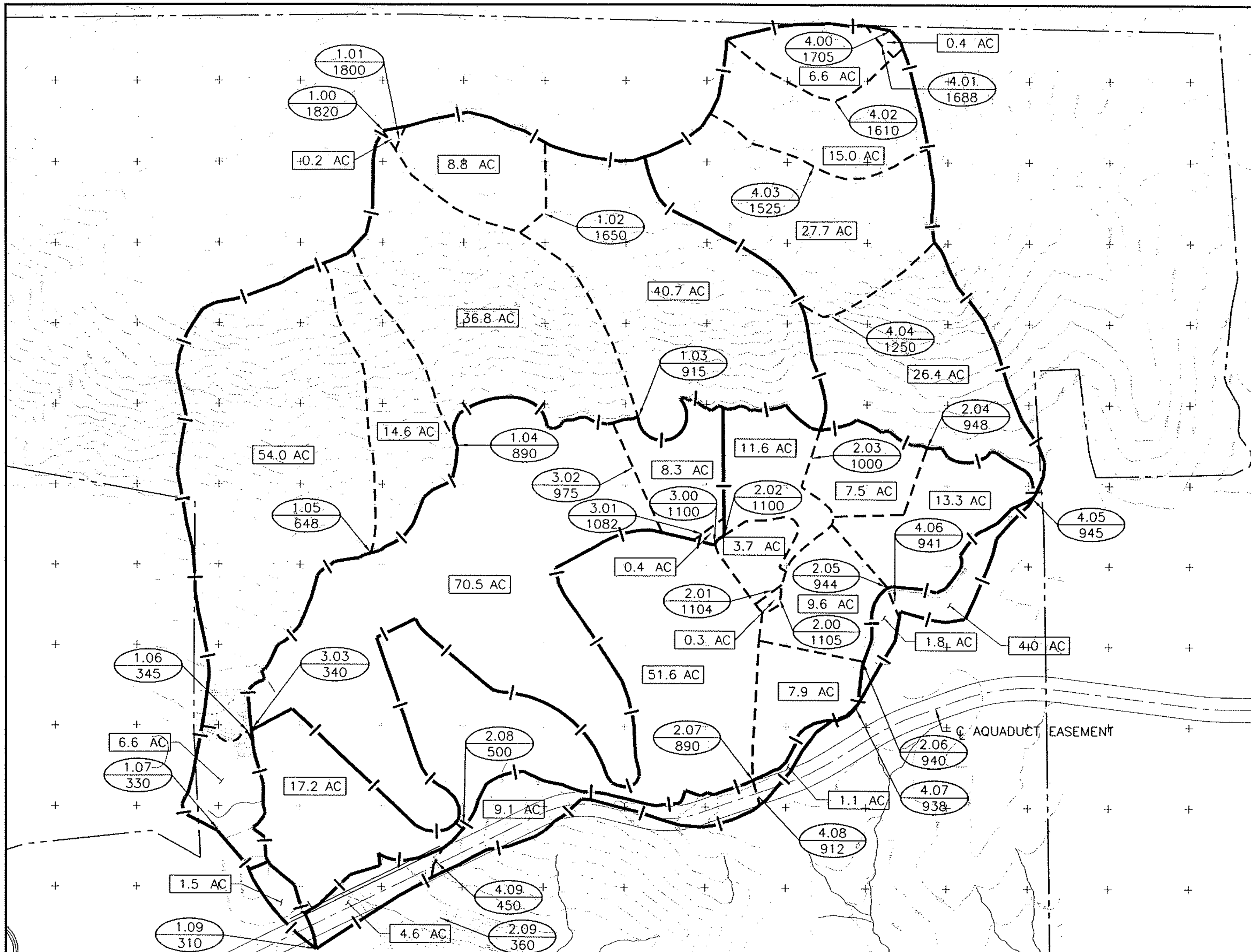
NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL
FINAL DRAINAGE PLAN

DESIGNED BY : C.M.	SCALE : AS SHOWN	
DRAWN BY : J.P.J.	DATE : 4-2002	FILE NO.: 340570B.DWG
CHECKED BY :	DATE :	DRAWING 7
APPROVED BY :	DATE :	

FOR PERMIT PURPOSES ONLY – NOT FOR CONSTRUCTION



GRAPHIC SCALE

300 150 0 300 600

(IN FEET)

N

GREGORY CANYON LANDFILL
100-YEAR RUNOFF SUMMARY TABLE

NODES NO.	SUB AREA (ACRES)	RUNOFF (CFS)	SUBAREA (ACRES)	RUNOFF (CFS)	COMMENTS
1.00-1.01	0.20	0.56	0.20	0.56	INITIAL
1.01-1.02	8.80	18.88	9.00	19.31	
1.02-1.03	40.70	79.14	49.70	96.64	
1.03-1.04	36.80	66.36	86.50	155.99	
1.04-1.05	14.60	25.50	101.10	176.61	
1.05-1.06	54.00	91.66	155.10	263.26	
1.06-1.07	6.60	10.74	161.70	263.26	
1.07			161.70	263.26	CONFLUENCE
4.00-4.01	0.40	1.12	0.40	1.12	INITIAL
4.01-4.02	6.60	15.84	7.00	16.80	
4.02-4.03	15.00	33.96	22.00	49.81	
4.03-4.04	27.70	58.49	49.70	104.94	
4.04-4.05	26.40	51.04	76.10	147.12	
4.05-4.06	4.00	6.81	80.10	147.12	
4.06-4.07	1.80	2.88	81.90	147.12	
4.07-4.08	1.10	1.71	83.00	147.12	
4.08-4.09	9.10	13.56	92.10	147.12	
4.08-4.09	4.60	6.85	96.70	147.12	ADDITIONAL
1.09			96.70	147.12	CONFLUENCE
2.00-2.01	0.30	0.62	0.30	0.62	INITIAL
2.01-2.02	3.70	5.84	4.00	6.31	
2.02-2.03	11.60	17.04	15.60	22.92	
2.03-2.04	7.50	10.25	23.10	31.57	
2.04-2.05	13.30	14.81	36.40	40.53	ADDITIONAL
2.05-2.06	9.60	10.44	46.00	50.04	ADDITIONAL
2.06-2.07	7.90	8.40	53.90	57.28	ADDITIONAL
2.07-2.08	51.60	53.48	105.50	109.35	ADDITIONAL
2.08-2.09	17.20	17.70	122.70	150.06	ADDITIONAL
3.00-3.01	0.40	1.12	0.40	1.12	INITIAL
3.01-3.02	8.30	19.78	8.70	20.73	
3.02-3.03	70.50	132.06	79.20	148.36	

LEGEND

	DRAINAGE TRIBUTARY AREA
	DRAINAGE SUB-AREA
1.00 / 1705 — NODE NAME / ELEVATION	NODE DESCRIPTION
54.00 AC	AREA IN ACRES

PRELIMINARY

FIGURE 18

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL
100-YEAR DEVELOPED CONDITION
HYDROLOGY MAP

DESIGNED BY : C.M.	SCALE : AS SHOWN	
DRAWN BY : J.P.J.	DATE : 9-2004	FILE NO.: 241850B.DWG
CHECKED BY :	DATE :	DRAWING 24
APPROVED BY :	DATE :	

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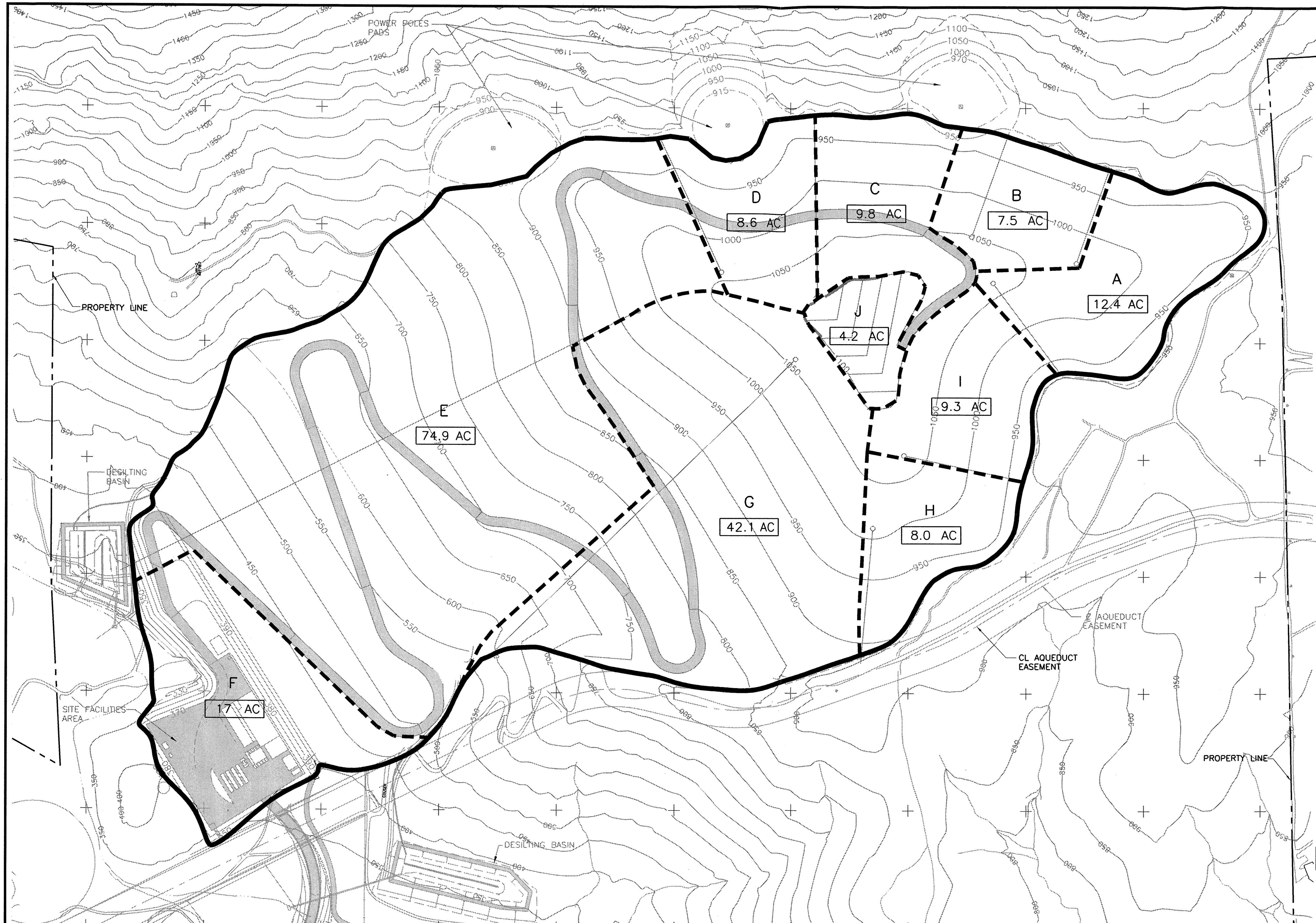

GRAPHIC SCALE

200 100 0 200 400

(IN FEET)
1 inch = ft.

STUDY AREA BOUNDARY
STUDY SUBAREA BOUNDARY
PROPERTY LINE
A SUBAREA NAME
0.5 AC AREA IN ACRES

GREGORY CANYON LANDFILL
SOIL LOSS SUMMARY TABLE

STUDY AREA	AREA (ACRES)	ANNUAL SOIL LOSS (TONS/YR)	VOLUME (CY)
A	12.4	23.5	17.19
B	7.5	14.0	10.40
C	9.8	18.3	13.59
D	8.6	16.1	11.93
E	74.9	140.2	103.86
F	17.0	31.8	23.57
G	42.1	78.8	58.38
H	8.0	15.0	11.09
I	9.3	17.4	12.90
J	4.2	7.9	5.82
TOTAL	193.8	362.8	268.7

AVERAGE SOIL LOSS = 1.9 tons/ac/yr

PRELIMINARY

FIGURE 27

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL SOIL LOSS ANALYSIS MAP

DESIGNED BY : G.V.N.	SCALE : AS SHOWN	
DRAWN BY : J.P.J.	DATE : 6-2001	FILE NO.: 44027DB.DWG
CHECKED BY :	DATE :	
APPROVED BY :	DATE :	DRAWING 25

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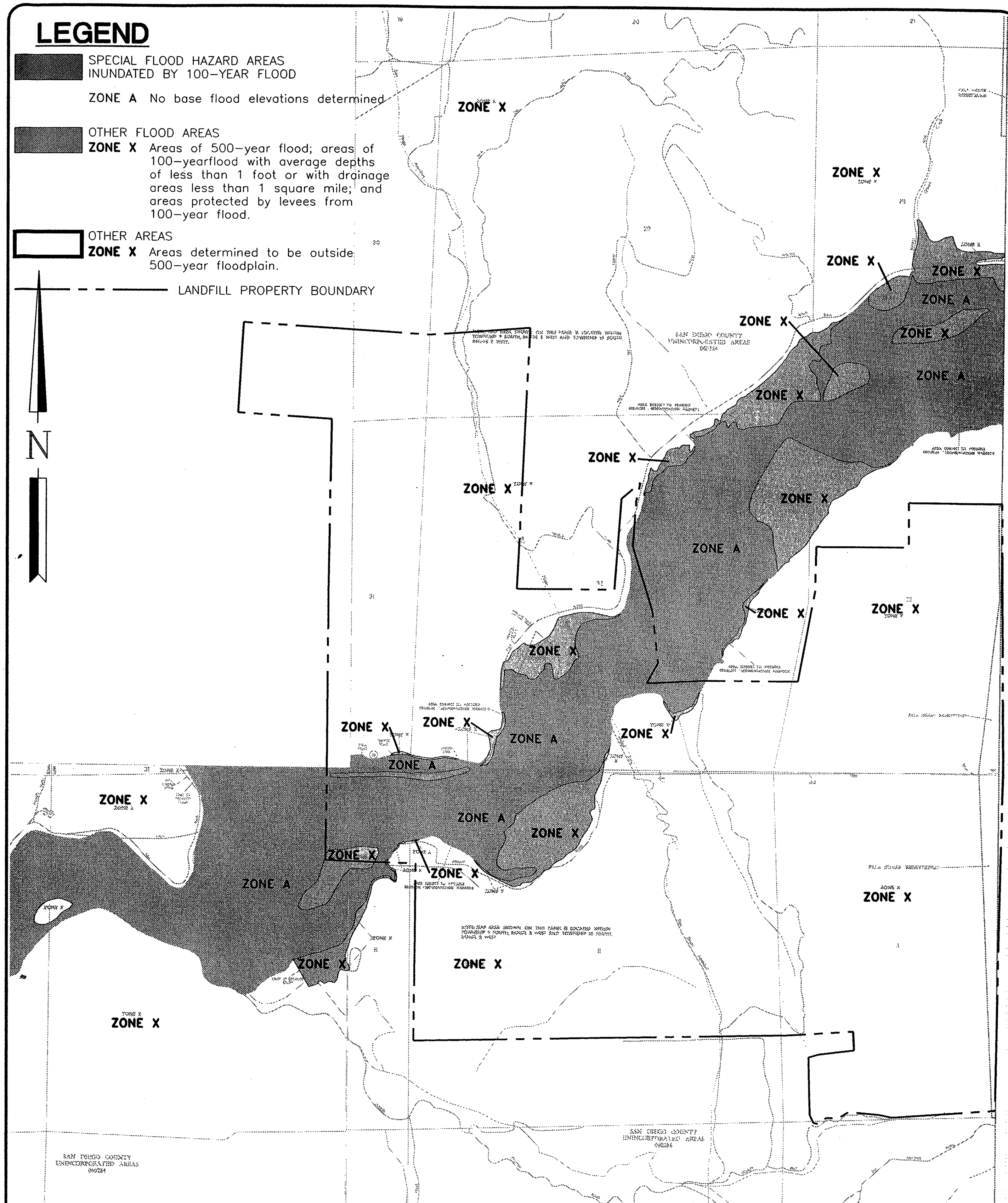

REFERENCE: FLOOD INSURANCE RATE MAP (FIRM) SAN DIEGO COUNTY, CA. AND INCORPORATED AREAS
MAP NOS. 06073C0503F, 06073C0501F ,06073C0484F (JUNE 19, 1997)

FIGURE 30B

BAS (909) 860-7777 BRYAN A. STIRRAT & ASSOCIATES CIVIL AND ENVIRONMENTAL ENGINEERS 1360 VALLEY VISTA DRIVE DIAMOND BAR, CA 91765	GREGORY CANYON LANDFILL **FLOOD PLAIN MAP**	JOB NO. 97139-7 DATE 3-2004 DRAWN BY M.T.B. FILE NAME 171861DB

Grading Plans

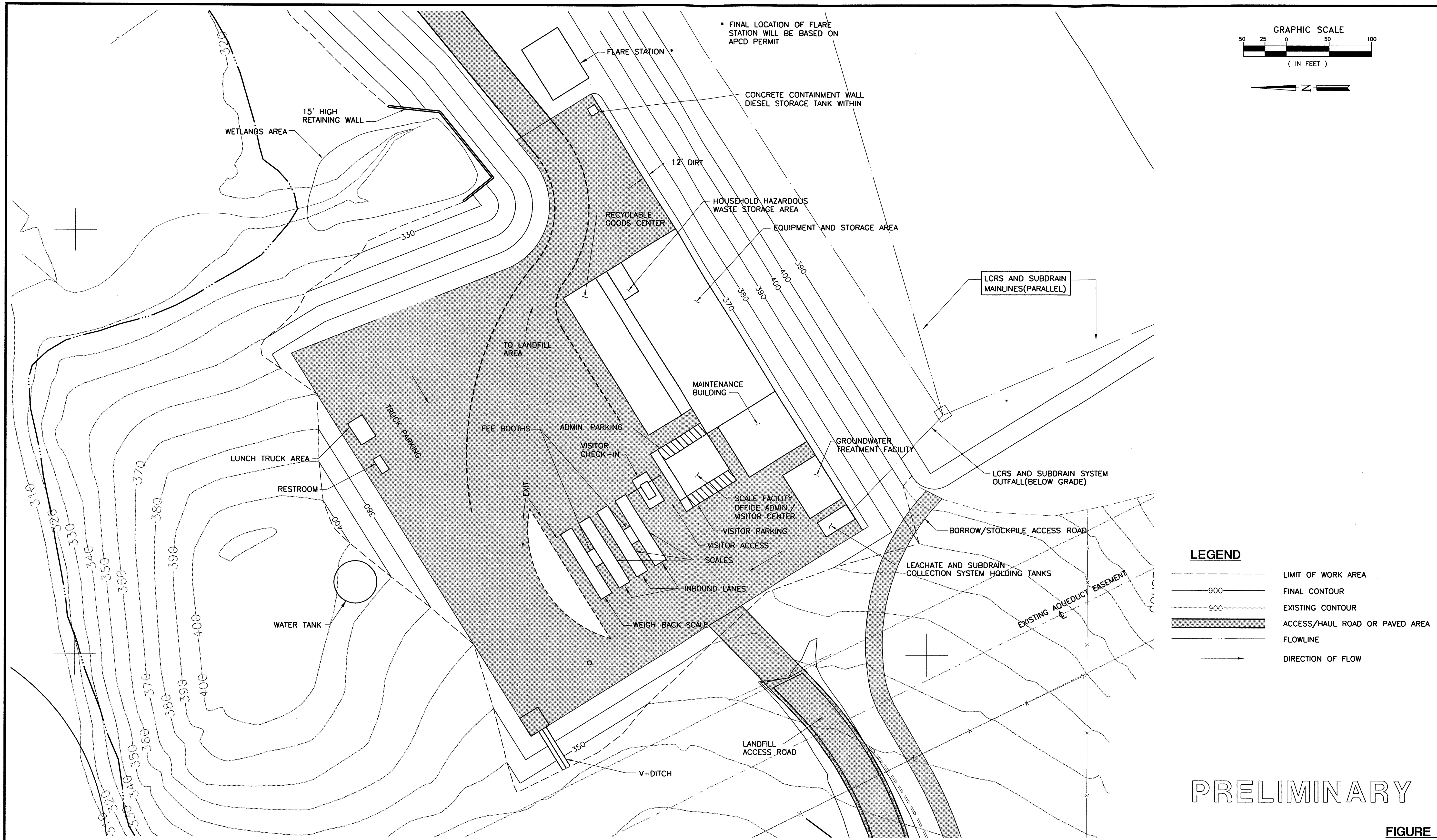

FIGURE 8

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL

SITE FACILITIES PLAN

DESIGNED BY : E.L.S.	SCALE : AS SHOWN	
DRAWN BY : M.T.B./J.P.J.	DATE : 5-2003	FILE NO.: 26048DB.DWG
CHECKED BY :	DATE :	DRAWING 3
APPROVED BY :	DATE :	

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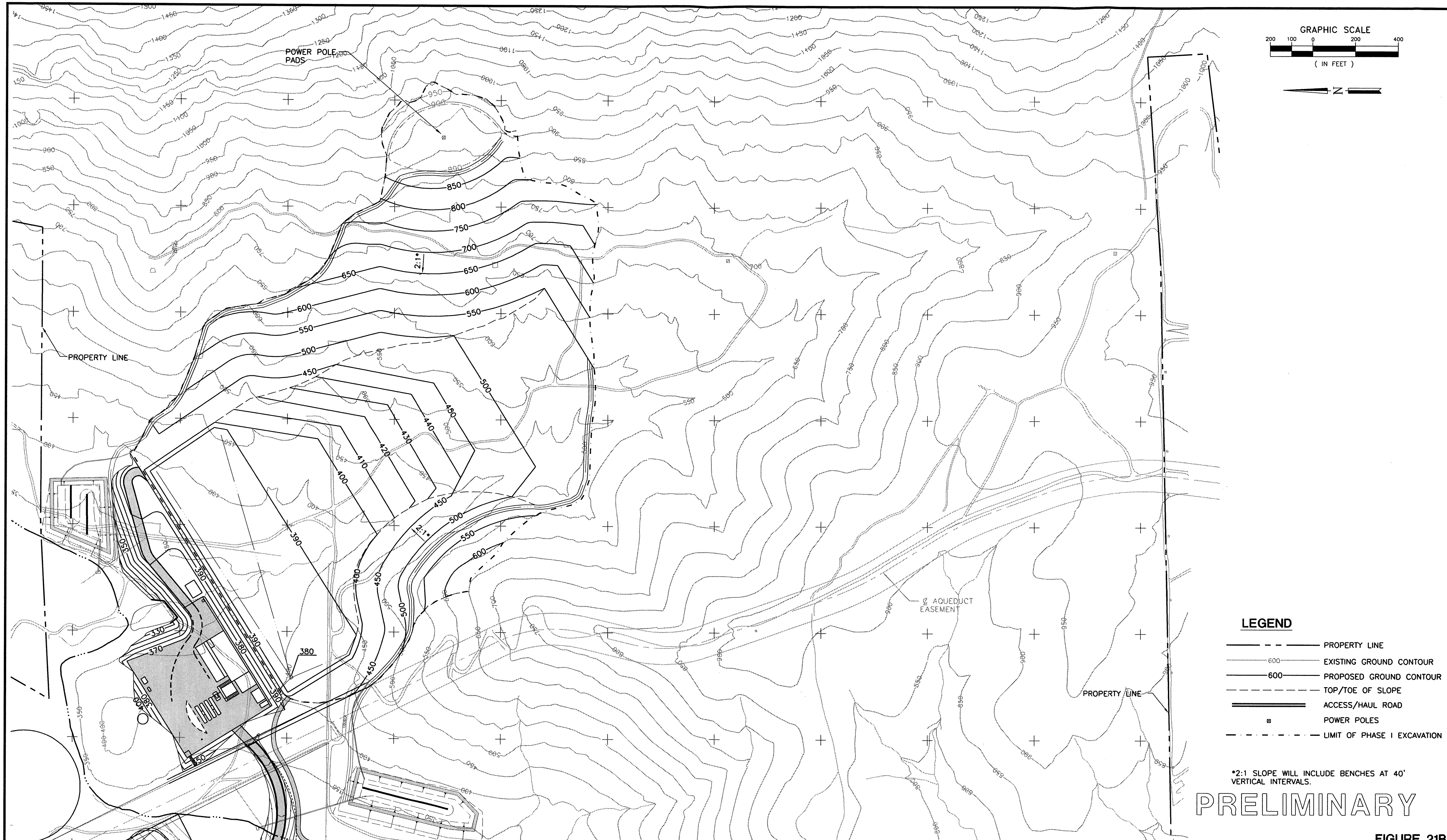

FIGURE 21B

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL
PHASE I EXCAVATION PLAN

DESIGNED BY : T.W.	SCALE : AS SHOWN		
DRAWN BY : J.P.J.	DATE : 6-2001	FILE NO. 171039DB.DWG	
CHECKED BY :	DATE :	DRAWING 9	
APPROVED BY :	DATE :		

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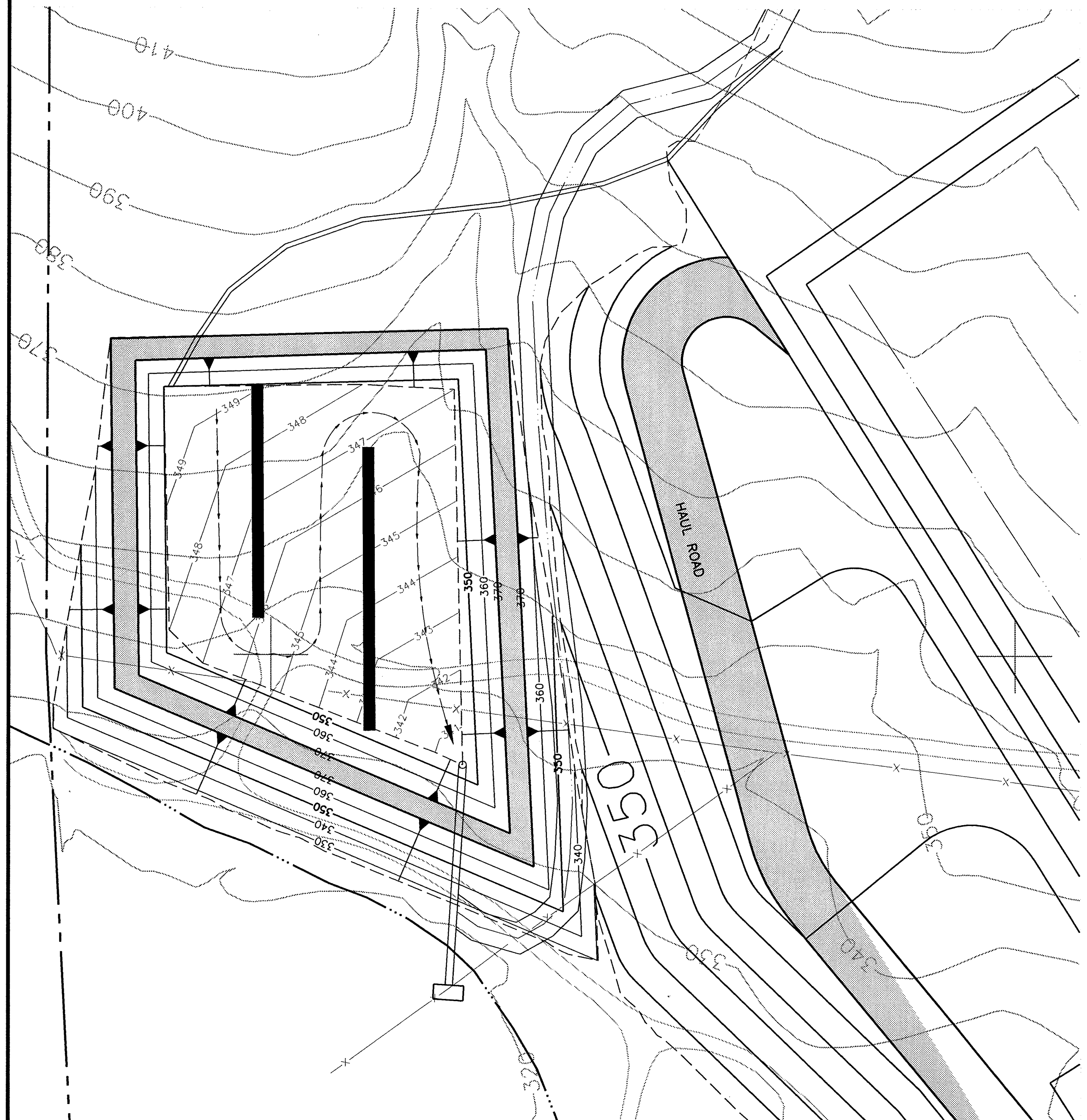
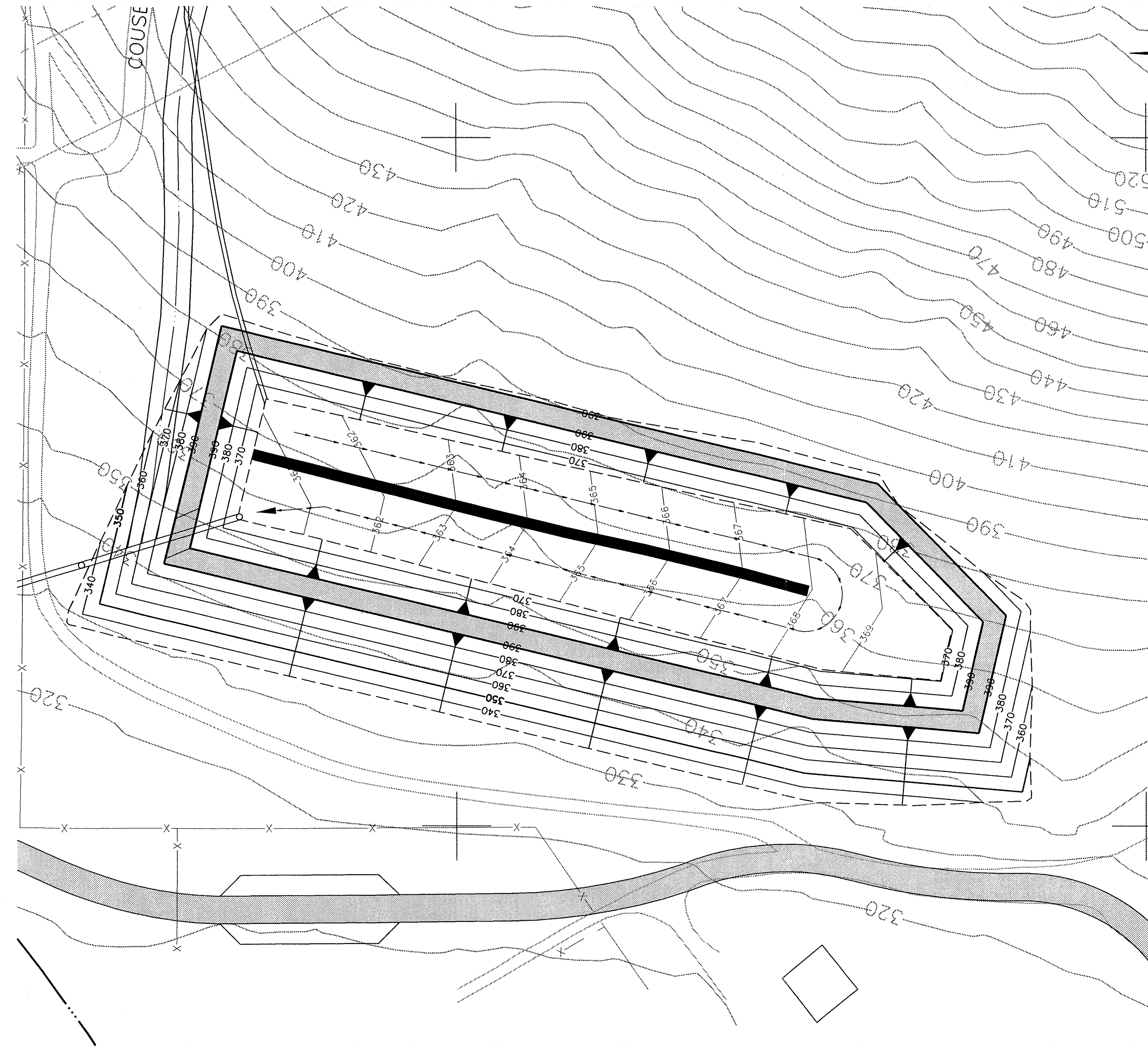
GRAPHIC SCALE

(IN FEET)



EASTERN DESILTING BASIN



WESTERN DESILTING BASIN

LEGEND

- PROPERTY LINE
- LIMIT OF REFUSE/PHASE I EXCAVATION
- TOP/TOE OF SLOPE
- 900 FINAL CONTOUR
- 900 EXISTING CONTOUR
- ACCESS/HAUL ROAD

PRELIMINARY

FIGURE 20

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
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1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL

DESILTING BASIN GRADING PLAN

DESIGNED BY : E.L.S.	SCALE : AS SHOWN	
DRAWN BY : M.T.B.	DATE : 11-1999	FILE NO.: 27498DB.DWG
CHECKED BY :	DATE :	DRAWING 26
APPROVED BY :	DATE :	

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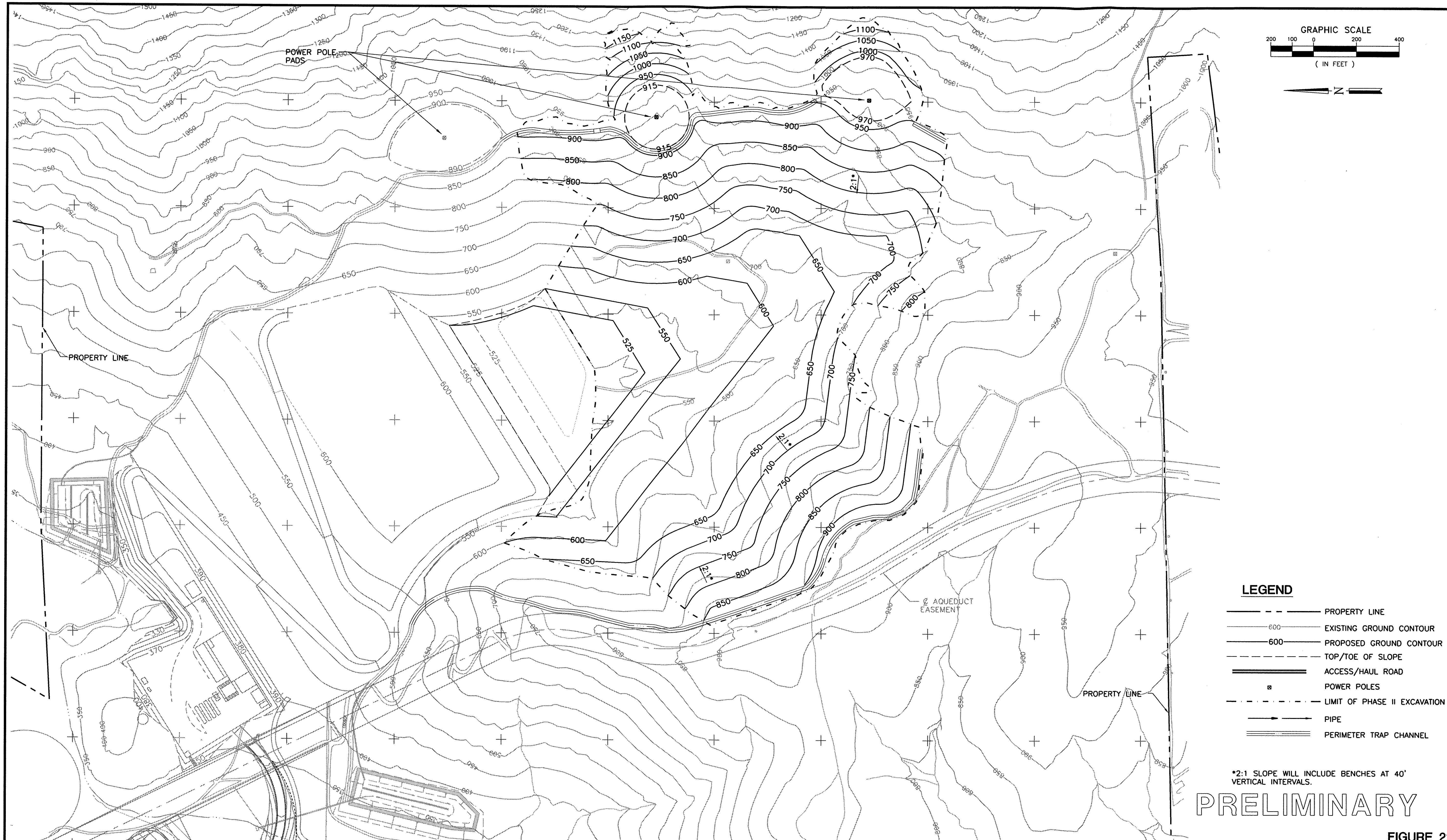

FIGURE 22

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL
PHASE II EXCAVATION PLAN

DESIGNED BY : T.W.	SCALE : AS SHOWN	
DRAWN BY : J.P.J.	DATE : 6-2001	FILE NO. 171048DB.DWG
CHECKED BY :	DATE :	DRAWING 12
APPROVED BY :	DATE :	

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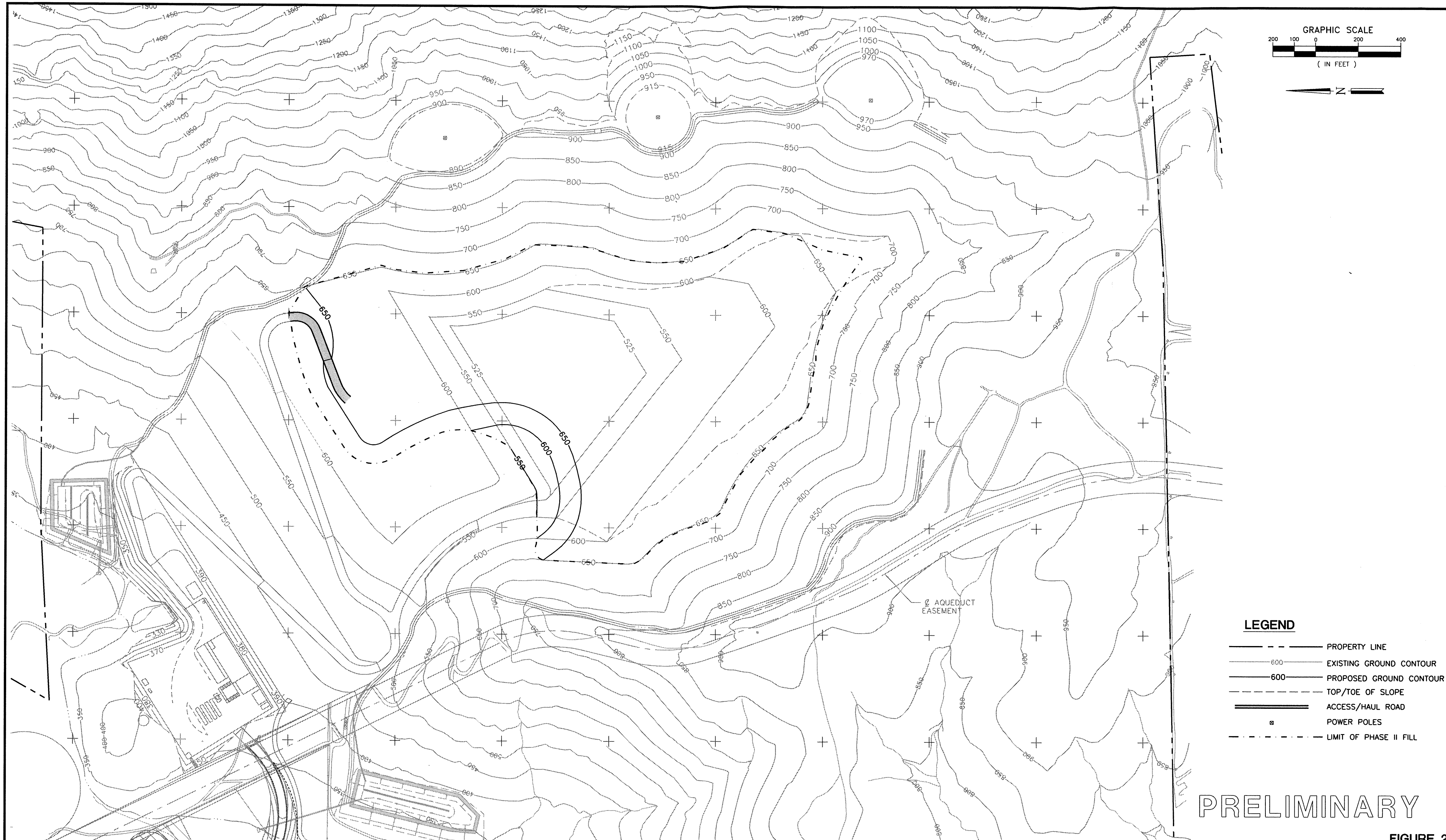

FIGURE 23

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
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1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL

PHASE II FILL PLAN

DESIGNED BY : T.W.	SCALE : AS SHOWN	
DRAWN BY : J.P.J.	DATE : 6-2001	FILE NO. 171049DB.DWG
CHECKED BY :	DATE :	DRAWING 13
APPROVED BY :	DATE :	

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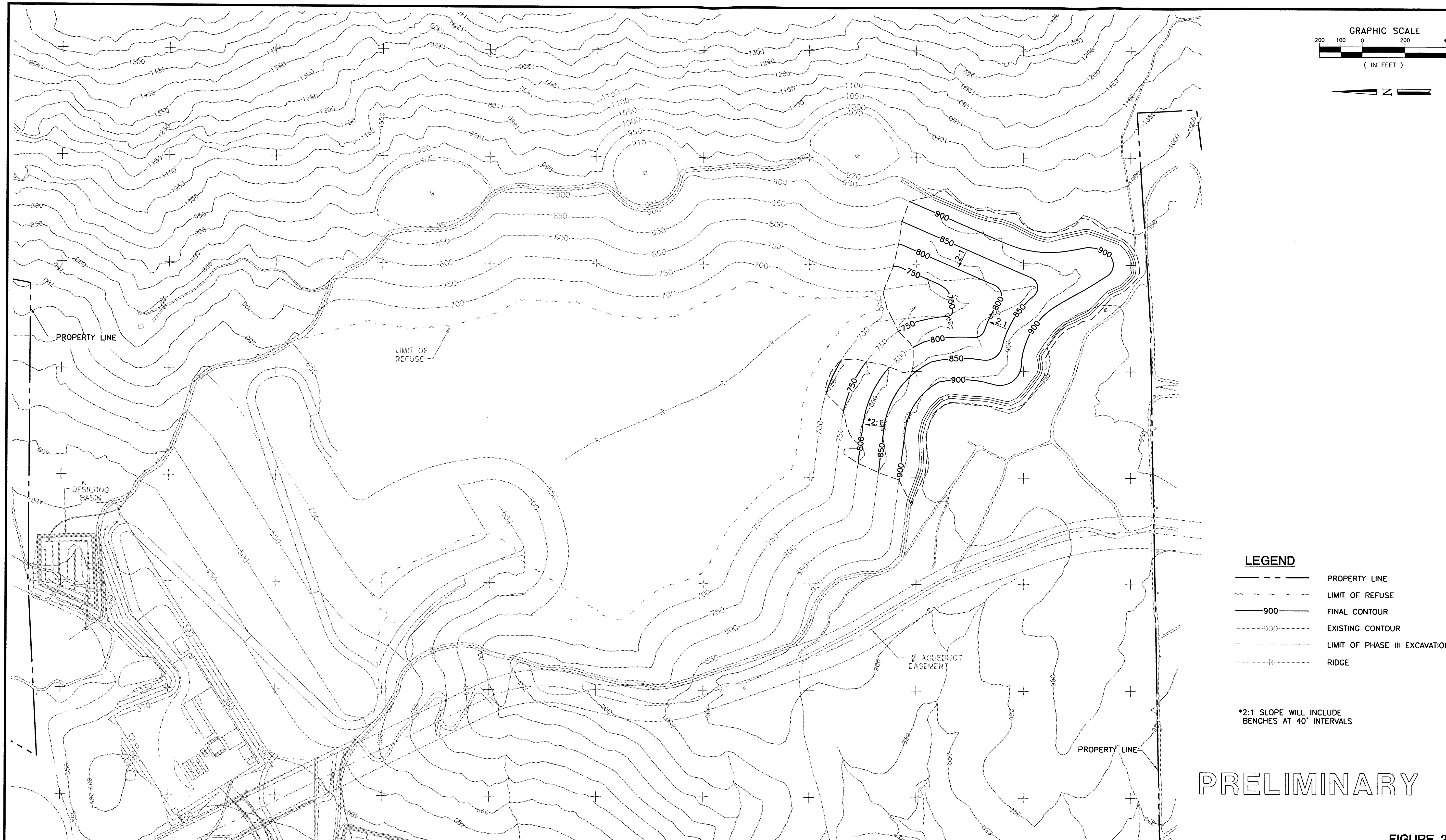

FIGURE 24

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
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1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL
PHASE III EXCAVATION

DESIGNED BY : E.L.S.	SCALE : AS SHOWN		
DRAWN BY : M.T.B.	DATE : 8-2000	FILE NO.: 28038DB.DWG	
CHECKED BY :	DATE :	DRAWING 14	
APPROVED BY :	DATE :		

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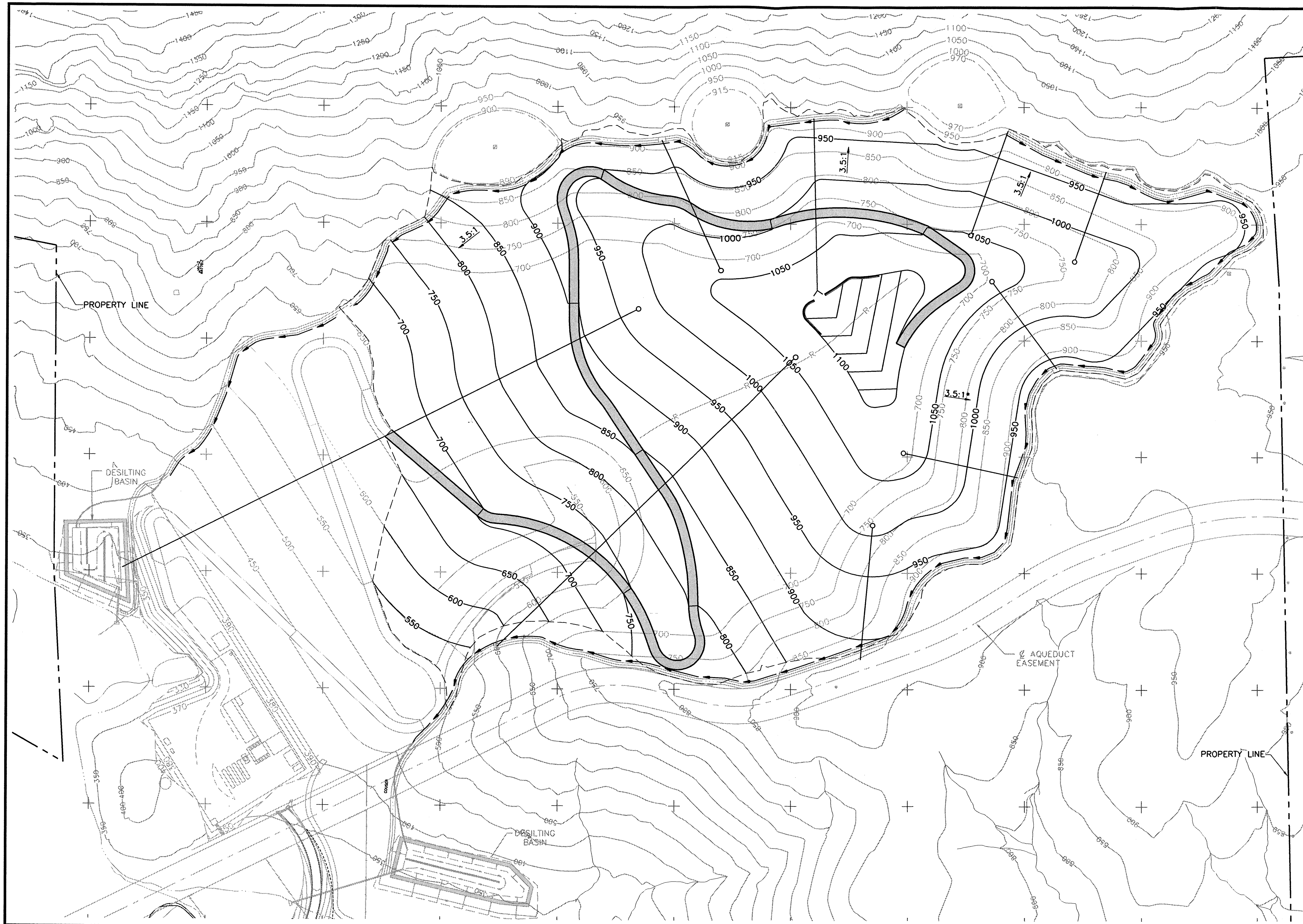

GRAPHIC SCALE

200 100 0 200 400

(IN FEET)

N

LEGEND

— - - —	PROPERTY LINE
— · — · —	LIMIT OF REFUSE
— — — —	LIMIT OF PHASE III FILL
—900—	FINAL CONTOUR
---900---	EXISTING CONTOUR
—R—	RIDGE
—▸—	BURIED PERIMETER DRAIN PIPE

*3.5:1 SLOPE WILL INCLUDE BENCHES AT 40' INTERVALS

PRELIMINARY

FIGURE 26

NO.	REVISION DESCRIPTION	BY:

BAS
BRYAN A. STIRRAT & ASSOCIATES
CONSULTING CIVIL & ENVIRONMENTAL ENGINEERS
1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL

PHASE III FILL

DESIGNED BY : E.L.S.	SCALE : AS SHOWN	
DRAWN BY : M.T.B./J.P.J.	DATE : 7-2000	FILE NO.: 27348DB.DWG
CHECKED BY :	DATE :	
APPROVED BY :	DATE :	DRAWING 16

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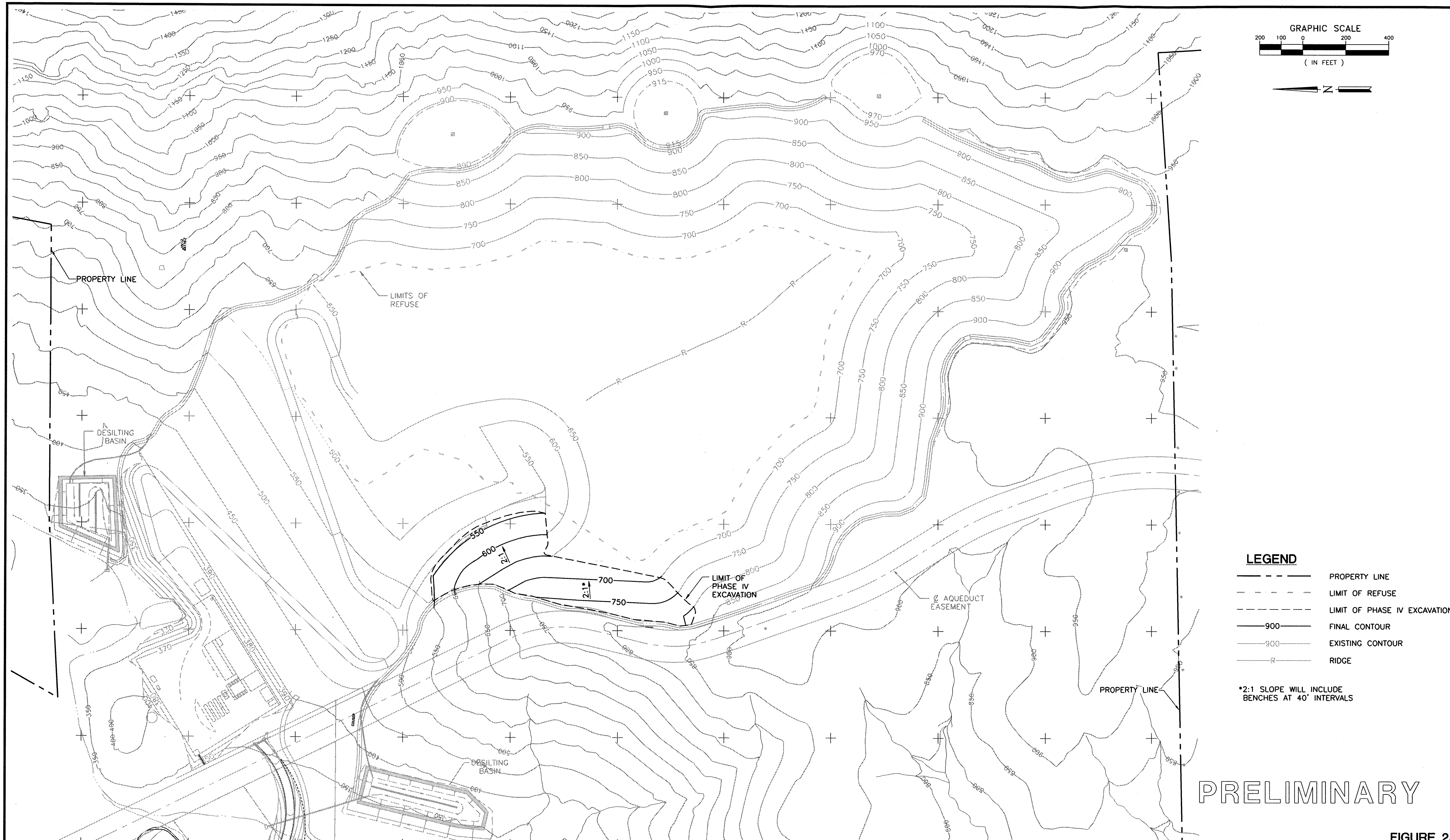

FIGURE 25

NO.	REVISION DESCRIPTION	BY:

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1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL
PHASE IV EXCAVATION

DESIGNED BY : E.L.S.	SCALE : AS SHOWN	
DRAWN BY : M.T.B.	DATE : 7-2000	FILE NO.: 28039DB.DWG
CHECKED BY :	DATE :	DRAWING 15
APPROVED BY :	DATE :	

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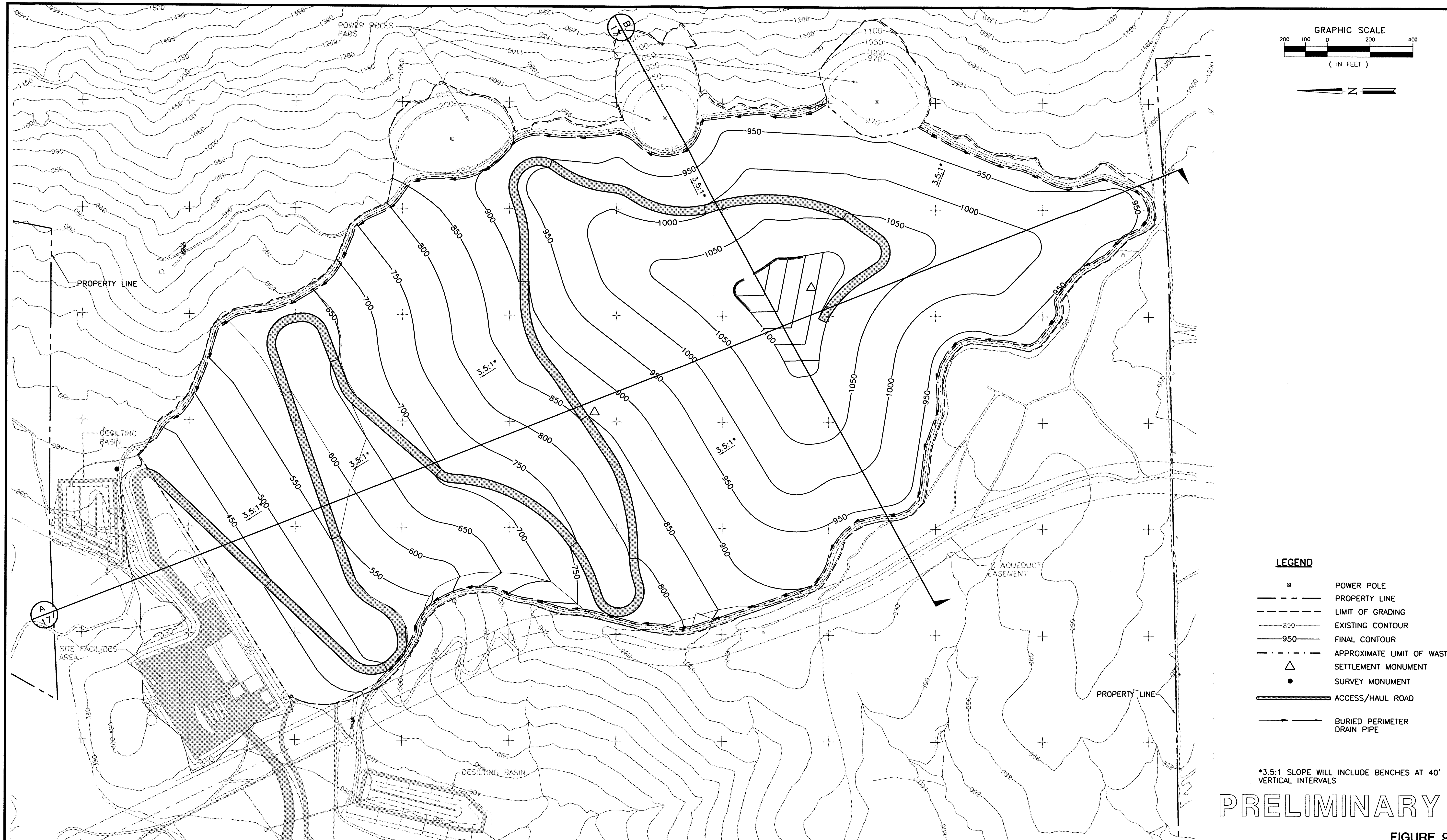

PRELIMINARY

FIGURE 9

NO.	REVISION DESCRIPTION	BY:

BAS
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1360 E. VALLEY VISTA DRIVE
DIAMOND BAR, CALIFORNIA 91765
(909) 860-7777

GREGORY CANYON LANDFILL

MASTER FILL PLAN

DESIGNED BY : E.L.S.	SCALE : AS SHOWN	
DRAWN BY : M.T.B.	DATE : 8-2000	FILE NO.: 27349DB.DWG
CHECKED BY :	DATE :	DRAWING 6
APPROVED BY :	DATE :	

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Attachment C

BMP Consideration Checklist

CONSTRUCTION SITE BMPs CONSIDERATION CHECKLIST					
The BMPs listed here should be considered for every project. Those BMPs that are not included in the SWPPP must be checked as "Not Used" with a brief statement describing why it is not being used.					
EROSION CONTROL BMPs					
BMP No.	**BMP**	**CONSIDERED FOR PROJECT**	**CHECK IF USED**	**CHECK IF NOT USED**	**IF NOT USED, STATE REASON**
EC-1	Scheduling		X		
EC-2	Preservation of Existing Vegetation		X		
EC-3	Hydraulic Mulch		X		
EC-4	Hydroseeding		X		
EC-5	Soil Binders		X		
EC-6	Straw Mulch		X		
EC-7	Geotextiles & Mats		X		
EC-8	Wood Mulching			X	Currently proposing other effective erosion control methods (EC-3 through EC-7)
EC-9	Earth Dikes & Drainage Swales		X		
EC-10	Velocity Dissipation Devices		X		
EC-11	Slope Drains		X		
EC-12	Streambank Stabilization		X		
EC-13	Polyacrylamide			X	Currently proposing other effective erosion control methods (EC-3 through EC-7)

CONSTRUCTION SITE BMPs
CONSIDERATION CHECKLIST

The BMPs listed here should be considered for every project. Those BMPs that are not included in the SWPPP must be checked as "Not Used" with a brief statement describing why it is not being used.

SEDIMENT CONTROL BMPs

BMP No.	BMP	CONSIDERED FOR PROJECT	CHECK IF USED	CHECK IF NOT USED	IF NOT USED, STATE REASON
SE-1	Silt Fence		X		
SE-2	Sediment Basin		X		
SE-3	Sediment Trap			X	Sediment Basins will be used instead of sediment traps
SE-4	Check Dam		X		
SE-5	Fiber Rolls		X		
SE-6	Gravel Bag Berm		X		
SE-7	Street Sweeping and Vacuuming		X		
SE-8	Sand Bag Barrier			X	Gravel bags will be used instead of Sand Bag Barriers
SE-9	Straw Bale Barrier			X	Silt Fence, Fiber Rolls, and Gravel Bags will be used instead of Straw Bale Barriers
SE-10	Storm Drain Inlet Protection		X		
SE-11	Chemical Treatment			X	Chemical treatment is not considered within the sediment basin due to the anticipated relatively coarse sediment sizes

WIND EROSION CONTROL BMPs

BMP No.	BMP	CONSIDERED FOR PROJECT	CHECK IF USED	CHECK IF NOT USED	IF NOT USED, STATE REASON
WE-1	Wind Erosion Control		X		

TRACKING CONTROL BMPs

BMP No.	BMP	CONSIDERED FOR PROJECT	CHECK IF USED	CHECK IF NOT USED	IF NOT USED, STATE REASON
TR-1	Stabilized Construction Entrance/Exit		X		
TR-2	Stabilized Construction Roadway		X		
TR-3	Entrance/Outlet Tire Wash	X			BMP maybe used depending on soil conditions

CONSTRUCTION SITE BMPs
CONSIDERATION CHECKLIST

The BMPs listed here should be considered for every project. Those BMPs that are not included in the SWPPP must be checked as "Not Used" with a brief statement describing why it is not being used.

NON-STORM WATER MANAGEMENT BMPs

BMP No.	BMP	CONSIDERED FOR PROJECT	CHECK IF USED	CHECK IF NOT USED	IF NOT USED, STATE REASON
NS-1	Water Conservation Practices		X		
NS-2	Dewatering Operations		X		
NS-3	Paving and Grinding Operations		X		
NS-4	Temporary Stream Crossing		X		
NS-5	Clear Water Diversion		X		
NS-6	Illicit Connection/ Discharge		X		
NS-7	Potable Water/Irrigation			X	
NS-8	Vehicle and Equipment Cleaning		X		
NS-9	Vehicle and Equipment Fueling		X		
NS-10	Vehicle and Equipment Maintenance		X		
NS-11	Pile Driving Operations		X		
NS-12	Concrete Curing		X		
NS-13	Concrete Finishing		X		
NS-14	Material and Equipment Use Over Water		X		
NS-15	Demolition Adjacent to Water			X	Demolition adjacent to water is not anticipated
NS-16	Temporary Batch Plants			X	Temporary batch plants are not anticipated to be used during construction

CONSTRUCTION SITE BMPs
CONSIDERATION CHECKLIST

The BMPs listed here should be considered for every project. Those BMPs that are not included in the SWPPP must be checked as "Not Used" with a brief statement describing why it is not being used.

WASTE MANAGEMENT AND MATERIALS POLLUTION CONTROL BMPs

BMP No.	BMP	CONSIDERED FOR PROJECT	CHECK IF USED	CHECK IF NOT USED	IF NOT USED, STATE REASON
WM-1	Material Delivery and Storage		X		
WM-2	Material Use		X		
WM-3	Stockpile Management		X		
WM-4	Spill Prevention and Control		X		
WM-5	Solid Waste Management		X		
WM-6	Hazardous Waste Management		X		
WM-7	Contaminated Soil Management			X	Contaminated soil is not expected to be encountered during construction
WM-8	Concrete Waste Management		X		
WM-9	Sanitary/Septic Waste Management		X		
WM-10	Liquid Waste Management		X		

Attachment D

Computation Sheet for Determining Runoff Coefficients

Total Landfill Site Area		=	308 Acres	(A)

Existing Site Conditions

Impervious Site Area [1]		=	2 Acres	(B)
Impervious Site Area Runoff Coefficient [2, 4]		=	0.9	(C)
Pervious Site Area [3]		=	306 Acres	(D)
Pervious Site Area Runoff Coefficient [4]		=	0.35	(E)
Existing Site Area Runoff Coefficient	$\frac{(B \times C) + (D \times E)}{(A)}$	=	0.353	(F)

Proposed Site Conditions (after construction)

Impervious Site Area [1]		=	13 Acres	(G)
Impervious Site Area Runoff Coefficient [2, 4]		=	0.90	(H)
Pervious Site Area [3]		=	295 Acres	(I)
Pervious Site Area Runoff Coefficient [4]		=	0.35	(J)
Proposed Site Area Runoff Coefficient	$\frac{(G \times H) + (I \times J)}{(A)}$	=	0.373	(K)

1. Includes paved areas, areas covered by buildings, and other impervious surfaces.
2. Use 0.95 unless lower or higher runoff coefficient can be verified.
3. Includes areas of vegetation, most unpaved or uncovered soil surfaces, and other pervious areas.
4. Refer to local Hydrology Manual for typical C values.

Attachment E

Computational Sheet for Determining Run-on Discharges

Run-on to East Perimeter Drainage Ditch (PSD)

Area Runoff Coefficient		=	0.35	(A)
Area Rainfall Intensity		=	3 in/hr	(B)
Drainage Area		=	162 Acres	(C)
Site Area Run-on Discharge	(A) x (B) x (C)	=	170 ft^3/sec	(D)

Run-on to West Perimeter Drainage Ditch (PSD)

Area Runoff Coefficient		=	0.35	(A)
Area Rainfall Intensity		=	3 in/hr	(B)
Drainage Area		=	97 Acres	(C)
Site Area Run-on Discharge	(A) x (B) x (C)	=	102 ft^3/sec	(D)

Attachment F

Notice of Intent (NOI)

Submitted under SMARTS System September 2010

Attachment G

The contractor shall use the following guidelines for maintenance, inspection, and repair of BMPs identified in the SWPPP		
BEST MANAGEMENT PRACTICES (BMPs)	**INSPECTION FREQUENCY (all controls)**	**MAINTENANCE/REPAIR PROGRAM**
TEMPORARY EROSION CONTROL BMPs		
EC-1 Scheduling	Daily during construction	- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions. - Amend the schedule when changes are warranted. - Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.
EC-2 Preservation of Existing Vegetation	Daily during construction	- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots. - Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.
EC-3 Hydraulic Mulch	Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season, and at two-week intervals during the non-rainy season.	- Areas where erosion is evident shall be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs. - Maintain an unbroken, temporary mulched ground cover throughout the period of construction when the soils are not being reworked.
EC-4 Hydroseeding	Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season, and at two-week intervals during the non-rainy season.	- Areas where erosion is evident shall be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs. - Where seeds fail to germinate, or they germinate and die, the area must be re-seeded, fertilized, and mulched within the planting season, using not less than half the original application rates. - Irrigation systems, if applicable, should be inspected daily while in use to identify system malfunctions and line breaks. When line breaks are detected, the system must be shut down immediately and breaks repaired before the system is put back into operation. - Irrigation systems shall be inspected for complete coverage and adjusted as needed to maintain complete coverage.

The contractor shall use the following guidelines for maintenance, inspection, and repair of BMPs identified in the SWPPP		
BEST MANAGEMENT PRACTICES (BMPs)	**INSPECTION FREQUENCY (all controls)**	**MAINTENANCE/REPAIR PROGRAM**
EC-5 Soil Binders	Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season, and at two-week intervals during the non-rainy season.	- Areas where erosion is evident shall be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs. - Reapply the selected soil binder as needed to maintain effectiveness.
EC-6 Straw Mulch	Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season, and at two-week intervals during the non-rainy season.	- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs. - The key consideration in inspection and maintenance is that the straw needs to last long enough to achieve erosion control objectives. - Maintain an unbroken, temporary mulched ground cover while disturbed soil areas are inactive. Repair any damaged ground cover and re-mulch exposed areas. - Reapplication of straw mulch and tackifier may be required to maintain effective soil stabilization over disturbed areas and slopes.
EC-7 Geotextiles & Mats	Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season, and at two-week intervals during the non-rainy season.	- Areas where erosion is evident shall be repaired and BMPs reapplied as soon as possible. - Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs. - If washout or breakage occurs, re-install the material after repairing the damage to the slope or channel. - Make sure matting is uniformly in contact with the soil. - Check that all the lap joints are secure. - Check that staples are flush with the ground. - Check that disturbed areas are seeded.

The contractor shall use the following guidelines for maintenance, inspection, and repair of BMPs identified in the SWPPP		
BEST MANAGEMENT PRACTICES (BMPs)	**INSPECTION FREQUENCY (all controls)**	**MAINTENANCE/REPAIR PROGRAM**
EC-9 Earth Dikes & Drainage Swales	- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season. - Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.	- Inspect ditches and berms for washouts. Replace lost riprap, damaged linings or soil stabilizers as needed. - Inspect channel linings, embankments, and beds of ditches and berms for erosion and accumulation of debris and sediment. Remove debris and sediment and repair linings and embankments as needed. - Temporary conveyances should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction
EC-10 Velocity Dissipation Devices	- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season. - Inspect BMPs subjected to non-stormwater discharges daily while non-stormwater discharges occur.	- Inspect apron for displacement of the riprap and damage to the underlying fabric. Repair fabric and replace riprap that has washed away. If riprap continues to wash away, consider using larger material. - Inspect for scour beneath the riprap and around the outlet. Repair damage to slopes or underlying filter fabric immediately. -Temporary devices should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction.
EC-11 Slope Drains	- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season. - Inspect BMPs subjected to non-stormwater discharges daily while non-stormwater discharges occur.	- Inspect outlet for erosion and downstream scour. If eroded, repair damage and install additional energy dissipation measures. If downstream scour is occurring, it may be necessary to reduce flows being discharged into the channel unless other preventative measures are implemented. - Insert inlet for clogging or undercutting. Remove debris from inlet to maintain flows. Repair undercutting at inlet and if needed, install flared section or rip rap around the inlet to prevent further undercutting. - Inspect pipes for leakage. Repair leaks and restore damaged slopes. - Inspect slope drainage for accumulations of debris and sediment. - Remove built up sediment from entrances and outlets as required. Flush drains if necessary; capture and settle out sediment from discharge. - Make sure water is not ponding onto inappropriate areas (e.g., active traffic lanes, material storage areas, etc.). - Pipe anchors must be checked to ensure that the pipe remains anchored to the slope. Install additional anchors if pipe movement is detected.

The contractor shall use the following guidelines for maintenance, inspection, and repair of BMPs identified in the SWPPP		
BEST MANAGEMENT PRACTICES (BMPs)	**INSPECTION FREQUENCY (all controls)**	**MAINTENANCE/REPAIR PROGRAM**
EC-12 Streambank Stabilization	- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation. - Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.	- Reshape berms as needed and replace lost or dislodged rock, and filter fabric. - Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location.
TEMPORARY SEDIMENT CONTROL BMPs		
SE-1 Silt Fence	Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.	- Repair undercut silt fences. - Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months. - Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed of, and replaced with new silt fence barriers. - Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location. - Silt fences should be left in place until the upstream area is permanently stabilized. Until then, the silt fence must be inspected and maintained. - Holes, depressions, or other ground disturbance caused by the removal of the silt fences should be backfilled and repaired.

The contractor shall use the following guidelines for maintenance, inspection, and repair of BMPs identified in the SWPPP		
BEST MANAGEMENT PRACTICES (BMPs)	**INSPECTION FREQUENCY (all controls)**	**MAINTENANCE/REPAIR PROGRAM**
SE-2 Sediment Basin	Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.	- Examine basin banks for seepage and structural soundness. -Check inlet and outlet structures and spillway for any damage or obstructions. --Repair damage and remove obstructions as needed. -Check inlet and outlet area for erosion and stabilize if required. -Check fencing for damage and repair as needed. -Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-half the designated sediment storage volume. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed of at appropriate locations. - Remove standing water from basin within 72 hours after accumulation. -To minimize vector production: remove accumulation of live and dead floating vegetation in basins during every inspection. - Remove excessive emergent and perimeter vegetation as needed or as advised by local or state vector control agencies.
SE-4 Check Dam	Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.	- Replace missing rock, bags, bales, etc. Replace bags or bales that have degraded or have become damaged. - If the check dam is used as a sediment capture device, sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. -Sediment should be removed when the sediment accumulation reaches one-third of the barrier height. - Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location. - If the check dam is used as a grade control structure, sediment removal is not required as long as the system continues to control the grade. -Remove accumulated sediment prior to permanent seeding or soil stabilization. -Remove check dam and accumulated sediment when check dams are no longer needed.

The contractor shall use the following guidelines for maintenance, inspection, and repair of BMPs identified in the SWPPP		
BEST MANAGEMENT PRACTICES (BMPs)	**INSPECTION FREQUENCY (all controls)**	**MAINTENANCE/REPAIR PROGRAM**
SE-5 Fiber Rolls	Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.	- Repair or replace split, torn, unraveling, or slumping fiber rolls. -If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-half the designated sediment storage depth, usually one-half the distance between the top of the fiber roll and the adjacent ground surface. Sediment removed during maintenance may be incorporated into earthwork on the site of disposed at an appropriate location. - If fiber rolls are used for erosion control, such as in a mini check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
SE-6 Gravel Bag Berm	Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.	- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags. - Reshape or replace gravel bags as needed. - Repair washouts or other damage as needed. - Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location. - Remove gravel bag berms when no longer needed. Remove sediment accumulation and clean, re-grade, and stabilize the area. Removed sediment should be incorporated in the project or disposed of.
SE-7 Street Sweeping and Vacuuming	-Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season. - When actively in use, points of ingress and egress must be inspected daily.	- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions. - Be careful not to sweep up any unknown substance or any object that may be potentially hazardous. - Adjust brooms frequently; maximize efficiency of sweeping operations. - After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

The contractor shall use the following guidelines for maintenance, inspection, and repair of BMPs identified in the SWPPP		
BEST MANAGEMENT PRACTICES (BMPs)	**INSPECTION FREQUENCY (all controls)**	**MAINTENANCE/REPAIR PROGRAM**
SE-10 Storm Drain Inlet Protection		
WIND EROSION CONTROL BMPs		
WE-1 Wind Erosion Control	- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. - While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.	Check areas protected to ensure coverage. Most dust control measures require frequent, often daily, or multiple times per day attention.
TRACKING CONTROL BMPs		
TR-1 Stabilized Construction Entrance/Exit	- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. - While activities associated with the BMPs are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation. - Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.	- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment. - Keep all temporary roadway ditches clear. - Check for damage and repair as needed. - Replace gravel material when surface voids are visible. - Remove all sediment deposited on paved roadways within 24 hours. - Remove gravel and filter fabric at completion of construction
TR-2 Stabilized Construction Roadway	- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. - While activities associated with the BMP are under way, impact weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.	- Keep all temporary roadway ditches clear. When no longer required, remove stabilized construction roadway and re-grade and repair slopes. - Periodically apply additional aggregate on gravel roads. - Active dirt construction roads are commonly watered three or more times per day during the dry season.

The contractor shall use the following guidelines for maintenance, inspection, and repair of BMPs identified in the SWPPP		
BEST MANAGEMENT PRACTICES (BMPs)	**INSPECTION FREQUENCY (all controls)**	**MAINTENANCE/REPAIR PROGRAM**
NON-STORM WATER MANAGEMENT BMPs		
NS-1 Water Conservation Practices NS-2 Dewatering Operations NS-3 Paving and Grinding Operations NS-4 Temporary Stream Crossing NS-5 Clear Water Diversion NS-6 Illicit Connection/Discharge NS-7 Potable Water/Irrigation NS-8 Vehicle and Equipment Maintenance NS-9 Vehicle and Equipment Fueling NS-10 Vehicle and Equipment Maintenance NS-11 Pile Driving Operations NS-12 Concrete Curing NS-13 Concrete Finishing NS-14 Material and Equipment Use Over Water	- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges. - Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occurring. - Vehicles and equipment should be inspected each day of use for leaks.	- Repair water equipment as needed to prevent unintended discharges. - Keep ample supplies of drip pans or absorbent materials onsite. - Inspect and maintain machinery regularly to minimize leaks and drips. - Inspect the site regularly to check for any illegal dumping or discharge. -Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site. - Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. - Monitor employees and subcontractors throughout the duration of the construction project to ensure appropriate practices are being implemented. - Prohibit employees and subcontractors from washing personal vehicles and equipment on the construction site. - Keep ample supplies of spill cleanup materials onsite. - Immediately clean up spills and properly dispose of contaminated soil and cleanup materials. - Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds. - Inspect cure containers and spraying equipment for leaks.

The contractor shall use the following guidelines for maintenance, inspection, and repair of BMPs identified in the SWPPP		
BEST MANAGEMENT PRACTICES (BMPs)	**INSPECTION FREQUENCY (all controls)**	**MAINTENANCE/REPAIR PROGRAM**
WASTE MANAGEMENT AND MATERIALS POLLUTION CONTROL BMPs		
WM-1 Material Delivery and Storage WM-2 Material Use WM-3 Stockpile Management WM-4 Spill Prevention and Control WM-5 Solid Waste Management WM-6 Hazardous Waste Management WM-8 Concrete Waste Management WM-9 Sanitary/Septic Waste Management WM-10 Liquid Waste Management	- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. - While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.	- Keep an ample supply of spill cleanup materials near the storage area. - Keep storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. - Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function. - Spot check employees and subcontractors throughout the job to ensure appropriate practices are being employed. - Arrange for regular waste collection. Hazardous waste should be regularly collected. - A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures. - A copy of the hazardous waste manifests should be provided. - Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. - Hardened concrete materials should be removed and disposed of. - Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full. - If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.

Attachment H

Storm Water Quality Construction Site Inspection Checklist

INSTRUCTIONS

- Use this form for inspecting BMPs as described in the SWPPP.
- This inspection form shall be completed and signed by the Contractor’s Storm Water Pollution Prevention Manager (SWPPM).
- The local agency may require the Contractor to use a different inspection form
- The weather information shall be the best estimate of beginning of the storm event, duration of the event, time elapsed since the last storm, and approximate amount of rainfall.
- List observations of all BMPs: temporary erosion controls, temporary sediment controls, wind erosion controls, tracking controls, non-storm water controls and waste management and materials pollution controls.
- Evaluate BMPs for adequacy and proper implementation and whether additional BMPs are required in accordance with the terms of the Permits.
- Verify implementation of non-storm water discharge BMPs and evaluate their effectiveness.
- One-time discharges of non-storm water shall be inspected when such discharges occur.
- Describe any inadequate BMPs.
- Note the corrective actions required, including any changes to the SWPPP, and implementation dates.
- If you answer “No” to any of the questions, describe the corrective action(s) to be taken and when the corrective action(s) are to be completed. Should you need more space to describe corrective actions, identify your response numerically and use additional sheets as necessary.

GENERAL INFORMATION				
Project Name	Gregory Canyon Landfill			
Project N^{o}				
Contractor				
Inspector's Name				
Inspector's Title				
Signature				
Date of Inspection				
Inspection Type (Check Applicable)	❒ Prior to forecast rain ❒ 24-hr intervals during extended rain		❒ After a rain event ❒ Other ____________	
Season (Check Applicable)	❒ Rainy		❒ Non-Rainy	
Storm Data	Storm Start Date & Time:		Storm Duration (hrs):	
	Time elapsed since last storm (Circle Applicable Units)	Min. Hr. Days	Approximate Rainfall Amount (inches)	

PROJECT AREA SUMMARY AND DISTURBED SOIL AREA (DSA) SIZE		
Total Project Area	____________	Acres
Field Estimate of Active DSAs	____________	Acres
Field Estimate of Non-Active DSAs	____________	Acres

INSPECTION OF BMPs				
BMP	**Yes**	**No**	**N/A**	**Corrective Action**
Preservation of Existing Vegetation				
Is temporary fencing provided to preserve vegetation in areas where no construction activity is planned?				
Location:				
Location:				
Location:				
Location:				
Erosion Control				
Does the applied temporary erosion control provide 100% coverage for the affected areas?				
Are any non-vegetated areas that may require temporary erosion control?				
Is the area where erosion controls are used required free from visible erosion?				
Location:				
Location:				
Location:				
Location:				
Temporary Linear Sediment Barriers (Silt Fence, Fiber Rolls, Sandbag Barriers, etc.)				
Are temporary linear sediment barriers properly installed, functional and maintained?				
Are temporary linear sediment barriers free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				
Are cross barriers installed where necessary and properly spaced?				
Location:				
Location:				
Location:				
Location:				
Location:				
Storm Drain Inlet Protection				
Are storm drain inlets internal to the project properly protected?				
Are storm drain inlet protection devices in working order and being properly maintained?				
Location:				
Location:				
Location:				
Location:				
Location:				

INSPECTION OF BMPs				
BMP	**Yes**	**No**	**N/A**	**Corrective Action**
Sediment Basins				
Are basins designed in accordance with the requirements of the General Permit?				
Are basins maintained to provide the required retention/detention?				
Are basin controls (inlets, outlets, diversions, weirs, spillways, and racks) in working order?				
Location:				
Location:				
Location:				
Location:				
Stockpiles				
Are all locations of temporary stockpiles, including soil, hazardous waste, and construction materials in approved areas?				
Are stockpiles protected from run-on, run-off from adjacent areas and from winds?				
Are stockpiles located at least 15 m from concentrated flows, downstream drainage courses and storm drain inlets?				
Are required covers and/or perimeter controls in place?				
Location:				
Location:				
Location:				
Location:				
Concentrated Flows				
Are concentrated flow paths free of visible erosion?				
Location:				
Location:				
Location:				
Location:				
Tracking Control				
Is the entrance stabilized to prevent tracking				
Is the stabilized entrance inspected daily to ensure that it is working properly				
Are points of ingress/egress to public/private roads inspected and swept and vacuumed as needed?				
Are all paved areas free of visible sediment tracking or other particulate matter?				
Location:				
Location:				
Location:				
Location:				

INSPECTION OF BMPs				
BMP	**Yes**	**No**	**N/A**	**Corrective Action**
Wind Erosion Control				
Is dust control implemented?				
Location:				
Location:				
Location:				
Location:				
Dewatering Operations				
Are all one-time dewatering operations covered by the General Permit inspected before and as they occur and BMPs implemented as necessary during discharge?				
Is ground water dewatering handled in conformance with the dewatering permit issued by the RWQCB?				
Is required treatment provided for dewatering effluent?				
Location:				
Location:				
Location:				
Location:				
Vehicle & Equipment Fueling, Cleaning, and Maintenance				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				
Are dedicated fueling, cleaning, and maintenance areas located at least 15 m away from downstream drainage facilities and watercourses and protected from run-on and runoff?				
Is wash water contained for infiltration/ evaporation and disposed of appropriately?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
On each day of use, are vehicles and equipment inspected for leaks and if necessary, repaired?				
Location:				
Location:				
Location:				
Location:				
Waste Management & Materials Pollution Control				
Are material storage areas and washout areas protected from run-on and runoff, and located at least 15 m from concentrated flows and downstream drainage facilities?				
Are all material handling and storage areas clean; organized; free of spills, leaks, or any other deleterious material; and stocked with appropriate clean-up supplies?				

INSPECTION OF BMPs				
BMP	**Yes**	**No**	**N/A**	**Corrective Action**
Are liquid materials, hazardous materials, and hazardous wastes stored in temporary containment facilities?				
Are bagged and boxed materials stored on pallets?				
Are hazardous materials and wastes stored in appropriate, labeled containers?				
Are proper storage, clean-up, and spill-reporting procedures for hazardous materials and wastes posted in open, conspicuous and accessible locations adjacent to storage areas?				
Are temporary containment facilities free of spills and rainwater?				
Are temporary containment facilities and bagged/boxed materials covered?				
Are temporary concrete washout facilities designated and being used?				
Are temporary concrete washout facilities functional for receiving and containing concrete waste and are concrete residues prevented from entering the drainage system?				
Do temporary concrete washout facilities provide sufficient volume and freeboard for planned concrete operations?				
Are concrete wastes, including residues from cutting and grinding, contained and disposed of off-site or in concrete washout facilities?				
Are spills from mobile equipment fueling and maintenance properly contained and cleaned up?				
Is the site free of litter?				
Are trash receptacles provided in the yard, field trailer areas, and at locations where workers congregate for lunch and break periods?				
Is litter from work areas collected and placed in watertight dumpsters?				
Are waste management receptacles free of leaks?				
Are the contents of waste management receptacles properly protected from contact with storm water or from being dislodged by winds?				
Are waste management receptacles filled at or beyond capacity?				
Location:				
Location:				
Location:				
Location:				
Temporary Water Body Crossing or Encroachment				
Are temporary water body crossings and encroachments constructed appropriately?				
Does the project conform to the requirements of the 404 permit and/or 1601agreement?				
Location:				
Location:				
Location:				
Location:				

INSPECTION OF BMPs				
BMP	**Yes**	**No**	**N/A**	**Corrective Action**
Illicit Connection/ Discharge				
Is there any evidence of illicit discharges or illegal dumping on the project site?				
If yes, has the Owner/Operator been notified?				
Location:				
Location:				
Location:				
Location:				
Discharge Points				
Are discharge points and discharge flows free from visible pollutants?				
Are discharge points free of any significant sediment transport?				
Location:				
Location:				
Location:				
Location:				
SWPPP Update				
Does the SWPPP and Project Schedule adequately reflect the current site conditions and contractor operations?				
Are all BMPs shown on the water pollution control drawings installed in the proper location(s) and according to the details in the SWPPP?				
Location:				
Location:				
Location:				
Location:				
General				
Are there any other potential concerns at the site?				
Location:				
Location:				
Location:				
Location:				
Storm Water Monitoring				
Does storm water discharge directly to a water body listed in the General Permit as impaired for sediment/sedimentation or turbidity?				
If yes, were samples for sediment/sedimentation or turbidity collected pursuant to the sampling and analysis plan in the SWPPP?				
Did the sampling results indicate that the discharges are causing or contributing to further impairment?				

INSPECTION OF BMPs				
BMP	**Yes**	**No**	**N/A**	**Corrective Action**
If yes, were the erosion/sediment control BMPs improved or maintained to reduce the discharge of sediment to the water body?				
Were there any BMPs not properly implemented or breaches, malfunctions, leakages or spills observed which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				
If sampling indicated pollution of the storm water, were the leaks, breaches, spills, etc. cleaned up and the contaminated soil properly disposed of?				
Were the BMPs maintained or replaced?				
Were soil amendments (e.g., gypsum, lime) used on the project?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan in the SWPPP?				
If sampling indicated pollution of the storm water by the use of the soil amendments, is there a contingency plan for retention onsite of the polluted storm water?				
Did storm water contact stored materials or waste and run off the construction site? (Materials not in watertight containers, etc.)				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan in the SWPPP?				

Attachment I

Trained Contractor Personnel Log

INSTRUCTIONS

- Use this sheet to record individuals attending formal training programs specified in the SWPPP. This form may also be used to record informal tailgate on-site meetings on storm water management.

Storm Water Management Training Log

Project Name: Gregory Canyon Landfill

Project Number/Location: ____________________

Storm Water Management Topic: (check as appropriate)

- ❑ Erosion Control
- ❑ Sediment Control
- ❑ Wind Erosion Control
- ❑ Tracking Control
- ❑ Non-storm water management
- ❑ Waste Management and Materials Pollution Control
- ❑ Storm Water Sampling

Specific Training Objective: ____________________

Location: ____________________ Date: ____________________

Instructor: ____________________ Telephone: ____________________

Course Length (hours): ____________________

Attendee Roster (attach additional forms if necessary)

Name	Company	Phone

COMMENTS:

Attachment J

Subcontractor Notification Letter and Notification Log

INSTRUCTIONS

- Use this sample to prepare the subcontractor letter and log required in the SWPPP.

SWPPP Notification

Company
Address
City, State, ZIP

Dear Sir/Madam,

Please be advised that the California State Water Resources Control Board has adopted the General Permit (General Permit) for Storm Water Discharges Associated with Construction Activity (CAS000002). The goal of these permits is prevent the discharge of pollutants associated with construction activity from entering the storm drain system, ground and surface waters.

Gregory Canyon Landfill, LTD. has developed a Storm Water Pollution Prevention Plan (SWPPP) in order to implement the requirements of the Permits.

As a subcontractor, you are required to comply with the SWPPP and the Permits for any work that you perform on site. Any person or group who violates any condition of the Permits may be subject to substantial penalties in accordance with state and federal law. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP and the Permits. A copy of the Permits and the SWPPP are available for your review at the construction office. Please contact me if you have further questions.

Sincerely,

Name
Title

SUBCONTRACTOR NOTIFICATION LOG

Project Name: ____________________

Project Number/Location: ____________________

SUBCONTRACTOR COMPANY NAME	CONTACT NAME	ADDRESS	PHONE NUMBER	PAGER/ FIELD PHONE	DATE NOTIFICATION LETTER SENT	TYPE OF WORK

USE ADDITIONAL PAGES AS NECESSARY

Attachment K

Notice of Non-Compliance

INSTRUCTIONS

- This form will used to report instances of discharges. The completed form will be submitted to the Owner [City or Agency Engineer] within 7 days of the assessment of non-compliance, discharge, written notice or orders from a regulatory agency.

To: Name of Owner [City/Agency Engineer]/Regional Board Staff   Date: Insert Date

Subject: Notice of Non-Compliance

Project Name:	Insert Project Name
Project Number/Location:	Project number

In accordance with the NPDES Statewide Permit for Storm Water Discharges Associated with Construction Activity, the following instance of discharge is noted:

Date, time, and location of discharge

Insert description and date of event

Nature of the operation that caused the discharge

insert description of operation

Initial assessment of any impact cause by the discharge

insert assessment

Existing BMP(s) in place prior to discharge event

list BMPs in place

Date of deployment and type of BMPs deployed after the discharge.

BMPs deployed after the discharge (with dates)

Steps taken or planned to reduce, eliminate and/or prevent recurrence of the discharge

insert steps taken to prevent recurrence

Implementation and maintenance schedule for any affected BMPs

insert implementation and maintenance schedule

If further information or a modification to the above schedule is required, notify the contact person below.

Name of Contact Person	Title
Company	Telephone Number
Signature	Date

Attachment L

Storm Water Pollution Prevention Plan (SWPPP) and Monitoring Program Checklist

CONSTRUCTION PROJECT: Gregory Canyon Landfill

PREPARER: URS Corporation

SECTION A: STORM WATER POLLUTION PREVENTION PLAN (SWPPP)				
CHECK IF ADDRESSED N/A IF NOT APPLICABLE	**SWPPP Section**	**ITEM**	**GENERAL PERMIT REF.**	**COMMENTS**
✓	100	***SWPPP Certification and Approval***	C.10	
✓	100.1	SWPPP Certification	C.10	
✓	100.2	SWPPP Approval	C.10	
✓	200	***SWPPP Amendments***	A.4.a, A.16	
✓	200.1	Amendment number and date entered into SWPPP – Amendment Log	A.4.a, A.16	Included Blank Form
✓	200.2	Amendment Certification and Approval	A.4.a, A.16	Included Blank Form
✓	300	***Introduction/Project Description***		
✓	300.1	Project Description and Location (narrative)	A.5.a.1	
✓	300.2	Unique Site Features (narrative)	A.5.a.1	
✓	300.4	***Project Schedule (narrative and graphical)***	A.5.c.5	Narrative Schedule Only
✓	400	***References***	A.14	
✓	500.2	***Vicinity Map (narrative or graphic)***	A.5.a.1	
✓	500.2	Site perimeter	A.5.a.1	
✓	500.2	Geographic Features	A.5.a.1	
✓	500.2	General topography	A.5.a.1	
✓	500.4	***Water Pollution Control Drawings (WPCDs) (graphic or narrative)***	A.5.a.2	
✓	500.4	Site perimeter	A.5.a.2	
✓	500.4	Existing and proposed buildings, lots, and roadways	A.5.a.2	
✓	500.4	Storm water collection and discharge points	A.5.a.2	Not all phases of construction can be currently shown

SECTION A: STORM WATER POLLUTION PREVENTION PLAN (SWPPP)				
CHECK IF ADDRESSED **N/A IF NOT APPLICABLE**	**SWPPP Section**	**ITEM**	**GENERAL PERMIT REF.**	**COMMENTS**
✓	500.4	General topography before and after construction	A.5.a.2	
✓	500.4	Anticipated discharge location(s)	A.5.a.2	
✓	500.4	Drainage patterns including the entire relevant drainage areas	A.5.a.2	Not all phases of construction can be currently shown
✓	500.4	Temporary on-site drainage(s)	A.5.a.2	Not all phases of construction can be currently shown
✓	500.3	***Pollutant Source and BMP Identification (narrate/ or indicate on site map)***	A.5.b	
✓		***Drainage***	A.5.b.1	
✓	500.4	Drainage patterns after major grading	A.5.b.1	Not all phases of construction can be shown at this time
✓	500.4	Slopes after major grading	A.5.b.1	Not all phases of construction can be shown at this time
✓	Attach. E	Calculations for storm water run-on	A.5.b.1	
✓	500.4	BMPs that divert off-site drainage from passing through site	A.5.b.1	Perimeter Drains
✓	500.4	***Storm Water Inlets***	A.5.b.2	
✓	500.4	Drainage patterns to storm water inlets or receiving water	A.5.b.2	
✓	500.4	BMPs that protect storm water inlets or receiving water	A.5.b.2	
✓		***Site History (narrative; if possible, indicate location(s) on the Water Pollution Control Drawings)***	A.5.b	
✓	500.3.3	Nature of fill material and data describing the soil. Description of toxic materials treated, stored, disposed, spilled or leaked on site	A.5.b.3	
✓	500.3.8 & 500.3.9	BMPs that minimize contact of contaminants with storm water	A.5.b.3	
		Location of Areas Designated for:	A.5.b.4	
✓	500.3.8 & 500.4	Vehicle storage & service	A.5.b.4	Areas identified on Construction BMP map may be relocated based upon more detailed construction sequencing
✓	500.3.8 & 500.4	Equipment storage, cleaning, maintenance	A.5.b.4	"
✓	500.3.9 & 500.4	Soil or waste storage	A.5.b.4	"
✓	500.3.9 & 500.4	Construction material loading, unloading, storage and access	A.5.b.4	"
✓	500.3.8 & 500.3.9	Areas outside of physical site (yards, borrow areas, etc.)		"
✓		***BMP Locations or Descriptions for:***	A.5.b.5	
✓	500.3.9 & 500.4	Waste handling and disposal areas	A.5.b.5	Areas identified on Construction BMP map may be relocated based upon more detailed construction sequencing

SECTION A: STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

CHECK IF ADDRESSED N/A IF NOT APPLICABLE	SWPPP Section	ITEM	GENERAL PERMIT REF.	COMMENTS
✓	500.3.9 & 500.4	On-site storage and disposal of construction materials and waste	A.5.b.5	Areas identified on Construction BMP map may be relocated based upon more detailed construction sequencing
✓	500.3.8, 500.3.9 & 500.4	Minimum exposure of storm water to construction materials, equipment, vehicles, waste	A.5.b.5	
✓	500.6	***Post Construction BMPs***	A.5.b.6	
✓	500.6.1	Listing or Description of Post-construction BMPs	A.5.b.6	
✓	500.4	Location of post-construction BMPs	A.5.b.6	
✓	500.6.2	Parties responsible for long-term maintenance	A.5.b.6	
✓		***Additional Information***	A.5.c	
✓	500.3.1	Description of other pollutant sources and BMPs	A.5.c.1	
✓	500.3.2	Pre-construction control practices	A.5.c.1	
✓	500.3.1	Inventory of materials and activities that may pollute storm water	A.5.c.2	
✓	500.3.8 & 500.3.9	BMPs to reduce/eliminate potential pollutants listed in the inventory	A.5.c.2	
✓	300.4	Runoff coefficient (before & after)	A.5.c.3	
✓	300.4	Percent impervious (before & after)	A.5.c.3	
✓	Attach. F	Copy of the NOT	A.5.c.4	Copy of NOI application and state database entry provided
✓	300.3	Construction activity schedule	A.5.c.5	General landfill construction and operation schedule provided
✓	300.5	Contact information	A.5.c.6	Name and phone number to be provided prior to construction
✓	500.4.1	**SOIL STABILIZATION (EROSION CONTROL)**	A.6	
✓		***The SWPPP shall include:***	A.6.a-c	
✓	500.4	Areas of vegetation on site	A.6.a.1	
✓	500.4	Areas of soil disturbance that will be stabilized during rainy season	A.6.a.2	General guidance is provided on implementation
✓	500.4	Areas of soil disturbance which will be exposed during any part of the rainy season	A.6.a.3	General guidance is provided on implementation
✓	300.4	Implementation schedule for erosion control measures	A.6.a.4	General guidance is provided on implementation
✓	500.3.4	BMPs for erosion control	A.6.b	
✓	500.3.7	BMPs to control wind erosion	A.6.c	
✓	500.3.5	**SEDIMENT CONTROL**	A.8	

SECTION A: STORM WATER POLLUTION PREVENTION PLAN (SWPPP)				
CHECK IF ADDRESSED N/A IF NOT APPLICABLE	**SWPPP Section**	**ITEM**	**GENERAL PERMIT REF.**	**COMMENTS**
✓	500.3.5 & 500.4	Description/Illustration of BMPs to prevent increase of sediment load in discharge	A.8	
✓	300.4, 500.3.5	Implementation schedule for sediment control measures	A.8	General guidance is provided on implementation
✓	500.3.6	BMPs to control sediment tracking	A.8	
✓	500.3.8 & 500.3.9	**NON-STORM WATER MANAGEMENT**	A.9	
✓	500.3.8 & 500.3.9	Description of non-storm water discharges to receiving waters	A.9	
✓	500.3.8 & 500.3.9	Locations of discharges	A.9	
✓	500.3.8 & 500.3.9	Description of BMPs	A.9	
✓	300.5	Name and phone number of person responsible for non-storm water management	A.9	Name and phone number to be provided prior to construction
✓	500.6	**POST-CONSTRUCTION**	A.10	
✓	500.6.1	Description of post-construction BMPs	A.10	
✓	500.6.2	Operation/Maintenance of BMPs after project completion (including short-term funding, long-term funding and responsible party)	A.10	
✓	500.5	**MAINTENANCE, INSPECTIONS, AND REPAIR**	A.11	
✓	300.5, 600.1	Name and phone number of person(s) responsible for inspections	A.11	Name and phone number to be provided prior to construction
✓	600.1, Attach. H	Complete inspection checklist: date, weather, inadequate BMPs, visual observations of BMPs, corrective action, inspector's name, title, signature	A.11.a-f	
✓		**OTHER REQUIREMENTS**	A.12-16	
✓	500.7	Documentation of all training	A.12	Training information to be provided prior to construction
✓	500.8	List of Contractors/Subcontractors	A.13	Subcontractor information to be provided prior to construction

SECTION B: MONITORING AND REPORTING REQUIREMENTS				
CHECK IF ADDRESSED N/A IF NOT APPLICABLE	**SWPPP Section**	**ITEM**	**GENERAL PERMIT REF.**	**COMMENTS**
✓	600.1	Description of Site Inspection Plans	B.3	
✓	100.3	Compliance certification (annually 7/1)	B.4	Blank Form Provided
✓	600.2	Discharge reporting	B.5	Blank Form Provided
✓	600.3	Keep records of all inspections, compliance certifications, and noncompliance reports on site for a period of at least three years	B.6	

SECTION B: MONITORING AND REPORTING REQUIREMENTS				
CHECK IF ADDRESSED N/A IF NOT APPLICABLE	**SWPPP Section**	**ITEM**	**GENERAL PERMIT REF.**	**COMMENTS**
✓	600.4	Sampling and Analysis Plan for Sediment	B.7	
✓	600.5	Sampling and Analysis Plan for Non-Visible Pollutants	B.8	

SECTION C: STANDARD PROVISIONS FOR CONSTRUCTION ACTIVITIES				
CHECK IF ADDRESSED N/A IF NOT APPLICABLE	**SWPPP Section**	**ITEM**	**GENERAL PERMIT REF.**	**COMMENTS**
✓	100.1	Signed SWPPP Certification	C.9,10	

STORM WATER POLLUTION PREVENTION PLAN and MONITORING PROGRAM REVIEW SHEET

GENERAL INDUSTRIAL ACTIVITIES STORM WATER PERMIT
WATER QUALITY ORDER NO. 97-03-DWQ

FACILITY NAME ______________________________

WDID# ______________________ REVIEW DATE ______________________

FACILITY CONTACT		CONSULTANT CONTACT	
Name	____________	Name	____________
Title	____________	Title	____________
Company	____________	Company	____________
Street Address	____________	Street Address	____________
City, State	____________	City, State	____________
Zip	____________	Zip	____________

Indication of WDID# ☐ **YES** ☐ **NO**

STORM WATER POLLUTION PREVENTION PLAN		**Not Applicable**	**Included**	**Not Included**	**Incomplete**	**Comments**
Signed Certification	**(C.9 and C.10)**					
Pollution Prevention Team	**(A.3.a)**					
Existing Facility Plans	**(A.3.b)**					
Facility Site Map(s)						
Facility boundaries	(A.4.a)					
Drainage areas	(A.4.a)					
Direction of flow	(A.4.a)					
On-site water bodies	(A.4.a)					
Areas of soil erosion	(A.4.a)					
Nearby water bodies	(A.4.a)					
Municipal storm drain inlets	(A.4.a)					
Points of discharge	(A.4.b)					
Structural control measures	(A.4.b)					
Impervious areas (paved areas, buildings, covered areas, roofed areas)	(A.4.c)					
Location of directly exposed materials	(A.4.d)					
Locations of significant spills and leaks	(A.4.d)					
Storage areas / Storage tanks	(A.4.e)					
Shipping and receiving areas	(A.4.e)					
Fueling areas	(A.4.e)					
Vehicle and equipment storage and maintenance	(A.4.e)					
Material handling / Material processing	(A.4.e)					
Waste treatment / Waste disposal	(A.4.e)					
Dust generation / Particulate generation	(A.4.e)					
Cleaning areas / Rinsing areas	(A.4.e)					
Other areas of industrial activities	(A.4.e)					
STORM WATER		**Not**		**Not**		

Items in parentheses refer to specific sections of the General Permit

Reviewer ______________________

POLLUTION PREVENTION PLAN		Applicable	Included	Included	Incomplete	Comments
List of Significant Materials For each material listed:	**(A.5)**					
Storage location						
Receiving and shipping location						
Handling location						
Quantity						
Frequency						
Description of Potential Pollution Sources	**(A.6)**					
Industrial processes	(A.6.a.i)					
Material handling and storage areas	(A.6.a.ii)					
Dust and particulate generating activities	(A.6.a.iii)					
Significant spills and leaks	(A.6.a.iv)					
Non-storm water discharges	(A.6.a.v)					
Soil erosion	(A.6.a.vi)					
Assessment of Potential Pollutant Sources	**(A.7)**					
Areas likely to be sources of pollutants	(A.7.a.i)					
Pollutants likely to be present	(A.7.a.ii)					
Storm Water Best Management Practices	**(A.8)**					
Existing BMPs						
Existing BMPs to be revised and/or implemented						
New BMPs to be implemented						
Non-structural BMPs	**(A.8.a)**					
Good housekeeping	(A.8.a.i)					
Preventative maintenance	(A.8.a.ii)					
Spill response	(A.8.a.iii)					
Material handling and storage	(A.8.a.iv)					
Employee training	(A.8.a.v)					
Waste handling / Waste recycling	(A.8.a.vi)					
Recordkeeping and internal reporting	(A.8.a.vii)					
Erosion control and site stabilization	(A.8.a.viii)					
Inspections	(A.8.a.ix)					
Quality assurance	(A.8.a.x)					
Structural BMPs	**(A.8.b)**					
Overhead coverage	(A.8.b.i)					
Retention ponds	(A.8.b.ii)					
Control devices	(A.8.b.iii)					
Secondary containment structures	(A.8.b.iv)					
Treatment	(A.8.b.v)					
Annual Comprehensive Site Compliance Evaluation						
Review of visual observations, inspections, and sampling analysis	(A.9.a)					
Visual inspection of potential pollution sources	(A.9.b)					
Review and evaluation of BMPs	(A.9.c)					
Evaluation report	(A.9.d)					

Items in parentheses refer to specific sections of the General Permit

Reviewer ______________________

MONITORING PROGRAM	Not Applicable	Included	Not Included	Incomplete	Comments
Quarterly Non-Storm Water Discharge Visual Observations (B.3)					
Observations to be conducted (B.3.c) (Jan-March, April-June, July-September, October-December)					
All drainage areas (B.3.a)					
Look for presence of unauthorized NSWDs (B.3.a)					
Observe authorized NSWDs (B.3.b)					
Maintain observation records (B.3.d)					
Storm Water Discharge Visual Observations (B.4)					
Once per month during wet season (B.4.a) (October 1-May 31)					
Observe during first hour of discharge (B.4.a)					
All drainage areas (B.4.a)					
Observe stored or contained storm water at time of discharge (B.4.a)					
Preceded by three working days dry weather (B.4.c)					
Document discharge characteristics (B.4.c)					
Sampling and Analysis					
Samples to be collected during first hour of discharge (B.5.a)					
Sample from first storm of the wet season (B.5.a)					
Sample from one additional storm during wet season (B.5.a)					
Samples collected from all discharge locations (B.5.a)					
Sampling of contained storm water at time of discharge (B.5.a)					
Sampling preceded by at least three working days without storm water discharges (B.5.b)					
Sampling for pH, TSS, SC, TOC or O&G (B.5.c.i)					
Sampling for toxic chemicals and other pollutants likely present in storm water discharges in significant quantities (B.5.c.ii)					
Other analytical parameters listed in Table D (B.5.c.iii)					
Storm Water Effluent Limitation Guidelines parameters (B.6)					
Description of sampling locations (B.7)					
Description of sampling methods (B.10)					
Identification of analytical methods and method detection limits (B.10.b)					
Retention of all records for at least five years (B.13)					
Annual Report to be submitted by July 1 each year (B.14)					

General Comments: ______________________________

____

____

____

Items in parentheses refer to specific sections of the General Permit

Reviewer ______________________

Attachment M

Annual Certification of Compliance Form

INSTRUCTIONS

- By July 1 of each year, the Owner shall complete this form, as required in Section 1.3 of the SWPPP. Annual certification of compliance is based on the site inspections required in the SWPPP.

- Completed and signed Annual Certifications and Approvals shall be included in Section 1.3 of the SWPPP following the required text of the section.

- This Annual Certification of Compliance form does not need to be completed at the initial approval, but it shall be completed during the first year of the initial SWPPP approval.

Project Name:	Gregory Canyon Landfill
Project Number:	
Company Name:	
Address:	

Construction Start Date: ____________________ **Completion Date:** ____________________

This project is in compliance with the General Permit and this SWPPP (check yes or no) ____ **YES** ____ **NO**

Description of Work:	description of work
Work Now in Progress:	work in progress
Work Planned for Next 12 Months:	work planned

"I certify under penalty of law that, during the past 12 months, the construction activities are in compliance with the requirements of the General Permit and this SWPPP. This Certification is based upon the site inspections required in Section B, Item 3 of the General Permit. This document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

______________________________ ______________________________
Owner (or Authorized Representative) Signature Date

______________________________ ______________________________
Name and Title Telephone Number

Attachment N

Other Plans and Permits

- Include copies of other local, state, and federal plans and permits. List of other plans and permits shall be included in Section 4 of the SWPPP.

TABLE 3-6
SUMMARY OF PERMITS

PERMIT NAME	ISSUING AGENCY	PURPOSE OF PERMIT
Solid Waste Facilities Permit (SWFP)	San Diego County Department of Environmental Health (concurrence by California Integrated Waste Management Board)	Defines operating conditions
Waste Discharge Requirements (WDRs), including a Variance for Engineered Alternative [a]	Regional Water Quality Control Board	Defines operating conditions and groundwater and surface water protection and monitoring procedures; variance to allow engineered alternative for bottom design
National Pollution Discharge Elimination System Permit (NPDES) [b]	State Water Resources Control Board	1) Establishes requirements for discharges to storm drains 2) Allows discharge of groundwater to surface water.
Section 401 Water Quality Certification	Regional Water Quality Control Board	Addresses water quality impacts on waterways
Permit to Construct/Operate (Air Quality)	San Diego Air Pollution Control District (APCD)	Specifies equipment and standards for collection, processing, and combustion of landfill gas
Section 404 Permit	U.S. Army Corps of Engineers	Addresses disturbances to "waters of the U.S."
Section 7 Consultation[c]	U.S. Fish and Wildlife Service	Addresses Endangered Species Act
Streambed Alteration (Section 1603) Agreement	California Department of Fish and Game	Addresses disturbances to natural streambeds and mitigation measures
Water Appropriation Permit	State Water Resources Board	Addresses water appropriation
Encroachment Permit	California Department of Transportation	Defines modifications to SR 76
Bridge Permit	San Diego County Public Works Department	Addresses crossing of waterways
Water Course Alteration Permit	San Diego County Public Works Department	Addresses alteration to waterways
Habitat Loss Permit (Rule 4d)[c]	San Diego County Department of Planning and Land Use	Addresses loss of habitat
Blasting Permit	San Diego County Sheriff's Department	Defines standards for blasting
Grading Permit	San Diego County Department of Planning and Land Use—Building Division	Defines standards for grading
Relocation Approval	Public Utilities Commission	Relocation of the easement and towers
Approval of Reclamation Plan and Financial Assurances [d]	San Diego County Department of Planning and Land Use	Reclamation of stockpiles, processing areas, and road; (as required by State Surface Mining and Reclamation Act)

PERMIT NAME	ISSUING AGENCY	PURPOSE OF PERMIT
Building Permit	San Diego County Department of Planning and Land Use—Building Division	Defines standards for construction of structures
Section 106 [e]	State Historic Preservation Office	Consultation regarding cultural resources
Major Use Permit [f]	San Diego County Department of Planning and Land Use	Exportation or sale of aggregate material

[a] Two alternatives that do not require a variance have been included in Chapter 6 of this Final EIR.
[b] For the landfill and ancillary facilities, including the RO system.
[c] Either a Section 7 or Habitat Loss Permit may be obtained to authorize an incidental take.
[d] A reclamation plan may not be required because the State Surface Mining and Reclamation Act does not apply to certain activities as provided in Public Resources Code Section 2714(b).
[e] Section 106 consultation under the National Historic Preservation Act (NHPA), if and to the extent required, if applicable.
[f] The San Diego County Ordinance, under the definition of borrow pit, allows for nine exceptions to the requirement for a MUP for the exportation and sale of aggregate material. Some of the exceptions include site preparation that is completed within a one-year timeframe. Therefore, the initial construction phase may be exempt from the requirement for a MUP. However, the project has been designed to accommodate the storage of all excavated material on-site. If the exportation or sale of aggregate material were to occur, the applicant would obtain the MUP, if necessary, prior to the exportation or sale of material.

Sources: Proposition C; David Evans and Associates, Inc.; San Diego County Department of Planning and Land Use, PCR Services Corporation, 2002.

Linda S. Adams
Secretary for Environmental Protection

State Water Resources Control Board

Arnold Schwarzenegger
Governor

Division of Water Quality
1001 I Street • Sacramento, California 95814 • (916) 341-5455
Mailing Address: P.O. Box 100 • Sacramento, California • 95812-0100
Fax (916) 341-5463 • http://www.waterboards.ca.gov

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR
STORM WATER DISCHARGES
ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBANCE
ACTIVITIES

ORDER NO. 2009-0009-DWQ
NPDES NO**. CAS000002**

This Order was adopted by the State Water Resources Control Board on:	**September 2, 2009**
This Order shall become effective on:	**July 1, 2010**
This Order shall expire on:	**September 2, 2014**

IT IS HEREBY ORDERED, that this Order supersedes Order No. 99-08-DWQ except for enforcement purposes. The Discharger shall comply with the requirements in this Order to meet the provisions contained in Division 7 of the California Water Code (commencing with section 13000) and regulations adopted thereunder, and the provisions of the federal Clean Water Act and regulations and guidelines adopted thereunder.

I, Jeanine Townsend, Clerk to the Board, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the State Water Resources Control Board, on September 2, 2009.

AYE: Vice Chair Frances Spivy-Weber
Board Member Arthur G. Baggett, Jr.
Board Member Tam M. Doduc

NAY: Chairman Charles R. Hoppin

ABSENT: None

ABSTAIN: None

Jeanine Townsend

Jeanine Townsend
Clerk to the Board

List of Documents included in this single file saved in pdf format on September 22, 2009:

- Fact Sheet
- Order
- Attachment A – Linear Underground/Overhead Requirements
- Attachment A.1 – LUP Project Type Determination
- Attachment A.2 – LUP Permit Registration Documents
- Attachment B – Permit Registration Documents
- Attachment C – Risk Level 1 Requirements
- Attachment D – Risk Level 2 Requirements
- Attachment E – Risk Level 3 Requirements
- Attachment F – Active Treatment System Requirements
- Appendix 1 – Risk Determination Worksheet and Sediment-related 303d List
- Appendix 2 – Post-Construction Water Balance
- Appendix 2.1 – Post-Construction Water Balance Calculator
- Appendix 3 - Bioassessment Monitoring Guidelines
- Appendix 4 – Adopted/Implemented Sediment and Non-sediment TMDLs
- Appendix 5 – Glossary
- Appendix 6 - Acronym List
- Appendix 7 – State and Regional Water Board Contacts

Linda S. Adams
Secretary for
Environmental Protection

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Arnold Schwarzenegger
Governor

CONSTRUCTION GENERAL PERMIT FACT SHEET TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. BACKGROUND

A. History

In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The 1987 amendments to the CWA added Section 402(p), which establishes a framework for regulating municipal and industrial storm water discharges under the NPDES Program. On November 16, 1990, the U.S. Environmental Protection Agency (USEPA) published final regulations that established storm water permit application requirements for specified categories of industries. The regulations provide that discharges of storm water to waters of the United States from construction projects that encompass five or more acres of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES Permit. Regulations (Phase II Rule) that became final on December 8, 1999 lowered the permitting threshold from five acres to one acre.

While federal regulations allow two permitting options for storm water discharges (Individual Permits and General Permits), the State Water Board has elected to adopt only one statewide General Permit at this time that will apply to most storm water discharges associated with construction activity.

On August 19, 1999, the State Water Board reissued the General Construction Storm Water Permit (Water Quality Order 99-08-DWQ). On December 8, 1999 the State Water Board amended Order 99-08-DWQ to apply to sites as small as one acre.

The General Permit accompanying this fact sheet regulates storm water runoff from construction sites. Regulating many storm water discharges under one permit will greatly reduce the administrative burden associated with permitting individual storm water discharges. To obtain coverage under this General Permit, dischargers shall electronically file the Permit Registration Documents (PRDs), which includes a Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and other compliance related documents required by this General Permit and mail the appropriate permit fee to the State Water Board. It is expected that as the storm water program develops, the Regional Water Quality Control Boards (Regional Water Boards) may issue General Permits or Individual Permits containing more specific permit provisions. When this occurs, this General Permit will no longer regulate those dischargers.

B. Legal Challenges and Court Decisions

1. Early Court Decisions

Shortly after the passage of the CWA, the USEPA promulgated regulations exempting most storm water discharges from the NPDES permit requirements. (See 40 C.F.R. § 125.4 (1975); see also *Natural Resources Defense Council v. Costle* (D.C. Cir. 1977) 568 F.2d 1369, 1372 (*Costle*); *Defenders of Wildlife v. Browner* (9th Cir. 1999) 191 F.3d 1159, 1163 (*Defenders of Wildlife*).) When environmental groups challenged this exemption in federal court, the District of Columbia Court of Appeals invalidated the regulation, holding that the USEPA "does not have authority to exempt categories of point sources from the permit requirements of [CWA] § 402." (*Costle*, 568 F.2d at 1377.) The *Costle* court rejected the USEPA's argument that effluent-based storm sewer regulation was administratively infeasible because of the variable nature of storm water pollution and the number of affected storm sewers throughout the country. (*Id.* at 1377-82.) Although the court acknowledged the practical problems relating to storm sewer regulation, the court found the USEPA had the flexibility under the CWA to design regulations that would overcome these problems. (*Id.* at 1379-83.) In particular, the court pointed to general permits and permits based on requiring best management practices (BMPs).

During the next 15 years, the USEPA made numerous attempts to reconcile the statutory requirement of point source regulation with the practical problem of regulating possibly millions of diverse point source discharges of storm water. (See *Defenders of Wildlife*, 191 F.3d at 1163; see also Gallagher, Clean Water Act in Environmental Law Handbook (Sullivan, edit., 2003)
p. 300 (Environmental Law Handbook); Eisen, *Toward a Sustainable Urbanism: Lessons from Federal Regulation of Urban Storm Water Runoff* (1995) 48 Wash. U.J. Urb. & Contemp. L.1, 40-41 [Regulation of Urban Storm Water Runoff].)

In 1987, Congress amended the CWA to require NPDES permits for storm water discharges. (See CWA § 402(p), 33 U.S.C. § 1342(p); *Defenders of Wildlife,* 191 F.3d at 1163; *Natural Resources Defense Council v. USEPA* (9th Cir. 1992) 966 F.2d 1292, 1296.) In these amendments, enacted as part of the Water Quality Act of 1987, Congress distinguished between industrial and municipal storm water discharges. With respect to industrial storm water discharges, Congress provided that NPDES permits "shall meet all applicable provisions of this section and section 1311 [requiring the USEPA to establish effluent limitations under specific timetables]." (CWA § 402(p)(3)(A), 33 U.S.C. § 1342(p)(3)(A); see also *Defenders of Wildlife,* 191 F.3d at 1163-64.)

In 1990, USEPA adopted regulations specifying what activities were considered “industrial” and thus required discharges of storm water associated with those activities to obtain coverage under NPDES permits. (55 Fed. Reg. 47,990 (1990); 40 C.F.R. § 122.26(b)(14).) Construction activities, deemed a subset of the industrial activities category, must also be regulated by an NPDES permit. (40 C.F.R. § 122.26(b)(14)(x)). In 1999, USEPA issued regulations for “Phase II” of storm water regulation, which required most small construction sites (1-5 acres) to be regulated under the NPDES program. (64 Fed. Reg. 68,722; 40 C.F.R. § 122.26(b)(15)(i).)

2. Court Decisions on Public Participation

Two recent federal court opinions have vacated USEPA rules that denied meaningful public review of NPDES permit conditions. On January 14, 2003, the Ninth Circuit Court of Appeals held that certain aspects of USEPA’s Phase II regulations governing MS4s were invalid primarily because the general permit did not contain express requirements for public participation. (*Environmental Defense Center v. USEPA* (9th Cir. 2003) 344 F.3d 832.) Specifically, the court determined that applications for general permit coverage (including the Notice of Intent (NOI) and Storm Water Management Program (SWMP)) must be made available to the public, the applications must be reviewed and determined to meet the applicable standard by the permitting authority before coverage commences, and there must be a process to accommodate public hearings. (*Id.* at 852-54.) Similarly, on February 28, 2005, the Second Circuit Court of Appeals held that the USEPA's confined animal feeding operation (CAFO) rule violated the CWA because it allowed dischargers to write their own nutrient management plans without public review. (*Waterkeeper Alliance v. USEPA* (2d Cir. 2005) 399 F.3d 486.) Although neither decision involved the issuance of construction storm water permits, the State Water Board’s Office of Chief Counsel has recommended that the new General Permit address the courts’ rulings where feasible[1].

[1] In *Texas Independent Producers and Royalty Owners Assn. v. USEPA* (7th Cir. 2005) 410 F.3d 964, the Seventh Circuit Court of Appeals held that the USEPA’s construction general permit was not required to provide the public with the opportunity for a public hearing on the Notice of Intent or Storm Water Pollution Prevention Plan. The Seventh Circuit briefly discussed why it agreed with the Ninth Circuit’s dissent in *Environmental Defense Center*, but generally did not discuss the substantive holdings in *Environmental Defense Center* and *Waterkeeper Alliance*, because neither court addressed the initial question of whether the plaintiffs had standing to challenge the permits at issue. However, notwithstanding the Seventh Circuit’s decision, it is not binding or controlling on the State Water Board because California is located within the Ninth Circuit.

The CWA and the USEPA's regulations provide states with the discretion to formulate permit terms, including specifying best management practices (BMPs), to achieve strict compliance with federal technology-based and water quality-based standards. (*Natural Resources Defense Council v. USEPA* (9th Cir. 1992) 966 F.2d 1292, 1308.) Accordingly, this General Permit has developed specific BMPs as well as numeric action levels (NALs) and numeric effluent limitations (NELs) in order to achieve these minimum federal standards. In addition, the General Permit requires a SWPPP and REAP (another dynamic, site-specific plan) to be developed but has removed all language requiring the discharger to implement these plans – instead, the discharger is required to comply with specific requirements. By requiring the dischargers to implement these specific BMPs, NALs, and NELs, this General Permit ensures that the dischargers do not "write their own permits." As a result this General Permit does not require each discharger's SWPPP and REAP to be reviewed and approved by the Regional Water Boards.

This General Permit also requires dischargers to electronically file all permit-related compliance documents. These documents include, but are not limited to, NOIs, SWPPPs, annual reports, Notice of Terminations (NOTs), and numeric action level (NAL) exceedance reports. Electronically submitted compliance information is immediately available to the public, as well as the Regional Water Quality Control Board (Regional Water Board) offices, via the Internet. In addition, this General Permit enables public review and hearings on permit applications when appropriate. Under this General Permit, the public clearly has a meaningful opportunity to participate in the permitting process.

C. Blue Ribbon Panel of Experts and Feasibility of Numeric Effluent Limitations

In 2005 and 2006, the State Water Board convened an expert panel (panel) to address the feasibility of numeric effluent limitations (NELs) in California's storm water permits. Specifically, the panel was asked to address:

"Is it technically feasible to establish numeric effluent limitations, or some other quantifiable limit, for inclusion in storm water permits? How would such limitations or criteria be established, and what information and data would be required?"

"The answers should address industrial general permits, construction general permits, and area-wide municipal permits. The answers should also address both technology-based limitations or criteria and water quality-based limitations or criteria. In evaluating establishment of any objective criteria, the panel should address all of the following:

The ability of the State Water Board to establish appropriate objective limitations or criteria;

How compliance determinations would be made;

The ability of dischargers and inspectors to monitor for compliance; and

The technical and financial ability of dischargers to comply with the limitations or criteria."

Through a series of public participation processes (State Water Board meetings, State Water Board workshops, and the solicitation of written comments), a number of water quality, public process and overall program effectiveness problems were identified. Some of these problems are addressed through this General Permit.

D. Summary of Panel Findings on Construction Activities

The panel's final report can be downloaded and viewed through links at www.waterboards.ca.gov or by clicking here[2].

The panel made the following observations:

"Limited field studies indicate that traditional erosion and sediment controls are highly variable in performance, resulting in highly variable turbidity levels in the site discharge."

"Site-to-site variability in runoff turbidity from undeveloped sites can also be quite large in many areas of California, particularly in more arid regions with less natural vegetative cover and steep slopes."

"Active treatment technologies involving the use of polymers with relatively large storage systems now exist that can provide much more consistent and very low discharge turbidity. However, these technologies have as yet only been applied to larger construction sites, generally five acres or greater. Furthermore, toxicity has been observed at some locations, although at the vast majority of sites, toxicity has not occurred. There is also the potential for an accidental large release of such chemicals with their use."

"To date most of the construction permits have focused on TSS and turbidity, but have not addressed other, potentially significant pollutants such as phosphorus and an assortment of chemicals used at construction sites."

"Currently, there is no required training or certification program for contractors, preparers of soil erosion and sediment control Storm Water Pollution Prevention Plans, or field inspectors."

"The quality of storm water discharges from construction sites that effectively employ BMPs likely varies due to site conditions such as climate, soil, and topography."

"The States of Oregon and Washington have recently adopted similar concepts to the Action Levels described earlier."

In addition, the panel made the following conclusions:

"It is the consensus of the Panel that active treatment technologies make Numeric Limits technically feasible for pollutants commonly associated with storm water discharges from construction sites (e.g. TSS and turbidity) for larger construction sites. Technical practicalities and cost-effectiveness may make these technologies less feasible for smaller sites, including small drainages within a larger site, as these technologies have seen limited use at small construction sites. If chemical addition is not permitted, then Numeric Limits are not likely feasible."

"The Board should consider Numeric Limits or Action Levels for other pollutants of relevance to construction sites, but in particular pH. It is of particular concern where fresh concrete or wash water from cement mixers/equipment is exposed to storm water."

"The Board should consider the phased implementation of Numeric Limits and Action Levels, commensurate with the capacity of the dischargers and support industry to respond."

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[2] http://www.waterboards.ca.gov/stormwtr/docs/numeric/swpanel_final_report.pdf

E. How the Panel's Findings are Used in this General Permit

The State Water Board carefully considered the findings of the panel and related public comments. The State Water Board also reviewed and considered the comments regarding statewide storm water policy and the reissuance of the Industrial General Permit. From the input received the State Water Board identified some permit and program performance gaps that are addressed in this General Permit. The Summary of Significant Changes (below) in this General Permit are a direct result of this process.

F. Summary of Significant Changes in This General Permit

The State Water Board has significant changes to Order 99-08-DWQ. This General Permit differs from Order 99-08-DWQ in the following significant ways:

Rainfall Erosivity Waiver: this General Permit includes the option allowing a small construction site (>1 and <5 acres) to self-certify if the rainfall erosivity value (R value) for their site's given location and time frame compute to be less than or equal to 5.

Technology-Based Numeric Action Levels: this General Permit includes NALs for pH and turbidity.

Technology-Based Numeric Effluent Limitations: this General Permit contains daily average NELs for pH during any construction phase where there is a high risk of pH discharge and daily average NELs turbidity for all discharges in Risk Level 3. The daily average NEL for turbidity is set at 500 NTU to represent the minimum technology that sites need to employ (to meet the traditional Best Available Technology Economically Achievable (BAT)/ Best Conventional Pollutant Control Technology (BCT) standard) and the traditional, numeric receiving water limitations for turbidity.

Risk-Based Permitting Approach: this General Permit establishes three levels of risk possible for a construction site. Risk is calculated in two parts: 1) Project Sediment Risk, and 2) Receiving Water Risk.

Minimum Requirements Specified: this General Permit imposes more minimum BMPs and requirements that were previously only required as elements of the SWPPP or were suggested by guidance.

Project Site Soil Characteristics Monitoring and Reporting: this General Permit provides the option for dischargers to monitor and report the soil characteristics at their project location. The primary purpose of this requirement is to provide better risk determination and eventually better program evaluation.

Effluent Monitoring and Reporting: this General Permit requires effluent monitoring and reporting for pH and turbidity in storm water discharges. The purpose of this monitoring is to determine compliance with the NELs and evaluate whether NALs included in this General Permit are exceeded.

Receiving Water Monitoring and Reporting: this General Permit requires some Risk Level 3 dischargers to monitor receiving waters and conduct bioassessments.

Post-Construction Storm Water Performance Standards: this General Permit specifies runoff reduction requirements for all sites not covered by a Phase I or Phase II MS4 NPDES permit, to avoid, minimize and/or mitigate post-construction storm water runoff impacts.

Rain Event Action Plan: this General Permit requires certain sites to develop and implement a Rain Event Action Plan (REAP) that must be designed to protect all exposed portions of the site within 48 hours prior to any likely precipitation event.

Annual Reporting: this General Permit requires all projects that are enrolled for more than one continuous three-month period to submit information and annually certify that their site is in compliance with these requirements. The primary purpose of this requirement is to provide information needed for overall program evaluation and pubic information.

Certification/Training Requirements for Key Project Personnel: this General Permit requires that key personnel (e.g., SWPPP preparers, inspectors, etc.) have specific training or certifications to ensure their level of knowledge and skills are adequate to ensure their ability to design and evaluate project specifications that will comply with General Permit requirements.

Linear Underground/Overhead Projects: this General Permit includes requirements for all Linear Underground/Overhead Projects (LUPs).

II. RATIONALE

A. General Permit Approach

A general permit for construction activities is an appropriate permitting approach for the following reasons:

1. A general permit is an efficient method to establish the essential regulatory requirements for a broad range of construction activities under differing site conditions;

2. A general permit is the most efficient method to handle the large number of construction storm water permit applications;

3. The application process for coverage under a general permit is far less onerous than that for individual permit and hence more cost effective;

4. A general permit is consistent with USEPA's four-tier permitting strategy, the purpose of which is to use the flexibility provided by the CWA in designing a workable and efficient permitting system; and

5. A general permit is designed to provide coverage for a group of related facilities or operations of a specific industry type or group of industries. It is appropriate when the discharge characteristics are sufficiently similar, and a standard set of permit requirements can effectively provide environmental protection and comply with water quality standards for discharges. In most cases, the general permit will provide sufficient and appropriate management requirements to protect the quality of receiving waters from discharges of storm water from construction sites.

There may be instances where a general permit is not appropriate for a specific construction project. A Regional Water Board may require any discharger otherwise covered under the General Permit to apply for and obtain an Individual Permit or apply for coverage under a more specific General Permit. The Regional Water Board must determine that this General Permit does not provide adequate assurance that water quality will be protected, or that there is a site-specific reason why an individual permit should be required.

B. Construction Activities Covered

1. **Construction activity subject to this General Permit:**

Any construction or demolition activity, including, but not limited to, clearing, grading, grubbing, or excavation, or any other activity that results in a land disturbance of equal to or greater than one acre.

Construction activity that results in land surface disturbances of less than one acre if the construction activity is part of a larger common plan of development or sale of one or more acres of disturbed land surface.

Construction activity related to residential, commercial, or industrial development on lands currently used for agriculture including, but not limited to, the construction of buildings related to agriculture that are considered industrial pursuant to USEPA regulations, such as dairy barns or food processing facilities.

Construction activity associated with LUPs including, but not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/borrow locations.

Discharges of sediment from construction activities associated with oil and gas exploration, production, processing, or treatment operations or transmission facilities.[3]

Storm water discharges from dredge spoil placement that occur outside of U.S. Army Corps of Engineers jurisdiction[4] (upland sites) and that disturb one or more acres of land surface from construction activity are covered by this General Permit. Construction projects that intend to disturb one or more acres of land within the jurisdictional boundaries of a CWA § 404 permit should contact the appropriate Regional Water Board to determine whether this permit applies to the project.

2. Linear Underground/Overhead Projects (LUPs) subject to this General Permit:

Underground/overhead facilities typically constructed as LUPs include, but are not limited to, any conveyance, pipe, or pipeline for the transportation of any gaseous, liquid (including water, wastewater for domestic municipal services), liquescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g., telephone, telegraph, radio or television messages); and associated ancillary facilities. Construction activities associated with LUPs include, but are not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/borrow locations.

Water Quality Order 2003-0007-DWQ regulated construction activities associated with small LUPs that resulted in land disturbances greater than one acre, but less than five acres. These projects were considered non-traditional construction projects. Attachment A of this Order now regulates all construction activities from LUPs resulting in land disturbances greater than one acre.

3. Common Plan of Development or Sale

USEPA regulations include the term “common plan of development or sale” to ensure that acreage within a common project does not artificially escape the permit requirements because construction activities are phased, split among smaller parcels, or completed by different owners/developers. In the absence of an exact definition of “common plan of development or sale,” the State Water Board is required to exercise its regulatory discretion in providing a common sense interpretation of the term as it applies to construction projects and permit coverage. An overbroad interpretation of the term would render meaningless the clear “one acre” federal permitting threshold and would potentially trigger permitting of

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[3] Pursuant to the Ninth Circuit Court of Appeals’ decision in *NRDC v. EPA* (9th Cir. 2008) 526 F.3d 591, and subsequent denial of the USEPA’s petition for reconsideration in November 2008, oil and gas construction activities discharging storm water contaminated only with sediment are no longer exempt from the NPDES program.

[4] A construction site that includes a dredge and/or fill discharge to any water of the United States (e.g., wetland, channel, pond, or marine water) requires a CWA Section 404 permit from the U.S. Army Corps of Engineers and a CWA Section 401 Water Quality Certification from the Regional Water Board or State Water Board.

almost any construction activity that occurs within an area that had previously received area-wide utility or road improvements.

Construction projects generally receive grading and/or building permits (Local Permits) from local authorities prior to initiating construction activity. These Local Permits spell out the scope of the project, the parcels involved, the type of construction approved, etc. Referring to the Local Permit helps define “common plan of development or sale.” In cases such as tract home development, a Local Permit will include all phases of the construction project including rough grading, utility and road installation, and vertical construction. All construction activities approved in the Local Permit are part of the common plan and must remain under the General Permit until construction is completed. For custom home construction, Local Permits typically only approve vertical construction as the rough grading, utilities, and road improvements were already independently completed under the a previous Local Permit. In the case of a custom home site, the homeowner must submit plans and obtain a distinct and separate Local Permit from the local authority in order to proceed. It is not the intent of the State Water Board to require permitting for an individual homeowner building a custom home on a private lot of less than one acre if it is subject to a separate Local Permit. Similarly, the installation of a swimming pool, deck, or landscaping that disturbs less than one acre that was not part of any previous Local Permit are not required to be permitted.

The following are several examples of construction activity of less than one acre that would require permit coverage:

a. A landowner receives a building permit(s) to build tract homes on a 100-acre site split into 200 one-third acre parcels, (the remaining acreage consists of streets and parkways) which are sold to individual homeowners as they are completed. The landowner completes and sells all the parcels except for two. Although the remaining two parcels combined are less than one acre, the landowner must continue permit coverage for the two parcels.

b. One of the parcels discussed above is sold to another owner who intends to complete the construction as already approved in the Local Permit. The new landowner must file Permit Registration Documents (PRDs) to complete the construction even if the new landowner is required to obtain a separate Local Permit.

c. Landowner in (1) above purchases 50 additional one half-acre parcels adjacent to the original 200-acre project. The landowner seeks a Local Permit (or amendment to existing Local permit) to build on 20 parcels while leaving the remaining 30 parcels for future development. The landowner must amend PRDs to include the 20 parcels 14 days prior to commencement of construction activity on those parcels.

C. Construction Activities Not Covered

1. Traditional Construction Projects Not Covered

This General Permit does not apply to the following construction activity:

a. Routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility.

b. Disturbances to land surfaces solely related to agricultural operations such as disking, harrowing, terracing and leveling, and soil preparation.

c. Discharges of storm water from areas on tribal lands; construction on tribal lands is regulated by a federal permit.

d. Discharges of storm water within the Lake Tahoe Hydrologic Unit. The Lahontan Regional Water Board has adopted its own permit to regulate storm water discharges from construction activity in the Lake Tahoe Hydrologic Unit (Regional Water Board 6SLT). Owners of construction projects in this watershed must apply for the Lahontan Regional Water Board permit rather than the statewide Construction General Permit. Construction projects within the Lahontan region must also comply with the Lahontan Region Project Guideline for Erosion Control (R6T-2005-0007 Section), which can be found at **http://www.waterboards.ca.gov/lahontan/Adopted_Orders/2005/r6t_2005_0007.pdf**

e. Construction activity that disturbs less than one acre of land surface, unless part of a larger common plan of development or the sale of one or more acres of disturbed land surface.

f. Construction activity covered by an individual NPDES Permit for storm water discharges.

g. Landfill construction activity that is subject to the Industrial General Permit.

h. Construction activity that discharges to Combined Sewer Systems.

i. Conveyances that discharge storm water runoff combined with municipal sewage.

j. Discharges of storm water identified in CWA § 402(*l*)(2), 33 U.S.C. § 1342(*l*)(2).

2. **Linear Projects Not Covered**

a. LUP construction activity does not include linear routine maintenance projects. Routine maintenance projects are projects associated with operations and maintenance activities that are conducted on existing lines and facilities and within existing right-of-way, easements, franchise agreements, or other legally binding agreements of the discharger. Routine maintenance projects include, but are not limited to projects that are conducted to:

i. Maintain the original purpose of the facility or hydraulic capacity.

ii. Update existing lines[5] and facilities to comply with applicable codes, standards, and regulations regardless if such projects result in increased capacity.

iii. Repairing leaks.

Routine maintenance does not include construction of new[6] lines or facilities resulting from compliance with applicable codes, standards, and regulations.

Routine maintenance projects do not include those areas of maintenance projects that are outside of an existing right-of-way, franchise, easements, or agreements. When a project must secure new areas,

[5]Update existing lines includes replacing existing lines with new materials or pipes.
[6]New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines.

those areas may be subject to this General Permit based on the area of disturbed land outside the original right-of-way, easement, or agreement.

b. LUP construction activity does not include field activities associated with the planning and design of a project (e.g., activities associated with route selection).

c. Tie-ins conducted immediately adjacent to “energized” or “pressurized” facilities by the discharger are not considered construction activities where all other LUP construction activities associated with the tie-in are covered by an NOI and SWPPP of a third party or municipal agency.

3. **EPA’s Small Construction Rainfall Erosivity Waiver**

EPA’s Storm Water Phase II Final Rule provides the option for a Small Construction Rainfall Erosivity Waiver. This waiver applies to small construction sites between 1 and 5 acres, and allows permitting authorities to waive those sites that do not have adverse water quality impacts.

Dischargers eligible for this waiver are exempt from Construction General Permit Coverage. In order to obtain the waiver, the discharger must certify to the State Water Board that small construction activity will occur only when the rainfall erosivity factor is less than 5 (“R” in the Revised Universal Soil Loss Equation). The period of construction activity begins at initial earth disturbance and ends with final stabilization. Where vegetation will be used for final stabilization, the date of installation of a practice that provides interim non-vegetative stabilization can be used for the end of the construction period. The operator must agree (as a condition waiver eligibility) to periodically inspect and properly maintain the area until the criteria for final stabilization as defined in the General Permit have been met. If use of this interim stabilization eligibility condition was relied on to qualify for the waiver, signature on the waiver with a certification statement constitutes acceptance of and commitment to complete the final stabilization process. The discharger must submit a waiver certification to the State Board prior to commencing construction activities.

USEPA funded a cooperative agreement with Texas A&M University to develop an online rainfall erosivity calculator. Dischargers can access the calculator from EPA’s website at: www.epa.gov/npdes/storm water/cgp. Use of the calculator allows the discharger to determine potential eligibility for the rainfall erosivity waiver. It may also be useful in determining the time periods during which construction activity could be waived from permit coverage.

D. Obtaining and Terminating Permit Coverage

The Legally Responsible Person (LRP) must obtain coverage under this General Permit, except in two limited circumstances. First, where the construction of pipelines, utility lines, fiber-optic cables, or other linear underground/overhead projects will occur across several properties, the utility company, municipality, or other public or private company or agency that owns or operates the linear underground/overhead project is responsible for obtaining coverage under the General Permit. Second, where there is a lease of a mineral estate (oil, gas, geothermal, aggregate, precious metals, and/or industrial metals), the lessee is responsible for obtaining coverage under the General Permit. To obtain coverage, the LRP or other entity described above must file Permit Registration Documents (PRDs) prior to the commencement of construction activity. Failure to obtain coverage under this General Permit for storm water discharges to waters of the United States is a violation of the CWA and the California Water Code.

To obtain coverage under this General Permit, LRPs must electronically file the PRDs, which include a Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and other documents required by this General Permit, and mail the appropriate permit fee to the State Water Board. It is expected that as the storm water program develops, the Regional Water Boards may issue General Permits or

Individual Permits that contain more specific permit provisions. When this occurs, this General Permit will no longer regulate those dischargers that obtain coverage under Individual Permits.

Any information provided to the Regional Water Board shall comply with the Homeland Security Act and any other federal law that concerns security in the United States; any information that does not comply should not be submitted.

The application requirements of the General Permit establish a mechanism to clearly identify the responsible parties, locations, and scope of operations of dischargers covered by the General Permit and to document the discharger's knowledge of the General Permit's requirements.

This General Permit provides a grandfathering exception to existing dischargers subject to Water Quality Order No. 99-08-DWQ. Construction projects covered under Water Quality Order No. 99-08-DWQ shall obtain permit coverage at Risk Level 1. LUP projects covered under Water Quality Order No. 2003-0007-DWQ shall obtain permit coverage at LUP Type 1. The Regional Water Boards have the authority to require Risk Determination to be performed on projects currently covered under Water Quality Order No. 99-08-DWQ and 2003-0007-DWQ where they deem necessary.

LRPs must file a Notice of Termination (NOT) with the Regional Water Board when construction is complete and final stabilization has been reached or ownership has been transferred. The discharger must certify that all State and local requirements have been met in accordance with this General Permit. In order for construction to be found complete, the discharger must install post-construction storm water management measures and establish a long-term maintenance plan. This requirement is intended to ensure that the post-construction conditions at the project site do not cause or contribute to direct or indirect water quality impacts (i.e., pollution and/or hydromodification) upstream and downstream. Specifically, the discharger must demonstrate compliance with the post-construction standards set forth in this General Permit (Section XIII). The discharger is responsible for all compliance issues including all annual fees until the NOT has been filed and approved by the local Regional Water Board.

E. Discharge Prohibitions

This General Permit authorizes the discharge of storm water to surface waters from construction activities that result in the disturbance of one or more acres of land, provided that the discharger satisfies all permit conditions set forth in the Order. This General Permit prohibits the discharge of pollutants other than storm water and non-storm water discharges authorized by this General Permit or another NPDES permit. This General Permit also prohibits all discharges which contain a hazardous substance in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges. In addition, this General Permit incorporates discharge prohibitions contained in water quality control plans, as implemented by the nine Regional Water Boards. Discharges to Areas of Special Biological Significance (ASBS) are prohibited unless covered by an exception that the State Water Board has approved.

Non-storm water discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Non-storm water discharges may contribute significant pollutant loads to receiving waters. Measures to control spills, leakage, and dumping, and to prevent illicit connections during construction must be addressed through structural as well as non-structural BMPs. The State Water Board recognizes, however, that certain non-storm water discharges may be necessary for the completion of construction projects. Authorized non-storm water discharges may include those from de-chlorinated potable water sources such as: fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water dewatering, and other discharges not subject to a separate general NPDES permit adopted by a region. Therefore this General Permit authorizes such discharges provided they meet the following conditions.

These authorized non-storm water discharges must:

1. be infeasible to eliminate;

2. comply with BMPs as described in the SWPPP;

3. filter or treat, using appropriate technology, all dewatering discharges from sedimentation basins;

4. meet the NELs and NALs for pH and turbidity; and

5. not cause or contribute to a violation of water quality standards.

Additionally, authorized non-storm water discharges must not be used to clean up failed or inadequate construction or post-construction BMPs designed to keep materials onsite. Authorized non-storm water dewatering discharges may require a permit because some Regional Water Boards have adopted General Permits for dewatering discharges.

This General Permit prohibits the discharge of storm water that causes or threatens to cause pollution, contamination, or nuisance.

F. Effluent Standards for All Types of Discharges

1. Technology-Based Effluent Limitations

Permits for storm water discharges associated with construction activity must meet all applicable provisions of Sections 301 and 402 of the CWA. These provisions require controls of pollutant discharges that utilize best available technology economically achievable (BAT) for toxic pollutants and non conventional pollutants and best conventional pollutant control technology (BCT) for conventional pollutants. Additionally, these provisions require controls of pollutant discharges to reduce pollutants and any more stringent controls necessary to meet water quality standards. The USEPA has already established such limitations, known as effluent limitation guidelines (ELGs), for some industrial categories. This is not the case with construction discharges. In instances where there are no ELGs the permit writer is to use best professional judgment (BPJ) to establish requirements that the discharger must meet using BAT/BCT technology. This General Permit contains both narrative effluent limitations and new numeric effluent limitations for pH and turbidity, set using the best professional judgment (BPJ) equivalent to BAT and BCT (respectively).

BAT/BCT technologies not only include passive systems such as conventional runoff and sediment control, but also treatment systems such as coagulation/flocculation using sand filtration, when appropriate. Such technologies allow for effective treatment of soil particles less 0.02 mm (medium silt) in diameter. The discharger must install structural controls, as necessary, such as erosion and sediment controls that meet BAT and BCT to achieve compliance with water quality standards. The narrative effluent limitations constitute compliance with the requirements of the CWA.

The numeric effluent limitations for pH and turbidity are based upon BPJ, which authorizes the State Water Board to issue a permit containing “such conditions as the Administrator determines are necessary to carry out the provisions of this Chapter” (CWA § 402(a)(1), 33 U.S.C. § 1342(a)(1).) Because the USEPA has not yet issued an effluent limit guideline for storm water, the State Water Board must use BPJ to consider the appropriate technology for the category or class of point sources, based upon all available information and any unique factors relating to the sources. In addition, the permitting authority must consider a number of factors including the cost of achieving effluent reductions in relation to the effluent reduction benefits, the age of the equipment and facilities, the processes employed and any required process changes, engineering aspects of the control technologies, non-water quality environmental impacts (including energy requirements), and other such other factors as the State Water Board deems appropriate (CWA 304(b)(1)(B)).

Because the permit is an NPDES permit, there is no legal requirement to address the factors set forth in Water Code sections 13241 and 13263, unless the permit is more stringent than what federal law requires. (See *City of Burbank v. State Water Resources Control Bd.* (2005) 35 Cal.4th 613, 618, 627.) None of the requirements in this permit are more stringent than the minimum federal requirements, which include technology-based requirements achieving BAT/BCT and strict compliance with water quality standards. The inclusion of numeric effluent limitations (NELs) in the permit do not cause the permit to be more stringent than current federal law. NELs and best management practices are simply two different methods of achieving the same federal requirement: strict compliance with state water quality standards. Federal law authorizes both narrative and numeric effluent limitations to meet state water quality standards. The use of NELs to achieve compliance with water quality standards is not a more stringent requirement than the use of BMPs. (State Water Board Order No. WQ 2006-0012 (*Boeing*).) Accordingly, the State Water Board does not need to take into account the factors in Water Code sections 13241 and 13263.

The State Water Board has concluded that the establishment of BAT/BCT will not create or aggravate other environmental problems through increases in air pollution, solid waste generation, or energy consumption. While there may be a slight increase in non-water quality impacts due to the implementation of additional monitoring or the construction of additional BMPs, these impacts will be negligible in comparison with the construction activities taking place on site and would be justified by the water quality benefits associated with compliance.

Considerations related to the processes employed and the changes necessitated by the adoption of the BAT/BCT effluent limits have been assessed throughout the stakeholder process (e.g., the Blue Ribbon Panel and the March 2007 preliminary draft) and are discussed in detail in Section I.C of this Fact Sheet. The following sections set forth the engineering aspects of the control technologies and the rationale for the determination of the numeric effluents for pH and turbidity.

In consideration of the costs for the establishment of BAT and BCT limits for pH and turbidity, existing requirements for the control of storm water pollution from construction sites have been established by USEPA and the previous Construction General Permit (State Water Board Order No. 99-08-DWQ) issued by the State Water Board. The General Permit establishes one, consistent set of performance standards for all levels and types of discharges (i.e., risk, linear utility, and ATS).The only difference is that for each level or type of discharge there may be more or less specific effluent limitations (e.g., the addition of numeric effluent limitations for turbidity applies to level/type 3 discharges). And the numeric effluent limitations themselves represent a minimum technology standard. In other words, the additional numeric effluent limitations, compared to the existing permit's narrative effluent limitations, do not increase compliance requirements; rather, they simply represent a point where one can quantitatively measure compliance with the lower end of the range of required technologies. Therefore, the compliance costs associated with the BAT/BCT numeric effluent limitations in this permit only differ by the costs required to measure compliance with the NELs when compared to the baseline compliance costs to comply with the limitations already established through EPA regulations and the existing Construction General Permit.

The State Water Board estimates these measurement costs to be approximately $1000 per construction site for the duration of the project. This represents the estimated cost of purchasing (or renting) monitoring equipment, in this case a turbidimeter (~$600) and a pH meter (~$400). In some cases the costs may be higher or lower. Costs could be lower if the discharger chooses to design and implement the project in a manner where effluent monitoring is likely to be avoided (e.g., no exposure during wet weather seasons, no discharge due to containment, etc.). Costs could be more if the project is subject to many effluent monitoring events or if the discharger exceeds NALs and/or NELs, resulting in additional monitoring requirements.

i. ***pH NEL***

Given the potential contaminants, the minimum standard method for control of pH in runoff requires the use of preventive measures such as avoiding concrete pours during rainy weather, covering concrete and directing flow away from fresh concrete if a pour occurs during rain, covering scrap drywall and stucco materials when stored outside and potentially exposed to rain, and other housekeeping measures. If necessary, pH-impaired storm water from construction sites can be treated in a filter or settling pond or basin, with additional natural or chemical treatment required to meet pH limits set forth in this permit. The basin or pond acts as a collection point and holds storm water for a sufficient period for the contaminants to be settled out, either naturally or artificially, and allows any additional treatment to take place. The State Water Board considers these techniques to be equivalent to BCT. In determining the pH concentration limit for discharges, the State Water Board used BPJ to set these limitations.

The chosen limits were established by calculating three standard deviations above and below the mean pH of runoff from highway construction sites[7] in California. Proper implementation of BMPs should result in discharges that are within the range of 6.0 to 9.0 pH Units.

ii. ***Turbidity NEL***

The Turbidity NEL of 500 NTU is a technology-based numeric effluent limitation and was developed using three different analyses aimed at finding the appropriate threshold to set the technology-based limit to ensure environmental protection, effluent quality and cost-effectiveness. The analyses fell into three, main types: (1) an ecoregion-specific dataset developed by Simon et. al. (2004)[8]; (2) Statewide Regional Water Quality Control Board enforcement data; and (3) published, peer-reviewed studies and reports on in-situ performance of best management practices in terms of erosion and sediment control on active construction sites.

A 1:3 relationship between turbidity (expressed as NTU) and suspended sediment concentration (expressed as mg/L) is assumed based on a review of suspended sediment and turbidity data from three gages used in the USGS National Water Quality Assessment Program:

USGS 11074000 SANTA ANA R BL PRADO DAM CA
USGS 11447650 SACRAMENTO R A FREEPORT CA
USGS 11303500 SAN JOAQUIN R NR VERNALIS CA

The turbidity NEL represents a feasible and cost effective performance standard that is demonstrated to be achievable. Although data has been collected to demonstrate that lower effluent levels may be achievable at some sites, staff cannot conclude at this time that a lower NEL is achievable within all the ecoregions of the state. The NEL represents staff determination that the NEL is the most practicable based on available data. The turbidity NEL represents a bridge between the narrative effluent limitations and receiving water limitations. The NEL limit may be considered an interim performance standard as additional data becomes available for evaluation during the next permit cycle. To support this NEL, State Water Board staff analyzed construction site discharge information (monitoring data, estimates) and receiving water monitoring information.

Since the turbidity NEL represents an appropriate threshold level expected at a site, compliance with this value does not necessarily represent compliance with either the narrative effluent limitations (as enforced through the BAT/BCT standard) or the receiving water limitations. In the San Diego region, some inland surface waters have a receiving water objective for turbidity equal to 20 NTU. Obviously a discharge up to, but not exceeding, the turbidity NEL of 500 NTU may still cause or contribute to the exceedance of the 20 NTU standard. Most of the waters of the State are protected by turbidity objectives based on background conditions**.**

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[7] Caltrans Construction Sites Runoff Characterization Study, 2002. Available at: http://www.dot.ca.gov/hq/env/storm water/pdf/CTSW-RT-02-055.pdf.
[8] Simon, A., W.D. Dickerson, and A. Heins. 2004. Suspended-sediment transport rates at the 1.5-year recurrence interval for ecoregions of the United States: transport conditions at the bankfull and effective discharge. Geomorphology 58: pp. 243-262.

Table 1 - Regional Water Board Basin Plans, Water Quality Objectives for Turbidity

REGIONAL WATER BOARD	WQ Objective	Background/Natural Turbidity	Maximum Increase
1 Based	on background	All levels	20%
2 Based	on background	> 50 NTU	10%
3 Based	on background	0-50 JTU 50-100 JTU > 100 JTU	20% 10 NTU 10%
4 Based	on background	0-50 NTU > 50 NTU	20% 10%
5 Based	on background	0-5 NTU 5-50 NTU 50-100 NTU >100 NTU	1 NTU 20% 10 NTU 10%
6 Based	on background	All levels	10%
7 Based	on background	N/A N/A	
8 Based	on background	0-50 NTU 50-100 NTU >100 NTU	20% 10 NTU 10%
9 Inland	Surface Waters, 20 NTU All others, based on background	0-50 NTU 50-100 NTU >100 NTU	20% 10 NTU 10%

Table 2 shows the suspended sediment concentrations at the 1.5 year flow recurrence interval for the 12 ecoregions in California from Simon et. al (2004).

Table 2 - Results of Ecoregion Analysis

Ecoregion	Percent of California Land Area	Median Suspended Sediment Concentration (mg/L)
1 9.1		874
4 0.2		120
5 8.8		35.6
6 20.7		1530
7 7.7		122
8 3.0		47.4
9 9.4		284
13 5.2		143
14 21.7		5150
78 8.1		581
80 2.4		199
81 3.7		503
Area-weighted average		1633

If a 1:3 relationship between turbidity and suspended sediment is assumed, the median turbidity is 544 NTU.

The following table is composed of turbidity readings measured in NTUs from administrative civil liberty (ACL) actions for construction sites from 2003 - 2009. This data was derived from the complete listing of construction-related ACLs for the six year period. All ACLs were reviewed and those that included turbidimeter readings at the point of storm water discharge were selected for this dataset.

Table 3 – ACL Sampling Data taken by Regional Water Board Staff

WDID# Regi	on	Discharger	Turbidity (NTU)
5S34C331884	5S Brad	shaw Interceptor Section 6B	1800
5S05C325110	5S Bridal	wood Subdivision	1670
5S48C336297	5S Cheye	nne at Browns Valley	1629
5R32C314271	5R Gri	zzly Ranch Construction	1400
6A090406008	6T	El Dorado County Department of Transportation, Angora Creek	97.4
5S03C346861	5S	TML Development, LLC	1600
6A31C325917	6T	Northstar Village	See Subdata Set

Subdata Set - Turbidity for point of storm water runoff discharge at Northstar Village

Date Turbi	dity (NTU)	Location
10/5/2006	900	Middle Martis Creek
11/2/2006	190	Middle Martis Creek
01/04/2007	36	West Fork, West Martis Creek
02/08/2007	180	Middle Martis Creek
02/09/2007	130	Middle Martis Creek
02/09/2007	290	Middle Martis Creek
02/09/2007	100	West Fork, West Martis Creek
02/10/2007	28	Middle Martis Creek
02/10/2007	23	Middle Martis Creek
02/10/2007	32	Middle Martis Creek
02/10/2007	12	Middle Martis Creek
02/10/2007	60	West Fork, West Martis Creek
02/10/2007	34	West Fork, West Martis Creek

A 95% confidence interval for mean turbidity in an ACL order was constructed. The data set used was a small sample size, so the 500 NTU (the value derived as the NEL for this General Permit) needed to be verified as a possible population mean. In this case, the population refers to a hypothetical population of turbidity measurements of which our sample of 20 represents. A t-distribution was assumed due to the small sample size:

Mean: 512.23 NTU Standard Deviation: 686.85 **Margin of** Error: 321.45 Confidence Interval: 190.78 NTU (Low) 833.68 NTU (High)

Based on a constructed 95% confidence interval, an ACL order turbidity measurement will be between 190.78 – 833.68 NTU. 500 NTU falls within this range. Using the same data set, a small-sample hypothesis test was also performed to test if the ACL turbidity data set contains enough information to cast doubt on choosing a 500 NTU as a mean. 500 NTU was again chosen due to its proposed use as an acceptable NEL value. The test was carried out using a 95% confidence interval. Results indicated that the ACL turbidity data set *does not* contain significant sample evidence to reject the claim of 500 NTU as an acceptable mean for the ACL turbidity population.

There are not many published, peer-reviewed studies and reports on in-situ performance of best management practices in terms of erosion and sediment control on active construction sites. The most often cited study is a report titled, "Improving the Cost Effectiveness of Highway Construction Site Erosion and Pollution Control" (Horner, Guedry, and Kortenhof 1990, http://www.wsdot.wa.gov/Research/Reports/200/200.1.htm). In a comment letter summarizing this report sent to the State Water Board, the primary author, Dr. Horner, states:

"The most effective erosion control product was wood fiber mulch applied at two different rates along with a bonding agent and grass seed in sufficient time before the tests to achieve germination. Plots treated in this way reduced influent turbidity by more than 97 percent and discharged effluent exhibiting mean and maximum turbidity values of 21 and 73 NTU, respectively. Some other mulch and blanket materials performed nearly as well. These tests demonstrated the control ability of widely available BMPs over a very broad range of erosion potential."

Other technologies studied in this report produced effluent quality at or near 100 NTU. It is the BPJ of the State Water Board staff that erosion control, while preferred, is not always an option on construction sites and that technology performance in a controlled study showing effluent quality directly leaving a BMP is always easier and cheaper to control than effluent being discharged from the project (edge of property, etc.). As a result, it is the BPJ of the State Water Board staff that it is not cost effective or feasible, at this time, for all risk level and type 3 sites in California to achieve effluent discharges with turbidity values that are less than 100 NTU.

To summarize, the analysis showed that: (1) results of the Simon et. al dataset reveals turbidity values in background receiving water in California's ecoregions range from 16 NTU to 1716 NTU (with a mean of 544 NTU); (2) based on a constructed 95% confidence interval, construction sites will be subject to administrative civil liability (ACL) when their turbidity measurement falls between 190.78 – 833.68 NTU; and (3) sites with highly controlled discharges employing and maintaining good erosion control practices can discharge effluent from the BMP with turbidity values less than 100 NTU. Therefore, the appropriate threshold to set the technology-based limit to ensure environmental protection, effluent quality, and cost-effectiveness ranges from 100 NTU to over 1700 NTU. To keep this parameter and the costs of compliance as low as possible, State Water Board staff has determined, using its BPJ, that it is most cost effective to set the numeric effluent limitation for turbidity at 500 NTU.

a. Compliance Storm Event

In response to public comments on the last draft and the recommendations of the expert panel, this General Permit contains "compliance storm event" exceptions from the technology-based NELs. The rationale is that technology-based requirements are developed assuming a certain design storm (defined as the storm producing a rainfall amount for a specified BMPs capacity). Compliance thresholds are needed for storm events above and beyond the design storms assumed to determine the technology-based NELs. For Risk Level 3 project sites applicable to NELs, this General Permit establishes a compliance storm event as the equivalent rainfall in a 5-year, 24-hour storm. This compliance storm was chosen due to its relative infrequent occurrence and the fact that the runoff volume associated with it is not as large as a 10-year, 24-hour storm event. The discharger shall determine this value using Western Regional Climate Center Precipitation Frequency Maps[9] for 5-year 24-hour storm events in Northern and Southern California (note that these are expressed in tenths of inches – divide by 10 to get inches).

b. TMDLs and Waste Load Allocations

Dischargers located within the watershed of a CWA § 303(d) impaired water body, for which a TMDL for sediment has been adopted by the Regional Water Board or USEPA, must comply with the approved TMDL if it identifies "construction activity" or land disturbance as a source of sediment. If it does, the TMDL should include a specific waste load allocation for this activity/source. The discharger, in this case, may be required by a separate Regional Water Board order to implement additional BMPs, conduct additional monitoring activities, and/or comply with an applicable waste load allocation and implementation schedule. If a specific waste load allocation has been established that would apply to a specific discharge, the Regional Water Board may adopt an order requiring specific implementation actions necessary to meet that allocation. In the instance where an approved TMDL has specified a general waste load allocation to construction storm water discharges, but no specific requirements for construction sites have been identified in the TMDL, dischargers must consult with the state TMDL authority[10] to confirm that adherence to a SWPPP that meets the requirements of the General Permit will be consistent with the approved TMDL.

2. Determining Compliance with Effluent Standards

a. Technology-Based Numeric Action Levels (NALs)

This General Permit contains technology-based NALs for pH and turbidity, and requirements for effluent monitoring at all Risk level 2 & 3, and LUP Type 2 & 3 sites. Numeric action levels are essentially numeric benchmark values for certain parameters that, if exceeded in effluent sampling, trigger the discharger to take actions. Exceedance of an NAL does not itself constitute a violation of the General Permit. If the discharger fails to take the corrective action required by the General Permit, though, that may consititute a violation.

The primary purpose of NALs is to assist dischargers in evaluating the effectiveness of their on-site measures. Construction sites need to employ many different systems that must work together to achieve compliance with the permit's requirements. The NALs chosen should indicate whether the systems are working as intended.

Another purpose of NALs is to provide information regarding construction activities and water quality impacts. This data will provide the State and Regional Water Boards and the rest of the storm water community with more information about levels and types of pollutants present in runoff and how effective the dischargers BMPs are at reducing pollutants in effluent. The State Water Board also hopes to learn more about the linkage between effluent and receiving water quality. In addition, these requirements will provide information on the mechanics needed to establish compliance monitoring programs at construction sites in future permit deliberations.

i. *pH*

[9] http://www.wrcc.dri.edu/pcpnfreq/nca5y24.gif & http://www.wrcc.dri.edu/pcpnfreq/sca5y24.gif .
[10] http://www.waterboards.ca.gov/tmdl/tmdl.html.

The chosen limits were established by calculating one standard deviation above and below the mean pH of runoff from highway construction sites[11] in California. Proper implementation of BMPs should result in discharges that are within the range of 6.5 to 8.5 pH Units.

The Caltrans study included 33 highway construction sites throughout California over a period of four years, which included 120 storm events. All of these sites had BMPs in place that would be generally implemented at all types of construction sites in California.

ii. *Turbidity*

BPJ was used to develop an NAL that can be used as a learning tool to help dischargers improve their site controls, and to provide meaningful information on the effectiveness of storm water controls. A statewide turbidity NAL has been set at 250 NTU.

G. Receiving Water Limitations

Construction-related activities that cause or contribute to an exceedance of water quality standards must be addressed. The dynamic nature of construction activity gives the discharger the ability to quickly identify and monitor the source of the exceedances. This is because when storm water mobilizes sediment, it provides visual cues as to where corrective actions should take place and how effective they are once implemented.

This General Permit requires that storm water discharges and authorized non-storm water discharges must not contain pollutants that cause or contribute to an exceedance of any applicable water quality objective or water quality standards. The monitoring requirements in this General Permit for sampling and analysis procedures will help determine whether BMPs installed and maintained are preventing pollutants in discharges from the construction site that may cause or contribute to an exceedance of water quality standards.

Water quality standards consist of designated beneficial uses of surface waters and the adoption of ambient criteria necessary to protect those uses. When adopted by the State Water Board or a Regional Water Board, the ambient criteria are termed "water quality objectives." If storm water runoff from construction sites contains pollutants, there is a risk that those pollutants could enter surface waters and cause or contribute to an exceedance of water quality standards. For that reason, dischargers should be aware of the applicable water quality standards in their receiving waters. (The best method to ensure compliance with receiving water limitations is to implement BMPs that prevent pollutants from contact with storm water or from leaving the construction site in runoff.)

In California, water quality standards are published in the Basin Plans adopted by each Regional Water Board, the California Toxics Rule (CTR), the National Toxics Rule (NTR), and the Ocean Plan.

Dischargers can determine the applicable water quality standards by contacting Regional Water Board staff or by consulting one of the following sources. The actual Basin Plans that contain the water quality standards can be viewed at the website of the appropriate Regional Water Board. (http://www.waterboards.ca.gov/regions.html), the State Water Board site for statewide plans (http://www.waterboards.ca.gov/plnspols/index.html), or the USEPA regulations for the NTR and CTR (40 C.F.R. §§ 131.36-38). Basin Plans and statewide plans are also available by mail from the appropriate Regional Water Board or the State Water Board. The USEPA regulations are available at http://www.epa.gov/. Additional information concerning water quality standards can be accessed through http://www.waterboards.ca.gov/stormwtr/gen_const.html.

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[11] Caltrans Construction Sites Runoff Characterization Study, 2002. Available at: http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-02-055.pdf.

H. Training Qualifications and Requirements

The Blue Ribbon Panel (BRP) made the following observation about the lack of industry-specific training requirements:

"Currently, there is no required training or certification program for contractors, preparers of soil erosion and sediment control Storm Water Pollution Prevention Plans, or field inspectors."

Order 99-08-DWQ required that all dischargers train their employees on how to comply with the permit, but it did not specificy a curriculum or certification program. This has resulted in inconsistent implementation by all affected parties - the dischargers, the local governments where the construction activity occurs, and the regulators required to enforce 99-08-DWQ. This General Permit requires Qualified SWPPP Developers and practitioners to obtain appropriate training, and makes this curriculum mandatory two years after adoption, to allow time for course completion. The State and Regional Water Board are working with many stakeholders to develop the curriculum and mechanisms needed to develop and deliver the courses.

To ensure that the preparation, implementation, and oversight of the SWPPP is sufficient for effective pollution prevention, the Qualified SWPPP Developer and Qualified SWPPP Practitioners responsible for creating, revising, overseeing, and implementing the SWPPP must attend a State Water Board-sponsored or approved Qualified SWPPP Developer and Qualified SWPPP Practitioner training course.

I. Sampling, Monitoring, Reporting and Record Keeping

1. Traditional Construction Monitoring Requirements

This General Permit requires visual monitoring at all sites, and effluent water quality at all Risk Level 2 & 3 sites. It requires receiving water monitoring at some Risk Level 3 sites. All sites are required to submit annual reports, which contain various types of information, depending on the site characteristics and events. A summary of the monitoring and reporting requirements is found in Table 4.

Table 4 - Required Monitoring Elements for Risk Levels

	Visual	Non-visible Pollutant	Effluent	Receiving Water
Risk Level 1	three types required for all Risk Levels: non-storm water, pre-rain and post-rain	As needed for all Risk Levels (see below)	where applicable	not required
Risk Level 2			pH, turbidity	not required
Risk Level 3			(if NEL exceeded) pH, turbidity and SSC	(if NEL exceeded) pH, turbidity and SSC. Bioassessment for sites 30 acres or larger.

a. Visual

All dischargers are required to conduct quarterly, non-storm water visual inspections. For these inspections, the discharger must visually observe each drainage area for the presence of (or indications of prior) unauthorized and authorized non-storm water discharges and their sources. For storm-related inspections, dischargers must visually observe storm water discharges at all discharge locations within two business days after a qualifying event. For this requirement, a qualifying rain event is one producing precipitation of ½ inch or more of discharge. Dischargers must conduct a post-storm event inspection to

(1) identify whether BMPs were adequately designed, implemented, and effective, and (2) identify any additional BMPs necessary and revise the SWPPP accordingly. Dischargers must maintain on-site records of all visual observations, personnel performing the observations, observation dates, weather conditions, locations observed, and corrective actions taken in response to the observations.

b. Non-Visible Pollutant Monitoring

This General Permit requires that all dischargers develop a sampling and analysis strategy for monitoring pollutants that are not visually detectable in storm water. Monitoring for non-visible pollutants must be required at any construction site when the exposure of construction materials occurs and where a discharge can cause or contribute to an exceedance of a water quality objective.

Of significant concern for construction discharges are the pollutants found in materials used in large quantities at construction sites throughout California and exposed throughout the rainy season, such as cement, flyash, and other recycled materials or by-products of combustion. The water quality standards that apply to these materials will depend on their composition. Some of the more common storm water pollutants from construction activity are not CTR pollutants. Examples of non-visible pollutants include glyphosate (herbicides), diazinon and chlorpyrifos (pesticides), nutrients (fertilizers), and molybdenum (lubricants). The use of diazinon and chlorpyrifos is a common practice among landscaping professionals and may trigger sampling and analysis requirements if these materials come into contact with storm water. High pH values from cement and gypsum, high pH and SSC from wash waters, and chemical/fecal contamination from portable toilets, also are not CTR pollutants. Although some of these constituents do have numeric water quality objectives in individual Basin Plans, many do not and are subject only to narrative water quality standards (i.e. not causing toxicity). Dischargers are encouraged to discuss these issues with Regional Water Board staff and other storm water quality professionals.

The most effective way to avoid the sampling and analysis requirements, and to ensure permit compliance, is to avoid the exposure of construction materials to precipitation and storm water runoff. Materials that are not exposed do not have the potential to enter storm water runoff, and therefore receiving waters sampling is not required. Preventing contact between storm water and construction materials is one of the most important BMPs at any construction site.

Preventing or eliminating the exposure of pollutants at construction sites is not always possible. Some materials, such as soil amendments, are designed to be used in a manner that will result in exposure to storm water. In these cases, it is important to make sure that these materials are applied according to the manufacturer's instructions and at a time when they are unlikely to be washed away. Other construction materials can be exposed when storage, waste disposal or the application of the material is done in a manner not protective of water quality. For these situations, sampling is required unless there is capture and containment of all storm water that has been exposed. In cases where construction materials may be exposed to storm water, but the storm water is contained and is not allowed to run off the site, sampling will only be required when inspections show that the containment failed or is breached, resulting in potential exposure or discharge to receiving waters.

The discharger must develop a list of potential pollutants based on a review of potential sources, which will include construction materials soil amendments, soil treatments, and historic contamination at the site. The discharger must review existing environmental and real estate documentation to determine the potential for pollutants that could be present on the construction site as a result of past land use activities.

Good sources of information on previously existing pollution and past land uses include:

i. Environmental Assessments;

ii. Initial Studies;

iii. Phase 1 Assessments prepared for property transfers; and

iv. Environmental Impact Reports or Environmental Impact Statements prepared under the requirements of the National Environmental Policy Act or the California Environmental Quality Act.

In some instances, the results of soil chemical analyses may be available and can provide additional information on potential contamination.

The potential pollutant list must include all non-visible pollutants that are known or should be known to occur on the construction site including, but not limited to, materials that:

i. are being used in construction activities;

ii. are stored on the construction site;

iii. were spilled during construction operations and not cleaned up;

iv. were stored (or used) in a manner that created the potential for a release of the materials during past land use activities;

v. were spilled during previous land use activities and not cleaned up; or

vi. were applied to the soil as part of past land use activities.

C. Effluent Monitoring

Federal regulations[12] require effluent monitoring for discharges subject to NALs and NELs. Subsequently, all Risk Level 2 and 3 dischargers must perform sampling and analysis of effluent discharges to characterize discharges associated with construction activity from the entire area disturbed by the project. Dischargers must collect samples of stored or contained storm water that is discharged subsequent to a storm event producing precipitation of ½ inch or more at the time of discharge.

Table 5 - Storm Water Effluent Monitoring Requirements by Risk Level

	Frequency	Effluent Monitoring (Section E, below)
Risk Level 1	when applicable	non-visible pollutant parameters (if applicable)
Risk Level 2	Minimum of 3 samples per day during qualifying rain event characterizing discharges associated with construction activity from the entire project disturbed area.	pH, turbidity, and non-visible pollutant parameters (if applicable)
Risk Level 3	Minimum of 3 samples per day during qualifying rain event characterizing discharges associated with construction activity from the entire project disturbed area.	If NEL exceeded: pH, turbidity and suspended sediment concentration (SSC)., Plus non-visible pollutant parameters if applicable

Risk Level 1 dischargers must analyze samples for:

[12] 40 C.F.R. § 122.44.

i. any parameters indicating the presence of pollutants identified in the pollutant source assessment required in Attachment C contained in the General Permit.

Risk Level 2 dischargers must analyze samples for:

i. pH and turbidity;

ii. any parameters indicating the presence of pollutants identified in the pollutant source assessment required in Attachment D contained in the General Permit, and

iii. any additional parameters for which monitoring is required by the Regional Water Board.

Risk Level 3 dischargers must analyze samples for:

i. pH, turbidity and SSC;

ii. any parameters indicating the presence of pollutants identified in the pollutant source assessment required in Attachment E contained in the General Permit, and

iii. any additional parameters for which monitoring is required by the Regional Water Board.

2. Linear Monitoring and Sampling Requirements

Attachment A, establishes minimum monitoring and reporting requirements for all LUPs. It establishes different monitoring requirements depending on project complexity and risk to water quality. The monitoring requirements for Type 1 LUPs are less than Type 2 & 3 projects because Type 1 projects have a lower potential to impact water quality.

A discharger shall prepare a monitoring program prior to the start of construction and immediately implement the program at the start of construction for LUPs. The monitoring program must be implemented at the appropriate level to protect water quality at all times throughout the life of the project.

a. Type 1 LUP Monitoring Requirements

A discharger must conduct daily visual inspections of Type 1 LUPs during working hours while construction activities are occurring. Inspections are to be conducted by qualified personnel and can be conducted in conjunction with other daily activities. Inspections will be conducted to ensure the BMPs are adequate, maintained, and in place at the end of the construction day. The discharger will revise the SWPPP, as appropriate, based on the results of the daily inspections. Inspections can be discontinued in non-active construction areas where soil disturbing activities have been completed and final stabilization has been achieved (e.g., trench has been paved, substructures have been installed, and successful final vegetative cover or other stabilization criteria have been met).

A discharger shall implement the monitoring program for inspecting Type 1 LUPs. This program requires temporary and permanent stabilization BMPs after active construction is completed. Inspection activities will continue until adequate permanent stabilization has been established and will continue in areas where re-vegetation is chosen until minimum vegetative coverage has been established. Photographs shall be taken during site inspections and submitted to the State Water Board.

b. Type 2 & 3 LUP Monitoring Requirements

A discharger must conduct daily visual inspections of Type 2 & 3 LUPs during working hours while construction activities are occurring. Inspections are to be conducted by qualified personnel and can be in conjunction with other daily activities.

All dischargers of Type 2 & 3 LUPs are required to conduct inspections by qualified personnel of the construction site during normal working hours prior to all anticipated storm events and after actual storm events. During extended storm events, the discharger shall conduct inspections during normal working hours for each 24-hour period. Inspections can be discontinued in non-active construction areas where soil disturbing activities have been completed and final stabilization has been achieved (e.g., trench has been paved, substructures installed, and successful vegetative cover or other stabilization criteria have been met).

The goals of these inspections are (1) to identify areas contributing to a storm water discharge; (2) to evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate and properly installed and functioning in accordance with the terms of the General Permit; and (3) to determine whether additional control practices or corrective maintenance activities are needed. Equipment, materials, and workers must be available for rapid response to failures and emergencies. All corrective maintenance to BMPs shall be performed as soon as possible, depending upon worker safety.

All dischargers shall develop and implement a monitoring program for inspecting Type 2 & 3 LUPs that require temporary and permanent stabilization BMPs after active construction is completed. Inspections will be conducted to ensure the BMPs are adequate and maintained. Inspection activities will continue until adequate permanent stabilization has been established and will continue in areas where revegetation is chosen until minimum vegetative coverage has been established.

A log of inspections conducted before, during, and after the storm events must be maintained in the SWPPP. The log will provide the date and time of the inspection and who conducted the inspection. Photographs must be taken during site inspections and submitted to the State Water Board.

c. Sampling Requirements for all LUP Project Types

LUPs are also subject to sampling and analysis requirements for visible pollutants (i.e., sedimentation/siltation, turbidity) and for non-visible pollutants.

Sampling for visible pollutants is required for Type 2 & 3 LUPs.

Non-visible pollutant monitoring is required for pollutants associated with construction sites and activities that (1) are not visually detectable in storm water discharges, and (2) are known or should be known to occur on the construction site, and (3) could cause or contribute to an exceedance of water quality objectives in the receiving waters. Sample collection for non-visible pollutants must only be required (1) during a storm event when pollutants associated with construction activities may be discharged with storm water runoff due to a spill, or in the event there was a breach, malfunction, failure, and/or leak of any BMP, and (2) when the discharger has failed to adequately clean the area of material and pollutants. Failure to implement appropriate BMPs will trigger the same sampling requirements as those required for a breach, malfunction and/or leak, or when the discharger has failed to implement appropriate BMPs prior to the next storm event.

Additional monitoring parameters may be required by the Regional Water Boards.

It is not anticipated that many LUPs will be required to collect samples for pollutants not visually detected in runoff due to the nature and character of the construction site and activities as previously described in this fact sheet. Most LUPs are constructed in urban areas with public access (e.g., existing roadways, road shoulders, parking areas, etc.). This raises a concern regarding the potential contribution of pollutants from vehicle use and/or from normal activities of the public (e.g., vehicle washing, landscape fertilization, pest spraying, etc.) in runoff from the project site. Since the dischargers are not the land owners of the project area and are not able to control the presence of these pollutants in the storm water that runs through their projects, it is not the intent of this General Permit to require dischargers to sample for these pollutants. This General Permit does not require the discharger to sample for these types of pollutants except where the discharger has brought materials onsite that contain these pollutants and when a condition (e.g., breach, failure, etc.) described above occurs.

3. Receiving Water Monitoring

In order to ensure that receiving water limitations are met, discharges subject to numeric effluent limitations (i.e., Risk Level 3, LUP Type 3, and ATS with direct discharges into receiving waters) must also monitor the downstream receiving water(s) for turbidity, SSC, and pH (if applicable) when an NEL is exceeded.

a. Bioassessment Monitoring

This General Permit requires a bioassessment of receiving waters for dischargers of Risk Level 3 or LUP Type 3 construction projects equal to or larger than 30 acres with direct discharges into receiving waters. Benthic macroinvertebrate samples will be taken upstream and downstream of the site's discharge point in the receiving water. Bioassessments measure the quality of the stream by analyzing the aquatic life present. Higher levels of appropriate aquatic species tend to indicate a healthy stream; whereas low levels of organisms can indicate stream degradation. Active construction sites have the potential to discharge large amounts of sediment and pollutants into receiving waters. Requiring a bioassessment for large project sites, with the most potential to impact water quality, provides a snapshot of the health of the receiving water prior to initiation of construction activities. This snapshot can be used in comparison to the health of the receiving water after construction has commenced.

Each ecoregion (biologically and geographically related area) in the State has a specific yearly peak time where stream biota is in a stable and abundant state. This time of year is called an Index Period. The bioassessment requirements in this General Permit, requires benthic macroinvertebrate sampling within a sites index period. The State Water Board has developed a map designating index periods for the ecoregions in the State (see State Water Board Website).

This General Permit requires the bioassessment methods to be in accordance with the Surface Water Ambient Monitoring Program (SWAMP) in order to provide data consistency within the state as well as generate useable biological stream data.

Table 6 - Receiving Water Monitoring Requirements

	Receiving Water Monitoring Parameters
Risk Level 1 /LUP Type 1	not required
Risk Level 2 / LUP Type 2	not required
Risk Level 3 / LUP Type 3	If NEL exceeded: pH (if applicable), turbidity, and SSC. Bioassessment for sites 30 acres or larger.

4. Reporting Requirements

a. NEL Violation Report

All Risk Level 3 and LUP Type 3 dischargers must electronically submit all storm event sampling results to the State and Regional Water Boards, via SMARTS, no later than 5 days after the conclusion of the storm event. The purpose of the electronic filing of the NEL Violation Report is to 1) inform stakeholder agencies and organizations and the general public, and 2) notify the State and Regional Water Boards of the exceedance so that they can determine whether any follow-up (e.g., inspection, enforcement, etc.) is necessary to bring the site into compliance.

In the event that an applicable NEL has been exceeded during a storm event equal to or larger than the Compliance Storm Event, Risk level 3/LUP Type 3 dischargers shall report the on-site rain gauge reading and nearby governmental rain gauge readings for verification. Specifically, the NEL Exceedance Report is required to contain:

- the analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit are to be reported as "less than the method detection limit or <MDL");
- the date, place, and time of sampling;
- any visual observation (inspections);
- any measurements, including precipitation; and
- a description of the current BMPs associated with the effluent sample that exceeded the NEL and any proposed corrective actions taken.

b. NAL Exceedance Report

All Risk Level 3 and LUP Type 3 dischargers must electronically submit all storm event sampling results to the State and Regional Water Boards, via the electronic data system, no later than 5 days after the conclusion of the storm event. In the event that any effluent sample exceeds an applicable NAL, all Risk Level 2 and LUP Type 2 dischargers must electronically submit all storm event sampling results to the State and Regional Water Boards no later than 10 days after the conclusion of the storm event. The Regional Water Boards have the authority to require the submittal of an NAL Exceedance Report.

Specifically, the NAL Exceedance Report is required to contain:

- the analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit are to be reported as "less than the method detection limit or <MDL");
- the date, place, and time of sampling;
- any visual observation (inspections);
- any measurements, including precipitation; and
- a description of the current BMPs associated with the effluent sample that exceeded the NAL and any proposed corrective actions taken.

c. Annual Report

All dischargers must prepare and electronically submit an annual report no later than September 1 of each year using the Storm water Multi-Application Reporting and Tracking System (SMARTS). The Annual Report must include a summary and evaluation of all sampling and analysis results, original laboratory reports, chain of custody forms, a summary of all corrective actions taken during the compliance year, and identification of any compliance activities or corrective actions that were not implemented.

5. Record Keeping

According to 40 C.F.R. Parts 122.21(p) and 122.41(j), the discharger is required to retain paper or electronic copies of all records required by this General Permit for a period of at least three years from the date generated or the date submitted to the State Water Board or Regional Water Boards. A discharger must retain records for a period beyond three years as directed by Regional Water Board.

J. Risk Determination

1. Traditional Projects

a. Overall Risk Determination

There are two major requirements related to site planning and risk determination in this General Permit. The project's overall risk is broken up into two elements – (1) project sediment risk (the relative amount of sediment that can be discharged, given the project and location details) and (2) receiving water risk (the risk sediment discharges pose to the receiving waters).

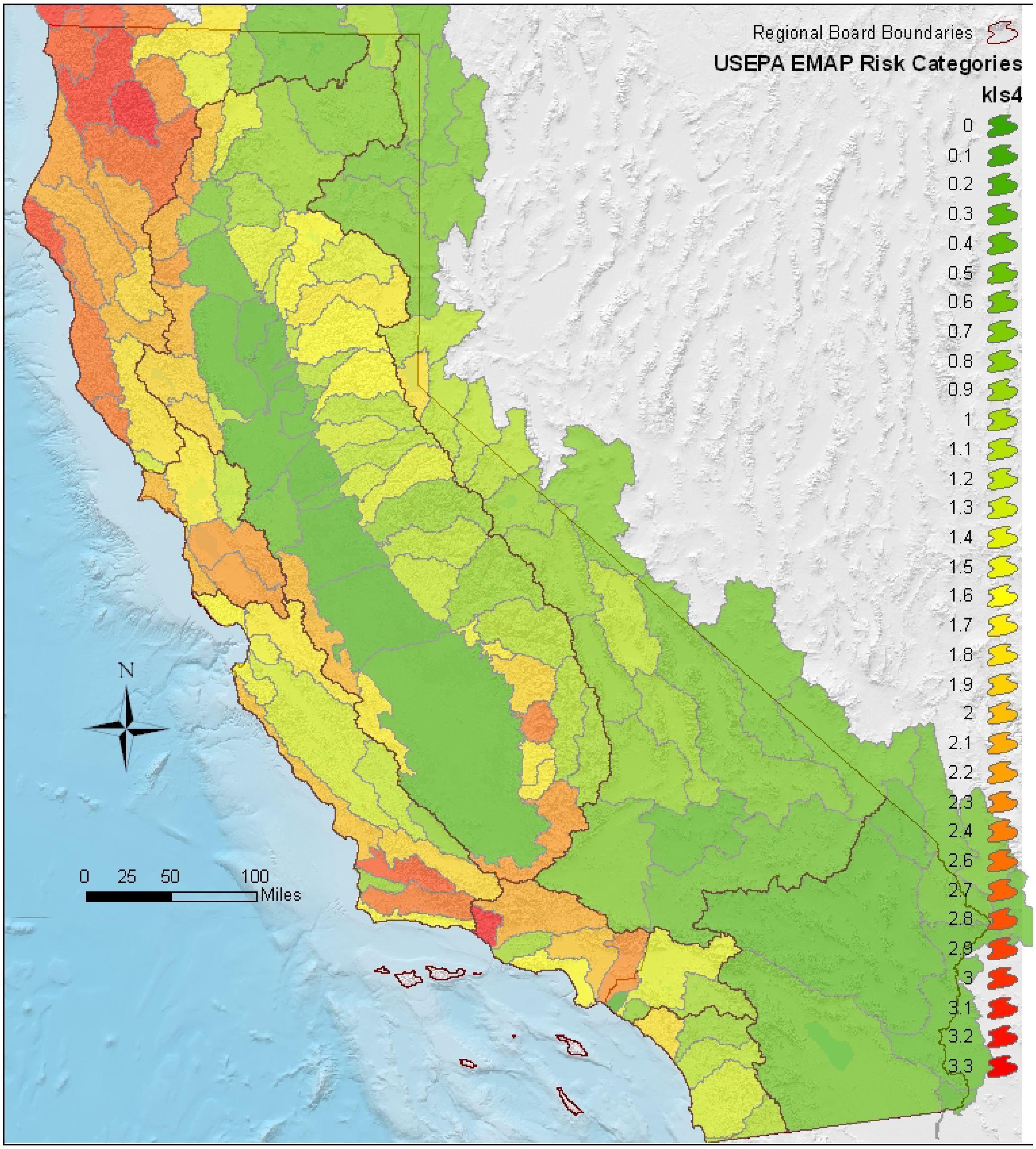
Project Sediment Risk:
Project Sediment Risk is determined by multiplying the R, K, and LS factors from the Revised Universal Soil Loss Equation (RUSLE) to obtain an estimate of project-related bare ground soil loss expressed in tons/acre. The RUSLE equation is as follows:

A = (R)(K)(LS)(C)(P)

Where: A = the rate of sheet and rill erosion
R = rainfall-runoff erosivity factor
K = soil erodibility factor
LS = length-slope factor
C = cover factor (erosion controls)
P = management operations and support practices (sediment controls)

The C and P factors are given values of 1.0 to simulate bare ground conditions.

There is a map option and a manual calculation option for determining soil loss. For the map option, the R factor for the project is calculated using the online calculator at http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm. The product of K and LS are shown on Figure 1. To determine soil loss in tons per acre, the discharger multiplies the R factor times the value for K times LS from the map.



Water Boards

State Water Resources Control Board, January 15, 2008

Figure 1 -Statewide Map of K * LS

For the manual calculation option, the R factor for the project is calculated using the online calculator at http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm. The K and LS factors are determined using Appendix 1.

Soil loss of less than 15 tons/acre is considered **low** sediment risk.
Soil loss between 15 and 75 tons/acre is **medium** sediment risk.
Soil loss over 75 tons/acre is considered **high** sediment risk.

The soil loss values and risk categories were obtained from mean and standard deviation RKLS values from the USEPA EMAP program. High risk is the mean RKLS value plus two standard deviations. Low risk is the mean RKLS value minus two standard deviations.

Receiving Water Risk:
Receiving water risk is based on whether a project drains to a sediment-sensitive waterbody. A sediment-sensitive waterbody is either

on the most recent 303d list for waterbodies impaired for sediment;
has a USEPA-approved Total Maximum Daily Load implementation plan for sediment; **or**
has the beneficial uses of COLD, SPAWN, and MIGRATORY.

A project that meets at least one of the three criteria has a high receiving water risk. A list of sediment-sensitive waterbodies will be posted on the State Water Board's website. It is anticipated that an interactive map of sediment sensitive water bodies in California will be available in the future.

The Risk Levels have been altered by eliminating the possibility of a Risk Level 4, and expanding the constraints for Risk Levels 1, 2, and 3. Therefore, projects with high receiving water risk and high sediment risk will be considered a Risk Level 3 risk to water quality.

In response to public comments, the Risk Level requirements have also been changed such that Risk Level 1 projects will be subject to minimum BMP and visual monitoring requirements, Risk Level 2 projects will be subject to NALs and some additional monitoring requirements, and Risk Level 3 projects will be subject to NELs, and more rigorous monitoring requirements such as receiving water monitoring and in some cases bioassessment.

Table 7 - Combined Risk Level Matrix

Combined Risk Level Matrix				
Receiving Water Risk		Sediment Risk		
		Low Medium		High
	Low	Level 1	Level 2	
	High	Level 2		Level 3

b. **Effluent Standards**

All dischargers are subject to the narrative effluent limitations specified in the General Permit. The narrative effluent limitations require storm water discharges associated with construction activity to meet all applicable provisions of Sections 301 and 402 of the CWA. These provisions require controls of pollutant discharges that utilize BAT and BCT to reduce pollutants and any more stringent controls necessary to meet water quality standards.

Risk Level 2, and 3 dischargers are subject to numeric effluent standards comparable to the project's risk to water quality. Risk Level 2 dischargers that pose a medium risk to water quality are subject to technology-based NALs for pH and turbidity. Risk Level 3 dischargers that pose a high risk to water quality are subject to technology-based NALs and technology-based NELs for pH and turbidity.

c. Good Housekeeping

Proper handling and managing of construction materials can help minimize threats to water quality. The discharger must consider good housekeeping measures for: construction materials, waste management, vehicle storage & maintenance, landscape materials, and potential pollutant sources. Examples include; conducting an inventory of products used, implementing proper storage & containment, and properly cleaning all leaks from equipment and vehicles.

d. Non-Storm Water Management

Non-storm water discharges directly connected to receiving waters or the storm drain system have the potential to negatively impact water quality. The discharger must implement measures to control all non-storm water discharges during construction, and from dewatering activities associated with construction. Examples include; properly washing vehicles in contained areas, cleaning streets, and minimizing irrigation runoff.

e. Erosion Control

The best way to minimize the risk of creating erosion and sedimentation problems during construction is to disturb as little of the land surface as possible by fitting the development to the terrain. When development is tailored to the natural contours of the land, little grading is necessary and, consequently, erosion potential is lower.[14] Other effective erosion control measures include: preserving existing vegetation where feasible, limiting disturbance, and stabilizing and re-vegetating disturbed areas as soon as possible after grading or construction activities. Particular attention must be paid to large, mass-graded sites where the potential for soil exposure to the erosive effects of rainfall and wind is great and where there is potential for significant sediment discharge from the site to surface waters. Until permanent vegetation is established, soil cover is the most cost-effective and expeditious method to protect soil particles from detachment and transport by rainfall. Temporary soil stabilization can be the single most important factor in reducing erosion at construction sites. The discharger is required to consider measures such as: covering disturbed areas with mulch, temporary seeding, soil stabilizers, binders, fiber rolls or blankets, temporary vegetation, and permanent seeding. These erosion control measures are only examples of what should be considered and should not preclude new or innovative approaches currently available or being developed. Erosion control BMPs should be the primary means of preventing storm water contamination, and sediment control techniques should be used to capture any soil that becomes eroded.[13]

Risk Level 3 dischargers pose a higher risk to water quality and are therefore additionally required to ensure that post-construction soil loss is equivalent to or less than the pre-construction levels.

f. Sediment Control

Sediment control BMPs should be the secondary means of preventing storm water contamination. When erosion control techniques are ineffective, sediment control techniques should be used to capture any soil that becomes eroded. The discharger is required to consider perimeter control measures such as: installing silt fences or placing straw wattles below slopes. These sediment control measures are only examples of what should be considered and should not preclude new or innovative approaches currently available or being developed.

Because Risk Level 2 and 3 dischargers pose a higher risk to water quality, additional requirements for the application of sediment controls are imposed on these projects. This General Permit also authorizes the Regional Water Boards to require Risk Level 3 dischargers to implement additional site-specific

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[13] U.S. Environmental Protection Agency. 2007. Developing Your Storm Water Pollution Prevention Plan: A Guide for Construction Sites.

sediment control requirements if the implementation of other erosion or sediment controls are not adequately protecting the receiving waters.

g. Run-on and Runoff Control

Inappropriate management of run-on and runoff can result in excessive physical impacts to receiving waters from sediment and increased flows. The discharger is required to manage all run-on and runoff from a project site. Examples include: installing berms and other temporary run-on and runoff diversions.

Risk Level 1 dischargers with lower risks to impact water quality are not subject to the run-on and runoff control requirements unless an evaluation deems them necessary or visual inspections show that such controls are required.

h. Inspection, Maintenance and Repair

All measures must be periodically inspected, maintained and repaired to ensure that receiving water quality is protected. Frequent inspections coupled with thorough documentation and timely repair is necessary to ensure that all measures are functioning as intended.

i. Rain Event Action Plan (REAP)

A Rain Event Action Plan (REAP) is a written document, specific for each rain event. A REAP should be designed that when implemented it protects all exposed portions of the site within 48 hours of any likely precipitation event forecast of 50% or greater probability.

This General Permit requires Risk Level 2 and 3 dischargers to develop and implement a REAP designed to protect all exposed portions of their sites within 48 hours prior to any likely precipitation event. The REAP requirement is designed to ensure that the discharger has adequate materials, staff, and time to implement erosion and sediment control measures that are intended to reduce the amount of sediment and other pollutants generated from the active site. A REAP must be developed when there is likely a forecast of 50% or greater probability of precipitation in the project area. (The National Oceanic and Atmospheric Administration (NOAA) defines a chance of precipitation as a probability of precipitation of 30% to 50% chance of producing precipitation in the project area.[14] NOAA defines the probability of precipitation (PoP) as the likelihood of occurrence (expressed as a percent) of a measurable amount (0.01 inch or more) of liquid precipitation (or the water equivalent of frozen precipitation) during a specified period of time at any given point in the forecast area.) Forecasts are normally issued for 12-hour time periods. Descriptive terms for uncertainty and aerial coverage are used as follows:

Table 8 -National Oceanic and Atmospheric Administration (NOAA) Definition of Probability of Precipitation (PoP)

PoP	Expressions of Uncertainty	Aerial Coverage
0%	none used	none used
10%	none used	isolated
20%	slight chance	isolated
30-50%	chance	scattered

[14] http://www.crh.noaa.gov/lot/severe/wxterms.php.

60-70%	likely	numerous
80-100%	none used	none used

The discharger must obtain the precipitation forecast information from the National Weather Service Forecast Office (http://www.srh.noaa.gov/).

2. Linear Projects

a. Linear Risk Determination

LUPs vary in complexity and water quality concerns based on the type of project. This General Permit has varying application requirements based on the project's risk to water quality. Factors that lead to the characterization of the project include location, sediment risk, and receiving water risk.

Based on the location and complexity of a project area or project section area, LUPs are separated into project types. As described below, LUPs have been categorized into three project types.

i. *Type 1 LUPs*

Type 1 LUPs are those construction projects where:

(1) 70 percent or more of the construction activity occurs on a paved surface and where areas disturbed during construction will be returned to preconstruction conditions or equivalent protection established at the end of the construction activities for the day, or

(2) greater than 30 percent of construction activities occur within the non-paved shoulders or land immediately adjacent to paved surfaces, or where construction occurs on unpaved improved roads, including their shoulders or land immediately adjacent to them where:

Areas disturbed during construction will be returned to pre-construction conditions or equivalent protection established at the end of the construction activities for the day to minimize the potential for erosion and sediment deposition, and

Areas where established vegetation was disturbed during construction will be stabilized and re-vegetated by the end of project. When required, adequate temporary stabilization Best Management Practices (BMPs) will be installed and maintained until vegetation is established to meet minimum cover requirements established in this General Permit for final stabilization.

Type 1 LUPs typically do not have a high potential to impact storm water quality because (1) these construction activities are not typically conducted during a rain event, (2) these projects are normally constructed over a short period of time[15], minimizing the duration that pollutants could potentially be exposed to rainfall; and (3) disturbed soils such as those from trench excavation are required to be hauled away, backfilled into the trench, and/or covered (e.g., metal plates, pavement, plastic covers over spoil piles) at the end of the construction day.

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[15] Short period of time refers to a project duration of weeks to months, but typically less than one year in duration.

Type 1 LUPs are determined during the risk assessment found in Attachment A.1 to be 1) low sediment risk and low receiving water risk; 2) low sediment risk and medium receiving water risk; and 3) medium sediment risk and low receiving water risk.

This General Permit requires the discharger to ensure a SWPPP is developed for these construction activities that is specific to project type, location and characteristics.

ii. ***Type 2 LUPs:***

Type 2 projects are determined to have a combination of High, Medium, and Low project sediment risk along with High, Medium, and Low receiving water risk. Like Type 1 projects, Type 2 projects are typically constructed over a short period of time. However, these projects have a higher potential to impact water quality because they:

(1) typically occur outside the more urban/developed areas;

(2) have larger areas of soil disturbance that are not closed or restored at the end of the day;

(3) may have onsite stockpiles of soil, spoil and other materials;

(4) cross or occur in close proximity to a wide variety of sensitive resources that may include, but are not limited to, steep topography and/or water bodies; and

(5) have larger areas of disturbed soils that may be exposed for a longer time interval before final stabilization, cleanup and/or reclamation occurs.

This General Permit requires the discharger to develop and implement a SWPPP for these construction activities that are specific for project type, location and characteristics.

iii. ***Type 3 LUPs:***

Type 3 projects are determined to have a combination of High and Medium project sediment risk along with High and Medium receiving water risk. Similar to Type 2 projects, Type 3 projects have a higher potential to impact water quality because they:

(1) typically occur outside of the more urban/developed areas;

(2) have larger areas of soil disturbance that are not closed or restored at the end of the day;

(3) may have onsite stockpiles of soil, spoil and other materials;

(4) cross or occur in close proximity to a wide variety of sensitive resources that may include, but are not limited to, steep topography and/or water bodies; and

(5) have larger areas of disturbed soils that may be exposed for a longer time interval before final stabilization, cleanup and/or reclamation occurs.

This General Permit requires the discharger to develop and implement a SWPPP for these construction activities that are specific for project type, location, and characteristics.

b. **Linear Effluent Standards**

All LUPs are subject to the narrative effluent limitations specified in the General Permit.

Type 2 and 3 LUPs are subject to NELs comparable to the project type's risk to water quality. Type 2 projects that pose an intermediate risk to water quality are subject to technology-based NALs for pH and turbidity. Type 3 projects posing a high risk to water quality are subject to technology-based NALs and NELs for pH and turbidity.

c. **Linear Good Housekeeping**

Improper use and handling of construction materials could potentially cause a threat to water quality. In order to ensure proper site management of these construction materials, all LUP dischargers must comply with a minimum set of Good Housekeeping measures specified in Attachment A of this General Permit.

d. **Linear Non-Storm Water Management**

In order to ensure control of all non-storm water discharges during construction, all LUP dischargers must comply with the Non-Storm Water Management measures specified in Attachment A of this General Permit.

e. **Linear Erosion Control**

This General Permit requires all LUP dischargers to implement effective wind erosion control measures, and soil cover for inactive areas. Type 3 LUPs posing a higher risk to water quality are additionally required to ensure the post-construction soil loss is equivalent to or less than the pre-construction levels.

f. **Linear Sediment Control**

In order to ensure control and containment of all sediment discharges, all LUP dischargers must comply with the general Sediment Control measures specified in Attachment A or this General Permit. Additional requirements for sediment controls are imposed on Type 2 & 3 LUPs due to their higher risk to water quality.

g. **Linear Run-on and Runoff Control**

Discharges originating outside of a project's perimeter and flowing onto the property can adversely affect the quantity and quality of discharges originating from a project site. In order to ensure proper management of run-on and runoff, all LUPs must comply with the run-on and runoff control measures specified in Attachment A of this General Permit. Due to the lower risk of impacting water quality, Type 1 LUPs are not required to implement run-on and runoff controls unless deemed necessary by the discharger.

h. **Linear Inspection, Maintenance and Repair**

Proper inspection, maintenance, and repair activities are important to ensure the effectiveness of on-site measures to control water quality. In order to ensure that inspection, maintenance, and repair activities are adequately performed, the all LUP dischargers a re required to comply with the Inspection, Maintenance, and Repair requirements specified in Attachment A of this General Permit.

K. ATS[16] Requirements

There are instances on construction sites where traditional erosion and sediment controls do not effectively control accelerated erosion. Under such circumstances, or under circumstances where storm water discharges leaving the site may cause or contribute to an exceedance of a water quality standard, the use of an Active Treatment System (ATS) may be necessary. Additionally, it may be appropriate to use an ATS when site constraints inhibit the ability to construct a correctly sized sediment basin, when clay and/or highly erosive soils are present, or when the site has very steep or long slope lengths.[17]

Although treatment systems have been in use in some form since the mid-1990s, the ATS industry in California is relatively young, and detailed regulatory standards have not yet been developed. Many developers are using these systems to treat storm water discharges from their construction sites. The new ATS requirements set forth in this General Permit are based on those in place for small wastewater treatment systems, ATS regulations from the Central Valley Regional Water Quality Control Board (September 2005 memorandum "2005/2006 Rainy Season – Monitoring Requirements for Storm Water Treatment Systems that Utilize Chemical Additives to Enhance Sedimentation"), the Construction Storm Water Program at the State of Washington's Department of Ecology, as well as recent advances in technology and knowledge of coagulant performance and aquatic safety.

The effective design of an ATS requires a detailed survey and analysis of site conditions. With proper planning, ATS performance can provide exceptional water quality discharge and prevent significant impacts to surface water quality, even under extreme environmental conditions.

These systems can be very effective in reducing the sediment in storm water runoff, but the systems that use additives/polymers to enhance sedimentation also pose a potential risk to water quality (e.g., operational failure, equipment failure, additive/polymer release, etc.). The State Water Board is concerned about the potential acute and chronic impacts that the polymers and other chemical additives may have on fish and aquatic organisms if released in sufficient quantities or concentrations. In addition to anecdotal evidence of polymer releases causing aquatic toxicity in California, the literature supports this concern.[18] For example, cationic polymers have been shown to bind with the negatively charged gills of fish, resulting in mechanical suffocation.[19] Due to the potential toxicity impacts, which may be caused by the release of additives/polymers into receiving waters, this General Permit establishes residual polymer monitoring and toxicity testing requirements have been established in this General Permit for discharges from construction sites that utilize an ATS in order to protect receiving water quality and beneficial uses.

The primary treatment process in an ATS is coagulation/flocculation. ATS's operate on the principle that the added coagulant is bound to suspended sediment, forming floc, which is gravitationally settled in tanks or a basin, or removed by sand filters. A typical installation utilizes an injection pump upstream from the clarifier tank, basin, or sand filters, which is electronically metered to both flow rate and suspended solids level of the influent, assuring a constant dose. The coagulant mixes and reacts with the influent, forming a dense floc. The floc may be removed by gravitational setting in a clarifier tank or basin, or by filtration. Water from the clarifier tank, basin, or sand filters may be routed through cartridge(s) and/or bag filters for final polishing. Vendor-specific systems use various methods of dose control, sediment/floc removal, filtration, etc., that are detailed in project-specific documentation. The

[16] An ATS is a treatment system that employs chemical coagulation, chemical flocculation, or electrocoagulation in order to reduce turbidity caused by fine suspended sediment.
[17] Pitt, R., S. Clark, and D. Lake. 2006. Construction Site Erosion and Sediment Controls: Planning, Design, and Performance. DEStech Publications. Lancaster, PA. 370pp.
[18] RomØen, K., B. Thu, and Ø. Evensen. 2002. Immersion delivery of plasmid DNA II. A study of the potentials of a chitosan based delivery system in rainbow trout (*Oncorhynchus mykiss*) fry. *Journal of Controlled Release* **85**: 215-225.
[19] Bullock, G., V. Blazer, S. Tsukuda, and S. Summerfelt. 2000. Toxicity of acidified chitosan for cultured rainbow trout (*Oncorhynchus mykiss*). *Aquaculture* **185**:273-280.

particular coagulant/flocculant to be used for a given project is determined based on the water chemistry of the site because the coagulants are specific in their reactions with various types of sediments. Appropriate selection of dosage must be carefully matched to the characteristics of each site.

ATS's are operated in two differing modes, either Batch or Flow-Through. Batch treatment can be defined as Pump-Treat-Hold-Test-Release. In Batch treatment, water is held in a basin or tank, and is not discharged until treatment is complete. Batch treatment involves holding or recirculating the treated water in a holding basin or tank(s) until treatment is complete or the basin or storage tank(s) is full. In Flow-Through treatment, water is pumped into the ATS directly from the runoff collection system or storm water holding pond, where it is treated and filtered as it flows through the system, and is then directly discharged. "Flow-Through Treatment" is also referred to as "Continuous Treatment."

1. Effluent Standards

This General Permit establishes NELs for discharges from construction sites that utilize an ATS. These systems lend themselves to NELs for turbidity and pH because of their known reliable treatment. Advanced systems have been in use in some form since the mid-1990s. An ATS is considered reliable, can consistently produce a discharge of less than 10 NTU, and has been used successfully at many sites in several states since 1995 to reduce turbidity to very low levels.[20]

This General Permit contains "compliance storm event" exceptions from the technology-based NELs for ATS discharges. The rationale is that technology-based requirements are developed assuming a certain design storm. In the case of ATS the industry-standard design storm is 10-year, 24-hour (as stated in Attachment F of this General Permit), so the compliance storm event has been established as the 10-year 24-hour event as well to provide consistency.

2. Training

Operator training is critical to the safe and efficient operation and maintenance of the ATS, and to ensure that all State Water Board monitoring and sampling requirements are met. The General Permit requires that all ATS operators have training specific to using ATS's liquid coagulants.

L. Post-Construction Requirements

Under past practices, new and redevelopment construction activities have resulted in modified natural watershed and stream processes. This is caused by altering the terrain, modifying the vegetation and soil characteristics, introducing impervious surfaces such as pavement and buildings, increasing drainage density through pipes and channels, and altering the condition of stream channels through straightening, deepening, and armoring. These changes result in a drainage system where sediment transport capacity is increased and sediment supply is decreased. A receiving channel's response is dependent on dominant channel materials and its stage of adjustment.

Construction activity can lead to impairment of beneficial uses in two main ways. First, during the actual construction process, storm water discharges can negatively affect the chemical, biological, and physical properties of downstream receiving waters. Due to the disturbance of the landscape, the most likely pollutant is sediment, however pH and other non-visible pollutants are also of great concern. Second, after most construction activities are completed at a construction site, the finished project may result in significant modification of the site's response to precipitation. New development and redevelopment

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[20] Currier, B., G. Minton, R. Pitt, L. Roesner, K. Schiff, M. Stenstrom, E. Strassler, and E. Strecker. 2006. The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities.

projects have almost always resulted in permanent post-construction water quality impacts because more precipitation ends up as runoff and less precipitation is intercepted, evapotranspired, and infiltrated.

General Permit 99-08-DWQ required the SWPPP to include a description of all post-construction BMPs on a site and a maintenance schedule. An effective storm water management strategy must address the full suite of storm events (water quality, channel protection, overbank flood protection, extreme flood protection) (Figure 2).

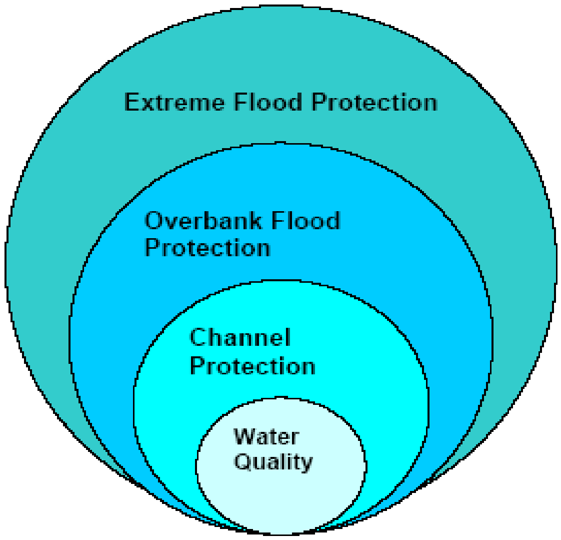

Figure 2 - Suite of Storm Events

The post-construction storm water performance standards in this General Permit specifically address water quality and channel protection events. Overbank flood protection and extreme flood protection events are traditionally dealt with in local drainage and flood protection ordinances. However, measures in this General Permit to address water quality and channel protection also reduce overbank and extreme flooding impacts. This General Permit aims to match post-construction runoff to pre-construction runoff for the 85th percentile storm event, which not only reduces the risk of impact to the receiving water's channel morphology but also provides some protection of water quality.

This General Permit clarifies that its runoff reduction requirements only apply to projects that lie outside of jurisdictions covered by a Standard Urban Storm water Management Plan (SUSMP) (or other more protective) post-construction requirements in either Phase I or Phase II permits.

Figures 3 and 4, below, show the General Permit enrollees (to Order 99-08-DWQ, as of March 10, 2008) overlaid upon a map with SUSMP (or more protective) areas in blue and purple. Areas without blue or purple indicate where the General Permit's runoff reduction requirements would actually apply.

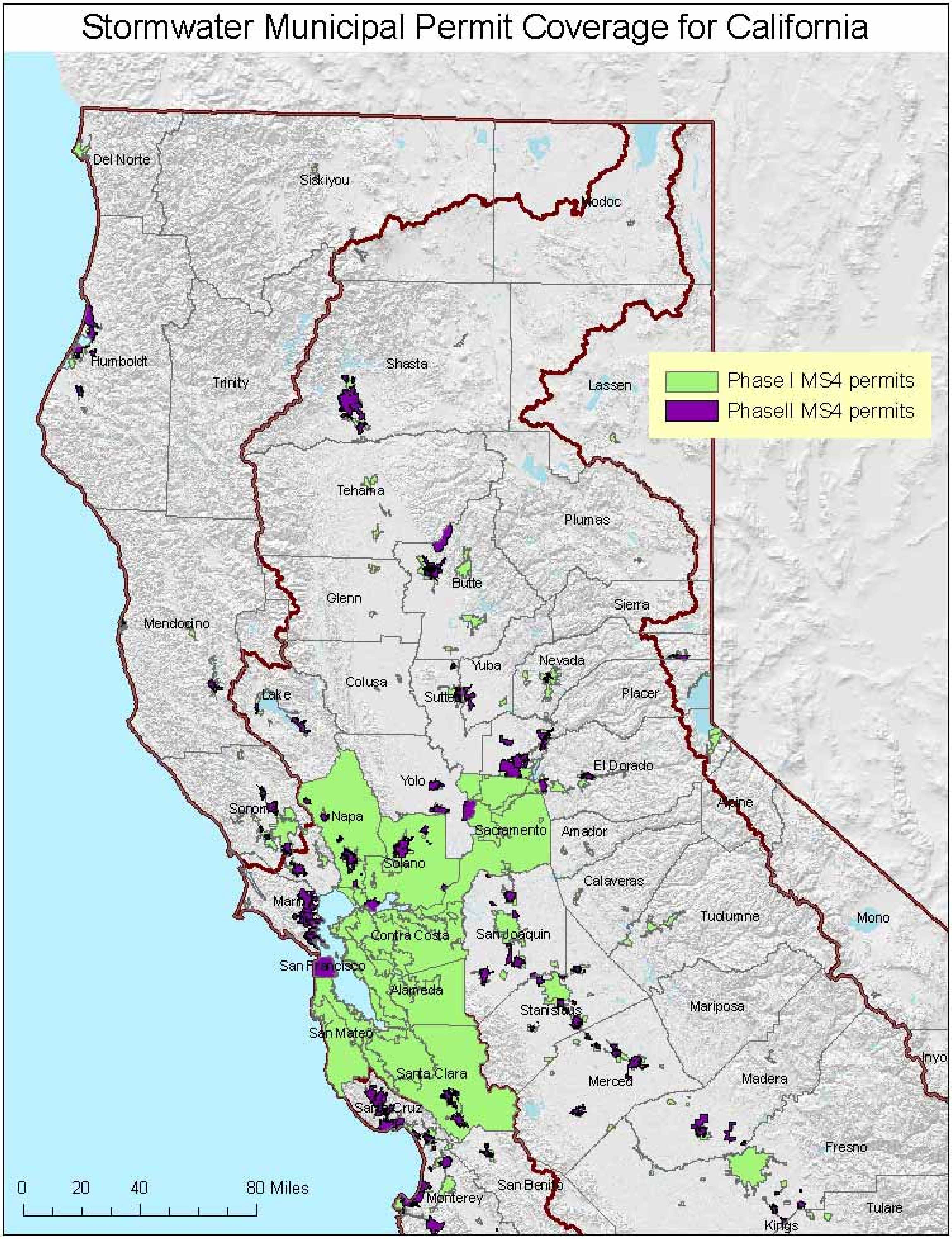

Figure 3 - Northern CA (2009) Counties / Cities With SUSMP-Plus Coverage

Figure 4 - Southern CA (2009) Counties / Cities With SUSMP-Plus Coverage

Water Quality:
This General Permit requires dischargers to replicate the pre-project runoff water balance (defined as the amount of rainfall that ends up as runoff) for the smallest storms up to the 85th percentile storm event, or the smallest storm event that generates runoff, whichever is larger. Contemporary storm water management generally routes these flows directly to the drainage system, increasing pollutant loads and potentially causing adverse effects on receiving waters. These smaller water quality events happen much more frequently than larger events and generate much higher pollutant loads on an annual basis. There are other adverse hydrological impacts that result from not designing according to the site's pre-construction water balance. In Maryland, Klein[21] noted that baseflow decreases as the extent of urbanization increases. Ferguson and Suckling[22] noted a similar relation in watersheds in Georgia. On Long Island, Spinello and Simmons[23] noted substantial decreases in base flow in intensely urbanized watersheds.

The permit emphasizes runoff reduction through on-site storm water reuse, interception, evapo-transpiration and infiltration through non-structural controls and conservation design measures (e.g., downspout disconnection, soil quality preservation/enhancement, interceptor trees). Employing these measures close to the source of runoff generation is the easiest and most cost-effective way to comply with the pre-construction water balance standard. Using low-tech runoff reduction techniques close to the source is consistent with a number of recommendations in the literature.[24] In many cases, BMPs implemented close to the source of runoff generation cost less than end-of the pipe measures.[25] Dischargers are given the option of using Appendix 2 to calculate the required runoff volume or a watershed process-based, continuous simulation model such as the EPA's Storm Water Management Model (SWMMM) or Hydrologic Simulation Program Fortran (HSPF). Such methods used by the discharger will be reviewed by the Regional Water Board upon NOT application.

Channel Protection:
In order to address channel protection, a basic understanding of fluvial geomorphic concepts is necessary. A dominant paradigm in fluvial geomorphology holds that streams adjust their channel dimensions (width and depth) in response to long-term changes in sediment supply and bankfull discharge (1.5 to 2 year recurrence interval). The bankfull stage corresponds to the discharge at which channel maintenance is the most effective, that is, the discharge at which the moving sediment, forming or removing bars, forming or changing bends and meanders, and generally doing work that results in the average morphologic characteristics of channels.[26] Lane (1955 as cited in Rosgen 1996[27]) showed the generalized relationship between sediment load, sediment size, stream discharge and stream slope in Figure 5. A change in any one of these variables sets up a series of mutual adjustments in the companion variables with a resulting direct change in the physical characteristics of the stream channel.

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[21] Klein 1979 as cited in Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE. 117 pp.
[22] Ferguson and Suckling 1990 as cited Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE. 117 pp.
[23] Center for Watershed Protection (CWP). 2000. The Practice of Watershed Protection: Techniques for protecting our nation's streams, lakes, rivers, and estuaries. Ellicott City, MD. 741 pp.
[24] Bay Area Storm Water Management Agencies Association (BASMAA). 1997. Start at the Source: Residential Site Planning and Design Guidance Manual for Storm Water Quality Protection. Palo Alto, CA;
McCuen, R.H. 2003 Smart Growth: hydrologic perspective. Journal of Professional Issues in Engineering Education and Practice. Vol (129), pp.151-154;
Moglen, G.E. and S. Kim. 2007. Impervious imperviousness-are threshold based policies a good idea? Journal of the American Planning Association, Vol 73 No. 2. pp 161-171.
[25] Delaware Department of natural Resources (DDNR). 2004. Green technology: The Delaware urban Runoff Management Approcah. Dover, DE. 117 pp.
[26] Dunne, T and L.B. Leopold. 1978. Water in Environmental Planning. San Francisco W.H. Freeman and Company
[27] Rosgen. D.L. 1996. Applied River Morphology. Pagosa Springs. Wildland Hydrology

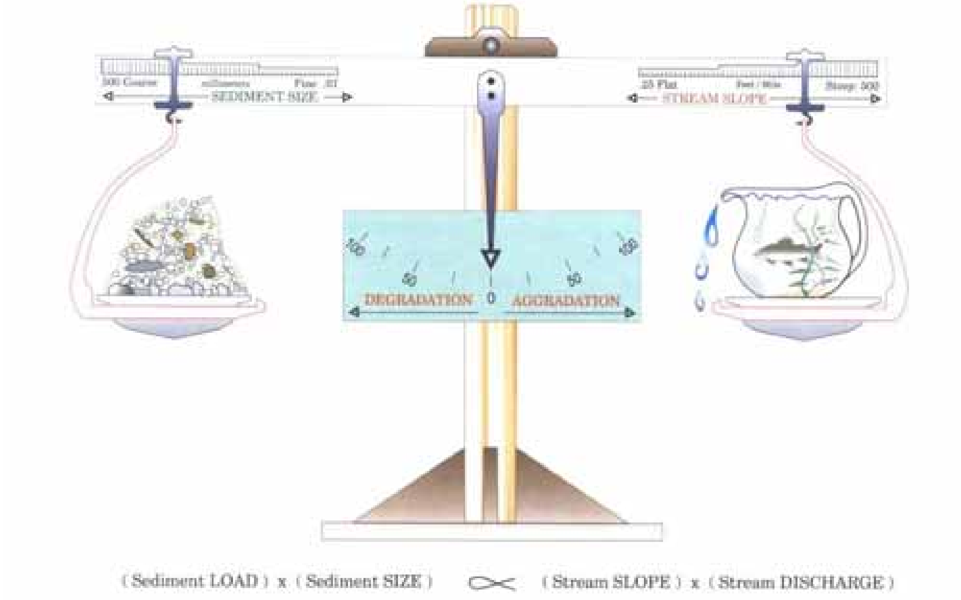

Figure 5 - Schematic of the Lane Relationship

After Lane (1955) as cited in Rosgen (1996)

Stream slope multiplied by stream discharge (the right side of the scale) is essentially an approximation of stream power, a unifying concept in fluvial geomorphology (Bledsoe 1999). Urbanization generally increases stream power and affects the resisting forces in a channel (sediment load and sediment size represented on the left side of the scale).

During construction, sediment loads can increase from 2 to 40,000 times over pre-construction levels.[28] Most of this sediment is delivered to stream channels during large, episodic rain events.[29] This increased sediment load leads to an initial aggradation phase where stream depths may decrease as sediment fills the channel, leading to a decrease in channel capacity and increase in flooding and overbank deposition. A degradation phase initiates after construction is completed.

Schumm et. al (1984) developed a channel evolution model that describes the series of adjustments from initial downcutting, to widening, to establishing new floodplains at lower elevations (Figure 6).

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[28] Goldman S.J., K. Jackson, and T.A. Bursztynsky. 1986. Erosion and Sediment Control Handbook. McGraw Hill. San Francisco.
[29] Wolman 1967 as cited in Paul, M.P. and J.L. Meyer. 2001. Streams in the Urban Landscape. *Annu. Rev.Ecol. Syst.* 32: 333-365.

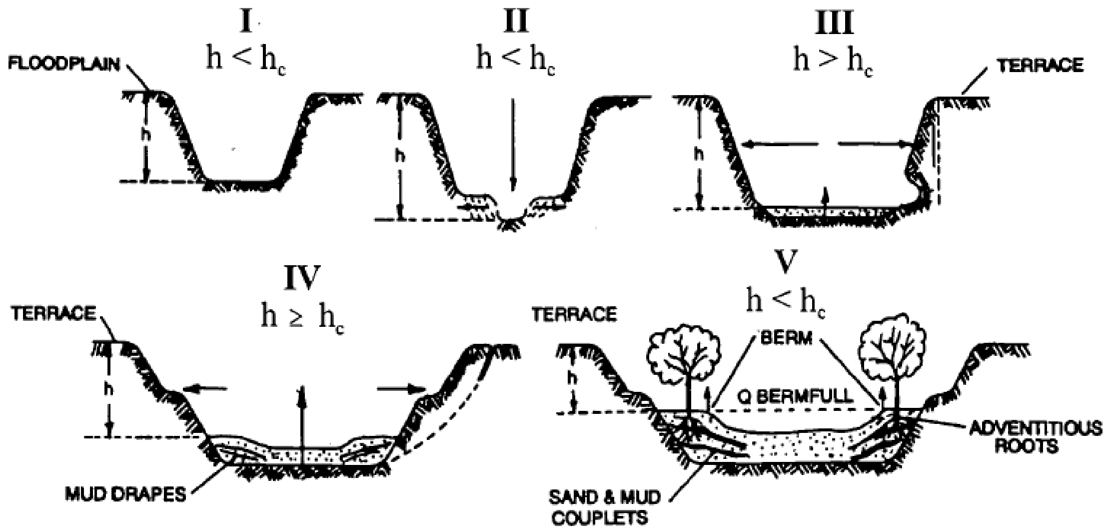

Figure 6 - Channel Changes Associated with Urbanization

After Incised Channel Evolution Sequence in Schumm et. al 1984

Channel incision (Stage II) and widening (Stages III and to a lesser degree, Stage IV) are due to a number of fundamental changes on the landscape. Connected impervious area and compaction of pervious surfaces increase the frequency and volume of bankfull discharges.[30] Increased drainage density (miles of stream length per square mile of watershed) also negatively impacts receiving stream channels.[31] Increased drainage density and hydraulic efficiency leads to an increase in the frequency and volume of bankfull discharges because the time of concentration is shortened. Flows from engineered pipes and channels are also often “sediment starved” and seek to replenish their sediment supply from the channel.

Encroachment of stream channels can also lead to an increase in stream slope, which leads to an increase in stream power. In addition, watershed sediment loads and sediment size (with size generally represented as the median bed and bank particle size, or d_{50}) decrease during urbanization.[32] This means that even if pre- and post-development stream power are the same, more erosion will occur in the post-development stage because the smaller particles are less resistant (provided they are non-cohesive).

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[30] Booth, D. B. and C. R. Jackson. 1997. Urbanization of Aquatic Systems: Degradation Thresholds, Storm Water Detection, and the Limits of Mitigation. Journal of the American Water Resources Association Vol. 33, No.5, pp. 1077-1089.

[31] May, C.W. 1998. Cumulative effects of urbanization on small streams in the Puget Sound Lowland ecoregion. Conference proceedings from Puget Sound Research '98 held March 12, 13 1998 in Seattle, WA;
Santa Clara Valley Urban Runoff Pollution Prevention Program. 2002. Hydromodification Management Plan Literature Review. 80 pp.

[32] Finkenbine, J.K., D.S. Atwater, and D.S. Mavinic. 2000. Stream health after urbanization. *J. Am. Water Resour. Assoc.* 36:1149-60;
Pizzuto, J.E. W.S. Hession, and M. McBride. 2000. Comparing gravel-bed rivers in paired urban and rural catchments of southeastern Pennsylvania. *Geology* 28:79-82.

As shown in Stages II and III, the channel deepens and widens to accommodate the increased stream power [33]and decrease in sediment load and sediment size. Channels may actually narrow as entrained sediment from incision is deposited laterally in the channel. After incised channels begin to migrate laterally (Stage III), bank erosion begins, which leads to general channel widening.[34] At this point, a majority of the sediment that leaves a drainage area comes from within the channel, as opposed to the background and construction related hillslope contribution. Stage IV is characterized by more aggradation and localized bank instability. Stage V represents a new quasi-equilibrium channel morphology in balance with the new flow and sediment supply regime. In other words, stream power is in balance with sediment load and sediment size.

The magnitude of the channel morphology changes discussed above varies along a stream network as well as with the age of development, slope, geology (sand-bedded channels may cycle through the evolution sequence in a matter of decades whereas clay-dominated channels may take much longer), watershed sediment load and size, type of urbanization, and land use history. It is also dependent on a channel's stage in the channel evolution sequence when urbanization occurs. Management strategies must take into account a channel's stage of adjustment and account for future changes in the evolution of channel form (Stein and Zaleski 2005).[35]

Traditional structural water quality BMPs (e.g. detention basins and other devices used to store volumes of runoff) unless they are highly engineered to provide adequate flow duration control, do not adequately protect receiving waters from accelerated channel bed and bank erosion, do not address post-development increases in runoff volume, and do not mitigate the decline in benthic macroinvertebrate communities in the receiving waters[36] suggest that structural BMPs are not as effective in protecting aquatic communities as a continuous riparian buffer of native vegetation. This is supported by the findings of Zucker and White[37], where instream biological metrics were correlated with the extent of forested buffers.

This General Permit requires dischargers to maintain pre-development drainage densities and times of concentration in order to protect channels and encourages dischargers to implement setbacks to reduce channel slope and velocity changes that can lead to aquatic habitat degradation.

There are a number of other approaches for modeling fluvial systems, including statistical and physical models and simpler stream power models.[38] The use of these models in California is described in Stein and Zaleski (2005).[39] Rather than prescribe a specific one-size-fits-all modeling method in this permit, the State Water Board intends to develop a stream power and channel evolution model-based framework to assess channels and develop a hierarchy of suitable analysis methods and management strategies. In time, this framework may become a State Water Board water quality control policy.

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[33] Hammer 1973 as cited in Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE. 117 pp;
Booth, D.B. 1990. Stream Channel Incision Following Drainage Basin Urbanization. *Water Resour. Bull.* 26:407-417.

[34] Trimble, S.W. 1997. Contribution of Stream Channel Erosion to Sediment Yield from an Urbanizing Watershed. *Science*: Vol. 278 (21), pp. 1442-1444.

[35] Stein, E.S. and S. Zaleski. 2005.Managing runoff to protect natural stream: the latest developments on investigation and management of hydromodification in California. Southern California Coastal Water Research Project Technical Report 475. 26 pp.

[36] Horner, R.R. 2006. Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices (LID) for the San Diego Region. Available at: http://www.projectcleanwater.org/pdf/permit/case-study_lid.pdf.

[37] Delaware Department of Natural Resources (DDNR). 2004. Green Technology: The Delaware Urban Runoff Management Approach. Dover, DE. 117 pp.

[38] Finlayson, D.P. and D.R. Montgomery. 2003. Modeling large-scale fluvial erosion in geographic information systems. Geomorphology (53), pp. 147-164).

[39] Stein, E.S. and S. Zaleski. 2005.Managing runoff to protect natural stream: the latest developments on investigation and management of hydromodification in California. Southern California Coastal Water Research Project Technical Report 475. 26 pp.

Permit Linkage to Overbank and Extreme Flood Protection
Site design BMPs (e.g. rooftop and impervious disconnection, vegetated swales, setbacks and buffers) filter and settle out pollutants and provide for more infiltration than is possible for traditional centralized structural BMPs placed at the lowest point in a site. They provide source control for runoff and lead to a reduction in pollutant loads. When implemented, they also help reduce the magnitude and volume of larger, less frequent storm events (e.g., 10-yr, 24-hour storm and larger), thereby reducing the need for expensive flood control infrastructure. Nonstructural BMPs can also be a landscape amenity, instead of a large isolated structure requiring substantial area for ancillary access, buffering, screening and maintenance facilities.[25] The multiple benefits of using non-structural benefits will be critically important as the state's population increases and imposes strains upon our existing water resources.

Maintaining predevelopment drainage densities and times of concentration will help reduce post-development peak flows and volumes in areas not covered under a municipal permit. The most effective way to preserve drainage areas and maximize time of concentration is to implement landform grading, incorporate site design BMPs and implement distributed structural BMPs (e.g., bioretention cells, rain gardens, rain cisterns).

M. Storm Water Pollution Prevention Plans

USEPA's Construction General Permit requires that qualified personnel conduct inspections. USEPA defines qualified personnel as "a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity."[40] USEPA also suggests that qualified personnel prepare SWPPPs and points to numerous states that require certified professionals to be on construction sites at all times. States that currently have certification programs are Washington, Georgia, Florida, Delaware, Maryland, and New Jersey. The Permit 99-08-DWQ did not require that qualified personnel prepare SWPPPs or conduct inspections. However, to ensure that water quality is being protected, this General Permit requires that all SWPPPs be written, amended, and certified by a Qualified SWPPP Developer. A Qualified SWPPP Developer must possess one of the eight certifications and or registrations specified in this General Permit and effective two years after the adoption date of this General Permit, must have attended a State Water Board-sponsored or approved Qualified SWPPP Developer training course. Table 9 provides an overview of the criteria used in determining qualified certification titles for a QSD and QSP.

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40 US Environmental Protection Agency. Stormwater Pollution Prevention Plans for Construction Activities. <http://cfpub.epa.gov/npdes/stormwater/swppp.cfm> and <http://www.epa.gov/npdes/pubs/sw_swppp_guide.pdf>.

Table 9 - Qualified SWPPP Developer/ Qualified SWPPP Practitioner Certification Criteria

Certification/ Title	Registered By	QSD/QSP	Certification Criteria
Professional Civil Engineer	California	Both	1. Approval Process 2. Code of Ethics 3. Accountability 4. Pre-requisites
Professional Geologist or Engineering Geologist	California	Both	1. Approval Process 2. Code of Ethics 3. Accountability 4. Pre-requisites
Landscape Architect	California	Both	1. Approval Process 2. Code of Ethics 3. Accountability 4. Pre-requisites
Professional Hydrologist	American Institute of Hydrology	Both	1. Approval Process 2. Code of Ethics 3. Accountability 4. Pre-requisites
Certified Professional in Erosion and Sediment Control™ (CPESC)	Enviro Cert International Inc.	Both	1. Approval Process 2. Code of Ethics 3. Accountability 4. Pre-requisites 5. Continuing Education
Certified Inspector of Sediment and Erosion Control™ (CISEC)	Certified Inspector of Sediment and Erosion Control, Inc.	QSP	1. Approval Process 2. Code of Ethics 3. Accountability 4. Pre-requisites 5. Continuing Education
Certified Erosion, Sediment and Storm Water Inspector™ (CESSWI)	Enviro Cert International Inc.	QSP	1. Approval Process 2. Code of Ethics 3. Accountability 4. Pre-requisites 5. Continuing Education
Certified Professional in Storm Water Quality™ (CPSWQ)	Enviro Cert International Inc.	Both	1. Approval Process 2. Code of Ethics 3. Accountability 4. Pre-requisites 5. Continuing Education

The previous versions of the General Permit required development and implementation of a SWPPP as the primary compliance mechanism. The SWPPP has two major objectives: (1) to help identify the sources of sediment and other pollutants that affect the quality of storm water discharges; and (2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in storm water and non-storm water discharges. The SWPPP must include BMPs that address source control, BMPs that address pollutant control, and BMPs that address treatment control.

This General Permit shifts some of the measures that were covered by this general requirement to specific permit requirements, each individually enforceable as a permit term. This General Permit emphasizes the use of appropriately selected, correctly installed and maintained pollution reduction BMPs. This approach provides the flexibility necessary to establish BMPs that can effectively address source control of pollutants during changing construction activities. These specific requirements also improve both the clarity and the enforceability of the General Permit so that the dischargers understand, and the public can determine whether the discharges are in compliance with, permit requirements.

The SWPPP must be implemented at the appropriate level to protect water quality at all times throughout the life of the project. The SWPPP must remain on the site during construction activities, commencing with the initial mobilization and ending with the termination of coverage under the General Permit. For LUPs the discharger shall make the SWPPP available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and map/drawing will be left with the field crew and the original SWPPP shall be made available via a request by radio or telephone. Once construction activities are complete, until stabilization is achieved, the SWPPP shall be available from the SWPPP contact listed in the PRDs

A SWPPP must be appropriate for the type and complexity of a project and will be developed and implemented to address project specific conditions. Some projects may have similarities or complexities, yet each project is unique in its progressive state that requires specific description and selection of BMPs needed to address all possible generated pollutants

N. Regional Water Board Authorities

Because this General Permit will be issued to thousands of construction sites across the State, the Regional Water Boards retain discretionary authority over certain issues that may arise from the discharges in their respective regions. This General Permit does not grant the Regional Water Boards any authority they do not otherwise have; rather, it merely emphasizes that the Regional Water Boards can take specific actions related to this General Permit. For example, the Regional Water Boards will be enforcing this General Permit and may need to adjust some requirements for a discharger based on the discharger’s compliance history.

Linda S. Adams
Secretary for Environmental Protection

State Water Resources Control Board

Division of Water Quality
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Arnold Schwarzenegger
Governor

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT FOR
STORM WATER DISCHARGES
ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBANCE
ACTIVITIES

ORDER NO. 2009-0009-DWQ
NPDES NO**. CAS000002**

This Order was adopted by the State Water Resources Control Board on:	**September 2, 2009**
This Order shall become effective on:	**July 1, 2010**
This Order shall expire on:	**September 2, 2014**

IT IS HEREBY ORDERED, that this Order supersedes Order No. 99-08-DWQ except for enforcement purposes. The Discharger shall comply with the requirements in this Order to meet the provisions contained in Division 7 of the California Water Code (commencing with section 13000) and regulations adopted thereunder, and the provisions of the federal Clean Water Act and regulations and guidelines adopted thereunder.

I, Jeanine Townsend, Clerk to the Board, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the State Water Resources Control Board, on September 2, 2009.

AYE: Vice Chair Frances Spivy-Weber
Board Member Arthur G. Baggett, Jr.
Board Member Tam M. Doduc

NAY: Chairman Charles R. Hoppin

ABSENT: None

ABSTAIN: None

Jeanine Townsend

Jeanine Townsend
Clerk to the Board

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LIST OF ATTACHMENTS

LIST OF APPENDICES

STATE WATER RESOURCES CONTROL BOARD
ORDER NO. 2009-0009-DWQ
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
GENERAL PERMIT NO. CAS000002

WASTE DISCHARGE REQUIREMENTS
FOR
DISCHARGES OF STORM WATER RUNOFF ASSOCIATED WITH CONSTRUCTION AND LAND DISTURBANCE ACTIVITIES

I. FINDINGS

A. General Findings

The State Water Resources Control Board (State Water Board) finds that:

1. The federal Clean Water Act (CWA) prohibits certain discharges of storm water containing pollutants except in compliance with a National Pollutant Discharge Elimination System (NPDES) permit (Title 33 United States Code (U.S.C.) §§ 1311 and 1342(p); also referred to as Clean Water Act (CWA) §§ 301 and 402(p)). The U.S. Environmental Protection Agency (U.S. EPA) promulgates federal regulations to implement the CWA's mandate to control pollutants in storm water runoff discharges. (Title 40 Code of Federal Regulations (C.F.R.) Parts 122, 123, and 124). The federal statutes and regulations require discharges to surface waters comprised of storm water associated with construction activity, including demolition, clearing, grading, and excavation, and other land disturbance activities (except operations that result in disturbance of less than one acre of total land area and which are not part of a larger common plan of development or sale), to obtain coverage under an NPDES permit. The NPDES permit must require implementation of Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or eliminate pollutants in storm water runoff. The NPDES permit must also include additional requirements necessary to implement applicable water quality standards.

2. This General Permit authorizes discharges of storm water associated with construction activity so long as the dischargers comply with all requirements, provisions, limitations and prohibitions in the permit. In addition, this General Permit regulates the discharges of storm water associated with construction activities from all Linear Underground/Overhead Projects resulting in the disturbance of greater than or equal to one acre (Attachment A).

3. This General Permit regulates discharges of pollutants in storm water associated with construction activity (storm water discharges) to waters of the United States from construction sites that disturb one or more acres of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface.

4. This General Permit does not preempt or supersede the authority of local storm water management agencies to prohibit, restrict, or control storm water discharges to municipal separate storm sewer systems or other watercourses within their jurisdictions.

5. This action to adopt a general NPDES permit is exempt from the provisions of Chapter 3 of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21100, et seq.), pursuant to Section 13389 of the California Water Code.

6. Pursuant to 40 C.F.R. § 131.12 and State Water Board Resolution No. 68-16,[1] which incorporates the requirements of § 131.12 where applicable, the State Water Board finds that discharges in compliance with this General Permit will not result in the lowering of water quality standards, and are therefore consistent with those provisions. Compliance with this General Permit will result in improvements in water quality.

7. This General Permit serves as an NPDES permit in compliance with CWA § 402 and will take effect on July 1, 2010 by the State Water Board provided the Regional Administrator of the U.S. EPA has no objection. If the U.S. EPA Regional Administrator objects to its issuance, the General Permit will not become effective until such objection is withdrawn.

8. Following adoption and upon the effective date of this General Permit, the Regional Water Quality Control Boards (Regional Water Boards) shall enforce the provisions herein.

9. Regional Water Boards establish water quality standards in Basin Plans. The State Water Board establishes water quality standards in various statewide plans, including the California Ocean Plan. U.S. EPA establishes water quality standards in the National Toxic Rule (NTR) and the California Toxic Rule (CTR).

[1] Resolution No. 68-16 generally requires that existing water quality be maintained unless degradation is justified based on specific findings.

10. This General Permit does not authorize discharges of fill or dredged material regulated by the U.S. Army Corps of Engineers under CWA § 404 and does not constitute a waiver of water quality certification under CWA § 401.

11. The primary storm water pollutant at construction sites is excess sediment. Excess sediment can cloud the water, which reduces the amount of sunlight reaching aquatic plants, clog fish gills, smother aquatic habitat and spawning areas, and impede navigation in our waterways. Sediment also transports other pollutants such as nutrients, metals, and oils and greases.

12. Construction activities can impact a construction site's runoff sediment supply and transport characteristics. These modifications, which can occur both during and after the construction phase, are a significant cause of degradation of the beneficial uses established for water bodies in California. Dischargers can avoid these effects through better construction site design and activity practices.

13. This General Permit recognizes four distinct phases of construction activities. The phases are Grading and Land Development Phase, Streets and Utilities Phase, Vertical Construction Phase, and Final Landscaping and Site Stabilization Phase. Each phase has activities that can result in different water quality effects from different water quality pollutants. This General Permit also recognizes inactive construction as a category of construction site type.

14. Compliance with any specific limits or requirements contained in this General Permit does not constitute compliance with any other applicable requirements.

15. Following public notice in accordance with State and Federal laws and regulations, the State Water Board heard and considered all comments and testimony in a public hearing on 06/03/2009. The State Water Board has prepared written responses to all significant comments.

16. Construction activities obtaining coverage under the General Permit may have multiple discharges subject to requirements that are specific to general, linear, and/or active treatment system discharge types.

17. The State Water Board may reopen the permit if the U.S. EPA adopts a final effluent limitation guideline for construction activities.

B. Activities Covered Under the General Permit

18. Any construction or demolition activity, including, but not limited to, clearing, grading, grubbing, or excavation, or any other activity that results in a land disturbance of equal to or greater than one acre.

19. Construction activity that results in land surface disturbances of less than one acre if the construction activity is part of a larger common plan of development or the sale of one or more acres of disturbed land surface.

20. Construction activity related to residential, commercial, or industrial development on lands currently used for agriculture including, but not limited to, the construction of buildings related to agriculture that are considered industrial pursuant to U.S. EPA regulations, such as dairy barns or food processing facilities.

21. Construction activity associated with Linear Underground/Overhead Utility Projects (LUPs) including, but not limited to, those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/borrow locations.

22. Discharges of sediment from construction activities associated with oil and gas exploration, production, processing, or treatment operations or transmission facilities.[2]

23. Storm water discharges from dredge spoil placement that occur outside of U.S. Army Corps of Engineers jurisdiction (upland sites) and that disturb one or more acres of land surface from construction activity are covered by this General Permit. Construction sites that intend to disturb one or more acres of land within the jurisdictional boundaries of a CWA § 404 permit should contact the appropriate Regional Water Board to determine whether this permit applies to the site.

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[2] Pursuant to the Ninth Circuit Court of Appeals' decision in *NRDC v. EPA* (9th Cir. 2008) 526 F.3d 591, and subsequent denial of the U.S. EPA's petition for reconsideration in November 2008, oil and gas construction activities discharging storm water contaminated only with sediment are no longer exempt from the NPDES program.

C. Activities Not Covered Under the General Permit

24. Routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility.

25. Disturbances to land surfaces solely related to agricultural operations such as disking, harrowing, terracing and leveling, and soil preparation.

26. Discharges of storm water from areas on tribal lands; construction on tribal lands is regulated by a federal permit.

27. Construction activity and land disturbance involving discharges of storm water within the Lake Tahoe Hydrologic Unit. The Lahontan Regional Water Board has adopted its own permit to regulate storm water discharges from construction activity in the Lake Tahoe Hydrologic Unit (Regional Water Board 6SLT). Owners of construction sites in this watershed must apply for the Lahontan Regional Water Board permit rather than the statewide Construction General Permit.

28. Construction activity that disturbs less than one acre of land surface, and that is not part of a larger common plan of development or the sale of one or more acres of disturbed land surface.

29. Construction activity covered by an individual NPDES Permit for storm water discharges.

30. Discharges from small (1 to 5 acre) construction activities with an approved Rainfall Erosivity Waiver authorized by U.S. EPA Phase II regulations certifying to the State Board that small construction activity will occur only when the Rainfall Erosivity Factor is less than 5 (“R” in the Revised Universal Soil Loss Equation).

31. Landfill construction activity that is subject to the Industrial General Permit.

32. Construction activity that discharges to Combined Sewer Systems.

33. Conveyances that discharge storm water runoff combined with municipal sewage.

34. Discharges of storm water identified in CWA § 402(*l*)(2), 33 U.S.C. § 1342(*l*)(2).

35. Discharges occurring in basins that are not tributary or hydrologically connected to waters of the United States (for more information contact your Regional Water Board).

D. Obtaining and Modifying General Permit Coverage

36. This General Permit requires all dischargers to electronically file all Permit Registration Documents (PRDs), Notices of Termination (NOT), changes of information, annual reporting, and other compliance documents required by this General Permit through the State Water Board's Storm water Multi-Application and Report Tracking System (SMARTS) website.

37. Any information provided to the Regional Water Board shall comply with the Homeland Security Act and any other federal law that concerns security in the United States; any information that does not comply should not be submitted.

38. This General Permit grants an exception from the Risk Determination requirements for existing sites covered under Water Quality Orders No. 99-08-DWQ, and No. 2003-0007-DWQ. For certain sites, adding additional requirements may not be cost effective. Construction sites covered under Water Quality Order No. 99-08-DWQ shall obtain permit coverage at the Risk Level 1. LUPs covered under Water Quality Order No. 2003-0007-DWQ shall obtain permit coverage as a Type 1 LUP. The Regional Water Boards have the authority to require Risk Determination to be performed on sites currently covered under Water Quality Orders No. 99-08-DWQ and No. 2003-0007-DWQ where they deem it necessary. The State Water Board finds that there are two circumstances when it may be appropriate for the Regional Water Boards to require a discharger that had filed an NOI under State Water Board Order No. 99-08-DWQ to recalculate the site's risk level. These circumstances are: (1) when the discharger has a demonstrated history of noncompliance with State Water Board Order No. 99-08-DWQ or; (2) when the discharger's site poses a significant risk of causing or contributing to an exceedance of a water quality standard without the implementation of the additional Risk Level 2 or 3 requirements.

E. Prohibitions

39. All discharges are prohibited except for the storm water and non-storm water discharges specifically authorized by this General Permit or another NPDES permit. Non-storm water discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Non-storm water discharges may

contribute significant pollutant loads to receiving waters. Measures to control spills, leakage, and dumping, and to prevent illicit connections during construction must be addressed through structural as well as non-structural Best Management Practices (BMPs)[3]. The State Water Board recognizes, however, that certain non-storm water discharges may be necessary for the completion of construction.

40. This General Permit prohibits all discharges which contain a hazardous substance in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

41. This General Permit incorporates discharge prohibitions contained in water quality control plans, as implemented by the State Water Board and the nine Regional Water Boards.

42. Pursuant to the Ocean Plan, discharges to Areas of Special Biological Significance (ASBS) are prohibited unless covered by an exception that the State Water Board has approved.

43. This General Permit prohibits the discharge of any debris[4] from construction sites. Plastic and other trash materials can cause negative impacts to receiving water beneficial uses. The State Water Board encourages the use of more environmentally safe, biodegradable materials on construction sites to minimize the potential risk to water quality.

F. Training

44. In order to improve compliance with and to maintain consistent enforcement of this General Permit, all dischargers are required to appoint two positions - the Qualified SWPPP Developer (QSD) and the Qualified SWPPP Practitioner (QSP) - who must obtain appropriate training. Together with the key stakeholders, the State and Regional Water Boards are leading the development of this curriculum through a collaborative organization called The Construction General Permit (CGP) Training Team.

45. The Professional Engineers Act (Bus. & Prof. Code section 6700, et seq.) requires that all engineering work must be performed by a California licensed engineer.

[3] BMPs are scheduling of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practice to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

[4] Litter, rubble, discarded refuse, and remains of destroyed inorganic anthropogenic waste.

G. Determining and Reducing Risk

46. The risk of accelerated erosion and sedimentation from wind and water depends on a number of factors, including proximity to receiving water bodies, climate, topography, and soil type.

47. This General Permit requires dischargers to assess the risk level of a site based on both sediment transport and receiving water risk. This General Permit contains requirements for Risk Levels 1, 2 and 3, and LUP Risk Type 1, 2, and 3 (Attachment A). Risk levels are established by determining two factors: first, calculating the site's sediment risk; and second, receiving water risk during periods of soil exposure (i.e. grading and site stabilization). Both factors are used to determine the site-specific Risk Level(s). LUPs can be determined to be Type 1 based on the flowchart in Attachment A.1.

48. Although this General Permit does not mandate specific setback distances, dischargers are encouraged to set back their construction activities from streams and wetlands whenever feasible to reduce the risk of impacting water quality (e.g., natural stream stability and habitat function). Because there is a reduced risk to receiving waters when setbacks are used, this General Permit gives credit to setbacks in the risk determination and post-construction storm water performance standards. The risk calculation and runoff reduction mechanisms in this General Permit are expected to facilitate compliance with any Regional Water Board and local agency setback requirements, and to encourage voluntary setbacks wherever practicable.

49. Rain events can occur at any time of the year in California. Therefore, a Rain Event Action Plan (REAP) is necessary for Risk Level 2 and 3 traditional construction projects (LUPs exempt) to ensure that active construction sites have adequate erosion and sediment controls implemented prior to the onset of a storm event, even if construction is planned only during the dry season.

50. Soil particles smaller than 0.02 millimeters (mm) (i.e., finer than medium silt) do not settle easily using conventional measures for sediment control (i.e., sediment basins). Given their long settling time, dislodging these soils results in a significant risk that fine particles will be released into surface waters and cause unacceptable downstream impacts. If operated correctly, an Active Treatment System (ATS[5]) can prevent or reduce the release of fine particles from construction sites.

[5] An ATS is a treatment system that employs chemical coagulation, chemical flocculation, or electro coagulation in order to reduce turbidity caused by fine suspended sediment.

Use of an ATS can effectively reduce a site's risk of impacting receiving waters.

51. Dischargers located in a watershed area where a Total Maximum Daily Load (TMDL) has been adopted or approved by the Regional Water Board or U.S. EPA may be required by a separate Regional Water Board action to implement additional BMPs, conduct additional monitoring activities, and/or comply with an applicable waste load allocation and implementation schedule. Such dischargers may also be required to obtain an individual Regional Water Board permit specific to the area.

H. Effluent Standards

52. The State Water Board convened a blue ribbon panel of storm water experts that submitted a report entitled, “The Feasibility of Numeric Effluent Limits Applicable to Discharges of Storm Water Associated with Municipal, Industrial and Construction Activities,” dated June 19, 2006. The panel concluded that numeric limits or action levels are technically feasible to control construction storm water discharges, provided that certain conditions are considered. The panel also concluded that numeric effluent limitations (NELs) are feasible for discharges from construction sites that utilize an ATS. The State Water Board has incorporated the expert panel’s suggestions into this General Permit, which includes both numeric action levels (NALs) and NELs for pH and turbidity, and special numeric limits for ATS discharges.

Numeric Effluent Limitations

53. Discharges of storm water from construction activities may become contaminated from alkaline construction materials resulting in high pH (greater than pH 7). Alkaline construction materials include, but are not limited to, hydrated lime, concrete, mortar, cement kiln dust (CKD), Portland cement treated base (CTB), fly ash, recycled concrete, and masonry work. This General Permit includes an NEL for pH (6.0-9.0) that applies only at sites that exhibit a "high risk of high pH discharge." A "high risk of high pH discharge" can occur during the complete utilities phase, the complete vertical build phase, and any portion of any phase where significant amounts of materials are placed directly on the land at the site in a manner that could result in significant alterations to the background pH of any discharges.

54. For Risk Level 3 discharges, this General Permit establishes technology-based, numeric effluent limitations (NELs) for turbidity of 500 NTU. Exceedances of the turbidity NEL constitutes a violation of this General Permit.

55. This General Permit establishes a 5 year, 24 hour (expressed in inches of rainfall) Compliance Storm Event exemption from the technology-based NELs for Risk Level 3 dischargers.

Determining Compliance with Numeric Limitations

56. This General Permit sets a pH NAL of 6.5 to 8.5, and a turbidity NAL of 250 NTU. The purpose of the NAL and its associated monitoring requirement is to provide operational information regarding the performance of the measures used at the site to minimize the discharge of pollutants and to protect beneficial uses and receiving waters from the adverse effects of construction-related storm water discharges. The NALs in this General Permit for pH and turbidity are not directly enforceable and do not constitute NELs.

57. This General Permit requires dischargers with NAL exceedances to immediately implement additional BMPs and revise their Storm Water Pollution Prevention Plans (SWPPPs) accordingly to either prevent pollutants and authorized non-storm water discharges from contaminating storm water, or to substantially reduce the pollutants to levels consistently below the NALs. NAL exceedances are reported in the State Water Boards SMARTS system, and the discharger is required to provide an NAL Exceedance Report when requested by a Regional Water Board.

58. If run-on is caused by a forest fire or any other natural disaster, then NELs do not apply.

59. Exceedances of the NELs are a violation of this Permit. This General Permit requires dischargers with NEL exceedances to implement additional monitoring, BMPs, and revise their SWPPPs accordingly. Dischargers are required to notify the State and Regional Water Boards of the violation through the State Water Boards SMARTs system, and provide an NEL Violation Report sharing additional information concerning the NEL exceedance.

I. Receiving Water Limitations

60. This General Permit requires all enrolled dischargers to determine the receiving waters potentially affected by their discharges and to comply with all applicable water quality standards, including any more stringent standards applicable to a water body.

J. Sampling, Monitoring, Reporting and Record Keeping

61. Visual monitoring of storm water and non-storm water discharges is required for all sites subject to this General Permit.

62. Records of all visual monitoring inspections are required to remain on-site during the construction period and for a minimum of three years.

63. For all Risk Level 3 and Risk Level 2 sites, this General Permit requires effluent monitoring for pH and turbidity. Sampling, analysis and monitoring requirements for effluent monitoring for pH and turbidity are contained in this General Permit.

64. Risk Level 3 sites in violation of the Numeric Effluent Limitations contained in this General Permit and with direct discharges to receiving water are required to conduct receiving water monitoring.

65. For Risk Level 3 sites larger than 30 acres and with direct discharges to receiving waters, this General Permit requires bioassessment sampling before and after site completion to determine if significant degradation to the receiving water's biota has occurred. Bioassessment sampling guidelines are contained in this General Permit.

66. A summary and evaluation of the sampling and analysis results will be submitted in the Annual Reports.

67. This General Permit contains sampling, analysis and monitoring requirements for non-visible pollutants at all sites subject to this General Permit.

68. Compliance with the General Permit relies upon dischargers to electronically self-report any discharge violations and to comply with any Regional Water Board enforcement actions.

69. This General Permit requires that all dischargers maintain a paper or electronic copy of all required records for three years from the date generated or date submitted, whichever is last. These records must be available at the construction site until construction is completed. For LUPs, these documents may be retained in a crew member's vehicle and made available upon request.

K. Active Treatment System (ATS) Requirements

70. Active treatment systems add chemicals to facilitate flocculation, coagulation and filtration of suspended sediment particles. The uncontrolled release of these chemicals to the environment can negatively affect the beneficial uses of receiving waters and/or degrade water quality (e.g., acute and chronic toxicity). Additionally, the batch storage and treatment of storm water through an ATS' can potentially

cause physical impacts on receiving waters if storage volume is inadequate or due to sudden releases of the ATS batches and improperly designed outfalls.

71. If designed, operated and maintained properly an ATS can achieve very high removal rates of suspended sediment (measured as turbidity), albeit at sometimes significantly higher costs than traditional erosion/sediment control practices. As a result, this General Permit establishes NELs consistent with the expected level of typical ATS performance.

72. This General Permit requires discharges of storm water associated with construction activity that undergo active treatment to comply with special operational and effluent limitations to ensure that these discharges do not adversely affect the beneficial uses of the receiving waters or cause degradation of their water quality.

73. For ATS discharges, this General Permit establishes technology-based NELs for turbidity.

74. This General Permit establishes a 10 year, 24 hour (expressed in inches of rainfall) Compliance Storm Event exemption from the technology-based numeric effluent limitations for ATS discharges. Exceedances of the ATS turbidity NEL constitutes a violation of this General Permit.

L. Post-Construction Requirements

75. This General Permit includes performance standards for post-construction that are consistent with State Water Board Resolution No. 2005-0006, "Resolution Adopting the Concept of Sustainability as a Core Value for State Water Board Programs and Directing Its Incorporation," and 2008-0030, “Requiring Sustainable Water Resources Management.“ The requirement for all construction sites to match pre-project hydrology will help ensure that the physical and biological integrity of aquatic ecosystems are sustained. This “runoff reduction” approach is analogous in principle to Low Impact Development (LID) and will serve to protect related watersheds and waterbodies from both hydrologic-based and pollution impacts associated with the post-construction landscape.

76. LUP projects are not subject to post-construction requirements due to the nature of their construction to return project sites to pre-construction conditions.

M. Storm Water Pollution Prevention Plan Requirements

77. This General Permit requires the development of a site-specific SWPPP. The SWPPP must include the information needed to demonstrate compliance with all requirements of this General Permit, and must be kept on the construction site and be available for review. The discharger shall ensure that a QSD develops the SWPPP.

78. To ensure proper site oversight, this General Permit requires a Qualified SWPPP Practitioner to oversee implementation of the BMPs required to comply with this General Permit.

N. Regional Water Board Authorities

79. Regional Water Boards are responsible for implementation and enforcement of this General Permit. A general approach to permitting is not always suitable for every construction site and environmental circumstances. Therefore, this General Permit recognizes that Regional Water Boards must have some flexibility and authority to alter, approve, exempt, or rescind permit authority granted under this General Permit in order to protect the beneficial uses of our receiving waters and prevent degradation of water quality.

IT IS HEREBY ORDERED that all dischargers subject to this General Permit shall comply with the following conditions and requirements (including all conditions and requirements as set forth in Attachments A, B, C, D, E and F)[6]:

II. CONDITIONS FOR PERMIT COVERAGE

A. Linear Underground/Overhead Projects (LUPs)

1. Linear Underground/Overhead Projects (LUPs) include, but are not limited to, any conveyance, pipe, or pipeline for the transportation of any gaseous, liquid (including water and wastewater for domestic municipal services), liquescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g. telephone, telegraph, radio or television messages); and associated ancillary facilities. Construction activities associated with LUPs include, but are not limited to, (a) those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment, and associated ancillary facilities); and include, but are not limited to, (b) underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/ or pavement repair or replacement, and stockpile/borrow locations.

2. The utility company, municipality, or other public or private company or agency that owns or operates the linear underground/overhead project is responsible for obtaining coverage under the General Permit where the construction of pipelines, utility lines, fiber-optic cables, or other linear underground/overhead projects will occur across several properties unless the LUP construction activities are covered under another construction storm water permit.

3. Only LUPs shall comply with the conditions and requirements in Attachment A, A.1 & A.2 of this Order. The balance of this Order is not applicable to LUPs except as indicated in Attachment A.

B. Obtaining Permit Coverage Traditional Construction Sites

[6] These attachments are part of the General Permit itself and are not separate documents that are capable of being updated independently by the State Water Board.

1. The Legally Responsible Person (LRP) (see Special Provisions, Electronic Signature and Certification Requirements, Section IV.I.1) must obtain coverage under this General Permit.

2. To obtain coverage, the LRP must electronically file Permit Registration Documents (PRDs) prior to the commencement of construction activity. Failure to obtain coverage under this General Permit for storm water discharges to waters of the United States is a violation of the CWA and the California Water Code.

3. PRDs shall consist of:

   a. Notice of Intent (NOI)
   b. Risk Assessment (Section VIII)
   c. Site Map
   d. Storm Water Pollution Prevention Plan (Section XIV)
   e. Annual Fee
   f. Signed Certification Statement

   Any information provided to the Regional Water Board shall comply with the Homeland Security Act and any other federal law that concerns security in the United States; any information that does not comply should not be submitted.

   Attachment B contains additional PRD information. Dischargers must electronically file the PRDs, and mail the appropriate annual fee to the State Water Board.

4. This permit is effective on July 1, 2010.

   a. **Dischargers Obtaining Coverage On or After July 1, 2010:** All dischargers requiring coverage on or after July 1, 2010, shall electronically file their PRDs prior to the commencement of construction activities, and mail the appropriate annual fee no later than seven days prior to the commencement of construction activities. Permit coverage shall not commence until the PRDs and the annual fee are received by the State Water Board, and a WDID number is assigned and sent by SMARTS.

   b. **Dischargers Covered Under 99-08-DWQ and 2003-0007-DWQ:** Existing dischargers subject to State Water Board Order No. 99-08-DWQ (existing dischargers) will continue coverage under 99-08-DWQ until July 1, 2010. After July 1, 2010, all NOIs subject to State Water Board Order No. 99-08-DWQ will be terminated. Existing dischargers shall electronically file their PRDs no later than

July 1, 2010. If an existing discharger's site acreage subject to the annual fee has changed, it shall mail a revised annual fee no less than seven days after receiving the revised annual fee notification, **or else lose permit coverage**. All existing dischargers shall be exempt from the risk determination requirements in Section VIII of this General Permit until two years after permit adoption. All existing dischargers are therefore subject to Risk Level 1 requirements regardless of their site's sediment and receiving water risks. However, a Regional Board retains the authority to require an existing discharger to comply with the Section VIII risk determination requirements.

5. The discharger is only considered covered by this General Permit upon receipt of a Waste Discharger Identification (WDID) number assigned and sent by the State Water Board Storm water Multi-Application and Report Tracking System (SMARTS). In order to demonstrate compliance with this General Permit, the discharger must obtain a WDID number and must present documentation of a valid WDID upon demand.

6. During the period this permit is subject to review by the U.S. EPA, the prior permit (State Water Board Order No. 99-08-DWQ) remains in effect. Existing dischargers under the prior permit will continue to have coverage under State Water Board Order No. 99-08-DWQ until this General Permit takes effect on July 1, 2010. Dischargers who complete their projects and electronically file an NOT prior to July 1, 2010, are not required to obtain coverage under this General Permit.

7. Small Construction Rainfall Erosivity Waiver

   EPA's Small Construction Erosivity Waiver applies to sites between one and five acres demonstrating that there are no adverse water quality impacts.

   Dischargers eligible for a Rainfall Erosivity Waiver based on low erosivity potential shall complete the electronic Notice of Intent (NOI) and Sediment Risk form through the State Water Board's SMARTS system, certifying that the construction activity will take place during a period when the value of the rainfall erosivity factor is less than five. Where the LRP changes or another LRP is added during construction, the new LRP must also submit a waiver certification through the SMARTS system.

   If a small construction site continues beyond the projected completion date given on the waiver certification, the LRP shall recalculate the rainfall erosivity factor for the new project duration and submit this information through the SMARTS system. If the new R factor is below five (5), the discharger shall update through SMARTS all applicable information on the waiver certification and retain a copy of the revised waiver onsite. The LRP shall submit the new waiver certification 30 days prior to the projected completion date listed on the original waiver form to assure exemption from permitting requirements is uninterrupted. If the new R factor is five (5) or above, the LRP shall be required to apply for coverage under this Order.

8. In the case of a public emergency that requires immediate construction activities, a discharger shall submit a brief description of the emergency construction activity within five days of the onset of construction, and then shall submit all PRDs within thirty days.

C. Revising Permit Coverage for Change of Acreage or New Ownership

1. The discharger may reduce or increase the total acreage covered under this General Permit when a portion of the site is complete and/or conditions for termination of coverage have been met (See Section II.D Conditions for Termination of Coverage); when ownership of a portion of the site is sold to a different entity; or when new acreage, subject to this General Permit, is added to the site.

2. Within 30 days of a reduction or increase in total disturbed acreage, the discharger shall electronically file revisions to the PRDs that include:

    a. A revised NOI indicating the new project size;

    b. A revised site map showing the acreage of the site completed, acreage currently under construction, acreage sold/transferred or added, and acreage currently stabilized in accordance with the Conditions for Termination of Coverage in Section II.D below.

    c. SWPPP revisions, as appropriate; and

    d. Certification that any new landowners have been notified of applicable requirements to obtain General Permit coverage. The certification shall include the name, address, telephone number, and e-mail address of the new landowner.

    e. If the project acreage has increased, dischargers shall mail payment of revised annual fees within 14 days of receiving the revised annual fee notification.

3. The discharger shall continue coverage under the General Permit for any parcel that has not achieved "Final Stabilization" as defined in Section II.D.

4. When an LRP owns property with active General Permit coverage, and the LRP sells the property, or a parcel thereof, to another person, that person shall become an LRP with respect to whatever parcel was sold. The existing LRP shall inform the new LRP of the General Permit's requirements. In order for the new LRP to continue the construction activity on its parcel of property, the new LRP, or the new LRP's approved signatory, must submit PRDs in accordance with this General Permit's requirements.

D. Conditions for Termination of Coverage

1. Within 90 days of when construction is complete or ownership has been transferred, the discharger shall electronically file a Notice of Termination (NOT), a final site map, and photos through the State Water Boards SMARTS system. Filing a NOT certifies that all General Permit requirements have been met. The Regional Water Board will consider a construction site complete only when all portions of the site have been transferred to a new owner, or all of the following conditions have been met:

    a. For purposes of "final stabilization," the site will not pose any additional sediment discharge risk than it did prior to the commencement of construction activity;

    b. There is no potential for construction-related storm water pollutants to be discharged into site runoff;

    c. Final stabilization has been reached;

    d. Construction materials and wastes have been disposed of properly;

    e. Compliance with the Post-Construction Standards in Section XIII of this General Permit has been demonstrated;

    f. Post-construction storm water management measures have been installed and a long-term maintenance plan[7] has been established; and

[7] For the purposes of this requirement a long-term maintenance plan will be designed for a minimum of five years, and will describe the procedures to ensure that the post-construction storm water management measures are adequately maintained.

g. All construction-related equipment, materials and any temporary BMPs no longer needed are removed from the site.

2. The discharger shall certify that final stabilization conditions are satisfied in their NOT. Failure to certify shall result in continuation of permit coverage and annual billing.

3. The NOT must demonstrate through photos, RUSLE or RUSLE2, or results of testing and analysis that the site meets all of the conditions above (Section II.D.1) and the final stabilization condition (Section II.D.1.a) is attained by one of the following methods:

   a. “70% final cover method,” no computational proof required

      OR:

   b. “RUSLE or RUSLE2 method,” computational proof required

      OR:

   c. “Custom method”, the discharger shall demonstrate in some other manner than a or b, above, that the site complies with the “final stabilization” requirement in Section II.D.1.a.

III. DISCHARGE PROHIBITIONS

A. Dischargers shall not violate any discharge prohibitions contained in applicable Basin Plans or statewide water quality control plans. Waste discharges to Areas of Special Biological Significance (ASBS) are prohibited by the California Ocean Plan, unless granted an exception issued by the State Water Board.

B. All discharges are prohibited except for the storm water and non-storm water discharges specifically authorized by this General Permit or another NPDES permit.

C. Authorized non-storm water discharges may include those from de-chlorinated potable water sources such as: fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, uncontaminated ground water from dewatering, and other discharges not subject to a separate general NPDES permit adopted by a Regional Water Board. The discharge of non-storm water is authorized under the following conditions:

1. The discharge does not cause or contribute to a violation of any water quality standard;

2. The discharge does not violate any other provision of this General Permit;

3. The discharge is not prohibited by the applicable Basin Plan;

4. The discharger has included and implemented specific BMPs required by this General Permit to prevent or reduce the contact of the non-storm water discharge with construction materials or equipment.

5. The discharge does not contain toxic constituents in toxic amounts or (other) significant quantities of pollutants;

6. The discharge is monitored and meets the applicable NALs and NELs; and

7. The discharger reports the sampling information in the Annual Report.

If any of the above conditions are not satisfied, the discharge is not authorized by this General Permit. The discharger shall notify the Regional Water Board of any anticipated non-storm water discharges not already authorized by this General Permit or another NPDES permit, to determine whether a separate NPDES permit is necessary.

D. Debris resulting from construction activities are prohibited from being discharged from construction sites.

E. When soil contamination is found or suspected and a responsible party is not identified, or the responsible party fails to promptly take the appropriate action, the discharger shall have those soils sampled and tested to ensure proper handling and public safety measures are implemented. The discharger shall notify the appropriate local, State, and federal agency(ies) when contaminated soil is found at a construction site, and will notify the appropriate Regional Water Board.

IV. SPECIAL PROVISIONS

A. Duty to Comply

1. The discharger shall comply with all of the conditions of this General Permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and the Porter-Cologne Water Quality Control Act and is grounds for enforcement action and/or removal from General Permit coverage.

2. The discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this General Permit has not yet been modified to incorporate the requirement.

B. General Permit Actions

1. This General Permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the discharger for a General Permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not annul any General Permit condition.

2. If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the CWA for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this General Permit, this General Permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition and the dischargers so notified.

C. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this General Permit.

D. Duty to Mitigate

The discharger shall take all responsible steps to minimize or prevent any discharge in violation of this General Permit, which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance

The discharger shall at all times properly operate and maintain any facilities and systems of treatment and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with the conditions of this General Permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance may require the operation of backup or auxiliary facilities or similar systems installed by a discharger when necessary to achieve compliance with the conditions of this General Permit.

F. Property Rights

This General Permit does not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor does it authorize any infringement of Federal, State, or local laws or regulations.

G. Duty to Maintain Records and Provide Information

1. The discharger shall maintain a paper or electronic copy of all required records, including a copy of this General Permit, for three years from the date generated or date submitted, whichever is last. These records shall be available at the construction site until construction is completed.

2. The discharger shall furnish the Regional Water Board, State Water Board, or U.S. EPA, within a reasonable time, any requested information to determine compliance with this General Permit. The discharger shall also furnish, upon request, copies of records that are required to be kept by this General Permit.

H. Inspection and Entry

The discharger shall allow the Regional Water Board, State Water Board, U.S. EPA, and/or, in the case of construction sites which discharge through a municipal separate storm sewer, an authorized representative of the municipal operator of the separate storm sewer system receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the discharger’s premises at reasonable times where a regulated construction activity is being conducted or where records must be kept under the conditions of this General Permit;

2. Access and copy at reasonable times any records that must be kept under the conditions of this General Permit;

3. Inspect at reasonable times the complete construction site, including any off-site staging areas or material storage areas, and the erosion/sediment controls; and

4. Sample or monitor at reasonable times for the purpose of ensuring General Permit compliance.

I. Electronic Signature and Certification Requirements

1. All Permit Registration Documents (PRDs) and Notice of Terminations (NOTs) shall be electronically signed, certified, and submitted via SMARTS to the State Water Board. Either the Legally Responsible Person (LRP) or a person legally authorized to sign and certify PRDs and NOTs on behalf of the LRP (the LRP's Approved Signatory) must submit all information electronically via SMARTS.

   a. The LRP's Approved Signatory must be one of the following:

      i. For a corporation: a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (a) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or (b) the manager of the facility if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

      ii. For a partnership or sole proprietorship: a general partner or the proprietor, respectively;

      iii. For a municipality, State, Federal, or other public agency: either a principal executive officer or ranking elected official. The principal executive officer of a Federal agency includes the chief executive officer of the agency or the senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA);

      iv. For the military: Any military officer who has been designated.

      v. For a public university: An authorized university official

b. Changes to Authorization. If an approved signatory's authorization is no longer accurate, a new authorization satisfying the requirements of paragraph (a) of this section must be submitted via SMARTS prior to or together with any reports, information or applications to be signed by an approved signatory.

2. All Annual Reports, or other information required by the General Permit (other than PRDs and NOTs) or requested by the Regional Water Board, State Water Board, U.S. EPA, or local storm water management agency shall be certified and submitted by the LRP or the LRP's approved signatory as described above.

J. Certification

Any person signing documents under Section IV.I above, shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

K. Anticipated Noncompliance

The discharger shall give advance notice to the Regional Water Board and local storm water management agency of any planned changes in the construction activity, which may result in noncompliance with General Permit requirements.

L. Bypass

Bypass[8] is prohibited. The Regional Water Board may take enforcement action against the discharger for bypass unless:

1. Bypass was unavoidable to prevent loss of life, personal injury or severe property damage;[9]

[8] The intentional diversion of waste streams from any portion of a treatment facility

[9] Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

2. There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated waste, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that could occur during normal periods of equipment downtime or preventative maintenance;

3. The discharger submitted a notice at least ten days in advance of the need for a bypass to the Regional Water Board; or

4. The discharger may allow a bypass to occur that does not cause effluent limitations to be exceeded, but only if it is for essential maintenance to assure efficient operation. In such a case, the above bypass conditions are not applicable. The discharger shall submit notice of an unanticipated bypass as required.

M. Upset

1. A discharger that wishes to establish the affirmative defense of an upset[10] in an action brought for noncompliance shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

    a. An upset occurred and that the discharger can identify the cause(s) of the upset

    b. The treatment facility was being properly operated by the time of the upset

    c. The discharger submitted notice of the upset as required; and

    d. The discharger complied with any remedial measures required

2. No determination made before an action of noncompliance occurs, such as during administrative review of claims that noncompliance was caused by an upset, is final administrative action subject to judicial review.

3. In any enforcement proceeding, the discharger seeking to establish the occurrence of an upset has the burden of proof

[10] An exceptional incident in which there is unintentional and temporary noncompliance the technology based numeric effluent limitations because of factors beyond the reasonable control of the discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or careless or improper operation.

N. Penalties for Falsification of Reports

Section 309(c)(4) of the CWA provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this General Permit, including reports of compliance or noncompliance shall upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than two years or by both.

O. Oil and Hazardous Substance Liability

Nothing in this General Permit shall be construed to preclude the institution of any legal action or relieve the discharger from any responsibilities, liabilities, or penalties to which the discharger is or may be subject to under Section 311 of the CWA.

P. Severability

The provisions of this General Permit are severable; and, if any provision of this General Permit or the application of any provision of this General Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this General Permit shall not be affected thereby.

Q. Reopener Clause

This General Permit may be modified, revoked and reissued, or terminated for cause due to promulgation of amended regulations, receipt of U.S. EPA guidance concerning regulated activities, judicial decision, or in accordance with 40 Code of Federal Regulations (CFR) 122.62, 122.63, 122.64, and 124.5.

R. Penalties for Violations of Permit Conditions

1. Section 309 of the CWA provides significant penalties for any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the CWA or any permit condition or limitation implementing any such section in a permit issued under Section 402. Any person who violates any permit condition of this General Permit is subject to a civil penalty not to exceed $37,500[11] per calendar day of such violation, as well as any other appropriate sanction provided by Section 309 of the CWA.

[11] May be further adjusted in accordance with the Federal Civil Penalties Inflation Adjustment Act.

2. The Porter-Cologne Water Quality Control Act also provides for civil and criminal penalties, which in some cases are greater than those under the CWA.

S. Transfers

This General Permit is not transferable.

T. Continuation of Expired Permit

This General Permit continues in force and effect until a new General Permit is issued or the SWRCB rescinds this General Permit. Only those dischargers authorized to discharge under the expiring General Permit are covered by the continued General Permit.

V. EFFLUENT STANDARDS

A. Narrative Effluent Limitations

1. Storm water discharges and authorized non-storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

2. Dischargers shall minimize or prevent pollutants in storm water discharges and authorized non-storm water discharges through the use of controls, structures, and management practices that achieve BAT for toxic and non-conventional pollutants and BCT for conventional pollutants.

B. Numeric Effluent Limitations (NELs)

Table 1- Numeric Effluent Limitations, Numeric Action Levels, Test Methods, Detection Limits, and Reporting Units

Parameter	Test Method	Discharge Type	Min. Detection Limit	Units	Numeric Action Level	Numeric Effluent Limitation
pH	Field test with calibrated portable instrument	Risk Level 2	0.2	pH units	lower NAL = 6.5 upper NAL = 8.5	N/A
		Risk Level 3			lower NAL = 6.5 upper NAL = 8.5	lower NEL = 6.0 upper NEL = 9.0
Turbidity	EPA 0180.1 and/or field test with calibrated portable instrument	Risk Level 2	1	NTU	250 NTU	N/A
		Risk Level 3			250 NTU	500 NTU

1. Numeric Effluent Limitations (NELs):

   a. **Storm Event, Daily Average pH Limits –** For Risk Level 3 dischargers, the pH of storm water and non-storm water discharges shall be within the ranges specified in Table 1 during any site phase where there is a "high risk of pH discharge."[12]

b. **Storm Event Daily Average Turbidity Limit –** For Risk Level 3 dischargers, the turbidity of storm water and non-storm water discharges shall not exceed 500 NTU.

2. If daily average sampling results are outside the range of pH NELs (i.e., is below the lower NEL for pH or exceeds the upper NEL for pH) or exceeds the turbidity NEL (as listed in Table 1), the discharger is in violation of this General Permit and shall electronically file monitoring results in violation within 5 business days of obtaining the results.

3. **Compliance Storm Event**:

   Discharges of storm water from Risk Level 3 sites shall comply with applicable NELs (above) unless the storm event causing the discharges is determined after the fact to be equal to or larger than the Compliance Storm Event (expressed in inches of rainfall). The Compliance Storm Event for Risk Level 3 discharges is the 5 year, 24 hour storm (expressed in tenths of an inch of rainfall), as determined by using these maps:

   http://www.wrcc.dri.edu/pcpnfreq/nca5y24.gif
   http://www.wrcc.dri.edu/pcpnfreq/sca5y24.gif

   Compliance storm event verification shall be done by reporting on-site rain gauge readings as well as nearby governmental rain gauge readings.

4. Dischargers shall not be required to comply with NELs if the site receives run-on from a forest fire or any other natural disaster.

C. Numeric Action Levels (NALs)

1. For Risk Level 2 and 3 dischargers, the lower storm event average NAL for pH is 6.5 pH units and the upper storm event average NAL for pH is 8.5 pH units. The discharger shall take actions as described below if the discharge is outside of this range of pH values.

[12] A period of high risk of pH discharge is defined as a project's complete utilities phase, complete vertical build phase, and any portion of any phase where significant amounts of materials are placed directly on the land at the site in a manner that could result in significant alterations of the background pH of the discharges.

2. For Risk Level 2 and 3 dischargers, the NAL storm event daily average for turbidity is 250 NTU. The discharger shall take actions as described below if the discharge is outside of this range of turbidity values.

3. Whenever the results from a storm event daily average indicate that the discharge is below the lower NAL for pH, exceeds the upper NAL for pH, or exceeds the turbidity NAL (as listed in Table 1), the discharger shall conduct a construction site and run-on evaluation to determine whether pollutant source(s) associated with the site's construction activity may have caused or contributed to the NAL exceedance and shall immediately implement corrective actions if they are needed.

4. The site evaluation shall be documented in the SWPPP and specifically address whether the source(s) of the pollutants causing the exceedance of the NAL:

   a. Are related to the construction activities and whether additional BMPs are required to (1) meet BAT/BCT requirements; (2) reduce or prevent pollutants in storm water discharges from causing exceedances of receiving water objectives; and (3) determine what corrective action(s) were taken or will be taken and with a description of the schedule for completion.

      AND/OR:

   b. Are related to the run-on associated with the construction site location and whether additional BMPs measures are required to (1) meet BAT/BCT requirements; (2) reduce or prevent pollutants in storm water discharges from causing exceedances of receiving water objectives; and (3) what corrective action(s) were taken or will be taken with a description of the schedule for completion.

VI. RECEIVING WATER LIMITATIONS

A. The discharger shall ensure that storm water discharges and authorized non-storm water discharges to any surface or ground water will not adversely affect human health or the environment.

B. The discharger shall ensure that storm water discharges and authorized non-storm water discharges will not contain pollutants in quantities that threaten to cause pollution or a public nuisance.

C. The discharger shall ensure that storm water discharges and authorized non-storm water discharges will not contain pollutants that cause or contribute to an exceedance of any applicable water quality objectives or water quality standards (collectively, WQS) contained in a Statewide Water Quality Control Plan, the California Toxics Rule, the National Toxics Rule, or the applicable Regional Water Board's Water Quality Control Plan (Basin Plan).

D. Dischargers located within the watershed of a CWA § 303(d) impaired water body, for which a TMDL has been approved by the U.S. EPA, shall comply with the approved TMDL if it identifies "construction activity" or land disturbance as a source of the pollution.

VII. TRAINING QUALIFICATIONS AND CERTIFICATION REQUIREMENTS

A. General

The discharger shall ensure that all persons responsible for implementing requirements of this General Permit shall be appropriately trained in accordance with this Section. Training should be both formal and informal, occur on an ongoing basis, and should include training offered by recognized governmental agencies or professional organizations. Those responsible for preparing and amending SWPPPs shall comply with the requirements in this Section VII.

The discharger shall provide documentation of all training for persons responsible for implementing the requirements of this General Permit in the Annual Reports.

B. SWPPP Certification Requirements

1. **Qualified SWPPP Developer:** The discharger shall ensure that SWPPPs are written, amended and certified by a Qualified SWPPP Developer (QSD). A QSD shall have one of the following registrations or certifications, and appropriate experience, as required for:

    a. A California registered professional civil engineer;

    b. A California registered professional geologist or engineering geologist;

    c. A California registered landscape architect;

    d. A professional hydrologist registered through the American Institute of Hydrology;

    e. A Certified Professional in Erosion and Sediment Control (CPESC) ™ registered through Enviro Cert International, Inc.;

    f. A Certified Professional in Storm Water Quality (CPSWQ) ™ registered through Enviro Cert International, Inc.; or

    g. A professional in erosion and sediment control registered through the National Institute for Certification in Engineering Technologies (NICET);

Effective two years after the adoption date of this General Permit, a QSD shall have attended a State Water Board-sponsored or approved QSD training course.

2. The discharger shall list the name and telephone number of the currently designated Qualified SWPPP Developer(s) in the SWPPP.

3. **Qualified SWPPP Practitioner:** The discharger shall ensure that all BMPs required by this General Permit are implemented by a Qualified SWPPP Practitioner (QSP). A QSP is a person responsible for non-storm water and storm water visual observations, sampling and analysis. Effective two years from the date of adoption of this General Permit, a QSP shall be either a QSD or have one of the following certifications:

   a. A certified erosion, sediment and storm water inspector registered through Enviro Cert International, Inc.; or

   b. A certified inspector of sediment and erosion control registered through Certified Inspector of Sediment and Erosion Control, Inc.

   Effective two years after the adoption date of this General Permit, a QSP shall have attended a State Water Board-sponsored or approved QSP training course.

4. The LRP shall list in the SWPPP, the name of any Approved Signatory, and provide a copy of the written agreement or other mechanism that provides this authority from the LRP in the SWPPP.

5. The discharger shall include, in the SWPPP, a list of names of all contractors, subcontractors, and individuals who will be directed by the Qualified SWPPP Practitioner. This list shall include telephone numbers and work addresses. Specific areas of responsibility of each subcontractor and emergency contact numbers shall also be included.

6. The discharger shall ensure that the SWPPP and each amendment will be signed by the Qualified SWPPP Developer. The discharger shall include a listing of the date of initial preparation and the date of each amendment in the SWPPP.

VIII. RISK DETERMINATION

The discharger shall calculate the site's sediment risk and receiving water risk during periods of soil exposure (i.e. grading and site stabilization) and use the calculated risks to determine a Risk Level(s) using the methodology in

Appendix 1. For any site that spans two or more planning watersheds,[13] the discharger shall calculate a separate Risk Level for each planning watershed. The discharger shall notify the State Water Board of the site's Risk Level determination(s) and shall include this determination as a part of submitting the PRDs. If a discharger ends up with more than one Risk Level determination, the Regional Water Board may choose to break the project into separate levels of implementation.

IX. RISK LEVEL 1 REQUIREMENTS

Risk Level 1 Dischargers shall comply with the requirements included in Attachment C of this General Permit.

X. RISK LEVEL 2 REQUIREMENTS

Risk Level 2 Dischargers shall comply with the requirements included in Attachment D of this General Permit.

XI. RISK LEVEL 3 REQUIREMENTS

Risk Level 3 Dischargers shall comply with the requirements included in Attachment E of this General Permit.

XII. ACTIVE TREATMENT SYSTEMS (ATS)

Dischargers choosing to implement an ATS on their site shall comply with all of the requirements in Attachment F of this General Permit.

[13] Planning watershed: defined by the Calwater Watershed documents as a watershed that ranges in size from approximately 3,000 to 10,000 acres http://cain.ice.ucdavis.edu/calwater/calwfaq.html, http://gis.ca.gov/catalog/BrowseRecord.epl?id=22175 .

XIII. POST-CONSTRUCTION STANDARDS

A. All dischargers shall comply with the following runoff reduction requirements unless they are located within an area subject to post-construction standards of an active Phase I or II municipal separate storm sewer system (MS4) permit that has an approved Storm Water Management Plan.

1. This provision shall take effect three years from the adoption date of this permit, or later at the discretion of the Executive Officer of the Regional Board.

2. The discharger shall demonstrate compliance with the requirements of this section by submitting with their NOI a map and worksheets in accordance with the instructions in Appendix 2. The discharger shall use non-structural controls unless the discharger demonstrates that non-structural controls are infeasible or that structural controls will produce greater reduction in water quality impacts.

3. The discharger shall, through the use of non-structural and structural measures as described in Appendix 2, replicate the pre-project water balance (for this permit, defined as the volume of rainfall that ends up as runoff) for the smallest storms up to the 85th percentile storm event (or the smallest storm event that generates runoff, whichever is larger). Dischargers shall inform Regional Water Board staff at least 30 days prior to the use of any structural control measure used to comply with this requirement. Volume that cannot be addressed using non-structural practices shall be captured in structural practices and approved by the Regional Water Board. When seeking Regional Board approval for the use of structural practices, dischargers shall document the infeasibility of using non-structural practices on the project site, or document that there will be fewer water quality impacts through the use of structural practices.

4. For sites whose disturbed area exceeds two acres, the discharger shall preserve the pre-construction drainage density (miles of stream length per square mile of drainage area) for all drainage areas within the area serving a first order stream[14] or larger stream and ensure that post-project time of runoff concentration is equal or greater than pre-project time of concentration.

[14] A first order stream is defined as a stream with no tributaries.

B. All dischargers shall implement BMPs to reduce pollutants in storm water discharges that are reasonably foreseeable after all construction phases have been completed at the site (Post-construction BMPs).

XIV. SWPPP REQUIREMENTS

A. The discharger shall ensure that the Storm Water Pollution Prevention Plans (SWPPPs) for all traditional project sites are developed and amended or revised by a QSD. The SWPPP shall be designed to address the following objectives:

1. All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled;

2. Where not otherwise required to be under a Regional Water Board permit, all non-storm water discharges are identified and either eliminated, controlled, or treated;

3. Site BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from construction activity to the BAT/BCT standard;

4. Calculations and design details as well as BMP controls for site run-on are complete and correct, and

5. Stabilization BMPs installed to reduce or eliminate pollutants after construction are completed.

B. To demonstrate compliance with requirements of this General Permit, the QSD shall include information in the SWPPP that supports the conclusions, selections, use, and maintenance of BMPs.

C. The discharger shall make the SWPPP available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and map/drawing will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone.

XV. REGIONAL WATER BOARD AUTHORITIES

A. In the case where the Regional Water Board does not agree with the discharger's self-reported risk level (e.g., they determine themselves to be a Level 1 Risk when they are actually a Level 2 Risk site), Regional Water Boards may either direct the discharger to reevaluate the Risk Level(s) for their site or terminate coverage under this General Permit.

B. Regional Water Boards may terminate coverage under this General Permit for dischargers who fail to comply with its requirements or where they determine that an individual NPDES permit is appropriate.

C. Regional Water Boards may require dischargers to submit a Report of Waste Discharge / NPDES permit application for Regional Water Board consideration of individual requirements.

D. Regional Water Boards may require additional Monitoring and Reporting Program Requirements, including sampling and analysis of discharges to sediment-impaired water bodies.

E. Regional Water Boards may require dischargers to retain records for more than the three years required by this General Permit.

XVI. ANNUAL REPORTING REQUIREMENTS

A. All dischargers shall prepare and electronically submit an Annual Report no later than September 1 of each year.

B. The discharger shall certify each Annual Report in accordance with the Special Provisions.

C. The discharger shall retain an electronic or paper copy of each Annual Report for a minimum of three years after the date the annual report is filed.

D. The discharger shall include storm water monitoring information in the Annual Report consisting of:

1. a summary and evaluation of all sampling and analysis results, including copies of laboratory reports;

2. the analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit");

3. a summary of all corrective actions taken during the compliance year;

4. identification of any compliance activities or corrective actions that were not implemented;

5. a summary of all violations of the General Permit;

6. the names of individual(s) who performed the facility inspections, sampling, visual observation (inspections), and/or measurements;

7. the date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation (rain gauge); and

8. the visual observation and sample collection exception records and reports specified in Attachments C, D, and E.

E. The discharger shall provide training information in the Annual Report consisting of:

1. documentation of all training for individuals responsible for all activities associated with compliance with this General Permit;

2. documentation of all training for individuals responsible for BMP installation, inspection, maintenance, and repair; and

3. documentation of all training for individuals responsible for overseeing, revising, and amending the SWPPP.

ATTACHMENT A
Linear Underground/ Overhead Requirements

All Linear Underground/Overhead project dischargers who submit permit registration documents (PRDs) indicating their intention to be regulated under the provisions of this General Permit shall comply with the following:

A. DEFINITION OF LINEAR UNDERGROUND/OVERHEAD PROJECTS

1. Linear Underground/Overhead Projects (LUPs) include, but are not limited to, any conveyance, pipe, or pipeline for the transportation of any gaseous, liquid (including water and wastewater for domestic municipal services), liquiescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g., telephone, telegraph, radio, or television messages); and associated ancillary facilities. Construction activities associated with LUPs include, but are not limited to, (a) those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment, and associated ancillary facilities); and include, but are not limited to, (b) underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/ or pavement repair or replacement, and stockpile/borrow locations.

2. LUP evaluation shall consist of two tasks:

a. Confirm that the project or project section(s) qualifies as an LUP. The State Water Board website contains a project determination guidance flowchart. http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

b. Identify which Type(s) (1, 2 or 3 described in Section I below) are applicable to the project or project sections based on project sediment and receiving water risk. (See Attachment A.1)

3. A Legally Responsible Person (LRP) for a Linear Underground/Overhead project is required to obtain CGP coverage under one or more permit registration document (PRD) electronic submittals to the State Water Board's Storm Water Multi-Application and Report Tracking (SMARTs) system. Attachment A.1 contains a flow chart to be used when determining if a linear project qualifies for coverage and to determine LUP Types. Since a LUP may be constructed within both developed and undeveloped locations and portions of LUPs may be constructed by different contractors, LUPs may be broken into logical permit sections. Sections may be determined based on portions of a project conducted by one contractor. Other situations may also occur, such as the time period in which the sections of a project will be constructed (e.g. project phases), for which separate permit coverage is possible. For projects that are broken into separate sections, a description of how each section relates to the overall project and the definition of the boundaries between sections shall be clearly stated.

4. Where construction activities transverse or enter into different Regional Water Board jurisdictions, LRPs shall obtain permit coverage for each Regional Water Board area involved prior to the commencement of construction activities.

5. Small Construction Rainfall Erosivity Waiver

EPA's Small Construction Erosivity Waiver applies to sites between one and five acres demonstrating that there are no adverse water quality impacts.

Dischargers eligible for a Rainfall Erosivity Waiver based on low erosivity potential shall complete the electronic Notice of Intent (NOI) and Sediment Risk form through the State Water Board's SMARTS system, certifying that the construction activity will take place during a period when the value of the rainfall erosivity factor is less than five. Where the LRP changes or another LRP is added during construction, the new LRP must also submit a waiver certification through the SMARTS system.

If a small linear construction site continues beyond the projected completion date given on the waiver certification, the LRP shall recalculate the rainfall erosivity factor for the new project duration and submit this information through the SMARTS system. If the new R factor is below five (5), the discharger shall update through SMARTS all applicable information on the waiver certification and retain a copy of the revised waiver onsite. The LRP shall submit the new waiver certification 30 days prior to the projected completion date listed on the original waiver form to assure exemption from permitting requirements is uninterrupted. If the new R factor is five (5) or above, the LRP shall be required to apply for coverage under this Order.

B. LINEAR PROJECT PERMIT REGISTRATION DOCUMENTS (PRDs)

Any information provided to the Regional Water Board shall comply with the Homeland Security Act and any other federal law that concerns security in the United States; any information that does not comply should not be submitted. PRDs shall consist of the following:

1. Notice of Intent (NOI)

Prior to construction activities, the LRP of a proposed linear underground/overhead project shall utilize the processes and methods provided in Attachment A.2, Permit Registration Documents (PRDs) – General Instructions for Linear Underground/Overhead Projects to comply with the Construction General Permit.

2. Site Maps

LRPs submitting PRDs shall include at least 3 maps. The first map will be a zoomed[1] 1000-1500 ft vicinity map that shows the starting point of the project. The second will be a zoomed map of 1000-1500 ft showing the ending location of the project. The third will be a larger view vicinity map, 1000 ft to 2000 ft, displaying the entire project location depending on the project size, and indicating the LUP type (1, 2 or 3) areas within the total project footprint.

3. Drawings

LRPs submitting PRDs shall include a construction drawing(s) or other appropriate drawing(s) or map(s) that shows the locations of storm drain

[1] An image with a close-up/enhanced detailed view of site features that show minute details such as streets and neighboring structures.
Or: An image with a close-up/enhanced detailed view of the site’s surrounding infrastructure.
Or: An image with a close up detailed view of the project and its surroundings.

inlets and waterbodies[2] that may receive discharges from the construction activities and that shows the locations of BMPs to be installed for all those BMPs that can be illustrated on the revisable drawing(s) or map(s). If storm drain inlets, waterbodies, and/or BMPs cannot be adequately shown on the drawing(s) or map(s) they should be described in detail within the SWPPP.

4. Storm Water Pollution Prevention Plan (SWPPP)

LUP dischargers shall comply with the SWPPP Preparation, Implementation, and Oversight requirements in Section K of this Attachment.

5. Contact information

LUP dischargers shall include contact information for all contractors (or subcontractors) responsible for each area of an LUP project. This should include the names, telephone numbers, and addresses of contact personnel. Specific areas of responsibility of each contact, and emergency contact numbers should also be included.

6. In the case of a public emergency that requires immediate construction activities, a discharger shall submit a brief description of the emergency construction activity within five days of the onset of construction, and then shall submit all PRDs within thirty days.

C. LINEAR PROJECT TERMINATION OF COVERAGE REQUIREMENTS

The LRP may terminate coverage of an LUP when construction activities are completed by submitting an electronic notice of termination (NOT) through the State Water Board's SMARTS system. Termination requirements are different depending on the complexity of the LUP. An LUP is considered complete when: (a) there is no potential for construction-related storm water pollution; (b) all elements of the SWPPP have been completed; (c) construction materials and waste have been disposed of properly; (d) the site is in compliance with all local storm water management requirements; and (e) the LRP submits a notice of termination (NOT) and has received approval for termination from the appropriate Regional Water Board office.

1. LUP Stabilization Requirements

The LUP discharger shall ensure that all disturbed areas of the construction site are stabilized prior to termination of coverage under this General Permit. Final stabilization for the purposes of submitting an NOT

[2] Includes basin(s) that the MS4 storm sewer systems may drain to for Hydromodification or Hydrological Conditional of Concerns under the MS4 permits.

is satisfied when all soil disturbing activities are completed and one of the following criteria is met:

a. In disturbed areas that were vegetated prior to construction activities of the LUP, the area disturbed must be re-established to a uniform vegetative cover equivalent to 70 percent coverage of the preconstruction vegetative conditions. Where preconstruction vegetation covers less than 100 percent of the surface, such as in arid areas, the 70 percent coverage criteria is adjusted as follows: if the preconstruction vegetation covers 50 percent of the ground surface, 70 percent of 50 percent (.70 X .50=.35) would require 35 percent total uniform surface coverage; or

b. Where no vegetation is present prior to construction, the site is returned to its original line and grade and/or compacted to achieve stabilization; or

c. Equiva lent stabilization measures have been employed. These measures include, but are not limited to, the use of such BMPs as blankets, reinforced channel liners, soil cement, fiber matrices, geotextiles, or other erosion resistant soil coverings or treatments.

2. LUP Termination of Coverage Requirements

The LRP shall file an NOT through the State Water Board's SMARTS system. By submitting an NOT, the LRP is certifying that construction activities for an LUP are complete and that the project is in full compliance with requirements of this General Permit and that it is now compliant with soil stabilization requirements where appropriate. Upon approval by the appropriate Regional Water Board office, permit coverage will be terminated.

3. Revising Coverage for Change of Acreage

When the LRP of a portion of an LUP construction project changes, or when a phase within a multi-phase project is completed, the LRP may reduce the total acreage covered by this General Permit. In reducing the acreage covered by this General Permit, the LRP shall electronically file revisions to the PRDs that include:

a. a revised NOI indicating the new project size;

b. a revised site map showing the acreage of the project completed, acreage currently under construction, acreage sold, transferred or added, and acreage currently stabilized.

c. SWPPP revisions, as appropriate; and

d. certification that any new LRPs have been notified of applicable requirements to obtain General Permit coverage. The certification shall include the name, address, telephone number, and e-mail address (if known) of the new LRP.

If the project acreage has increased, dischargers shall mail payment of revised annual fees within 14 days of receiving the revised annual fee notification.

D. DISCHARGE PROHIBITIONS

1. LUP dischargers shall not violate any discharge prohibitions contained in applicable Basin Plans or statewide water quality control plans. Waste discharges to Areas of Special Biological Significance (ASBS) are prohibited by the California Ocean Plan, unless granted an exception issued by the State Water Board.

2. LUP dischargers are prohibited from discharging non-storm water that is not otherwise authorized by this General Permit. Non-storm water discharges authorized by this General Permit[3] may include, fire hydrant flushing, irrigation of vegetative erosion control measures, pipe flushing and testing, water to control dust, street cleaning, dewatering,[4] uncontaminated groundwater from dewatering, and other discharges not subject to a separate general NPDES permit adopted by a Regional Water Board. Such discharges are allowed by this General Permit provided they are not relied upon to clean up failed or inadequate construction or post-construction BMPs designed to keep materials on site. These authorized non-storm water discharges:

[3] Dischargers must identify all authorized non-storm water discharges in the LUP's SWPPP and identify BMPs that will be implemented to either eliminate or reduce pollutants in non-storm water discharges. Regional Water Boards may direct the discharger to discontinue discharging such non-storm water discharges if determined that such discharges discharge significant pollutants or threaten water quality.
[4] Dewatering activities may be prohibited or need coverage under a separate permit issued by the Regional Water Boards. Dischargers shall check with the appropriate Regional Water Boards for any required permit or basin plan conditions prior to initial dewatering activities to land, storm drains, or waterbodies.

a. Shall not cause or contribute to a violation of any water quality standard;

b. Shall not violate any other provision of this General Permit;

c. Shall not violate any applicable Basin Plan;

d. Shall comply with BMPs as described in the SWPPP;

e. Shall not contain toxic constituents in toxic amounts or (other) significant quantities of pollutants;

f. Shall be monitored and meets the applicable NALs and NELs; and

g. Shall be reported by the discharger in the Annual Report.

If any of the above conditions are not satisfied, the discharge is not authorized by this General Permit. The discharger shall notify the Regional Water Board of any anticipated non-storm water discharges not authorized by this General Permit to determine the need for a separate NPDES permit.

Additionally, some LUP dischargers may be required to obtain a separate permit if the applicable Regional Water Board has adopted a General Permit for dewatering discharges. Wherever feasible, alternatives, that do not result in the discharge of non-storm water, shall be implemented in accordance with this Attachment's Section K.2 - SWPPP Implementation Schedule.

3. LUP dischargers shall ensure that trench spoils or any other soils disturbed during construction activities that are contaminated[5] are not discharged with storm water or non-storm water discharges into any storm drain or water body except pursuant to an NPDES permit.

When soil contamination is found or suspected and a responsible party is not identified, or the responsible party fails to promptly take the appropriate action, the LUP discharger shall have those soils sampled and tested to ensure that proper handling and public safety measures are

[5] Contaminated soil contains pollutants in concentrations that exceed the appropriate thresholds that various regulatory agencies set for those substances. Preliminary testing of potentially contaminated soils will be based on odor, soil discoloration, or prior history of the site's chemical use and storage and other similar factors. When soil contamination is found or suspected and a responsible party is not identified, or the responsible party fails to promptly take the appropriate action, the discharger shall have those soils sampled and tested to ensure proper handling and public safety measures are implemented. The legally responsible person will notify the appropriate local, State, or federal agency(ies) when contaminated soil is found at a construction site, and will notify the Regional Water Board by submitting an NOT at the completion of the project.

implemented. The LUP discharger shall notify the appropriate local, State, and federal agency(ies) when contaminated soil is found at a construction site, and will notify the appropriate Regional Water Board.

4. Discharging any pollutant-laden water that will cause or contribute to an exceedance of the applicable Regional Water Board's Basin Plan from a dewatering site or sediment basin into any receiving water or storm drain is prohibited.

5. Debris[6] resulting from construction activities are prohibited from being discharged from construction project sites.

E. SPECIAL PROVISIONS

1. Duty to Comply

a. The LUP discharger must comply with all of the conditions of this General Permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and the Porter-Cologne Water Quality Control Act and is grounds for enforcement action and/or removal from General Permit coverage.

b. The LUP discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this General Permit has not yet been modified to incorporate the requirement.

2. General Permit Actions

a. This General Permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the discharger for a General Permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not annul any General Permit condition.

[6] Litter, rubble, discarded refuse, and remains of something destroyed.

b. If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the CWA for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this General Permit, this General Permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition and the dischargers so notified.

3. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an LUP discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this General Permit.

4. Duty to Mitigate

The LUP discharger shall take all responsible steps to minimize or prevent any discharge in violation of this General Permit, which has a reasonable likelihood of adversely affecting human health or the environment.

5. Proper Operation and Maintenance

The LUP discharger shall at all times properly operate and maintain any facilities and systems of treatment and control (and related appurtenances) which are installed or used by the discharger to achieve compliance with the conditions of this General Permit and with the requirements of the Storm Water Pollution Prevention Plan (SWPPP). Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance may require the operation of backup or auxiliary facilities or similar systems installed by a discharger when necessary to achieve compliance with the conditions of this General Permit.

6. Property Rights

This General Permit does not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor does it authorize any infringement of Federal, State, or local laws or regulations.

7. Duty to Maintain Records and Provide Information

a. The LUP discharger shall maintain a paper or electronic copy of all required records, including a copy of this General Permit, for three years from the date generated or date submitted, whichever is last. These records shall be kept at the construction site or in a crew member's vehicle until construction is completed, and shall be made available upon request.

b. The LUP discharger shall furnish the Regional Water Board, State Water Board, or USEPA, within a reasonable time, any requested information to determine compliance with this General Permit. The LUP discharger shall also furnish, upon request, copies of records that are required to be kept by this General Permit.

8. Inspection and Entry

The LUP discharger shall allow the Regional Water Board, State Water Board, USEPA, and/or, in the case of construction sites which discharge through a municipal separate storm sewer, an authorized representative of the municipal operator of the separate storm sewer system receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the discharger's premises at reasonable times where a regulated construction activity is being conducted or where records must be kept under the conditions of this General Permit;

b. Access and copy at reasonable times any records that must be kept under the conditions of this General Permit;

c. Inspect at reasonable times the complete construction site, including any off-site staging areas or material storage areas, and the erosion/sediment controls; and

d. Sample or monitor at reasonable times for the purpose of ensuring General Permit compliance.

9. Electronic Signature and Certification Requirements

a. All Permit Registration Documents (PRDs) and Notices of Termination (NOTs) shall be electronically signed, certified, and submitted via SMARTS to the State Water Board. Either the Legally Responsible Person (LRP) or a person legally authorized to sign and certify PRDs and NOTs on behalf of the LRP (the LRP's Approved Signatory) must submit all information electronically via SMARTS. For Linear Underground/Overhead projects, the Legally Responsible Person is the person in charge of the utility company, municipality, or other public or private company or agency that owns or operates the LUP. The LRP's Approved Signatory must be one of the following:

i For a corporation: a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(1) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(2) the manager of the facility if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

ii For a partnership or sole proprietorship: a general partner or the proprietor, respectively; or

iii For a municipality, State, Federal, or other public agency: either a principal executive officer or ranking elected official. The principal executive officer of a Federal agency includes the chief executive officer of the agency or the senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA).

b. Changes to Authorization. If an approved signatory's authorization is no longer accurate, a new authorization satisfying the requirements of paragraph (a) of this section must be submitted via SMARTS prior to or together with any reports, information or applications to be signed by an approved signatory.

c. All SWPPP revisions, annual reports, or other information required by the General Permit (other than PRDs and NOTs) or requested by the Regional Water Board, State Water Board, USEPA, or local storm water management agency shall be certified and submitted by the LRP or the LRP's approved signatory as described above.

10. Certification

Any person signing documents under Section E.9 above, shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

11. Anticipated Noncompliance

The LUP discharger shall give advance notice to the Regional Water Board and local storm water management agency of any planned changes in the construction activity, which may result in noncompliance with General Permit requirements.

12. Penalties for Falsification of Reports

Section 309(c)(4) of the CWA provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this General Permit, including reports of compliance or noncompliance shall upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than two years or by both.

13. Oil and Hazardous Substance Liability

Nothing in this General Permit shall be construed to preclude the institution of any legal action or relieve the discharger from any responsibilities, liabilities, or penalties to which the LUP discharger is or may be subject to under Section 311 of the CWA.

14. Severability

The provisions of this General Permit are severable; and, if any provision of this General Permit or the application of any provision of this General Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this General Permit shall not be affected thereby.

15. Reopener Clause

This General Permit may be modified, revoked and reissued, or terminated for cause due to promulgation of amended regulations, receipt of USEPA guidance concerning regulated activities, judicial decision, or in accordance with 40 Code of Federal Regulations (CFR) 122.62, 122.63, 122.64, and 124.5.

16. Penalties for Violations of Permit Conditions

a. Section 309 of the CWA provides significant penalties for any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the CWA or any permit condition or limitation implementing any such section in a permit issued under Section 402. Any person who violates any permit condition of this General Permit is subject to a civil penalty not to exceed $37,500[7] per calendar day of such violation, as well as any other appropriate sanction provided by Section 309 of the CWA.

b. The Porter-Cologne Water Quality Control Act also provides for civil and criminal penalties, which in some cases are greater than those under the CWA.

17. Transfers

This General Permit is not transferable. A new LRP of an ongoing construction activity must submit PRDs in accordance with the requirements of this General Permit to be authorized to discharge under this General Permit. An LRP who is a property owner with active General Permit coverage who sells a fraction or all the land shall inform the new property owner(s) of the requirements of this General Permit.

18. Continuation of Expired Permit

This General Permit continues in force and effect until a new General Permit is issued or the SWRCB rescinds this General Permit. Only those dischargers authorized to discharge under the expiring General Permit are covered by the continued General Permit.

F. EFFLUENT STANDARDS

1. Narrative Effluent Limitations

a. LUP dischargers shall ensure that storm water discharges and authorized non-storm water discharges regulated by this General Permit do not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

b. LUP dischargers shall minimize or prevent pollutants in storm water discharges and authorized non-storm water discharges through the use of structural or non-structural controls, structures, and management practices that achieve BAT for toxic and non-conventional pollutants and BCT for conventional pollutants.

[7] May be further adjusted in accordance with the Federal Civil Penalties Inflation Adjustment Act

2. Numeric Effluent Limitations (NELs)

Table 1. Numeric Effluent Limitations, Numeric Action Levels, Test Methods, Detection Limits, and Reporting Units

Parameter	Test Method	Discharge Type	Min. Detection Limit	Units	Numeric Action Level	Numeric Effluent Limitation
pH	Field test with calibrated portable instrument	LUP Type 2	0.2	pH units	lower NAL = 6.5 upper NAL = 8.5	N/A
		LUP Type 3			lower NAL = 6.5 upper NAL = 8.5	lower NEL = 6.0 upper NEL = 9.0
Turbidity	EPA 0180.1 and/or field test with calibrated portable instrument	LUP Type 2	1 NTU		250 NTU	N/A
		LUP Type 3			250 NTU	500 NTU

a. Numeric Effluent Limitations (NELs):

i **Storm Event, Daily Average pH Limits –** For LUP Type 3 dischargers, the daily average pH of storm water and non-storm water discharges shall be within the ranges specified in Table 1 during any project phase where there is a "high risk of pH discharge."[8]

ii **Storm Event Daily Average Turbidity Limit –** For LUP Type 3 dischargers, the daily average turbidity of storm water and non-storm water discharges shall not exceed 500 NTU.

[8] A period of high risk of pH discharge is defined as a project's complete utilities phase, complete vertical build phase, and any portion of any phase where significant amounts of materials are placed directly on the land at the site in a manner that could result in significant alterations of the background pH of the discharges.

b. If a daily average sample result is outside the range of pH NELs (i.e., is below the lower NEL for pH or exceeds the upper NEL for pH) or exceeds the turbidity NEL (as listed in Table 1), the discharger is in violation of this General Permit and shall electronically file the results in violation within 5 business days of obtaining the results.

c. Compliance Storm Event:

   Discharges of storm water from LUP Type 3 sites shall comply with applicable NELs (above) unless the storm event causing the discharges is determined after the fact to be equal to or larger than the Compliance Storm Event (expressed in inches of rainfall). The Compliance Storm Event for LUP Type 3 discharges is the 5-year, 24-hour storm (expressed in tenths of an inch of rainfall), as determined by using these maps:

   http://www.wrcc.dri.edu/pcpnfreq/nca5y24.gif
   http://www.wrcc.dri.edu/pcpnfreq/sca5y24.gif

   Compliance storm event verification shall be done by reporting on-site rain gauge readings as well as nearby governmental rain gauge readings.

d. Dischargers shall not be required to comply with NELs if the site receives run-on from a forest fire or any other natural disaster.

3. Numeric Action Levels (NALs)

a. For LUP Type 2 and 3 dischargers, the lower storm event daily average NAL for pH is 6.5 pH units and the upper storm event daily average NAL for pH is 8.5 pH units. The LUP discharger shall take actions as described below if the storm event daily average discharge is outside of this range of pH values.

b. For LUP Type 2 and 3 dischargers, the storm event daily average NAL for turbidity is 250 NTU. The discharger shall take actions as described below if the storm event daily average discharge is outside of this range of turbidity values.

c. Whenever daily average analytical effluent monitoring results indicate that the discharge is below the lower NAL for pH, exceeds the upper NAL for pH, or exceeds the turbidity NAL (as listed in Table 1), the LUP discharger shall conduct a construction site and run-on evaluation to determine whether pollutant source(s) associated with the site's construction activity may have caused or contributed to the NAL exceedance and shall immediately implement corrective actions if they are needed.

d. The site evaluation will be documented in the SWPPP and specifically address whether the source(s) of the pollutants causing the exceedance of the NAL:

i Are related to the construction activities and whether additional BMPs or SWPPP implementation measures are required to (1) meet BAT/BCT requirements; (2) reduce or prevent pollutants in storm water discharges from causing exceedances of receiving water objectives; and (3) determine what corrective action(s) were taken or will be taken and with a description of the schedule for completion.

AND/OR:

ii Are related to the run-on associated with the construction site location and whether additional BMPs or SWPPP implementation measures are required to (1) meet BAT/BCT requirements; (2) reduce or prevent pollutants in storm water discharges from causing exceedances of receiving water objectives; and (3) decide what corrective action(s) were taken or will be taken, including a description of the schedule for completion.

G. RECEIVING WATER LIMITATIONS

1. LUP dischargers shall ensure that storm water discharges and authorized non-storm water discharges to any surface or ground water will not adversely affect human health or the environment.

2. LUP dischargers shall ensure that storm water discharges and authorized non-storm water discharges will not contain pollutants in quantities that threaten to cause pollution or a public nuisance.

3. LUP dischargers shall ensure that storm water discharges and authorized non-storm water discharges will not contain pollutants that cause or contribute to an exceedance of any applicable water quality objectives or water quality standards (collectively, WQS) contained in a Statewide Water Quality Control Plan, the California Toxics Rule, the National Toxics Rule, or the applicable Regional Water Board's Water Quality Control Plan (Basin Plan).

H. TRAINING QUALIFICATIONS

1. General

All persons responsible for implementing requirements of this General Permit shall be appropriately trained. Training should be both formal and informal, occur on an ongoing basis, and should include training offered by recognized governmental agencies or professional organizations. Persons responsible for preparing, amending and certifying SWPPPs shall comply with the requirements in this Section H.

2. SWPPP Certification Requirements

a. **Qualified SWPPP Developer:** The LUP discharger shall ensure that all SWPPPs be written, amended and certified by a Qualified SWPPP Developer (QSD). A QSD shall have one of the following registrations or certifications, and appropriate experience, as required for:

i A California registered professional civil engineer;

ii A California registered professional geologist or engineering geologist;

iii A California registered landscape architect;

iv A professional hydrologist registered through the American Institute of Hydrology;

v A certified professional in erosion and sediment control (CPESC) ™ registered through Enviro Cert International, Inc;

vi A certified professional in storm water quality (CPSWQ)™ registered through Enviro Cert International, Inc.; or

vii A certified professional in erosion and sediment control registered through the National Institute for Certification in Engineering Technologies (NICET).

Effective two years after the adoption date of this General Permit, a QSD shall have attended a State Water Board-sponsored or approved QSD training course.

b. The LUP discharger shall ensure that the SWPPP is written and amended, as needed, to address the specific circumstances for each construction site covered by this General Permit prior to commencement of construction activity for any stage.

c. The LUP discharger shall list the name and telephone number of the currently designated Qualified SWPPP Developer(s) in the SWPPP.

d. **Qualified SWPPP Practitioner:** The LUP discharger shall ensure that all elements of any SWPPP for each project will be implemented by a Qualified SWPPP Practitioner (QSP). A QSP is a person responsible for non-storm water and storm water visual observations, sampling and analysis, and for ensuring full compliance with the permit and implementation of all elements of the SWPPP. Effective two years from the date of adoption of this General Permit, a QSP shall be either a QSD or have one of the following certifications:

   i A certified erosion, sediment and storm water inspector registered through Certified Professional in Erosion and Sediment Control, Inc.; or

   ii A certified inspector of sediment and erosion control registered through Certified Inspector of Sediment and Erosion Control, Inc.

   Effective two years after the adoption date of this General Permit, a QSP shall have attended a State Water Board-sponsored or approved QSP training course.

e. The LUP discharger shall ensure that the SWPPP include a list of names of all contractors, subcontractors, and individuals who will be directed by the Qualified SWPPP Practitioner, and who is ultimately responsible for implementation of the SWPPP. This list shall include telephone numbers and work addresses. Specific areas of responsibility of each subcontractor and emergency contact numbers shall also be included.

f. The LUP discharger shall ensure that the SWPPP and each amendment be signed by the Qualified SWPPP Developer. The LUP discharger shall include a listing of the date of initial preparation and the dates of each amendment in the SWPPP.

I. TYPES OF LINEAR PROJECTS

This attachment establishes three types (Type 1, 2 & 3) of complexity for areas within an LUP or project section based on threat to water quality. Project area Types are determined through Attachment A.1.

The Type 1 requirements below establish the baseline requirements for all LUPs subject to this General Permit. Additional requirements for Type 2 and Type 3 LUPs are labeled.

1. Type 1 LUPs*:*

LUP dischargers with areas of a LUP designated as Type 1 shall comply with the requirements in this Attachment. Type 1 LUPs are:

a. Those construction areas where 70 percent or more of the construction activity occurs on a paved surface and where areas disturbed during construction will be returned to preconstruction conditions or equivalent protection established at the end of the construction activities for the day; or

b. Where greater than 30 percent of construction activities occur within the non-paved shoulders or land immediately adjacent to paved surfaces, or where construction occurs on unpaved improved roads, including their shoulders or land immediately adjacent to them where:

   i Areas disturbed during construction will be returned to preconstruction conditions or equivalent protection is established at the end of the construction activities for the day to minimize the potential for erosion and sediment deposition, and

   ii Areas where established vegetation was disturbed during construction will be stabilized and re-vegetated by the end of project. When required, adequate temporary stabilization BMPs will be installed and maintained until vegetation is established to meet minimum cover requirements established in this General Permit for final stabilization.

c. Where the risk determination is as follows:

   i Low sediment risk, low receiving water risk, or

   ii Low sediment risk, medium receiving water risk, or

   iii Medium sediment risk, low receiving water risk

2. **Type 2 LUPs**:

Type 2 LUPs are determined by the Combined Risk Matrix in Attachment A.1. Type 2 LUPs have the specified combination of risk:

d. High sediment risk, low receiving water risk, or

e. Medium sediment risk, medium receiving water risk, or

f. Low sediment risk, high receiving water risk

Receiving water risk is either considered "Low" for those areas of the project that are not in close proximity to a sensitive receiving watershed, "Medium" for those areas of the project within a sensitive receiving watershed yet outside of the flood plain of a sensitive receiving water body, and "High" where the soil disturbance is within close proximity to a sensitive receiving water body. Project sediment risk is calculated based on the Risk Factor Worksheet in Attachment C of this General Permit.

3. **Type 3 LUPs:**

Type 3 LUPs are determined by the Combined Risk Matrix in Attachment A.1. Type 3 LUPs have the specified combination of risk:

a. High sediment risk, high receiving water risk, or

b. High sediment risk, medium receiving water risk, or

c. Medium sediment risk, high receiving water risk

Receiving water risk is either considered "Medium" for those areas of the project within a sensitive receiving watershed yet outside of the flood plain of a sensitive receiving water body, or "High" where the soil disturbance is within close proximity to a sensitive receiving water body. Project sediment risk is calculated based on the Risk Factor Worksheet in Attachment C.

J. LUP TYPE-SPECIFIC REQUIREMENTS

1. Effluent Standards

a. Narrative – LUP dischargers shall comply with the narrative effluent standards below.

i Storm water discharges and authorized non-storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

ii LUP dischargers shall minimize or prevent pollutants in storm water discharges and authorized non-storm water discharges through the use of controls, structures, and management practices that achieve BAT for toxic and non-conventional pollutants and BCT for conventional pollutants.

b. Numeric – LUP Type 1 dischargers are not subject to a numeric effluent standard

c. Numeric –LUP Type 2 dischargers are subject to a pH NAL of 6.5-8.5, and a turbidity NAL of 250 NTU.

d. Numeric – LUP Type 3 dischargers are subject to a pH NAL of 6.5-8.5, and a turbidity NAL of 250 NTU. In addition, LUP Type 3 dischargers are subject to a pH NEL of 6.0-9.0 and a turbidity NEL of 500 NTU.

2. Good Site Management "Housekeeping"

a. LUP dischargers shall implement good site management (i.e., "housekeeping") measures for construction materials that could potentially be a threat to water quality if discharged. At a minimum, the good housekeeping measures shall consist of the following:

i Identify the products used and/or expected to be used and the end products that are produced and/or expected to be produced. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

ii Cover and berm loose stockpiled construction materials that are not actively being used (i.e. soil, spoils, aggregate, fly-ash, stucco, hydrated lime, etc.).

iii Store chemicals in watertight containers (with appropriate secondary containment to prevent any spillage or leakage) or in a storage shed (completely enclosed).

iv Minimize exposure of construction materials to precipitation (not applicable to materials designed to be outdoors and exposed to the environment).

v Implement BMPs to control the off-site tracking of loose construction and landscape materials.

b. LUP dischargers shall implement good housekeeping measures for <u>waste management</u>, which, at a minimum, shall consist of the following:

i Prevent disposal of any rinse or wash waters or materials on impervious or pervious site surfaces or into the storm drain system.

ii Ensure the containment of sanitation facilities (e.g., portable toilets) to prevent discharges of pollutants to the storm water drainage system or receiving water.

iii Clean or replace sanitation facilities and inspecting them regularly for leaks and spills.

iv Cover waste disposal containers at the end of every business day and during a rain event.

v Prevent discharges from waste disposal containers to the storm water drainage system or receiving water.

vi Contain and securely protect stockpiled waste material from wind and rain at all times unless actively being used.

vii Implement procedures that effectively address hazardous and non-hazardous spills.

viii Develop a spill response and implementation element of the SWPPP prior to commencement of construction activities. The SWPPP shall require that:

(1) Equipment and materials for cleanup of spills shall be available on site and that spills and leaks shall be cleaned up immediately and disposed of properly; and

(2) Appropriate spill response personnel are assigned and trained.

ix Ensure the containment of concrete washout areas and other washout areas that may contain additional pollutants so there is no discharge into the underlying soil and onto the surrounding areas.

c. LUP dischargers shall implement good housekeeping for vehicle storage and maintenance, which, at a minimum, shall consist of the following:

i Prevent oil, grease, or fuel from leaking into the ground, storm drains or surface waters.

ii Implement appropriate BMPs whenever equipment or vehicles are fueled, maintained or stored.

iii Clean leaks immediately and disposing of leaked materials properly.

d. LUP dischargers shall implement good housekeeping for landscape materials, which, at a minimum, shall consist of the following:

i Contain stockpiled materials such as mulches and topsoil when they are not actively being used.

ii Contain fertilizers and other landscape materials when they are not actively being used.

iii Discontinue the application of any erodible landscape material at least 2 days before a forecasted rain event[9] or during periods of precipitation.

iv Applying erodible landscape material at quantities and application rates according to manufacture recommendations or based on written specifications by knowledgeable and experienced field personnel.

v Stacking erodible landscape material on pallets and covering or storing such materials when not being used or applied.

e. LUP dischargers shall conduct an assessment and create a list of potential pollutant sources and identify any areas of the site where additional BMPs are necessary to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges. This potential pollutant list shall be kept with the SWPPP and shall identify all non-visible pollutants which are known, or should be known, to occur on the construction site. At a minimum, when developing BMPs, LUP dischargers shall do the following:

[9] 50% or greater chance of producing precipitation.

i Consider the quantity, physical characteristics (e.g., liquid, powder, solid), and locations of each potential pollutant source handled, produced, stored, recycled, or disposed of at the site.

ii Consider the degree to which pollutants associated with those materials may be exposed to and mobilized by contact with storm water.

iii Consider the direct and indirect pathways that pollutants may be exposed to storm water or authorized non-storm water discharges. This shall include an assessment of past spills or leaks, non-storm water discharges, and discharges from adjoining areas.

iv Ensure retention of sampling, visual observation, and inspection records.

v Ensure effectiveness of existing BMPs to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges.

f. LUP dischargers shall implement good housekeeping measures on the construction site to control the air deposition of site materials and from site operations.

3. Non-Storm Water Management

a. LUP dischargers shall implement measures to control all non-storm water discharges during construction.

b. LUP dischargers shall wash vehicles in such a manner as to prevent non-storm water discharges to surface waters or MS4 drainage systems.

c. LUP dischargers shall clean streets in such a manner as to prevent unauthorized non-storm water discharges from reaching surface water or MS4 drainage systems.

4. Erosion Control

a. LUP dischargers shall implement effective wind erosion control.

b. LUP dischargers shall provide effective soil cover for inactive[10] areas and all finished slopes, and utility backfill.

[10] Areas of construction activity that have been disturbed and are not scheduled to be re-disturbed for at least 14 days

c. LUP dischargers shall limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist. Where plastic materials are deemed necessary, the discharger shall consider the use of plastic materials resistant to solar degradation.

5. Sediment Controls

a. LUP dischargers shall establish and maintain effective perimeter controls as needed, and implement effective BMPs for all construction entrances and exits to sufficiently control erosion and sediment discharges from the site.

b. On sites where sediment basins are to be used, LUP dischargers shall, at minimum, design sediment basins according to the guidance provided in CASQA's Construction BMP Handbook.

c. **Additional LUP Type 2 & 3 Requirement:** LUP Type 2 & 3 dischargers shall apply linear sediment controls along the toe of the slope, face of the slope, and at the grade breaks of exposed slopes to comply with sheet flow lengths[11] in accordance with Table 2 below.

Table 2 – Critical Slope/Sheet Flow Length Combinations

Slope Percentage	Sheet flow length not to exceed
0-25% 20	feet
25-50% 15	feet
Over 50%	10 feet

d. **Additional LUP Type 2 & 3 Requirement:** LUP Type 2 & 3 dischargers shall ensure that construction activity traffic to and from the project is limited to entrances and exits that employ effective controls to prevent off-site tracking of sediment.

e. **Additional LUP Type 2 & 3 Requirement:** LUP Type 2 & 3 dischargers shall ensure that all storm drain inlets and perimeter controls, runoff control BMPs, and pollutant controls at entrances and exits (e.g. tire washoff locations) are maintained and protected from activities that reduce their effectiveness.

f. **Additional LUP Type 2 & 3 Requirement:** LUP Type 2 & 3 dischargers shall inspect all immediate access roads. At a minimum daily and prior to any rain event, the discharger shall remove any

[11] Sheet flow length is the length that shallow, low velocity flow travels across a site.

sediment or other construction activity-related materials that are deposited on the roads (by vacuuming or sweeping).

g. **Additional LUP Type 3 Requirement:** The Regional Water Board may require LUP Type 3 dischargers to implement additional site-specific sediment control requirements if the implementation of the other requirements in this section are not adequately protecting the receiving waters.

6. Run-on and Run-off Controls

a. LUP dischargers shall effectively manage all run-on, all runoff within the site and all runoff that discharges off the site. Run-on from off site-shall be directed away from all disturbed areas or shall collectively be in compliance with the effluent limitations in this Attachment.

b. Run-on and runoff controls are not required for Type 1 LUPs unless the evaluation of quantity and quality of run-on and runoff deems them necessary or visual inspections show that the site requires such controls.

7. Inspection, Maintenance and Repair

a. All inspection, maintenance repair and sampling activities at the discharger’s LUP location shall be performed or supervised by a QSP representing the discharger. The QSP may delegate any or all of these activities to an employee trained to do the task(s) appropriately, but shall ensure adequate deployment.

b. LUP dischargers shall conduct visual inspections and observations daily during working hours (not recorded). At least once each 24-hour period during extended storm events, **LUP Type 2 & 3 dischargers** shall conduct visual inspections to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Inspectors shall be the QSP or be trained by the QSP.

c. Upon identifying failures or other shortcomings, as directed by the QSP, LUP dischargers shall begin implementing repairs or design changes to BMPs within 72 hours of identification and complete the changes as soon as possible.

d. For each pre- and post-rain event inspection required, LUP dischargers shall complete an inspection checklist, using a form provided by the State Water Board or Regional Water Board or in an alternative format that includes the information described below.

e. The LUP discharger shall ensure that the checklist remains on-site or with the SWPPP. At a minimum, an inspection checklist should include:

   i Inspection date and date the inspection report was written.

   ii Weather information, including presence or absence of precipitation, estimate of beginning of qualifying storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall in inches.

   iii Site information, including stage of construction, activities completed, and approximate area of the site exposed.

   iv A description of any BMPs evaluated and any deficiencies noted.

   v If the construction site is safely accessible during inclement weather, list the observations of all BMPs: erosion controls, sediment controls, chemical and waste controls, and non-storm water controls. Otherwise, list the results of visual inspections at all relevant outfalls, discharge points, downstream locations and any projected maintenance activities.

   vi Report the presence of noticeable odors or of any visible sheen on the surface of any discharges.

   vii Any corrective actions required, including any necessary changes to the SWPPP and the associated implementation dates.

   viii Photographs taken during the inspection, if any.

   ix Inspector’s name, title, and signature.

K. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS

1. Objectives

SWPPPs for all LUPs shall be developed and amended or revised by a QSD. The SWPPP shall be designed to address the following objectives:

a. All pollutants and their sources, including sources of sediment, associated with construction activities associated with LUP activity are controlled;

b. All non-storm water discharges are identified and either eliminated, controlled, or treated;

c. BMPs are effective and result in the reduction or elimination of pollutants in storm water discharges and authorized non-storm water discharges from LUPs during construction; and

d. Stabilization BMPs installed to reduce or eliminate pollutants after construction is completed are effective and maintained.

2. SWPPP Implementation Schedule

a. LUPs for which PRDs have been submitted to the State Water Board shall develop a site/project location SWPPP prior to the start of land-disturbing activity in accordance with this Section and shall implement the SWPPP concurrently with commencement of soil-disturbing activities.

b. For an ongoing LUP involving a change in the LRP, the new LRP shall review the existing SWPPP and amend it, if necessary, or develop a new SWPPP within 15 calendar days to conform to the requirements set forth in this General Permit.

3. Availability

The SWPPP shall be available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, copies of the BMPs and map/drawing will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone.

L. REGIONAL WATER BOARD AUTHORITIES

1. Regional Water Boards shall administer the provisions of this General Permit. Administration of this General Permit may include, but is not limited to, requesting the submittal of SWPPPs, reviewing SWPPPs, reviewing monitoring and sampling and analysis reports, conducting compliance inspections, gathering site information by any medium including sampling, photo and video documentation, and taking enforcement actions.

2. Regional Water Boards may terminate coverage under this General Permit for dischargers who fail to comply with its requirements or where they determine that an individual NPDES permit is appropriate.

3. Regional Water Boards may issue separate permits for discharges of storm water associated with construction activity to individual dischargers, categories of dischargers, or dischargers in a geographic area. Upon issuance of such permits by a Regional Water Board, dischargers subject to those permits shall no longer be regulated by this General Permit.

4. Regional Water Boards may direct the discharger to reevaluate the LUP Type(s) for the project (or elements/areas of the project) and impose the appropriate level of requirements.

5. Regional Water Boards may terminate coverage under this General Permit for dischargers who negligently or with willful intent incorrectly determine or report their LUP Type (e.g., they determine themselves to be a LUP Type 1 when they are actually a Type 2).

6. Regional Water Boards may review PRDs and reject or accept applications for permit coverage or may require dischargers to submit a Report of Waste Discharge / NPDES permit application for Regional Water Board consideration of individual requirements.

7. Regional Water Boards may impose additional requirements on dischargers to satisfy TMDL implementation requirements or to satisfy provisions in their Basin Plans.

8. Regional Water Boards may require additional Monitoring and Reporting Program Requirements, including sampling and analysis of discharges to sediment-impaired water bodies.

9. Regional Water Boards may require dischargers to retain records for more than the three years required by this General Permit.

10. Based on an LUP's threat to water quality and complexity, the Regional Water Board may determine on a case-by-case basis that an LUP, or a portion of an LUP, is not eligible for the linear project requirements contained in this Attachment, and require that the discharger comply with all standard requirements in this General Permit.

11. The Regional Water Board may require additional monitoring and reporting program requirements including sampling and analysis of discharges to CWA § 303(d)-listed water bodies. Additional requirements imposed by the Regional Water Board shall be consistent with the overall monitoring effort in the receiving waters.

M. MONITORING AND REPORTING REQUIREMENTS

Table 3. LUP Summary of Monitoring Requirements

LUP Type	Visual Inspections				Sample Collection		
	Daily Site BMP	Pre-storm Event: Baseline	Daily Storm BMP	Post Storm	Storm Water Discharge	Receiving Water	Non-Visible (when applicable)
1	X						x
2	X	X	X	X	X		x
3	X	X	X	X	X	X	x

1. Objectives

LUP dischargers shall prepare a monitoring and reporting program (M&RP) prior to the start of construction and immediately implement the program at the start of construction for LUPs. The monitoring program must be implemented at the appropriate level to protect water quality at all times throughout the life of the project. The M&RP must be a part of the SWPPP, included as an appendix or separate SWPPP chapter.

2. M&RP Implementation Schedule

a. LUP dischargers shall implement the requirements of this Section at the time of commencement of construction activity. LUP dischargers are responsible for implementing these requirements until construction activity is complete and the site is stabilized.

b. LUP dischargers shall revise the M&RP when:

i Site conditions or construction activities change such that a change in monitoring is required to comply with the requirements and intent of this General Permit.

ii The Regional Water Board requires the discharger to revise its M&RP based on its review of the document. Revisions may include, but not be limited to, conducting additional site inspections, submitting reports, and certifications. Revisions shall be submitted via postal mail or electronic e-mail.

iii The Regional Water Board may require additional monitoring and reporting program requirements including sampling and analysis of discharges to CWA § 303(d)-listed water bodies. Additional requirements imposed by the Regional Water Board shall be consistent with the overall monitoring effort in the receiving waters.

3. LUP Type 1 Monitoring and Reporting Requirements

a. LUP Type 1 Inspection Requirements

i LUP Type 1 dischargers shall ensure that all inspections are conducted by trained personnel. The name(s) and contact number(s) of the assigned inspection personnel should be listed in the SWPPP.

ii LUP Type 1 dischargers shall ensure that all visual inspections are conducted daily during working hours and in conjunction with other daily activities in areas where active construction is occurring.

iii LUP Type 1 dischargers shall ensure that photographs of the site taken before, during, and after storm events are taken during inspections, and submitted through the State Water Board's SMARTS website once every three rain events.

iv LUP Type 1 dischargers shall conduct daily visual inspections to verify that:

(1) Appropriate BMPs for storm water and non-storm water are being implemented in areas where active construction is occurring (including staging areas);

(2) Project excavations are closed, with properly protected spoils, and that road surfaces are cleaned of excavated material and construction materials such as chemicals by either removing or storing the material in protective storage containers at the end of every construction day;

(3) Land areas disturbed during construction are returned to pre-construction conditions or an equivalent protection is used at the end of each workday to eliminate or minimize erosion and the possible discharge of sediment or other pollutants during a rain event.

v Inspections may be discontinued in non-active construction areas where soil-disturbing activities are completed and final soil stabilization is achieved (e.g., paving is completed, substructures are installed, vegetation meets minimum cover requirements for final stabilization, or other stabilization requirements are met).

vi Inspection programs are required for LUP Type 1 projects where temporary and permanent stabilization BMPs are installed and are to be monitored after active construction is completed. Inspection activities shall continue until adequate permanent stabilization is established and, in areas where re-vegetation is chosen, until minimum vegetative coverage is established in accordance with Section C.1 of this Attachment.

b. <u>LUP Type 1 Monitoring Requirements for Non-Visible Pollutants</u>

LUP Type 1 dischargers shall implement sampling and analysis requirements to monitor non-visible pollutants associated with (1) construction sites; (2) activities producing pollutants that are not visually detectable in storm water discharges; and (3) activities which could cause or contribute to an exceedance of water quality objectives in the receiving waters.

i Sampling and analysis for non-visible pollutants is only required where the LUP Type 1 discharger believes pollutants associated with construction activities have the potential to be discharged with storm water runoff due to a spill or in the event there was a breach, malfunction, failure and/or leak of any BMP. Also, failure to implement BMPs may require sample collection.

(1) Visual observations made during the monitoring program described above will help the LUP Type 1 discharger determine when to collect samples.

(2) The LUP Type 1 discharger is not required to sample if one of the conditions described above (e.g., breach or spill) occurs and the site is cleaned of material and pollutants and/or BMPs are implemented prior to the next storm event.

ii LUP Type 1 dischargers shall collect samples down-gradient from all discharge locations where the visual observations were made triggering the monitoring, and which can be safely accessed. For sites where sampling and analysis is required, personnel trained in water quality sampling procedures shall collect storm water samples.

iii If sampling for non-visible pollutant parameters is required, LUP Type 1 dischargers shall ensure that samples be analyzed for parameters indicating the presence of pollutants identified in the pollutant source assessment required in Section J.2.a.i.

iv LUP Type 1 dischargers shall collect samples during the first two hours of discharge from rain events that occur during business hours and which generate runoff.

v LUP Type 1 dischargers shall ensure that a sufficiently large sample of storm water that has not come into contact with the disturbed soil or the materials stored or used on-site (uncontaminated sample[12]) will be collected for comparison with the discharge sample. Samples shall be collected during the first two hours of discharge from rain events that occur during daylight hours and which generate runoff.

vi LUP Type 1 dischargers shall compare the uncontaminated sample to the samples of discharge using field analysis or through laboratory analysis. Analyses may include, but are not limited to, indicator parameters such as: pH, specific conductance, dissolved oxygen, conductivity, salinity, and Total Dissolved Solids (TDS).

vii For laboratory analyses, all sampling, sample preservation, and other analyses must be conducted according to test procedures pursuant to 40 C.F.R. Part 136. LUP Type 1 dischargers shall ensure that field samples are collected and analyzed according to manufacturer specifications of the sampling devices employed. Portable meters shall be calibrated according to manufacturer’s specification.

viii LUP Type 1 dischargers shall ensure that all field and/or analytical data are kept in the SWPPP document.

c. <u>LUP Type 1 Visual Observation Exceptions</u>

i LUP Type 1 dischargers shall be prepared to collect samples and conduct visual observation (inspections) to meet the minimum visual observation requirements of this Attachment. The Type 1 LUP discharger is not required to physically collect samples or conduct visual observation (inspections) under the following conditions:

(1) During dangerous weather conditions such as flooding and electrical storms;

(2) Outside of scheduled site business hours.

(3) When access to the site is unsafe due to storm events.

[12] Sample collected at a location unaffected by contruction activities.

ii If the LUP Type 1 discharger does not collect the required samples or visual observation (inspections) due to these exceptions, an explanation why the sampling or visual observation (inspections) were not conducted shall be included in both the SWPPP and the Annual Report.

d. Particle Size Analysis for Risk Justification

LUP Type 1 dischargers utilizing justifying an alternative project risk shall report a soil particle size analysis used to determine the RUSLE K-Factor. ASTM D-422 (Standard Test Method for Particle-Size Analysis of Soils), as revised, shall be used to determine the percentages of sand, very fine sand, silt, and clay on the site.

4. LUP Type 2 & 3 Monitoring and Reporting Requirements

a. LUP Type 2 & 3 Inspection Requirements

i LUP Type 2 & 3 dischargers shall ensure that all inspections are conducted by trained personnel. The name(s) and contact number(s) of the assigned inspection personnel should be listed in the SWPPP.

ii LUP Type 2 & 3 dischargers shall ensure that all visual inspections are conducted daily during working hours and in conjunction with other daily activities in areas where active construction is occurring.

iii LUP Type 2 & 3 dischargers shall ensure that photographs of the site taken before, during, and after storm events are taken during inspections, and submitted through the State Water Board's SMARTS website once every three rain events.

iv LUP Type 2 & 3 dischargers shall conduct daily visual inspections to verify that appropriate BMPs for storm water and non-storm water are being implemented and in place in areas where active construction is occurring (including staging areas).

v LUP Type 2 & 3 dischargers shall conduct inspections of the construction site prior to anticipated storm events, during extended storm events, and after actual storm events to identify areas contributing to a discharge of storm water associated with construction activity. Pre-storm inspections are to ensure that BMPs are properly installed and maintained; post-storm inspections are to assure that BMPs have functioned adequately. During extended storm events, inspections shall be required during normal working hours for each 24-hour period.

vi Inspections may be discontinued in non-active construction areas where soil-disturbing activities are completed and final soil stabilization is achieved (e.g., paving is completed, substructures are installed, vegetation meets minimum cover requirements for final stabilization, or other stabilization requirements are met).

vii LUP Type 2 & 3 dischargers shall implement a monitoring program for inspecting projects that require temporary and permanent stabilization BMPs after active construction is complete. Inspections shall ensure that the BMPs are adequate and maintained. Inspection activities shall continue until adequate permanent stabilization is established and, in vegetated areas, until minimum vegetative coverage is established in accordance with Section C.1 of this Attachment.

viii If possible, LUP Type 2 & 3 dischargers shall install a rain gauge on-site at an accessible and secure location with readings made during all storm event inspections. When readings are unavailable, data from the closest rain gauge with publically available data may be used.

ix LUP Type 2 & 3 dischargers shall Include and maintain a log of the inspections conducted in the SWPPP. The log will provide the date and time of the inspection and who conducted the inspection.

b. LUP Type 2 & 3 Storm Water Effluent Monitoring Requirements

Table 4. LUP Type 2 & 3 Effluent Monitoring Requirements

LUP Type	Frequency	Effluent Monitoring
2	Minimum of 3 samples per day characterizing discharges associated with construction activity from the project active areas of construction.	Turbidity, pH, and non-visible pollutant parameters (if applicable)
3	Minimum of 3 samples per day characterizing discharges associated with construction activity from the project active areas of construction.	turbidity, pH, suspended sediment concentrations (SSC)[13] (only if turbidity NEL exceeded), plus non-visible pollutant parameters (if applicable)

i LUP Type 2 & 3 dischargers shall collect storm water grab samples from sampling locations characterizing discharges associated with

[13] Suspended Sediment Concentration monitoring is required for any Type 3 area that exceeds its turbidity NEL.

activity from the LUP active areas of construction. At a minimum, 3 samples shall be collected per day of discharge.

ii LUP Type 2 & 3 dischargers shall collect samples of stored or contained storm water that is discharged subsequent to a storm event producing precipitation of ½ inch or more at the time of discharge.

iii LUP Type 2 & 3 dischargers shall ensure that storm water grab sample(s) obtained be representative of the flow and characteristics of the discharge.

iv LUP Type 2 & 3 dischargers shall analyze their effluent samples for:

(1) pH and turbidity
(2) Any additional parameter for which monitoring is required by the Regional Water Board.

v LUP Type 3 dischargers that have violated the turbidity daily average NEL shall analyze subsequent effluent samples for turbidity and SSC.

c. <u>LUP Type 2 & 3 Storm Water Effluent Sampling Locations</u>

i LUP Type 2 & 3 dischargers shall perform sampling and analysis of storm water discharges to characterize discharges associated with construction activity from the entire disturbed project or area.

ii LUP Type 2 & 3 dischargers may monitor and report run-on from surrounding areas if there is reason to believe run-on may contribute to exceedance of NALs or NELs (applicable to Type 3).

iii LUP Type 2 & 3 dischargers shall select analytical test methods from the list provided in Table 5 below.

iv LUP Type 2 & 3 dischargers shall ensure that all storm water sample collection preservation and handling shall be conducted in accordance with the “Storm Water Sample Collection and Handling Instructions” below.

d. <u>LUP Type 3 Receiving Water Monitoring Requirements</u>

i In the event that an LUP Type 3 discharger violates an applicable NEL contained in this General Permit and has a direct discharge to receiving waters, the LUP discharger shall subsequently sample Receiving Waters (RWs) for turbidity, pH (if applicable) and SSC.

ii LUP Type 3 dischargers that meet the project criteria in Appendix 3 of this General Permit and have more than 30 acres of soil disturbance in the project area or project section area designated as Type 3, shall comply with the Bioassessment requirements prior to commencement of construction activity.

iii LUP Type 3 dischargers shall obtain RW samples in accordance with the requirements of the Receiving Water Sampling Locations section (Section M.4.d of this Attachment).

e. <u>LUP Type 3 Receiving Water Sampling Locations</u>

i **Upstream/up-gradient RW samples**: LUP Type 3 dischargers shall obtain any required upstream/up-gradient receiving water samples from a representative and accessible location as close as possible to and upstream from the effluent discharge point.

ii **Downstream/down-gradient RW samples**: LUP Type 3 dischargers shall obtain any required downstream/down-gradient receiving water samples from a representative and accessible location as close as possible to and downstream from the effluent discharge point.

iii If two or more discharge locations discharge to the same receiving water, LUP Type 3 dischargers may sample the receiving water at a single upstream and downstream location.

f. <u>LUP Type 2 & 3 Monitoring Requirements for Non-Visible Pollutants</u>

LUP Type 2 & 3 dischargers shall implement sampling and analysis requirements to monitor non-visible pollutants associated with (1) construction sites; (2) activities producing pollutants that are not visually detectable in storm water discharges; and (3) activities which could cause or contribute to an exceedance of water quality objectives in the receiving waters.

i Sampling and analysis for non-visible pollutants is only required where LUP Type 2 & 3 dischargers believe pollutants associated with construction activities have the potential to be discharged with storm water runoff due to a spill or in the event there was a breach, malfunction, failure and/or leak of any BMP. Also, failure to implement BMPs may require sample collection.

(1) Visual observations made during the monitoring program described above will help LUP Type 2 & 3 dischargers determine when to collect samples.

(2) LUP Type 2 & 3 dischargers are not required to sample if one of the conditions described above (e.g., breach or spill) occurs and the site is cleaned of material and pollutants and/or BMPs are implemented prior to the next storm event.

ii LUP Type 2 & 3 dischargers shall collect samples down-gradient from the discharge locations where the visual observations were made triggering the monitoring and which can be safely accessed. For sites where sampling and analysis is required, personnel trained in water quality sampling procedures shall collect storm water samples.

iii If sampling for non-visible pollutant parameters is required, LUP Type 2 & 3 dischargers shall ensure that samples be analyzed for parameters indicating the presence of pollutants identified in the pollutant source assessment required in Section J.2.a.i.

iv LUP Type 2 & 3 dischargers shall collect samples during the first two hours of discharge from rain events that occur during business hours and which generate runoff.

v LUP Type 2 & 3 dischargers shall ensure that a sufficiently large sample of storm water that has not come into contact with the disturbed soil or the materials stored or used on-site (uncontaminated sample[14]) will be collected for comparison with the discharge sample. Samples shall be collected during the first two hours of discharge from rain events that occur during daylight hours and which generate runoff.

vi LUP Type 2 & 3 dischargers shall compare the uncontaminated sample to the samples of discharge using field analysis or through laboratory analysis. Analyses may include, but are not limited to, indicator parameters such as: pH, specific conductance, dissolved oxygen, conductivity, salinity, and Total Dissolved Solids (TDS).

vii For laboratory analyses, all sampling, sample preservation, and other analyses must be conducted according to test procedures pursuant to 40 C.F.R. Part 136. LUP Type 2 & 3 dischargers shall ensure that field samples are collected and analyzed according to manufacturer specifications of the sampling devices employed. Portable meters shall be calibrated according to manufacturer's specification.

viii LUP Type 2 & 3 dischargers shall ensure that all field and/or analytical data are kept in the SWPPP document.

[14] Sample collected at a location unaffected by construction activities

g. <u>LUP Type 2 & 3 Visual Observation and Sample Collection Exceptions</u>

i LUP Type 2 & 3 dischargers shall be prepared to collect samples and conduct visual observation (inspections) to meet the minimum visual observation requirements of this Attachment. Type 2 & 3 LUP dischargers are not required to physically collect samples or conduct visual observation (inspections) under the following conditions:

(1) During dangerous weather conditions such as flooding and electrical storms;

(2) Outside of scheduled site business hours.

(3) When access to the site is unsafe due to storm events.

ii If the LUP Type 2 or 3 discharger does not collect the required samples or visual observation (inspections) due to these exceptions, an explanation why the sampling or visual observation (inspections) were not conducted shall be included in both the SWPPP and the Annual Report.

h. <u>LUP Type 2 & 3 Storm Water Sample Collection and Handling Instructions</u>

LUP Type 2 & 3 dischargers shall refer to Table 5 below for test Methods, detection Limits, and reporting Units. During storm water sample collection and handling, the LUP Type 2 & 3 discharger shall:

i Identify the parameters required for testing and the number of storm water discharge points that will be sampled. Request the laboratory to provide the appropriate number of sample containers, types of containers, sample container labels, blank chain of custody forms, and sample preservation instructions.

ii Determine how to ship the samples to the laboratory. The testing laboratory should receive samples within 48 hours of the physical sampling (unless otherwise required by the laboratory). The options are to either deliver the samples to the laboratory, arrange to have the laboratory pick them up, or ship them overnight to the laboratory.

iii Use only the sample containers provided by the laboratory to collect and store samples. Use of any other type of containers could contaminate your samples.

iv Prevent sample contamination, by not touching, or putting anything into the sample containers before collecting storm water samples.

v Not overfilling sample containers. Overfilling can change the analytical results.

vi Tightly screw the cap of each sample container without stripping the threads of the cap.

vii Complete and attach a label to each sample container. The label shall identify the date and time of sample collection, the person taking the sample, and the sample collection location or discharge point. The label should also identify any sample containers that have been preserved.

viii Carefully pack sample containers into an ice chest or refrigerator to prevent breakage and maintain temperature during shipment. Remember to place frozen ice packs into the shipping container. Samples should be kept as close to 4° C (39° F) as possible until arriving at the laboratory. Do not freeze samples.

ix Complete a Chain of Custody form for each set of samples. The Chain of Custody form shall include the discharger's name, address, and phone number, identification of each sample container and sample collection point, person collecting the samples, the date and time each sample container was filled, and the analysis that is required for each sample container.

x Upon shipping/delivering the sample containers, obtain both the signatures of the persons relinquishing and receiving the sample containers.

xi Designate and train personnel to collect, maintain, and ship samples in accordance with the above sample protocols and good laboratory practices.

xii Refer to the Surface Water Ambient Monitoring Program's (SWAMP) Quality Assurance Management Plan (QAMP) for more information on sampling collection and analysis. See http://www.waterboards.ca.gov/water_issues/programs/swamp/[15]
QAMP Link:
http://www.waterboards.ca.gov/water_issues/programs/swamp/qamp.shtml

[15] Additional information regarding QAMP can be found at http://mpsl.mlml.calstate.edu/swqacompare.htm.

Table 5. Test Methods, Detection Limits, Reporting Units and Applicable NALs/NELs

Parameter	Test Method	Discharge Type	Min. Detection Limit	Reporting Units	Numeric Action Levels	Numeric Effluent Limitation (LUP Type 3)
pH	Field test with calibrated portable instrument	Type 2 & 3	0.2	pH units	Lower = 6.5 upper = 8.5	Lower = 6.0 upper = 9.0
Turbidity	EPA 0180.1 and/or field test with calibrated portable instrument	Type 2 & 3	1	NTU	250 NTU	500 NTU
SSC	ASTM Method D 3977-97[16]	Type 3 if NEL is exceeded	5 Mg/L		N/A	N/A
Bioassessment	(STE) Level I of (SAFIT),[17] fixed-count of 600 org/sample	Type 3 LUPs > 30 acres	N/A N/A		N/A	N/A

i. <u>LUP Type 2 & 3 Monitoring Methods</u>

i The LUP Type 2 or 3 discharger's project M&RP shall include a description of the following items:

(1) Visual observation locations, visual observation procedures, and visual observation follow-up and tracking procedures.

(2) Sampling locations, and sample collection and handling procedures. This shall include detailed procedures for sample collection, storage, preservation, and shipping to the testing lab to assure that consistent quality control and quality assurance is maintained. Dischargers shall attach to the monitoring program a copy of the Chain of Custody form used when handling and shipping samples.

[16] ASTM, 1999, Standard Test Method for Determining Sediment Concentration in Water Samples: American Society of Testing and Materials, D 3977-97, Vol. 11.02, pp. 389-394

[17] The current SAFIT STEs (28 November 2006) list requirements for both the Level I and Level II taxonomic effort, and are located at: http://www.swrcb.ca.gov/swamp/docs/safit/ste_list.pdf. When new editions are published by SAFIT, they will supersede all previous editions. All editions will be posted at the State Water Board's SWAMP website.

(3) Identification of the analytical methods and related method detection limits (if applicable) for each parameter required in Section M.4.f above.

ii LUP Type 2 & 3 dischargers shall ensure that all sampling and sample preservation be in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association). All monitoring instruments and equipment (including a discharger's own field instruments for measuring pH and turbidity) shall be calibrated and maintained in accordance with manufacturers' specifications to ensure accurate measurements. All laboratory analyses shall be conducted according to test procedures under 40 CFR Part 136, unless other test procedures have been specified in this General Permit or by the Regional Water Board. With the exception of field analysis conducted by the discharger for turbidity and pH, all analyses shall be sent to and conducted at a laboratory certified for such analyses by the State Department of Health Services (SSC exception). The LUP discharger shall conduct its own field analysis of pH and may conduct its own field analysis of turbidity if the discharger has sufficient capability (qualified and trained employees, properly calibrated and maintained field instruments, etc.) to adequately perform the field analysis.

j. <u>LUP Type 2 & 3 Analytical Methods</u>

LUP Type 2 & 3 dischargers shall refer to Table 5 above for test Methods, detection Limits, and reporting Units.

i **pH**: LUP Type 2 & 3 dischargers shall perform pH analysis on-site with a calibrated pH meter or pH test kit. The LUP discharger shall record pH monitoring results on paper and retain these records in accordance with Section M.4.o, below.

ii **Turbidity**: LUP Type 2 & 3 dischargers shall perform turbidity analysis using a calibrated turbidity meter (turbidimeter), either on-site or at an accredited lab. Acceptable test methods include Standard Method 2130 or USEPA Method 180.1. The results shall be recorded in the site log book in Nephelometric Turbidity Units (NTU).

iii **Suspended sediment concentration (SSC)**: LUP Type 3 dischargers exceeding their NEL, shall perform SSC analysis using ASTM Method D3977-97.

iv **Bioassessment**: LUP Type 3 dischargers shall perform bioassessment sampling and analysis according to Appendix 3 of this General Permit.

k. Watershed Monitoring Option

If an LUP Type 2 or 3 discharger is part of a qualified regional watershed-based monitoring program the LUP Type 2 or 3 discharger may be eligible for relief from the monitoring requirements in this Attachment. The Regional Water Board may approve proposals to substitute an acceptable watershed-based monitoring program if it determines that the watershed-based monitoring program will provide information to determine each discharger's compliance with the requirements of this General Permit.

l. Particle Size Analysis for Risk Justification

LUP Type 2 & 3 dischargers justifying an alternative project risk shall report a soil particle size analysis used to determine the RUSLE K-Factor. ASTM D-422 (Standard Test Method for Particle-Size Analysis of Soils), as revised, shall be used to determine the percentages of sand, very fine sand, silt, and clay on the site.

m. NAL Exceedance Report

i In the event that any effluent sample exceeds an applicable NAL, the Regional Water Boards may require LUP Type 2 & 3 dischargers to submit NAL Exceedance Reports.

ii LUP Type 2 & 3 dischargers shall certify each NAL Exceedance Report in accordance with the Special Provisions for Construction Activity.

iii LUP Type 2 & 3 dischargers shall retain an electronic or paper copy of each NAL Exceedance Report for a minimum of three years after the date the exceedance report is filed.

iv LUP Type 2 & 3 dischargers shall include in the NAL Exceedance Report:

(1) the analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit"); and
(2) the date, place, time of sampling, visual observation (inspections), and/or measurements, including precipitation.

(3) Description of the current BMPs associated with the effluent sample that exceeded the NAL and the proposed corrective actions taken.

n. NEL Violation Report

i All LUP Type 3 dischargers shall electronically submit all storm event sampling results to the State Water Board no later than 5 days after the conclusion of the storm event.

ii In the event that a LUP Type 3 discharger has violated an applicable NEL, the discharger shall submit an NEL Violation Report to the State Water Board no later than 24 hours after the NEL exceedance has been identified.

iii The LUP Type 3 discharger shall certify each NEL Violation Report in accordance with the Special Provisions for Construction Activity.

iv The LUP Type 3 discharger shall retain an electronic or paper copy of each NEL Violation Report for a minimum of three years after the date the violation report is filed.

v The LUP Type 3 discharger shall include in the NEL Violation Report:

(1) the analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit"); and
(2) the date, place, time of sampling, visual observation (inspections), and/or measurements, including precipitation.
(3) Description of the current on-site BMPs, and the proposed corrective actions taken to manage the NEL exceedance.

vi Compliance Storm Exemption:
In the event that an applicable NEL has been exceeded during a storm event equal to or larger than the Compliance Storm Event (see Section F.2.c of this Attachment), the LUP Type 3 discharger shall report the on-site rain gauge and nearby governmental rain gauge readings for verification.

o. Monitoring Records

LUP Type 2 & 3 dischargers shall ensure that records of all storm water monitoring information and copies of all reports (including Annual Reports) required by this General Permit be retained for a period of at least three years. LUP Type 2 & 3 dischargers may retain records off-site and make them available upon request. These records shall include:

i The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation (rain gauge);

ii The individual(s) who performed the facility inspections, sampling, visual observation (inspections), and or measurements;

iii The date and approximate time of analyses;

iv The individual(s) who performed the analyses;

v A summary of all analytical results from the last three years, the method detection limits and reporting units, the analytical techniques or methods used, and all chain of custody forms;

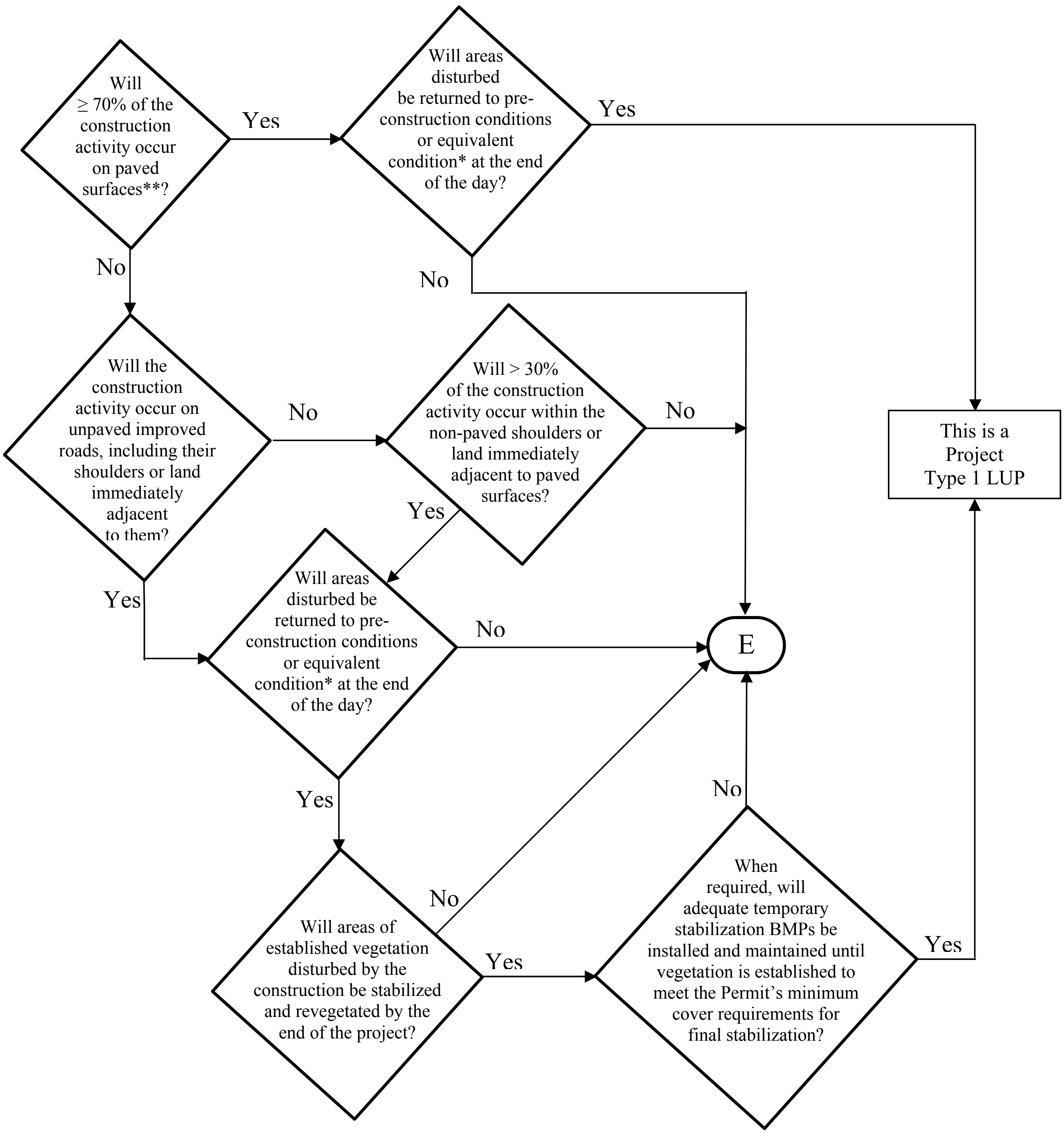
vi Quality assurance/quality control records and results;

vii Non-storm water discharge inspections and visual observation (inspections) and storm water discharge visual observation records (see Section M.4.a above);

viii Visual observation and sample collection exception records (see Section M.4.g above); and

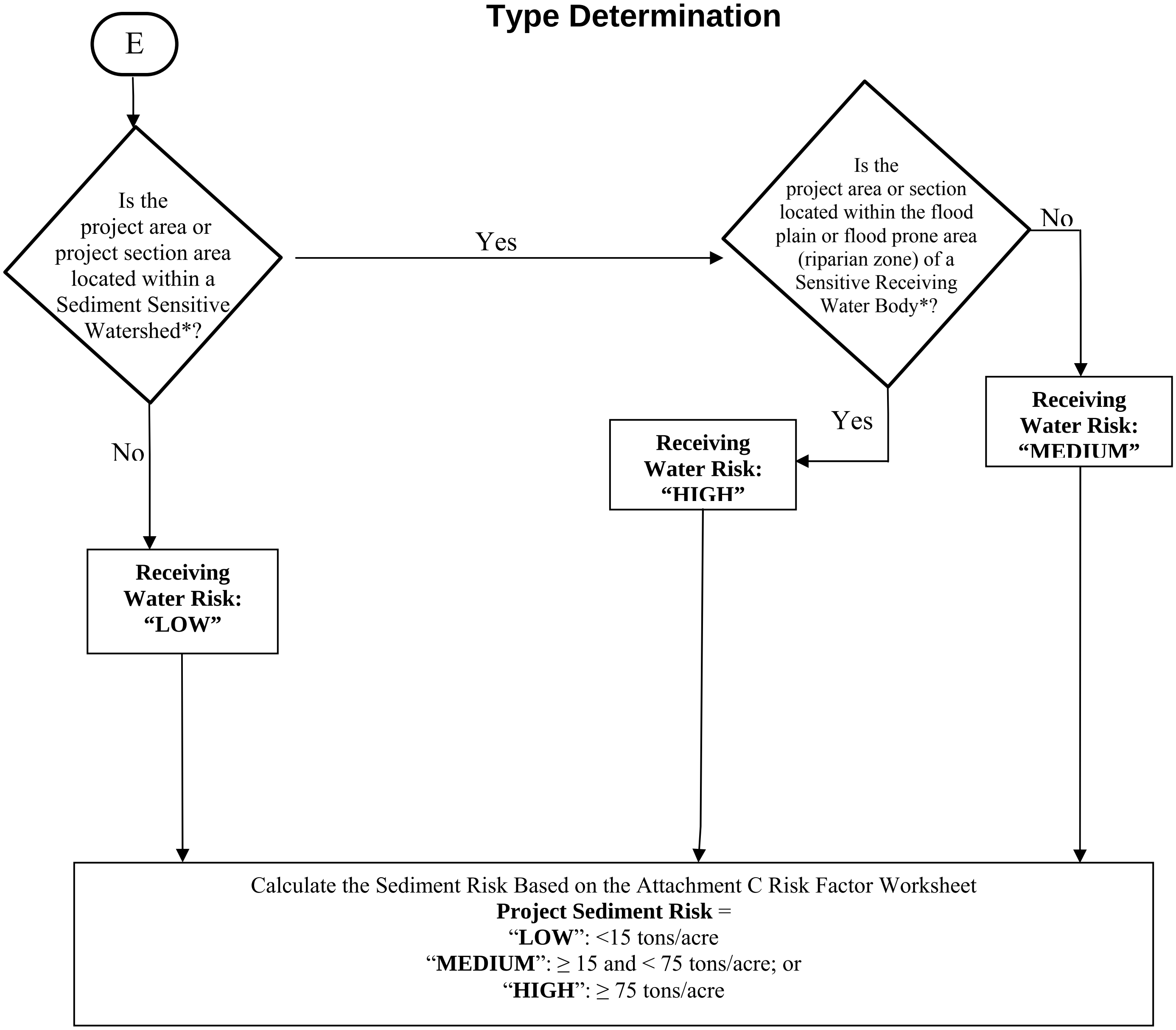
ix The records of any corrective actions and follow-up activities that resulted from analytical results, visual observation (inspections), or inspections.

ATTACHMENT A.1
LUP Project Area or Project Section Area Type Determination



*See Definition of Terms
** Or: "Will < 30% of the soil disturbance occur on unpaved surfaces?

ATTACHMENT A.1
LUP Project Area or Project Section Area Type Determination



* See Definition of Terms

PROJECT SEDIMENT RISK

RECEIVING WATER RISK	LOW	MEDIUM	HIGH
LOW	Type 1	Type 1	Type 2
MEDIUM	Type 1	Type 2	Type 3
HIGH	Type 2	Type 3	Type 3

ATTACHMENT A.1
Definition of Terms

1. **Equivalent Condition** – Means disturbed soils such as those from trench excavation are required to be hauled away, backfilled into the trench, and/or covered (e.g., metal plates, pavement, plastic covers over spoil piles) at the end of the construction day.
2. **Linear Construction Activity** – Linear construction activity consists of underground/ overhead facilities that typically include, but are not limited to, any conveyance, pipe or pipeline for the transportation of any gaseous, liquid (including water, wastewater for domestic municipal services), liquescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g., telephone, telegraph, radio or television messages); and associated ancillary facilities. Construction activities associated with LUPs include, but are not limited to those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities) and include, but are not limited to, underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/ tower pad and cable/ wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/or pavement repair or replacement, and stockpile/ borrow locations.
3. **Sediment Sensitive Receiving Water Body –** Defined as a water body segment that is listed on EPA's approved CWA 303(d) list for sedimentation/siltation, turbidity, or is designated with beneficial uses of SPAWN, MIGRATORY, and COLD.
4. **Sediment Sensitive Watershed –** Defined as a watershed draining into a receiving water body listed on EPA's approved CWA 303(d) list for sedimentation/siltation, turbidity, or a water body designated with beneficial uses of SPAWN, MIGRATORY, and COLD.

ATTACHMENT A.2
PERMIT REGISTRATION DOCUMENTS (PRDs)
GENERAL INSTRUCTIONS FOR LINEAR UNDERGROUND/OVERHEAD PROJECTS TO COMPLY WITH THE CONSTRUCTION GENERAL PERMIT

GENERAL INSTRUCTIONS

Who Must Submit

This permit is effective on July 1, 2010.

The Legally Responsible Person (LRP) for construction activities associated with linear underground/overhead project (LUP) must electronically apply for coverage under this General Permit on or after July 1, 2010. If it is determined that the LUP construction activities require an NPDES permit, the Legally Responsible Person[1] (LRP) shall submit PRDs for this General Permit in accordance with the following:

LUPs associated with Private or Municipal Development Projects

1. For LUPs associated with pre-development and pre-redevelopment construction activities:

   The LRP must obtain coverage[2] under this General Permit for its pre-development and pre-redevelopment construction activities where the total disturbed land area of these construction activities is greater than 1 acre.

2. For LUPs associated with new development and redevelopment construction projects:

   The LRP must obtain coverage under this General Permit for LUP construction activities associated with new development and redevelopment projects where the total disturbed land area of the LUP is greater than 1 acre. Coverage under this permit is not required where the same LUP construction activities are covered by another NPDES permit.

LUPs not associated with private or municipal new development or redevelopment projects:

The LRP must obtain coverage under this General Permit on or after July 1, 2010 for its LUP construction activities where the total disturbed land area is greater than 1 acre.

PRD Submittal Requirements

Prior to the start of construction activities a LRP must submit PRDs and fees to the State Water Board for each LUP.

New and Ongoing LUPs

Dischargers of new LUPs that commence construction activities after the adoption date of this General Permit shall file PRDs prior to the commencement of construction and implement the SWPPP upon the start of construction.

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[1] person possessing the title of the land on which the construction activities will occur for the regulated site
[2] obtain coverage means filing PRDs for the project.

PERMIT REGISTRATION DOCUMENTS (PRDs)
GENERAL INSTRUCTIONS (CONTINUED)

Dischargers of ongoing LUPs that are currently covered under State Water Board Order No. 2003-0007 (Small LUP General Permit) shall electronically file Permit Registration Documents no later than July 1, 2010. After July 1, 2010, all NOIs subject to State Water Board Order No. 2003-0007-DWQ will be terminated. All existing dischargers shall be exempt from the risk determination requirements in Attachment A. All existing dischargers are therefore subject to LUP Type 1 requirements regardless of their project's sediment and receiving water risks. However, a Regional Board retains the authority to require an existing discharger to comply with the risk determination requirements in Attachment A.

Where to Apply

The Permit Registration Documents (PRDs) can be found at www.waterboards.ca.gov/water_issues/programs/stormwater/

Fees

The annual fee for storm water permits are established through the State of California Code of Regulations.

When Permit Coverage Commences

To obtain coverage under the General Permit, the LRP must include the complete PRDs and the annual fee. All PRDs deemed incomplete will be rejected with an explanation as to what is required to complete submittal. Upon receipt of complete PRDs and associated fee, each discharger will be sent a waste discharger's identification (WDID) number.

Projects and Activities Not Defined As Construction Activity

1. LUP construction activity does not include routine maintenance projects to maintain original line and grade, hydraulic capacity, or original purpose of the facility. Routine maintenance projects are projects associated with operations and maintenance activities that are conducted on existing lines and facilities and within existing right-of-way, easements, franchise agreements or other legally binding agreements of the discharger. Routine maintenance projects include, but are not limited to projects that are conducted to:

- Maintain the original purpose of the facility, or hydraulic capacity.
- Update existing lines[3] and facilities to comply with applicable codes, standards and regulations regardless if such projects result in increased capacity.
- Repairing leaks.

Routine maintenance does not include construction of new[4] lines or facilities resulting from compliance with applicable codes, standards and regulations.

[3] Update existing lines includes replacing existing lines with new materials or pipes.
[4] New lines are those that are not associated with existing facilities and are not part of a project to update or replace existing lines.

PERMIT REGISTRATION DOCUMENTS (PRDs)
GENERAL INSTRUCTIONS (CONTINUED)

Routine maintenance projects do not include those areas of maintenance projects that are outside of an existing right-of-way, franchise, easements, or agreements. When a project must acquire new areas, those areas may be subject to this General Permit based on the area of disturbed land outside the original right-of-way, easement or agreement.

2. LUP construction activity does not include field activities associated with the planning and design of a project (e.g., activities associated with route selection).

3. Tie-ins conducted immediately adjacent to "energized" or "pressurized" facilities by the discharger are not considered small construction activities where all other LUP construction activities associated with the tie-in are covered by a NOI and SWPPP of a third party or municipal agency.

Calculating Land Disturbance Areas of LUPs

The total land area disturbed for LUPs is the sum of the:

- Surface areas of trenches, laterals and ancillary facilities, plus
- Area of the base of stockpiles on unpaved surfaces, plus
- Surface area of the borrow area, plus
- Areas of paved surfaces constructed for the project, plus
- Areas of new roads constructed or areas of major reconstruction to existing roads (e.g. improvements to two-track surfaces or road widening) for the sole purpose of accessing construction activities or as part of the final project, plus
- Equipment and material storage, staging, and preparation areas (laydown areas) not on paved surfaces, plus
- Soil areas outside the surface area of trenches, laterals and ancillary facilities that will be graded, and/or disturbed by the use of construction equipment, vehicles and machinery during construction activities.

Stockpiling Areas

Stockpiling areas, borrow areas and the removal of soils from a construction site may or may not be included when calculating the area of disturbed soil for a site depending on the following conditions:

- For stockpiling of soils onsite or immediately adjacent to a LUP site and the stockpile is not on a paved surface, the area of the base of the stockpile is to be included in the disturbed area calculation.

- The surface area of borrow areas that are onsite or immediately adjacent to a project site are to be included in the disturbed area calculation.

- For soil that is hauled offsite to a location owned or operated by the discharger that is not a paved surface, the area of the base of the stockpile is to be included in the disturbed area calculation except when the offsite location is already subject to a separate storm water permit.

PERMIT REGISTRATION DOCUMENTS (PRDs)
GENERAL INSTRUCTIONS (CONTINUED)

- For soil that is brought to the project from an off-site location owned or operated by the discharger the surface area of the borrow pit is to be included in the disturbed area calculation except when the offsite location is already subject to a separate storm water permit.

- Trench spoils on a paved surface that are either returned to the trench or excavation or hauled away from the project daily for disposal or reuse will not be included in the disturbed area calculation.

If you have any questions concerning submittal of PRDs, please call the State Water Board at (866) 563-3107.

ATTACHMENT B
PERMIT REGISTRATION DOCUMENTS (PRDs) TO COMPLY WITH THE TERMS OF THE GENERAL PERMIT TO DISCHARGE STORM WATER ASSOCIATED WITH CONSTRUCTION ACTIVITY

GENERAL INSTRUCTIONS

A. All Linear Construction Projects shall comply with the PRD requirements in Attachment A.2 of this Order.

B. Who Must Submit

Discharges of storm water associated with construction that results in the disturbance of one acre or more of land must apply for coverage under the General Construction Storm Water Permit (General Permit). Any construction activity that is a part of a larger common plan of development or sale must also be permitted, regardless of size. (For example, if 0.5 acre of a 20-acre subdivision is disturbed by the construction activities of discharger A and the remaining 19.5 acres is to be developed by discharger B, discharger A must obtain a General Storm Water Permit for the 0.5 acre project).

Other discharges from construction activities that are covered under this General Permit can be found in the General Permit Section II.B.

It is the LRP's responsibility to obtain coverage under this General Permit by electronically submitting complete PRDs (Permit Registration Documents).

In all cases, the proper procedures for submitting the PRDs must be completed before construction can commence.

C. Construction Activity Not Covered By This General Permit

Discharges from construction that are not covered under this General Permit can be found in the General Permit Sections II.A &B..

D. Annual Fees and Fee Calculation

Annual fees are calculated based upon the total area of land to be disturbed not the total size of the acreage owned. However, the calculation includes all acres to be disturbed during the duration of the project. For example, if 10 acres are scheduled to be disturbed the first year and 10 in each subsequent year for 5 years, the annual fees would be based upon 50 acres of disturbance. The State Water Board will evaluate adding acreage to an existing Permit Waste Discharge Identification (WDID) number on a case-by-case basis. In general, any acreage to be considered must be contiguous to the permitted land area and the existing

SWPPP must be appropriate for the construction activity and topography of the acreage under consideration. As acreage is built out and stabilized or sold, the Change of Information (COI) form enables the applicant to remove those acres from inclusion in the annual fee calculation. Checks should be made payable to: State Water Board.

The Annual fees are established through regulations adopted by the State Water Board. The total annual fee is the current base fee plus applicable surcharges for all construction sites submitting an NOI, based on the total acreage to be disturbed during the life of the project. Annual fees are subject to change by regulation.

Dischargers that apply for and satisfy the Small Construction Erosivity Wavier requirements shall pay a fee of $200.00 plus an applicable surcharge, see the General Permit Section II.B.7.

E. When to Apply

LRP's proposing to conduct construction activities subject to this General Permit must submit their PRDs prior to the commencement of construction activity.

F. Requirements for Completing Permit Registration Documents (PRDs)

All dischargers required to comply with this General Permit shall electronically submit the required PRDs for their type of construction as defined below.

G. Standard PRD Requirements (All Dischargers)

1. Notice of Intent
2. Risk Assessment (Standard or Site-Specific)
3. Site Map
4. SWPPP
5. Annual Fee
6. Certification

H. Additional PRD Requirements Related to Construction Type

1. Discharger in unincorporated areas of the State (not covered under an adopted Phase I or II SUSMP requirements) and that are not a linear project shall also submit a completed:
   a. Post-Construction Water Balance Calculator (Appendix 2).

2. Dischargers who are proposing to implement ATS shall submit:
   a. Complete ATS Plan in accordance with Attachment F at least 14 days prior to the planned operation of the ATS and a paper copy shall be available onsite during ATS operation.

   b. Certification proof that design done by a professional in accordance with Attachment F.

3. Dischargers who are proposing an alternate Risk Justification:
   a. Particle Size Analysis.

I. Exceptions to Standard PRD Requirements

Construction sites with an R value less than 5 as determined in the Risk Assessment are not required to submit a SWPPP.

J. Description of PRDs

1. Notice of Intent (NOI)

2. Site Map(s) Includes:
   a. The project's surrounding area (vicinity)
   b. Site layout
   c. Construction site boundaries
   d. Drainage areas
   e. Discharge locations
   f. Sampling locations
   g. Areas of soil disturbance (temporary or permanent)
   h. Active areas of soil disturbance (cut or fill)
   i. Locations of all runoff BMPs
   j. Locations of all erosion control BMPs
   k. Locations of all sediment control BMPs
   l. ATS location (if applicable)
   m. Locations of sensitive habitats, watercourses, or other features which are not to be disturbed
   n. Locations of all post-construction BMPs
   o. Locations of storage areas for waste, vehicles, service, loading/unloading of materials, access (entrance/exits) points to construction site, fueling, and water storage, water transfer for dust control and compaction practices

3. **SWPPPs**
   A site-specific SWPPP shall be developed by each discharger and shall be submitted with the PRDs.

4. **Risk Assessment**
   All dischargers shall use the Risk Assessment procedure as describe in the General Permit Appendix 1.

   a. The Standard Risk Assessment includes utilization of the following:
      i. Receiving water Risk Assessment interactive map

ii. EPA Rainfall Erosivity Factor Calculator Website
iii. Sediment Risk interactive map
iv. Sediment sensitive water bodies list

b. The Site-Specific Risk Assessment includes the completion of the hand calculated R value Risk Calculator

5. **Post-Construction Water Balance Calculator**
All dischargers subject to this requirement shall complete the Water Balance Calculator (in Appendix 2) in accordance with the instructions.

6. **ATS Design Document and Certification**
All dischargers using ATS must submit electronically their system design (as well as any supporting documentation) and proof that the system was designed by a qualified ATS design professional (See Attachment F).

To obtain coverage under the General Permit PRDs must be included and completed. If any of the required items are missing, the PRD submittal is considered incomplete and will be rejected. Upon receipt of a complete PRD submittal, the State Water Board will process the application package in the order received and assign a (WDID) number.

Questions?

If you have any questions on completing the PRDs please email stormwater@waterboards.ca.gov or call (866) 563-3107.

ATTACHMENT C
RISK LEVEL 1 REQUIREMENTS

A. Effluent Standards

[These requirements are the same as those in the General Permit order.]

1. Narrative – Risk Level 1 dischargers shall comply with the narrative effluent standards listed below:

   a. Storm water discharges and authorized non-storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

   b. Dischargers shall minimize or prevent pollutants in storm water discharges and authorized non-storm water discharges through the use of controls, structures, and management practices that achieve BAT for toxic and non-conventional pollutants and BCT for conventional pollutants.

2. Numeric – Risk Level 1 dischargers are not subject to a numeric effluent standard.

B. Good Site Management "Housekeeping"

1. Risk Level 1 dischargers shall implement good site management (i.e., "housekeeping") measures for construction materials that could potentially be a threat to water quality if discharged. At a minimum, Risk Level 1 dischargers shall implement the following good housekeeping measures:

   a. Conduct an inventory of the products used and/or expected to be used and the end products that are produced and/or expected to be produced. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

   b. Cover and berm loose stockpiled construction materials that are not actively being used (i.e. soil, spoils, aggregate, fly-ash, stucco, hydrated lime, etc.).

c. Store chemicals in watertight containers (with appropriate secondary containment to prevent any spillage or leakage) or in a storage shed (completely enclosed).

d. Minimize exposure of construction materials to precipitation. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

e. Implement BMPs to prevent the off-site tracking of loose construction and landscape materials.

2. Risk Level 1 dischargers shall implement good housekeeping measures for waste management, which, at a minimum, shall consist of the following:

a. Prevent disposal of any rinse or wash waters or materials on impervious or pervious site surfaces or into the storm drain system.

b. Ensure the containment of sanitation facilities (e.g., portable toilets) to prevent discharges of pollutants to the storm water drainage system or receiving water.

c. Clean or replace sanitation facilities and inspecting them regularly for leaks and spills.

d. Cover waste disposal containers at the end of every business day and during a rain event.

e. Prevent discharges from waste disposal containers to the storm water drainage system or receiving water.

f. Contain and securely protect stockpiled waste material from wind and rain at all times unless actively being used.

g. Implement procedures that effectively address hazardous and non-hazardous spills.

h. Develop a spill response and implementation element of the SWPPP prior to commencement of construction activities. The SWPPP shall require that:

i. Equipment and materials for cleanup of spills shall be available on site and that spills and leaks shall be cleaned up immediately and disposed of properly; and

ii. Appropriate spill response personnel are assigned and trained.

i. Ensure the containment of concrete washout areas and other washout areas that may contain additional pollutants so there is no discharge into the underlying soil and onto the surrounding areas.

3. Risk Level 1 dischargers shall implement good housekeeping for vehicle storage and maintenance, which, at a minimum, shall consist of the following:

   a. Prevent oil, grease, or fuel to leak in to the ground, storm drains or surface waters.

   b. Place all equipment or vehicles, which are to be fueled, maintained and stored in a designated area fitted with appropriate BMPs.

   c. Clean leaks immediately and disposing of leaked materials properly.

4. Risk Level 1 dischargers shall implement good housekeeping for landscape materials, which, at a minimum, shall consist of the following:

   a. Contain stockpiled materials such as mulches and topsoil when they are not actively being used.

   b. Contain fertilizers and other landscape materials when they are not actively being used.

   c. Discontinue the application of any erodible landscape material within 2 days before a forecasted rain event or during periods of precipitation.

   d. Apply erodible landscape material at quantities and application rates according to manufacture recommendations or based on written specifications by knowledgeable and experienced field personnel.

   e. Stack erodible landscape material on pallets and covering or storing such materials when not being used or applied.

5. Risk Level 1 dischargers shall conduct an assessment and create a list of potential pollutant sources and identify any areas of the site where additional BMPs are necessary to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges. This potential pollutant list shall be kept with the SWPPP and shall identify

all non-visible pollutants which are known, or should be known, to occur on the construction site. At a minimum, when developing BMPs, Risk Level 1 dischargers shall do the following:

a. Consider the quantity, physical characteristics (e.g., liquid, powder, solid), and locations of each potential pollutant source handled, produced, stored, recycled, or disposed of at the site.

b. Consider the degree to which pollutants associated with those materials may be exposed to and mobilized by contact with storm water.

c. Consider the direct and indirect pathways that pollutants may be exposed to storm water or authorized non-storm water discharges. This shall include an assessment of past spills or leaks, non-storm water discharges, and discharges from adjoining areas.

d. Ensure retention of sampling, visual observation, and inspection records.

e. Ensure effectiveness of existing BMPs to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges.

6. Risk Level 1 dischargers shall implement good housekeeping measures on the construction site to control the air deposition of site materials and from site operations. Such particulates can include, but are not limited to, sediment, nutrients, trash, metals, bacteria, oil and grease and organics.

C. Non-Storm Water Management

1. Risk Level 1 dischargers shall implement measures to control all non-storm water discharges during construction.

2. Risk Level 1 dischargers shall wash vehicles in such a manner as to prevent non-storm water discharges to surface waters or MS4 drainage systems.

3. Risk Level 1 dischargers shall clean streets in such a manner as to prevent unauthorized non-storm water discharges from reaching surface water or MS4 drainage systems.

D. Erosion Control

1. Risk Level 1 dischargers shall implement effective wind erosion control.

2. Risk Level 1 dischargers shall provide effective soil cover for inactive[1] areas and all finished slopes, open space, utility backfill, and completed lots.

3. Risk Level 1 dischargers shall limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist. Where plastic materials are deemed necessary, the discharger shall consider the use of plastic materials resistant to solar degradation.

E. Sediment Controls

1. Risk Level 1 dischargers shall establish and maintain effective perimeter controls and stabilize all construction entrances and exits to sufficiently control erosion and sediment discharges from the site.

2. On sites where sediment basins are to be used, Risk Level 1 dischargers shall, at minimum, design sediment basins according to the method provided in CASQA's Construction BMP Guidance Handbook.

F. Run-on and Runoff Controls

Risk Level 1 dischargers shall effectively manage all run-on, all runoff within the site and all runoff that discharges off the site. Run-on from off site shall be directed away from all disturbed areas or shall collectively be in compliance with the effluent limitations in this General Permit.

G. Inspection, Maintenance and Repair

1. Risk Level 1 dischargers shall ensure that all inspection, maintenance repair and sampling activities at the project location shall be performed or supervised by a Qualified SWPPP Practitioner (QSP) representing the discharger. The QSP may delegate any or all of these activities to an employee trained to do the task(s) appropriately, but shall ensure adequate deployment.

2. Risk Level 1 dischargers shall perform weekly inspections and observations, and at least once each 24-hour period during extended

[1] Inactive areas of construction are areas of construction activity that have been disturbed and are not scheduled to be re-disturbed for at least 14 days.

storm events, to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Inspectors shall be the QSP or be trained by the QSP.

3. Upon identifying failures or other shortcomings, as directed by the QSP, Risk Level 1 dischargers shall begin implementing repairs or design changes to BMPs within 72 hours of identification and complete the changes as soon as possible.

4. For each inspection required, Risk Level 1 dischargers shall complete an inspection checklist, using a form provided by the State Water Board or Regional Water Board or in an alternative format.

5. Risk Level 1 dischargers shall ensure that checklists shall remain onsite with the SWPPP and at a minimum, shall include:

   a. Inspection date and date the inspection report was written.

   b. Weather information, including presence or absence of precipitation, estimate of beginning of qualifying storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall in inches.

   c. Site information, including stage of construction, activities completed, and approximate area of the site exposed.

   d. A description of any BMPs evaluated and any deficiencies noted.

   e. If the construction site is safely accessible during inclement weather, list the observations of all BMPs: erosion controls, sediment controls, chemical and waste controls, and non-storm water controls. Otherwise, list the results of visual inspections at all relevant outfalls, discharge points, downstream locations and any projected maintenance activities.

   f. Report the presence of noticeable odors or of any visible sheen on the surface of any discharges.

   g. Any corrective actions required, including any necessary changes to the SWPPP and the associated implementation dates.

   h. Photographs taken during the inspection, if any.

   i. Inspector’s name, title, and signature.

H. Rain Event Action Plan

Not required for Risk Level 1 dischargers.

I. Risk Level 1 Monitoring and Reporting Requirements

Table 1- Summary of Monitoring Requirements

Risk Level	Visual Inspections					Sample Collection	
	Quarterly Non-storm Water Discharge	Pre-storm Event		Daily Storm BMP	Post Storm	Storm Water Discharge	Receiving Water
		Baseline	REAP				
1	X	X		X	X		

1. **Construction Site Monitoring Program Requirements**

   a. Pursuant to Water Code Sections 13383 and 13267, all dischargers subject to this General Permit shall develop and implement a written site-specific Construction Site Monitoring Program (CSMP) in accordance with the requirements of this Section. The CSMP shall include all monitoring procedures and instructions, location maps, forms, and checklists as required in this section. The CSMP shall be developed prior to the commencement of construction activities, and revised as necessary to reflect project revisions. The CSMP shall be a part of the Storm Water Pollution Prevention Plan (SWPPP), included as an appendix or separate SWPPP chapter.

   b. Existing dischargers registered under the State Water Board Order No. 99-08-DWQ shall make and implement necessary revisions to their Monitoring Programs to reflect the changes in this General Permit in a timely manner, but no later than July 1, 2010. Existing dischargers shall continue to implement their existing Monitoring Programs in compliance with State Water Board Order No. 99-08-DWQ until the necessary revisions are completed according to the schedule above.

   c. When a change of ownership occurs for all or any portion of the construction site prior to completion or final stabilization, the new discharger shall comply with these requirements as of the date the ownership change occurs.

2. **Objectives**

   The CSMP shall be developed and implemented to address the following objectives:

   a. To demonstrate that the site is in compliance with the Discharge Prohibitions;

b. To determine whether non-visible pollutants are present at the construction site and are causing or contributing to exceedances of water quality objectives;

c. To determine whether immediate corrective actions, additional Best Management Practice (BMP) implementation, or SWPPP revisions are necessary to reduce pollutants in storm water discharges and authorized non-storm water discharges; and

d. To determine whether BMPs included in the SWPPP are effective in preventing or reducing pollutants in storm water discharges and authorized non-storm water discharges.

3. **Risk Level 1 - Visual Monitoring (Inspection) Requirements for Qualifying Rain Events**

a. Risk Level 1 dischargers shall visually observe (inspect) storm water discharges at all discharge locations within two business days (48 hours) after each qualifying rain event.

b. Risk Level 1 dischargers shall visually observe (inspect) the discharge of stored or contained storm water that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Stored or contained storm water that will likely discharge after operating hours due to anticipated precipitation shall be observed prior to the discharge during operating hours.

c. Risk Level 1 dischargers shall conduct visual observations (inspections) during business hours only.

d. Risk Level 1 dischargers shall record the time, date and rain gauge reading of all qualifying rain events.

e. Within 2 business days (48 hours) prior to each qualifying rain event, Risk Level 1 dischargers shall visually observe (inspect):

i. All storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources. If needed, the discharger shall implement appropriate corrective actions.

ii. All BMPs to identify whether they have been properly implemented in accordance with the SWPPP. If needed, the discharger shall implement appropriate corrective actions.

iii. Any storm water storage and containment areas to detect leaks and ensure maintenance of adequate freeboard.

f. For the visual observations (inspections) described in e.i and e.iii above, Risk Level 1 dischargers shall observe the presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

g. Within two business days (48 hours) after each qualifying rain event, Risk Level 1 dischargers shall conduct post rain event visual observations (inspections) to (1) identify whether BMPs were adequately designed, implemented, and effective, and (2) identify additional BMPs and revise the SWPPP accordingly.

h. Risk Level 1 dischargers shall maintain on-site records of all visual observations (inspections), personnel performing the observations, observation dates, weather conditions, locations observed, and corrective actions taken in response to the observations.

4. **Risk Level 1 – Visual Observation Exemptions**

a. Risk Level 1 dischargers shall be prepared to conduct visual observation (inspections) until the minimum requirements of Section I.3 above are completed. Risk Level 1 dischargers are not required to conduct visual observation (inspections) under the following conditions:

i. During dangerous weather conditions such as flooding and electrical storms.

ii. Outside of scheduled site business hours.

b. If no required visual observations (inspections) are collected due to these exceptions, Risk Level 1 dischargers shall include an explanation in their SWPPP and in the Annual Report documenting why the visual observations (inspections) were not conducted.

5. **Risk Level 1 – Monitoring Methods**

Risk Level 1 dischargers shall include a description of the visual observation locations, visual observation procedures, and visual observation follow-up and tracking procedures in the CSMP.

6. **Risk Level 1 – Non-Storm Water Discharge Monitoring Requirements**

a. Visual Monitoring Requirements:

   i. Risk Level 1 dischargers shall visually observe (inspect) each drainage area for the presence of (or indications of prior) unauthorized and authorized non-storm water discharges and their sources.

   ii. Risk Level 1 dischargers shall conduct one visual observation (inspection) quarterly in each of the following periods: January-March, April-June, July-September, and October-December. Visual observation (inspections) are only required during daylight hours (sunrise to sunset).

   iii. Risk Level 1 dischargers shall ensure that visual observations (inspections) document the presence or evidence of any non-storm water discharge (authorized or unauthorized), pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.), and source. Risk Level 1 dischargers shall maintain on-site records indicating the personnel performing the visual observation (inspections), the dates and approximate time each drainage area and non-storm water discharge was observed, and the response taken to eliminate unauthorized non-storm water discharges and to reduce or prevent pollutants from contacting non-storm water discharges.

7. **Risk Level 1 – Non-Visible Pollutant Monitoring Requirements**

   a. Risk Level 1 dischargers shall collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water.

   b. Risk Level 1 dischargers shall ensure that water samples are large enough to characterize the site conditions.

   c. Risk Level 1 dischargers shall collect samples at all discharge locations that can be safely accessed.

   d. Risk Level 1 dischargers shall collect samples during the first two hours of discharge from rain events that occur during business hours and which generate runoff.

   e. Risk Level 1 dischargers shall analyze samples for all non-visible pollutant parameters (if applicable) - parameters indicating the presence of pollutants identified in the pollutant source assessment required (Risk Level 1 dischargers shall modify their CSMPs to address these additional parameters in accordance with any updated SWPPP pollutant source assessment).

f. Risk Level 1 dischargers shall collect a sample of storm water that has not come in contact with the disturbed soil or the materials stored or used on-site (uncontaminated sample) for comparison with the discharge sample.

g. Risk Level 1 dischargers shall compare the uncontaminated sample to the samples of discharge using field analysis or through laboratory analysis.[2]

h. Risk Level 1 dischargers shall keep all field /or analytical data in the SWPPP document.

8. **Risk Level 1 – Particle Size Analysis for Project Risk Justification**

Risk Level 1 dischargers justifying an alternative project risk shall report a soil particle size analysis used to determine the RUSLE K-Factor. ASTM D-422 (Standard Test Method for Particle-Size Analysis of Soils), as revised, shall be used to determine the percentages of sand, very fine sand, silt, and clay on the site.

9. **Risk Level 1 – Records**

Risk Level 1 dischargers shall retain records of all storm water monitoring information and copies of all reports (including Annual Reports) for a period of at least three years. Risk Level 1 dischargers shall retain all records on-site while construction is ongoing. These records include:

a. The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation.

b. The individual(s) who performed the facility inspections, sampling, visual observation (inspections), and or measurements.

c. The date and approximate time of analyses.

d. The individual(s) who performed the analyses.

[2] For laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136. Field discharge samples shall be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed.

e. A summary of all analytical results from the last three years, the method detection limits and reporting units, and the analytical techniques or methods used.

f. Rain gauge readings from site inspections.

g. Quality assurance/quality control records and results.

h. Non-storm water discharge inspections and visual observation (inspections) and storm water discharge visual observation records (see Sections I.3 and I.6 above).

i. Visual observation and sample collection exception records (see Section I.4 above).

j. The records of any corrective actions and follow-up activities that resulted from analytical results, visual observation (inspections), or inspections.

ATTACHMENT D
RISK LEVEL 2 REQUIREMENTS

A. Effluent Standards

[These requirements are the same as those in the General Permit order.]

1. Narrative – Risk Level 2 dischargers shall comply with the narrative effluent standards listed below:

   a. Storm water discharges and authorized non-storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

   b. Dischargers shall minimize or prevent pollutants in storm water discharges and authorized non-storm water discharges through the use of controls, structures, and management practices that achieve BAT for toxic and non-conventional pollutants and BCT for conventional pollutants.

2. Numeric – Risk level 2 dischargers are subject to a pH NAL of 6.5-8.5, and a turbidity NAL of 250 NTU.

B. Good Site Management "Housekeeping"

1. Risk Level 2 dischargers shall implement good site management (i.e., "housekeeping") measures for construction materials that could potentially be a threat to water quality if discharged. At a minimum, Risk Level 2 dischargers shall implement the following good housekeeping measures:

   a. Conduct an inventory of the products used and/or expected to be used and the end products that are produced and/or expected to be produced. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

   b. Cover and berm loose stockpiled construction materials that are not actively being used (i.e. soil, spoils, aggregate, fly-ash, stucco, hydrated lime, etc.).

c. Store chemicals in watertight containers (with appropriate secondary containment to prevent any spillage or leakage) or in a storage shed (completely enclosed).

d. Minimize exposure of construction materials to precipitation. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

e. Implement BMPs to prevent the off-site tracking of loose construction and landscape materials.

2. Risk Level 2 dischargers shall implement good housekeeping measures for waste management, which, at a minimum, shall consist of the following:

a. Prevent disposal of any rinse or wash waters or materials on impervious or pervious site surfaces or into the storm drain system.

b. Ensure the containment of sanitation facilities (e.g., portable toilets) to prevent discharges of pollutants to the storm water drainage system or receiving water.

c. Clean or replace sanitation facilities and inspecting them regularly for leaks and spills.

d. Cover waste disposal containers at the end of every business day and during a rain event.

e. Prevent discharges from waste disposal containers to the storm water drainage system or receiving water.

f. Contain and securely protect stockpiled waste material from wind and rain at all times unless actively being used.

g. Implement procedures that effectively address hazardous and non-hazardous spills.

h. Develop a spill response and implementation element of the SWPPP prior to commencement of construction activities. The SWPPP shall require:

i. Equipment and materials for cleanup of spills shall be available on site and that spills and leaks shall be cleaned up immediately and disposed of properly.

ii. Appropriate spill response personnel are assigned and trained.

i. Ensure the containment of concrete washout areas and other washout areas that may contain additional pollutants so there is no discharge into the underlying soil and onto the surrounding areas.

3. Risk Level 2 dischargers shall implement good housekeeping for vehicle storage and maintenance, which, at a minimum, shall consist of the following:

   a. Prevent oil, grease, or fuel to leak in to the ground, storm drains or surface waters.

   b. Place all equipment or vehicles, which are to be fueled, maintained and stored in a designated area fitted with appropriate BMPs.

   c. Clean leaks immediately and disposing of leaked materials properly.

4. Risk Level 2 dischargers shall implement good housekeeping for landscape materials, which, at a minimum, shall consist of the following:

   a. Contain stockpiled materials such as mulches and topsoil when they are not actively being used.

   b. Contain all fertilizers and other landscape materials when they are not actively being used.

   c. Discontinue the application of any erodible landscape material within 2 days before a forecasted rain event or during periods of precipitation.

   d. Apply erodible landscape material at quantities and application rates according to manufacture recommendations or based on written specifications by knowledgeable and experienced field personnel.

   e. Stack erodible landscape material on pallets and covering or storing such materials when not being used or applied.

5. Risk Level 2 dischargers shall conduct an assessment and create a list of potential pollutant sources and identify any areas of the site where additional BMPs are necessary to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges. This potential pollutant list shall be kept with the SWPPP and shall identify

all non-visible pollutants which are known, or should be known, to occur on the construction site. At a minimum, when developing BMPs, Risk Level 2 dischargers shall do the following:

a. Consider the quantity, physical characteristics (e.g., liquid, powder, solid), and locations of each potential pollutant source handled, produced, stored, recycled, or disposed of at the site.

b. Consider the degree to which pollutants associated with those materials may be exposed to and mobilized by contact with storm water.

c. Consider the direct and indirect pathways that pollutants may be exposed to storm water or authorized non-storm water discharges. This shall include an assessment of past spills or leaks, non-storm water discharges, and discharges from adjoining areas.

d. Ensure retention of sampling, visual observation, and inspection records.

e. Ensure effectiveness of existing BMPs to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges.

6. Risk Level 2 dischargers shall implement good housekeeping measures on the construction site to control the air deposition of site materials and from site operations. Such particulates can include, but are not limited to, sediment, nutrients, trash, metals, bacteria, oil and grease and organics.

7. **Additional Risk Level 2 Requirement:** Risk Level 2 dischargers shall document all housekeeping BMPs in the SWPPP and REAP(s) in accordance with the nature and phase of the construction project. Construction phases at traditional land development projects include Grading and Land Development Phase, Streets and Utilities, or Vertical Construction for traditional land development projects.

C. Non-Storm Water Management

1. Risk Level 2 dischargers shall implement measures to control all non-storm water discharges during construction.

2. Risk Level 2 dischargers shall wash vehicles in such a manner as to prevent non-storm water discharges to surface waters or MS4 drainage systems.

3. Risk Level 2 dischargers shall clean streets in such a manner as to prevent unauthorized non-storm water discharges from reaching surface water or MS4 drainage systems.

D. Erosion Control

1. Risk Level 2 dischargers shall implement effective wind erosion control.

2. Risk Level 2 dischargers shall provide effective soil cover for inactive[1] areas and all finished slopes, open space, utility backfill, and completed lots.

3. Risk Level 2 dischargers shall limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist. Where plastic materials are deemed necessary, the discharger shall consider the use of plastic materials resistant to solar degradation.

E. Sediment Controls

1. Risk Level 2 dischargers shall establish and maintain effective perimeter controls and stabilize all construction entrances and exits to sufficiently control erosion and sediment discharges from the site.

2. On sites where sediment basins are to be used, Risk Level 2 dischargers shall, at minimum, design sediment basins according to the method provided in CASQA's Construction BMP Guidance Handbook.

3. **Additional Risk Level 2 Requirement:** Risk Level 2 dischargers shall implement appropriate erosion control BMPs (runoff control and soil stabilization) in conjunction with sediment control BMPs for areas under active[2] construction.

4. **Additional Risk Level 2 Requirement:** Risk Level 2 dischargers shall apply linear sediment controls along the toe of the slope, face of the slope, and at the grade breaks of exposed slopes to comply with sheet flow lengths[3] in accordance with Table 1.

Table 1 - Critical Slope/Sheet Flow Length Combinations

Slope Percentage	Sheet flow length not

[1] Inactive areas of construction are areas of construction activity that have been disturbed and are not scheduled to be re-disturbed for at least 14 days.
[2] Active areas of construction are areas undergoing land surface disturbance. This includes construction activity during the preliminary stage, mass grading stage, streets and utilities stage and the vertical construction stage.
[3] Sheet flow length is the length that shallow, low velocity flow travels across a site.

	to exceed
0-25% 20	feet
25-50% 15	feet
Over 50%	10 feet

5. **Additional Risk Level 2 Requirement:** Risk Level 2 dischargers shall ensure that construction activity traffic to and from the project is limited to entrances and exits that employ effective controls to prevent offsite tracking of sediment.

6. **Additional Risk Level 2 Requirement:** Risk Level 2 dischargers shall ensure that all storm drain inlets and perimeter controls, runoff control BMPs, and pollutant controls at entrances and exits (e.g. tire washoff locations) are maintained and protected from activities that reduce their effectiveness.

7. **Additional Risk Level 2 Requirement:** Risk Level 2 dischargers shall inspect on a daily basis all immediate access roads daily. At a minimum daily (when necessary) and prior to any rain event, the discharger shall remove any sediment or other construction activity-related materials that are deposited on the roads (by vacuuming or sweeping).

F. Run-on and Run-off Controls

Risk Level 2 dischargers shall effectively manage all run-on, all runoff within the site and all runoff that discharges off the site. Run-on from off site shall be directed away from all disturbed areas or shall collectively be in compliance with the effluent limitations in this General Permit.

G. Inspection, Maintenance and Repair

1. Risk Level 2 dischargers shall ensure that all inspection, maintenance repair and sampling activities at the project location shall be performed or supervised by a Qualified SWPPP Practitioner (QSP) representing the discharger. The QSP may delegate any or all of these activities to an employee appropriately trained to do the task(s).

2. Risk Level 2 dischargers shall perform weekly inspections and observations, and at least once each 24-hour period during extended storm events, to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Inspectors shall be the QSP or be trained by the QSP.

3. Upon identifying failures or other shortcomings, as directed by the QSP, Risk Level 2 dischargers shall begin implementing repairs or

design changes to BMPs within 72 hours of identification and complete the changes as soon as possible.

4. For each inspection required, Risk Level 2 dischargers shall complete an inspection checklist, using a form provided by the State Water Board or Regional Water Board or in an alternative format.

5. Risk Level 2 dischargers shall ensure that checklists shall remain onsite with the SWPPP and at a minimum, shall include:

   a. Inspection date and date the inspection report was written.

   b. Weather information, including presence or absence of precipitation, estimate of beginning of qualifying storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall in inches.

   c. Site information, including stage of construction, activities completed, and approximate area of the site exposed.

   d. A description of any BMPs evaluated and any deficiencies noted.

   e. If the construction site is safely accessible during inclement weather, list the observations of all BMPs: erosion controls, sediment controls, chemical and waste controls, and non-storm water controls. Otherwise, list the results of visual inspections at all relevant outfalls, discharge points, downstream locations and any projected maintenance activities.

   f. Report the presence of noticeable odors or of any visible sheen on the surface of any discharges.

   g. Any corrective actions required, including any necessary changes to the SWPPP and the associated implementation dates.

   h. Photographs taken during the inspection, if any.

   i. Inspector's name, title, and signature.

H. Rain Event Action Plan

1. **Additional Risk Level 2 Requirement:** The discharger shall ensure a QSP develop a Rain Event Action Plan (REAP) 48 hours prior to any likely precipitation event. A likely precipitation event is any weather pattern that is forecast to have a 50% or greater probability of producing precipitation in the project area. The discharger shall

ensure a QSP obtain a printed copy of precipitation forecast information from the National Weather Service Forecast Office (e.g., by entering the zip code of the project's location at http://www.srh.noaa.gov/forecast).

2. **Additional Risk Level 2 Requirement:** The discharger shall ensure a QSP develop the REAPs for all phases of construction (i.e., Grading and Land Development, Streets and Utilities, Vertical Construction, Final Landscaping and Site Stabilization).

3. **Additional Risk Level 2 Requirement:** The discharger shall ensure a QSP ensure that the REAP include, at a minimum, the following site information:

   a. Site Address
   b. Calculated Risk Level (2 or 3)
   c. Site Storm Water Manager Information including the name, company, and 24-hour emergency telephone number
   d. Erosion and Sediment Control Provider information including the name, company, and 24-hour emergency telephone number
   e. Storm Water Sampling Agent information including the name, company, and 24-hour emergency telephone number

4. **Additional Risk Level 2 Requirement:** The discharger shall ensure a QSP include in the REAP, at a minimum, the following project phase information:

   a. Activities associated with each construction phase
   b. Trades active on the construction site during each construction phase
   c. Trade contractor information
   d. Suggested actions for each project phase

5. **Additional Risk Level 2 Requirement:** The discharger shall ensure a QSP develop additional REAPs for project sites where construction activities are indefinitely halted or postponed (Inactive Construction). At a minimum, Inactive Construction REAPs must include:

   a. Site Address
   b. Calculated Risk Level (2 or 3)
   c. Site Storm Water Manager Information including the name, company, and 24-hour emergency telephone number
   d. Erosion and Sediment Control Provider information including the name, company, and 24-hour emergency telephone number
   e. Storm Water Sampling Agent information including the name, company, and 24-hour emergency telephone number

   f. Trades active on site during Inactive Construction
   g. Trade contractor information
   h. Suggested actions for inactive construction sites

6. **Additional Risk Level 2 Requirement:** The discharger shall ensure a QSP begin implementation and make the REAP available onsite no later than 24 hours prior to the likely precipitation event.

7. **Additional Risk Level 2 Requirement:** The discharger shall ensure a QSP maintain onsite a paper copy of each REAP onsite in compliance with the record retention requirements of the Special Provisions in this General Permit.

I. Risk Level 2 Monitoring and Reporting Requirements

Table 2- Summary of Monitoring Requirements

Risk Level	Visual Inspections					Sample Collection	
	Quarterly Non-storm Water Discharge	Pre-storm Event		Daily Storm BMP	Post Storm	Storm Water Discharge	Receiving Water
		Baseline	REAP				
2	X	X	X	X	X	X	

1. Construction Site Monitoring Program Requirements

   a. Pursuant to Water Code Sections 13383 and 13267, all dischargers subject to this General Permit shall develop and implement a written site-specific Construction Site Monitoring Program (CSMP) in accordance with the requirements of this Section. The CSMP shall include all monitoring procedures and instructions, location maps, forms, and checklists as required in this section. The CSMP shall be developed prior to the commencement of construction activities, and revised as necessary to reflect project revisions. The CSMP shall be a part of the Storm Water Pollution Prevention Plan (SWPPP), included as an appendix or separate SWPPP chapter.

   b. Existing dischargers registered under the State Water Board Order No. 99-08-DWQ shall make and implement necessary revisions to their Monitoring Program to reflect the changes in this General Permit in a timely manner, but no later than July 1, 2010. Existing dischargers shall continue to implement their existing Monitoring Programs in compliance with State Water Board Order No. 99-08-DWQ until the necessary revisions are completed according to the schedule above.

   c. When a change of ownership occurs for all or any portion of the construction site prior to completion or final stabilization, the new discharger shall comply with these requirements as of the date the ownership change occurs.

2. **Objectives**

   The CSMP shall be developed and implemented to address the following objectives:

a. To demonstrate that the site is in compliance with the Discharge Prohibitions and applicable Numeric Action Levels (NALs)/Numeric Effluent Limitations (NELs) of this General Permit.

b. To determine whether non-visible pollutants are present at the construction site and are causing or contributing to exceedances of water quality objectives.

c. To determine whether immediate corrective actions, additional Best Management Practice (BMP) implementation, or SWPPP revisions are necessary to reduce pollutants in storm water discharges and authorized non-storm water discharges.

d. To determine whether BMPs included in the SWPPP/Rain Event Action Plan (REAP) are effective in preventing or reducing pollutants in storm water discharges and authorized non-storm water discharges.

3. **Risk Level 2 – Visual Monitoring (Inspection) Requirements for Qualifying Rain Events**

a. Risk Level 2 dischargers shall visually observe (inspect) storm water discharges at all discharge locations within two business days (48 hours) after each qualifying rain event.

b. Risk Level 2 dischargers shall visually observe (inspect) the discharge of stored or contained storm water that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Stored or contained storm water that will likely discharge after operating hours due to anticipated precipitation shall be observed prior to the discharge during operating hours.

c. Risk Level 2 dischargers shall conduct visual observations (inspections) during business hours only.

d. Risk Level 2 dischargers shall record the time, date and rain gauge reading of all qualifying rain events.

e. Within 2 business days (48 hours) prior to each qualifying rain event, Risk Level 2 dischargers shall visually observe (inspect):

i. all storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources. If needed, the discharger shall implement appropriate corrective actions.

ii. all BMPs to identify whether they have been properly implemented in accordance with the SWPPP/REAP. If needed, the discharger shall implement appropriate corrective actions.

iii. any storm water storage and containment areas to detect leaks and ensure maintenance of adequate freeboard.

f. For the visual observations (inspections) described in c.i and c.iii above, Risk Level 2 dischargers shall observe the presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

g. Within two business days (48 hours) after each qualifying rain event, Risk Level 2 dischargers shall conduct post rain event visual observations (inspections) to (1) identify whether BMPs were adequately designed, implemented, and effective, and (2) identify additional BMPs and revise the SWPPP accordingly.

h. Risk Level 2 dischargers shall maintain on-site records of all visual observations (inspections), personnel performing the observations, observation dates, weather conditions, locations observed, and corrective actions taken in response to the observations.

4. **Risk Level 2 – Water Quality Sampling and Analysis**

a. Risk Level 2 dischargers shall collect storm water grab samples from sampling locations, as defined in Section I.5. The storm water grab sample(s) obtained shall be representative of the flow and characteristics of the discharge.

b. At minimum, Risk Level 2 dischargers shall collect 3 samples per day of the qualifying event.

c. Risk Level 2 dischargers shall ensure that the grab samples collected of stored or contained storm water are from discharges subsequent to a qualifying rain event (producing precipitation of ½ inch or more at the time of discharge).

<u>Storm Water Effluent Monitoring Requirements</u>

d. Risk Level 2 dischargers shall analyze their effluent samples for:

i. pH and turbidity.

ii. Any additional parameters for which monitoring is required by the Regional Water Board.

5. **Risk Level 2 – Storm Water Discharge Water Quality Sampling Locations**

Effluent Sampling Locations

a. Risk Level 2 dischargers shall perform sampling and analysis of storm water discharges to characterize discharges associated with construction activity from the entire project disturbed area.

b. Risk Level 2 dischargers shall collect effluent samples at all discharge points where storm water is discharged off-site.

c. Risk Level 2 dischargers shall ensure that storm water discharge collected and observed represent[4] the effluent in each drainage area based on visual observation of the water and upstream conditions.

d. Risk Level 2 dischargers shall monitor and report site run-on from surrounding areas if there is reason to believe run-on may contribute to an exceedance of NALs or NELs.

e. Risk Level 2 dischargers who deploy an ATS on their site, or a portion on their site, shall collect ATS effluent samples and measurements from the discharge pipe or another location representative of the nature of the discharge.

f. Risk Level 2 dischargers shall select analytical test methods from the list provided in Table 3 below.

g. All storm water sample collection preservation and handling shall be conducted in accordance with Section I.7 “Storm Water Sample Collection and Handling Instructions” below.

6. **Risk Level 2 – Visual Observation and Sample Collection Exemptions**

a. Risk Level 2 dischargers shall be prepared to collect samples and conduct visual observation (inspections) until the minimum requirements of Sections I.3 and I.4 above are completed. Risk

[4] For example, if there has been concrete work recently in an area, or drywall scrap is exposed to the rain, a pH sample shall be taken of drainage from the relevant work area. Similarly, if sediment laden water is flowing through some parts of a silt fence, samples shall be taken of the sediment-laden water even if most water flowing through the fence is clear.

Level 2 dischargers are not required to physically collect samples or conduct visual observation (inspections) under the following conditions:

i. During dangerous weather conditions such as flooding and electrical storms.

ii. Outside of scheduled site business hours.

b. If no required samples or visual observation (inspections) are collected due to these exceptions, Risk Level 2 dischargers shall include an explanation in their SWPPP and in the Annual Report documenting why the sampling or visual observation (inspections) were not conducted.

7. **Risk Level 2 – Storm Water Sample Collection and Handling Instructions**

a. Risk Level 2 dischargers shall refer to Table 3 below for test methods, detection limits, and reporting units.

b. Risk Level 2 dischargers shall ensure that testing laboratories will receive samples within 48 hours of the physical sampling (unless otherwise required by the laboratory), and shall use only the sample containers provided by the laboratory to collect and store samples.

c. Risk Level 2 dischargers shall designate and train personnel to collect, maintain, and ship samples in accordance with the Surface Water Ambient Monitoring Program's (SWAMP) 2008 Quality Assurance Program Plan (QAPrP).[5]

8. **Risk Level 2 – Monitoring Methods**

a. Risk Level 2 dischargers shall include a description of the following items in the CSMP:

i. Visual observation locations, visual observation procedures, and visual observation follow-up and tracking procedures.

ii. Sampling locations, and sample collection and handling procedures. This shall include detailed procedures for sample

[5] Additional information regarding SWAMP's QAPrP and QAMP can be found at http://www.waterboards.ca.gov/water_issues/programs/swamp/.
QAPrP:http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/qapp/swamp_qapp_master090108a.pdf.
QAMP: http://www.waterboards.ca.gov/water_issues/programs/swamp/qamp.shtml.

collection, storage, preservation, and shipping to the testing lab to assure that consistent quality control and quality assurance is maintained. Dischargers shall attach to the monitoring program an example Chain of Custody form used when handling and shipping samples.

iii. Identification of the analytical methods and related method detection limits (if applicable) for each parameter required in Section I.4 above.

b. Risk Level 2 dischargers shall ensure that all sampling and sample preservation are in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association). All monitoring instruments and equipment (including a discharger's own field instruments for measuring pH and turbidity) should be calibrated and maintained in accordance with manufacturers' specifications to ensure accurate measurements. Risk Level 2 dischargers shall ensure that all laboratory analyses are conducted according to test procedures under 40 CFR Part 136, unless other test procedures have been specified in this General Permit or by the Regional Water Board. With the exception of field analysis conducted by the discharger for turbidity and pH, all analyses should be sent to and conducted at a laboratory certified for such analyses by the State Department of Health Services. Risk Level 2 dischargers shall conduct their own field analysis of pH and may conduct their own field analysis of turbidity if the discharger has sufficient capability (qualified and trained employees, properly calibrated and maintained field instruments, etc.) to adequately perform the field analysis.

9. **Risk Level 2 – Analytical Methods**

a. Risk Level 2 dischargers shall refer to Table 3 below for test methods, detection limits, and reporting units.

b. **pH**: Risk Level 2 dischargers shall perform pH analysis on-site with a calibrated pH meter or a pH test kit. Risk Level 2 dischargers shall record pH monitoring results on paper and retain these records in accordance with Section I.14, below.

c. **Turbidity**: Risk Level 2 dischargers shall perform turbidity analysis using a calibrated turbidity meter (turbidimeter), either on-site or at an accredited lab. Acceptable test methods include Standard Method 2130 or USEPA Method 180.1. The results will be recorded in the site log book in Nephelometric Turbidity Units (NTU).

10. **Risk Level 2 - Non-Storm Water Discharge Monitoring Requirements**

a. Visual Monitoring Requirements:

i. Risk Level 2 dischargers shall visually observe (inspect) each drainage area for the presence of (or indications of prior) unauthorized and authorized non-storm water discharges and their sources.

ii. Risk Level 2 dischargers shall conduct one visual observation (inspection) quarterly in each of the following periods: January-March, April-June, July-September, and October-December. Visual observation (inspections) are only required during daylight hours (sunrise to sunset).

iii. Risk Level 2 dischargers shall ensure that visual observations (inspections) document the presence or evidence of any non-storm water discharge (authorized or unauthorized), pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.), and source. Risk Level 2 dischargers shall maintain on-site records indicating the personnel performing the visual observation (inspections), the dates and approximate time each drainage area and non-storm water discharge was observed, and the response taken to eliminate unauthorized non-storm water discharges and to reduce or prevent pollutants from contacting non-storm water discharges.

b. Effluent Sampling Locations:

i. Risk Level 2 dischargers shall sample effluent at all discharge points where non-storm water and/or authorized non-storm water is discharged off-site.

ii. Risk Level 2 dischargers shall send all non-storm water sample analyses to a laboratory certified for such analyses by the State Department of Health Services.

iii. Risk Level 2 dischargers shall monitor and report run-on from surrounding areas if there is reason to believe run-on may contribute to an exceedance of NALs.

11. **Risk Level 2 – Non-Visible Pollutant Monitoring Requirements**

a. Risk Level 2 dischargers shall collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water.

b. Risk Level 2 dischargers shall ensure that water samples are large enough to characterize the site conditions.

c. Risk Level 2 dischargers shall collect samples at all discharge locations that can be safely accessed.

d. Risk Level 2 dischargers shall collect samples during the first two hours of discharge from rain events that occur during business hours and which generate runoff.

e. Risk Level 2 dischargers shall analyze samples for all non-visible pollutant parameters (if applicable) - parameters indicating the presence of pollutants identified in the pollutant source assessment required (Risk Level 2 dischargers shall modify their CSMPs to address these additional parameters in accordance with any updated SWPPP pollutant source assessment).

f. Risk Level 2 dischargers shall collect a sample of storm water that has not come in contact with the disturbed soil or the materials stored or used on-site (uncontaminated sample) for comparison with the discharge sample.

g. Risk Level 2 dischargers shall compare the uncontaminated sample to the samples of discharge using field analysis or through laboratory analysis.[6]

h. Risk Level 2 dischargers shall keep all field /or analytical data in the SWPPP document.

12. **Risk Level 2 – Watershed Monitoring Option**

Risk Level 2 dischargers who are part of a qualified regional watershed-based monitoring program may be eligible for relief from the requirements in Sections I.5. The Regional Water Board may approve proposals to substitute an acceptable watershed-based monitoring program by determining if the watershed-based monitoring program

[6] For laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136. Field discharge samples shall be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed.

will provide substantially similar monitoring information in evaluating discharger compliance with the requirements of this General Permit.

13. **Risk Level 2 – Particle Size Analysis for Project Risk Justification**

Risk Level 2 dischargers justifying an alternative project risk shall report a soil particle size analysis used to determine the RUSLE K-Factor. ASTM D-422 (Standard Test Method for Particle-Size Analysis of Soils), as revised, shall be used to determine the percentages of sand, very fine sand, silt, and clay on the site.

14. **Risk Level 2 – Records**

Risk Level 2 dischargers shall retain records of all storm water monitoring information and copies of all reports (including Annual Reports) for a period of at least three years. Risk Level 2 dischargers shall retain all records on-site while construction is ongoing. These records include:

a. The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation.

b. The individual(s) who performed the facility inspections, sampling, visual observation (inspections), and or measurements.

c. The date and approximate time of analyses.

d. The individual(s) who performed the analyses.

e. A summary of all analytical results from the last three years, the method detection limits and reporting units, the analytical techniques or methods used, and the chain of custody forms.

f. Rain gauge readings from site inspections;

g. Quality assurance/quality control records and results.

h. Non-storm water discharge inspections and visual observation (inspections) and storm water discharge visual observation records (see Sections I.3 and I.10 above).

i. Visual observation and sample collection exception records (see Section I.6 above).

j. The records of any corrective actions and follow-up activities that resulted from analytical results, visual observation (inspections), or inspections.

15. **Risk Level 2 – NAL Exceedance Report**

a. In the event that any effluent sample exceeds an applicable NAL, Risk Level 2 dischargers shall electronically submit all storm event sampling results to the State Water Board no later than 10 days after the conclusion of the storm event. The Regional Boards have the authority to require the submittal of an NAL Exceedance Report.

b. Risk Level 2 dischargers shall certify each NAL Exceedance Report in accordance with the Special Provisions for Construction Activity.

c. Risk Level 2 dischargers shall retain an electronic or paper copy of each NAL Exceedance Report for a minimum of three years after the date the annual report is filed.

d. Risk Level 2 dischargers shall include in the NAL Exceedance Report:

   i. The analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit").

   ii. The date, place, time of sampling, visual observation (inspections), and/or measurements, including precipitation.

   iii. A description of the current BMPs associated with the effluent sample that exceeded the NAL and the proposed corrective actions taken.

Table 3 – Risk Level 2 Test Methods, Detection Limits, Reporting Units and Applicable NALs/NELs

Parameter	Test Method / Protocol	Discharge Type	Min. Detection Limit	Reporting Units	Numeric Action Level
pH	Field test with calibrated portable instrument	Risk Level 2 Discharges	0.2 pH	units	lower NAL = 6.5 upper NAL = 8.5
Turbidity EPA	0180.1 and/or field test with calibrated portable instrument	Risk Level 2 Discharges other than ATS	1 NTU		250 NTU
		For ATS discharges	1 NTU		N/A

ATTACHMENT E
RISK LEVEL 3 REQUIREMENTS

A. Effluent Standards

[These requirements are the same as those in the General Permit order.]

1. Narrative – Risk Level 3 dischargers shall comply with the narrative effluent standards listed below:

   a. Storm water discharges and authorized non-storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.

   b. Dischargers shall minimize or prevent pollutants in storm water discharges and authorized non-storm water discharges through the use of controls, structures, and management practices that achieve BAT for toxic and non-conventional pollutants and BCT for conventional pollutants.

2. Numeric –Risk Level 3 dischargers are subject to a pH NAL of 6.5-8.5, and a turbidity NAL of 250 NTU. In addition, Risk Level 3 dischargers are subject to a pH NEL of 6.0-9.0 and a turbidity NEL of 500 NTU.

B. Good Site Management "Housekeeping"

1. Risk Level 3 dischargers shall implement good site management (i.e., "housekeeping") measures for construction materials that could potentially be a threat to water quality if discharged. At a minimum, Risk Level 3 dischargers shall implement the following good housekeeping measures:

   a. Conduct an inventory of the products used and/or expected to be used and the end products that are produced and/or expected to be produced. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

   b. Cover and berm loose stockpiled construction materials that are not actively being used (i.e. soil, spoils, aggregate, fly-ash, stucco, hydrated lime, etc.).

c. Store chemicals in watertight containers (with appropriate secondary containment to prevent any spillage or leakage) or in a storage shed (completely enclosed).

d. Minimize exposure of construction materials to precipitation. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

e. Implement BMPs to prevent the off-site tracking of loose construction and landscape materials.

2. Risk Level 3 dischargers shall implement good housekeeping measures for waste management, which, at a minimum, shall consist of the following:

   a. Prevent disposal of any rinse or wash waters or materials on impervious or pervious site surfaces or into the storm drain system.

   b. Ensure the containment of sanitation facilities (e.g., portable toilets) to prevent discharges of pollutants to the storm water drainage system or receiving water.

   c. Clean or replace sanitation facilities and inspecting them regularly for leaks and spills.

   d. Cover waste disposal containers at the end of every business day and during a rain event.

   e. Prevent discharges from waste disposal containers to the storm water drainage system or receiving water.

   f. Contain and securely protecting stockpiled waste material from wind and rain at all times unless actively being used.

   g. Implement procedures that effectively address hazardous and non-hazardous spills.

   h. Develop a spill response and implementation element of the SWPPP prior to commencement of construction activities. The SWPPP shall require that:

      i. Equipment and materials for cleanup of spills shall be available on site and that spills and leaks shall be cleaned up immediately and disposed of properly; and

ii. Appropriate spill response personnel are assigned and trained.

i. Ensure the containment of concrete washout areas and other washout areas that may contain additional pollutants so there is no discharge into the underlying soil and onto the surrounding areas.

3. Risk Level 3 dischargers shall implement good housekeeping for <u>vehicle storage and maintenance</u>, which, at a minimum, shall consist of the following:

   a. Prevent oil, grease, or fuel to leak in to the ground, storm drains or surface waters.

   b. Place all equipment or vehicles, which are to be fueled, maintained and stored in a designated area fitted with appropriate BMPs.

   c. Clean leaks immediately and disposing of leaked materials properly.

4. Risk Level 3 dischargers shall implement good housekeeping for <u>landscape materials</u>, which, at a minimum, shall consist of the following:

   a. Contain stockpiled materials such as mulches and topsoil when they are not actively being used.

   b. Contain fertilizers and other landscape materials when they are not actively being used.

   c. Discontinuing the application of any erodible landscape material within 2 days before a forecasted rain event or during periods of precipitation.

   d. Applying erodible landscape material at quantities and application rates according to manufacture recommendations or based on written specifications by knowledgeable and experienced field personnel.

   e. Stacking erodible landscape material on pallets and covering or storing such materials when not being used or applied.

5. Risk Level 3 dischargers shall conduct an assessment and create a list of <u>potential pollutant sources</u> and identify any areas of the site where additional BMPs are necessary to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges. This potential pollutant list shall be kept with the SWPPP and shall identify

all non-visible pollutants which are known, or should be known, to occur on the construction site. At a minimum, when developing BMPs, Risk Level 3 dischargers shall do the following:

a. Consider the quantity, physical characteristics (e.g., liquid, powder, solid), and locations of each potential pollutant source handled, produced, stored, recycled, or disposed of at the site.

b. Consider the degree to which pollutants associated with those materials may be exposed to and mobilized by contact with storm water.

c. Consider the direct and indirect pathways that pollutants may be exposed to storm water or authorized non-storm water discharges. This shall include an assessment of past spills or leaks, non-storm water discharges, and discharges from adjoining areas.

d. Ensure retention of sampling, visual observation, and inspection records.

e. Ensure effectiveness of existing BMPs to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges.

6. Risk Level 3 dischargers shall implement good housekeeping measures on the construction site to control the air deposition of site materials and from site operations. Such particulates can include, but are not limited to, sediment, nutrients, trash, metals, bacteria, oil and grease and organics.

7. **Additional Risk Level 3 Requirement:** Risk Level 3 dischargers shall document all housekeeping BMPs in the SWPPP and REAP(s) in accordance with the nature and phase of the construction project. Construction phases at traditional land development projects include Grading and Land Development Phase, Streets and Utilities, or Vertical Construction for traditional land development projects.

C. Non-Storm Water Management

1. Risk Level 3 dischargers shall implement measures to control all non-storm water discharges during construction.

2. Risk Level 3 dischargers shall wash vehicles in such a manner as to prevent non-storm water discharges to surface waters or MS4 drainage systems.

3. Risk Level 3 dischargers shall clean streets in such a manner as to prevent unauthorized non-storm water discharges from reaching surface water or MS4 drainage systems.

D. Erosion Control

1. Risk Level 3 dischargers shall implement effective wind erosion control.

2. Risk Level 3 dischargers shall provide effective soil cover for inactive[1] areas and all finished slopes, open space, utility backfill, and completed lots.

3. Dischargers shall limit the use of plastic materials when more sustainable, environmentally friendly alternatives exist. Where plastic materials are deemed necessary, the discharger shall consider the use of plastic materials resistant to solar degradation.

E. Sediment Controls

1. Risk Level 3 dischargers shall establish and maintain effective perimeter controls and stabilize all construction entrances and exits to sufficiently control erosion and sediment discharges from the site.

2. On sites where sediment basins are to be used, Risk Level 3 dischargers shall, at minimum, design sediment basins according to the method provided in CASQA's Construction BMP Guidance Handbook.

3. **Additional Risk Level 3 Requirement:** Risk Level 3 dischargers shall implement appropriate erosion control BMPs (runoff control and soil stabilization) in conjunction with sediment control BMPs for areas under active[2] construction.

4. **Additional Risk Level 3 Requirement:** Risk Level 3 dischargers shall apply linear sediment controls along the toe of the slope, face of the slope, and at the grade breaks of exposed slopes to comply with sheet flow lengths[3] in accordance with Table 1.

[1] Inactive areas of construction are areas of construction activity that have been disturbed and are not scheduled to be re-disturbed for at least 14 days.
[2] Active areas of construction are areas undergoing land surface disturbance. This includes construction activity during the preliminary stage, mass grading stage, streets and utilities stage and the vertical construction stage
[3] Sheet flow length is the length that shallow, low velocity flow travels across a site.

Table 1 - Critical Slope/Sheet Flow Length Combinations

Slope Percentage	Sheet flow length not to exceed
0-25% 20	feet
25-50% 15	feet
Over 50%	10 feet

5. **Additional Risk Level 3 Requirement:** Risk Level 3 dischargers shall ensure that construction activity traffic to and from the project is limited to entrances and exits that employ effective controls to prevent offsite tracking of sediment.

6. **Additional Risk Level 3 Requirement:** Risk Level 3 dischargers shall ensure that all storm drain inlets and perimeter controls, runoff control BMPs, and pollutant controls at entrances and exits (e.g. tire washoff locations) are maintained and protected from activities that reduce their effectiveness.

7. **Additional Risk Level 3 Requirement:** Risk Level 3 dischargers shall inspect on a daily basis all immediate access roads daily. At a minimum daily (when necessary) and prior to any rain event, the discharger shall remove any sediment or other construction activity-related materials that are deposited on the roads (by vacuuming or sweeping).

8. **Additional Risk Level 3 Requirement:** The Regional Water Board may require Risk Level 3 dischargers to implement additional site-specific sediment control requirements if the implementation of the other requirements in this section are not adequately protecting the receiving waters.

F. Run-on and Run-off Controls

Risk Level 3 dischargers shall effectively manage all run-on, all runoff within the site and all runoff that discharges off the site. Run-on from off site shall be directed away from all disturbed areas or shall collectively be in compliance with the effluent limitations in this General Permit.

G. Inspection, Maintenance and Repair

1. Risk Level 3 dischargers shall ensure that all inspection, maintenance repair and sampling activities at the project location shall be performed or supervised by a Qualified SWPPP Practitioner (QSP) representing the discharger. The QSP may delegate any or all of these activities to an employee appropriately trained to do the task(s).

2. Risk Level 3 dischargers shall perform weekly inspections and observations, and at least once each 24-hour period during extended storm events, to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Inspectors shall be the QSP or be trained by the QSP.

3. Upon identifying failures or other shortcomings, as directed by the QSP, Risk Level 3 dischargers shall begin implementing repairs or design changes to BMPs within 72 hours of identification and complete the changes as soon as possible.

4. For each inspection required, Risk Level 3 dischargers shall complete an inspection checklist, using a form provided by the State Water Board or Regional Water Board or in an alternative format.

5. Risk Level 3 dischargers shall ensure that checklists shall remain onsite with the SWPPP and at a minimum, shall include:

   a. Inspection date and date the inspection report was written.

   b. Weather information, including presence or absence of precipitation, estimate of beginning of qualifying storm event, duration of event, time elapsed since last storm, and approximate amount of rainfall in inches.

   c. Site information, including stage of construction, activities completed, and approximate area of the site exposed.

   d. A description of any BMPs evaluated and any deficiencies noted.

   e. If the construction site is safely accessible during inclement weather, list the observations of all BMPs: erosion controls, sediment controls, chemical and waste controls, and non-storm water controls. Otherwise, list the results of visual inspections at all relevant outfalls, discharge points, downstream locations and any projected maintenance activities.

   f. Report the presence of noticeable odors or of any visible sheen on the surface of any discharges.

   g. Any corrective actions required, including any necessary changes to the SWPPP and the associated implementation dates.

   h. Photographs taken during the inspection, if any.

i. Inspector's name, title, and signature.

H. Rain Event Action Plan

1. **Additional Risk Level 3 Requirement:** The discharger shall ensure a QSP develop a Rain Event Action Plan (REAP) 48 hours prior to any likely precipitation event. A likely precipitation event is any weather pattern that is forecast to have a 50% or greater probability of producing precipitation in the project area. The QSP shall obtain a printed copy of precipitation forecast information from the National Weather Service Forecast Office (e.g., by entering the zip code of the project's location at http://www.srh.noaa.gov/forecast).

2. **Additional Risk Level 3 Requirement:** The discharger shall ensure a QSP develop the REAPs for all phases of construction (i.e., Grading and Land Development, Streets and Utilities, Vertical Construction, Final Landscaping and Site Stabilization).

3. **Additional Risk Level 3 Requirement:** The discharger shall ensure a QSP ensure that the REAP include, at a minimum, the following site information:

   a. Site Address.
   b. Calculated Risk Level (2 or 3).
   c. Site Storm Water Manager Information including the name, company, and 24-hour emergency telephone number.
   d. Erosion and Sediment Control Provider information including the name, company, and 24-hour emergency telephone number.
   e. Storm Water Sampling Agent information including the name, company, and 24-hour emergency telephone number.

4. **Additional Risk Level 3 Requirement:** The QSP shall include in the REAP, at a minimum, the following project phase information:

   a. Activities associated with each construction phase.
   b. Trades active on the construction site during each construction phase.
   c. Trade contractor information.
   d. Suggested actions for each project phase.

5. **Additional Risk Level 3 Requirement:** The QSP shall develop additional REAPs for project sites where construction activities are indefinitely halted or postponed (Inactive Construction). At a minimum, Inactive Construction REAPs must include:

a. Site Address.
b. Calculated Risk Level (2 or 3).
c. Site Storm Water Manager Information including the name, company, and 24-hour emergency telephone number.
d. Erosion and Sediment Control Provider information including the name, company, and 24-hour emergency telephone number.
e. Storm Water Sampling Agent information including the name, company, and 24-hour emergency telephone number.
f. Trades active on site during Inactive Construction.
g. Trade contractor information.
h. Suggested actions for inactive construction sites.

6. **Additional Risk Level 3 Requirement:** The discharger shall ensure a QSP begin implementation and make the REAP available onsite no later than 24 hours prior to the likely precipitation event.

7. **Additional Risk Level 3 Requirement:** The discharger shall ensure a QSP maintain onsite a paper copy of each REAP onsite in compliance with the record retention requirements of the Special Provisions in this General Permit.

I. Risk Level 3 Monitoring and Reporting Requirements

Table 2- Summary of Monitoring Requirements

Risk Level	Visual Inspections					Sample Collection	
	Quarterly Non-storm Water Discharge	Pre-storm Event		Daily Storm BMP	Post Storm	Storm Water Discharge	Receiving Water
		Baseline	REAP				
3	X	X	X	X	X	X	X[4]

1. Construction Site Monitoring Program Requirements

   a. Pursuant to Water Code Sections 13383 and 13267, all dischargers subject to this General Permit shall develop and implement a written site-specific Construction Site Monitoring Program (CSMP) in accordance with the requirements of this Section. The CSMP shall include all monitoring procedures and instructions, location maps, forms, and checklists as required in this section. The CSMP shall be developed prior to the commencement of construction activities, and revised as necessary to reflect project revisions. The CSMP shall be a part of the Storm Water Pollution Prevention Plan (SWPPP), included as an appendix or separate SWPPP chapter.

   b. Existing dischargers registered under the State Water Board Order No. 99-08-DWQ shall make and implement necessary revisions to their Monitoring Program to reflect the changes in this General Permit in a timely manner, but no later than July 1, 2010. Existing dischargers shall continue to implement their existing Monitoring Program in compliance with State Water Board Order No. 99-08-DWQ until the necessary revisions are completed according to the schedule above.

   c. When a change of ownership occurs for all or any portion of the construction site prior to completion or final stabilization, the new discharger shall comply with these requirements as of the date the ownership change occurs.

2. **Objectives**

   The CSMP shall be developed and implemented to address the following objectives:

[4] When NEL exceeded

a. To demonstrate that the site is in compliance with the Discharge Prohibitions and applicable Numeric Action Levels (NALs)/Numeric Effluent Limitations (NELs) of this General Permit.

b. To determine whether non-visible pollutants are present at the construction site and are causing or contributing to exceedances of water quality objectives.

c. To determine whether immediate corrective actions, additional Best Management Practice (BMP) implementation, or SWPPP revisions are necessary to reduce pollutants in storm water discharges and authorized non-storm water discharges.

d. To determine whether BMPs included in the SWPPP/Rain Event Action Plan (REAP) are effective in preventing or reducing pollutants in storm water discharges and authorized non-storm water discharges.

3. **Risk Level 3 – Visual Monitoring (Inspection) Requirements for Qualifying Rain Events**

a. Risk Level 3 dischargers shall visually observe (inspect) storm water discharges at all discharge locations within two business days (48 hours) after each qualifying rain event.

b. Risk Level 3 dischargers shall visually observe (inspect) the discharge of stored or contained storm water that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge. Stored or contained storm water that will likely discharge after operating hours due to anticipated precipitation shall be observed prior to the discharge during operating hours.

c. Risk Level 3 dischargers shall conduct visual observations (inspections) during business hours only.

d. Risk Level 3 dischargers shall record the time, date and rain gauge reading of all qualifying rain events.

e. Within 2 business days (48 hours) prior to each qualifying rain event, Risk Level 3 dischargers shall visually observe (inspect):

i. all storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources. If needed, the discharger shall implement appropriate corrective actions.

ii. all BMPs to identify whether they have been properly implemented in accordance with the SWPPP/REAP. If needed, the discharger shall implement appropriate corrective actions.

iii. any storm water storage and containment areas to detect leaks and ensure maintenance of adequate freeboard.

f. For the visual observations (inspections) described in c.i. and c.iii above, Risk Level 3 dischargers shall observe the presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

g. Within two business days (48 hours) after each qualifying rain event, Risk Level 3 dischargers shall conduct post rain event visual observations (inspections) to (1) identify whether BMPs were adequately designed, implemented, and effective, and (2) identify additional BMPs and revise the SWPPP accordingly.

h. Risk Level 3 dischargers shall maintain on-site records of all visual observations (inspections), personnel performing the observations, observation dates, weather conditions, locations observed, and corrective actions taken in response to the observations.

4. **Risk Level 3 – Water Quality Sampling and Analysis**

a. Risk Level 3 dischargers shall collect storm water grab samples from sampling locations, as defined in Section I.5. The storm water grab sample(s) obtained shall be representative of the flow and characteristics of the discharge.

b. At minimum, Risk Level 3 dischargers shall collect 3 samples per day of the qualifying event.

c. Risk Level 3 dischargers shall ensure that the grab samples collected of stored or contained storm water are from discharges subsequent to a qualifying rain event (producing precipitation of ½ inch or more at the time of discharge).

<u>Storm Water Effluent Monitoring Requirements</u>

d. Risk Level 3 dischargers shall analyze their effluent samples for:

i. pH and turbidity.

ii. Any additional parameters for which monitoring is required by the Regional Water Board.

e. Risk 3 dischargers shall electronically submit all storm event sampling results to the State Water Board no later than 5 days after the conclusion of the storm event.

f. Risk Level 3 discharger sites that have violated the turbidity daily average NEL shall analyze subsequent effluent samples for all the parameters specified in Section I.4.e, above, and Suspended Sediment Concentration (SSC).

Receiving Water Monitoring Requirements

g. In the event that a Risk Level 3 discharger violates an NEL contained in this General Permit and has a direct discharge into receiving waters, the Risk Level 3 discharger shall subsequently sample receiving waters (RWs) for all parameter(s) required in Section I.4.e above for the duration of coverage under this General Permit.

h. Risk Level 3 dischargers disturbing 30 acres or more of the landscape and with direct discharges into receiving waters shall conduct or participate in benthic macroinvertebrate bioassessment of RWs prior to commencement of construction activity (See Appendix 3).

i. Risk Level 3 dischargers shall obtain RW samples in accordance with the Receiving Water sampling location section (Section I.5), below.

5. **Risk Level 3 – Storm Water Discharge Water Quality Sampling Locations**

Effluent Sampling Locations

a. Risk Level 3 dischargers shall perform sampling and analysis of storm water discharges to characterize discharges associated with construction activity from the entire project disturbed area.

b. Risk Level 3 dischargers shall collect effluent samples at all discharge points where storm water is discharged off-site.

c. Risk Level 3 dischargers shall ensure that storm water discharge collected and observed represent[5] the effluent in each drainage area based on visual observation of the water and upstream conditions.

d. Risk Level 3 dischargers shall monitor and report site run-on from surrounding areas if there is reason to believe run-on may contribute to an exceedance of NALs or NELs.

e. Risk Level 3 dischargers who deploy an ATS on their site, or a portion on their site, shall collect ATS effluent samples and measurements from the discharge pipe or another location representative of the nature of the discharge.

f. Risk Level 3 dischargers shall select analytical test methods from the list provided in Table 3 below.

g. All storm water sample collection preservation and handling shall be conducted in accordance with Section I.7 “Storm Water Sample Collection and Handling Instructions” below.

Receiving Water Sampling Locations

h. **Upstream/up-gradient RW samples**: Risk Level 3 dischargers shall obtain any required upstream/up-gradient receiving water samples from a representative and accessible location as close as possible and upstream from the effluent discharge point.

i. **Downstream/down-gradient RW samples**: Risk Level 3 dischargers shall obtain any required downstream/down-gradient receiving water samples from a representative and accessible location as close as possible and downstream from the effluent discharge point.

j. If two or more discharge locations discharge to the same receiving water, Risk Level 3 dischargers may sample the receiving water at a single upstream and downstream location.

[5] For example, if there has been concrete work recently in an area, or drywall scrap is exposed to the rain, a pH sample shall be taken of drainage from the relevant work area. Similarly, if sediment-laden water is flowing through some parts of a silt fence, samples shall be taken of the sediment laden water even if most water flowing through the fence is clear.

6. **Risk Level 3 – Visual Observation and Sample Collection Exemptions**

   a. Risk Level 3 dischargers shall be prepared to collect samples and conduct visual observation (inspections) until the minimum requirements of Sections I.3 and I.4 above are completed. Risk Level 3 dischargers are not required to physically collect samples or conduct visual observation (inspections) under the following conditions:

      i. During dangerous weather conditions such as flooding and electrical storms.

      ii. Outside of scheduled site business hours.

   b. If no required samples or visual observation (inspections) are collected due to these exceptions, Risk Level 3 dischargers shall include an explanation in their SWPPP and in the Annual Report documenting why the sampling or visual observation (inspections) were not conducted.

7. **Risk Level 3 – Storm Water Sample Collection and Handling Instructions**

   a. Risk Level 3 dischargers shall refer to Table 3 below for test methods, detection limits, and reporting units.

   b. Risk Level 3 dischargers shall ensure that testing laboratories will receive samples within 48 hours of the physical sampling (unless otherwise required by the laboratory), and shall use only the sample containers provided by the laboratory to collect and store samples.

   c. Risk Level 3 dischargers shall designate and train personnel to collect, maintain, and ship samples in accordance with the Surface Water Ambient Monitoring Program's (SWAMP) 2008 Quality Assurance Program Plan (QAPrP).[6]

[6] Additional information regarding SWAMP's QAPrP and QAMP can be found at http://www.waterboards.ca.gov/water_issues/programs/swamp/.
QAPrP:http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/qapp/swamp_qapp_master090108a.pdf
QAMP: http://www.waterboards.ca.gov/water_issues/programs/swamp/qamp.shtml

8. **Risk Level 3 – Monitoring Methods**

   a. Risk Level 3 dischargers shall include a description of the following items in the CSMP:

      i. Visual observation locations, visual observation procedures, and visual observation follow-up and tracking procedures.

      ii. Sampling locations, and sample collection and handling procedures. This shall include detailed procedures for sample collection, storage, preservation, and shipping to the testing lab to assure that consistent quality control and quality assurance is maintained. Dischargers shall attach to the monitoring program an example Chain of Custody form used when handling and shipping samples.

      iii. Identification of the analytical methods and related method detection limits (if applicable) for each parameter required in Section I.4 above.

   b. Risk Level 3 dischargers shall ensure that all sampling and sample preservation are in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association). All monitoring instruments and equipment (including a discharger's own field instruments for measuring pH and turbidity) should be calibrated and maintained in accordance with manufacturers' specifications to ensure accurate measurements. Risk Level 3 dischargers shall ensure that all laboratory analyses are conducted according to test procedures under 40 CFR Part 136, unless other test procedures have been specified in this General Permit or by the Regional Water Board. With the exception of field analysis conducted by the discharger for turbidity and pH, all analyses should be sent to and conducted at a laboratory certified for such analyses by the State Department of Health Services (SSC exception). Risk Level 3 dischargers shall conduct their own field analysis of pH and may conduct their own field analysis of turbidity if the discharger has sufficient capability (qualified and trained employees, properly calibrated and maintained field instruments, etc.) to adequately perform the field analysis.

9. **Risk Level 3 – Analytical Methods**

   a. Risk Level 3 dischargers shall refer to Table 3 below for test methods, detection limits, and reporting units.

b. **pH**: Risk Level 3 dischargers shall perform pH analysis on-site with a calibrated pH meter or a pH test kit. Risk Level 3 dischargers shall record pH monitoring results on paper and retain these records in accordance with Section I.14, below.

c. **Turbidity**: Risk Level 3 dischargers shall perform turbidity analysis using a calibrated turbidity meter (turbidimeter), either on-site or at an accredited lab. Acceptable test methods include Standard Method 2130 or USEPA Method 180.1. The results will be recorded in the site log book in Nephelometric Turbidity Units (NTU).

d. **Suspended sediment concentration (SSC)**: Risk Level 3 dischargers shall perform SSC analysis using ASTM Method D3977-97.

e. **Bioassessment**: Risk Level 3 dischargers shall perform bioassessment sampling and analysis according to Appendix 3 of this General Permit.

10. **Risk Level 3 - Non-Storm Water Discharge Monitoring Requirements**

a. Visual Monitoring Requirements:

i. Risk Level 3 dischargers shall visually observe (inspect) each drainage area for the presence of (or indications of prior) unauthorized and authorized non-storm water discharges and their sources.

ii. Risk Level 3 dischargers shall conduct one visual observation (inspection) quarterly in each of the following periods: January-March, April-June, July-September, and October-December. Visual observation (inspections) are only required during daylight hours (sunrise to sunset).

iii. Risk Level 3 dischargers shall ensure that visual observations (inspections) document the presence or evidence of any non-storm water discharge (authorized or unauthorized), pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.), and source. Risk Level 3 dischargers shall maintain on-site records indicating the personnel performing the visual observation (inspections), the dates and approximate time each drainage area and non-storm water discharge was observed, and the response taken to eliminate unauthorized non-storm water discharges and to reduce or prevent pollutants from contacting non-storm water discharges.

b. Effluent Sampling Locations:

   i. Risk Level 3 dischargers shall sample effluent at all discharge points where non-storm water and/or authorized non-storm water is discharged off-site.

   ii. Risk Level 3 dischargers shall send all non-storm water sample analyses to a laboratory certified for such analyses by the State Department of Health Services.

   iii. Risk Level 3 dischargers shall monitor and report run-on from surrounding areas if there is reason to believe run-on may contribute to an exceedance of NALs or NELs.

11. **Risk Level 3 – Non-Visible Pollutant Monitoring Requirements**

a. Risk Level 3 dischargers shall collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water.

b. Risk Level 3 dischargers shall ensure that water samples are large enough to characterize the site conditions.

c. Risk Level 3 dischargers shall collect samples at all discharge locations that can be safely accessed.

d. Risk Level 3 dischargers shall collect samples during the first two hours of discharge from rain events that occur during business hours and which generate runoff.

e. Risk Level 3 dischargers shall analyze samples for all non-visible pollutant parameters (if applicable) - parameters indicating the presence of pollutants identified in the pollutant source assessment required (Risk Level 3 dischargers shall modify their CSMPs to address these additional parameters in accordance with any updated SWPPP pollutant source assessment).

f. Risk Level 3 dischargers shall collect a sample of storm water that has not come in contact with the disturbed soil or the materials stored or used on-site (uncontaminated sample) for comparison with the discharge sample.

g. Risk Level 3 dischargers shall compare the uncontaminated sample to the samples of discharge using field analysis or through laboratory analysis.[7]

h. Risk Level 3 dischargers shall keep all field /or analytical data in the SWPPP document.

12. **Risk Level 3 – Watershed Monitoring Option**

Risk Level 3 dischargers who are part of a qualified regional watershed-based monitoring program may be eligible for relief from the requirements in Sections I.5. The Regional Water Board may approve proposals to substitute an acceptable watershed-based monitoring program by determining if the watershed-based monitoring program will provide substantially similar monitoring information in evaluating discharger compliance with the requirements of this General Permit.

13. **Risk Level 3 – Particle Size Analysis for Project Risk Justification**

Risk Level 3 dischargers justifying an alternative project risk shall report a soil particle size analysis used to determine the RUSLE K-Factor. ASTM D-422 (Standard Test Method for Particle-Size Analysis of Soils), as revised, shall be used to determine the percentages of sand, very fine sand, silt, and clay on the site.

14. **Risk Level 3 – Records**

Risk Level 3 dischargers shall retain records of all storm water monitoring information and copies of all reports (including Annual Reports) for a period of at least three years. Risk Level 3 dischargers shall retain all records on-site while construction is ongoing. These records include:

a. The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation.

b. The individual(s) who performed the facility inspections, sampling, visual observation (inspections), and or measurements.

c. The date and approximate time of analyses.

[7] For laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136. Field discharge samples shall be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed.

d. The individual(s) who performed the analyses.

e. A summary of all analytical results from the last three years, the method detection limits and reporting units, the analytical techniques or methods used, and the chain of custody forms.

f. Rain gauge readings from site inspections.

g. Quality assurance/quality control records and results.

h. Non-storm water discharge inspections and visual observation (inspections) and storm water discharge visual observation records (see Sections I.3 and I.10 above).

i. Visual observation and sample collection exception records (see Section I.6 above).

j. The records of any corrective actions and follow-up activities that resulted from analytical results, visual observation (inspections), or inspections.

15. **Risk Level 3 – NAL Exceedance Report**

a. In the event that any effluent sample exceeds an applicable NAL, Risk Level 3 dischargers shall electronically submit all storm event sampling results to the State Water Board no later than 10 days after the conclusion of the storm event. The Regional Boards have the authority to require the submittal of an NAL Exceedance Report.

b. Risk Level 3 dischargers shall certify each NAL Exceedance Report in accordance with the Special Provisions for Construction Activity In this General Permit.

c. Risk Level 3 dischargers shall retain an electronic or paper copy of each NAL Exceedance Report for a minimum of three years after the date the annual report is filed.

d. Risk Level 3 dischargers shall include in the NAL Exceedance Report:

   i. The analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit").

ii. The date, place, time of sampling, visual observation (inspections), and/or measurements, including precipitation.

iii. A description of the current BMPs associated with the effluent sample that exceeded the NAL and the proposed corrective actions taken.

16. **Risk Level 3 – NEL Violation Report**

a. Risk Level 3 dischargers shall electronically submit all storm event sampling results to the State Water Board no later than 5 days after the conclusion of the storm event.

b. In the event that a discharger has violated an applicable NEL, Risk Level 3 dischargers shall submit an NEL Violation Report to the State Water Board within 24 hours after the NEL exceedance has been identified.

c. Risk Level 3 dischargers shall certify each NEL Violation Report in accordance with the Special Provisions for Construction Activity in this General Permit.

d. Risk Level 3 dischargers shall retain an electronic or paper copy of each NEL Violation Report for a minimum of three years after the date the annual report is filed.

e. Risk Level 3 dischargers shall include in the NEL Violation Report:

i. The analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit");

ii. The date, place, time of sampling, visual observation (inspections), and/or measurements, including precipitation; and

iii. A Description of the current onsite BMPs, and the proposed corrective actions taken to manage the NEL exceedance.

f. Compliance Storm Exemption - In the event that an applicable NEL has been exceeded during a storm event equal to or larger than the Compliance Storm Event, Risk level 3 discharger shall report the on-site rain gauge reading and nearby governmental rain gauge readings for verification.

17. **Risk Level 3 – Bioassessment**

a. Risk Level 3 dischargers with a total project-related ground disturbance exceeding 30 acres shall:

   i. Conduct bioassessment monitoring, as described in Appendix 3.

   ii. Include the collection and reporting of specified in stream biological data and physical habitat.

   iii. Use the bioassessment sample collection and Quality Assurance & Quality Control (QA/QC) protocols developed by the State of California's Surface Water Ambient Monitoring Program (SWAMP).[8]

b. Risk Level 3 dischargers qualifying for bioassessment, where construction commences out of an index period for the site location shall:

   i. Receive Regional Board approval for the sampling exception.

   ii. Conduct bioassessment monitoring, as described in Appendix 3.

   iii. Include the collection and reporting of specified instream biological data and physical habitat.

   iv. Use the bioassessment sample collection and Quality Assurance & Quality Control (QA/QC) protocols developed by the State of California's Surface Water Ambient Monitoring Program (SWAMP).

   OR

   v. Make a check payable to: Cal State Chico Foundation (SWAMP Bank Account) or San Jose State Foundation (SWAMP Bank Account) and include the WDID# on the check for the amount calculated for the exempted project.

   vi. Send a copy of the check to the Regional Water Board office for the site's region.

   vii. Invest $**7,500.00 X The number of samples required** into the SWAMP program as compensation (upon regional board approval).

[8] http://www.waterboards.ca.gov/water_issues/programs/swamp/.

Table 3 – Risk Level 3 Test Methods, Detection Limits, Reporting Units and Applicable NALs/NELs

Parameter	Test Method / Protocol	Discharge Type	Min. Detection Limit	Reporting Units	Numeric Action Level	Numeric Effluent Limitation
pH	Field test with calibrated portable instrument	Risk Level 3 Discharges	0.2 pH	units	lower NAL = 6.5 upper NAL = 8.5	lower NEL = 6.0 upper NEL = 9.0
Turbidity EPA	0180.1 and/or field test with calibrated portable instrument	Risk Level 3 Discharges other than ATS	1	NTU	250 NTU	500 NTU
		For ATS discharges	1 NTU		N/A	10 NTU for Daily Weighted Average & 20 NTU for Any Single Sample
SSC ASTM	Method D 3977-97[9]	Risk Level 3 (if NEL exceeded)	5 mg/L		N/A	N/A
Bioassessment	(STE) Level I of (SAFIT),[10] fixed-count of 600 org/sample	Risk Level 3 projects> 30 acres	N/A N/A		N/A	N/A

[9] ASTM, 1999, Standard Test Method for Determining Sediment Concentration in Water Samples: American Society of Testing and Materials, D 3977-97, Vol. 11.02, pp. 389-394.

[10] The current SAFIT STEs (28 November 2006) list requirements for both the Level I and Level II taxonomic effort, and are located at: http://www.swrcb.ca.gov/swamp/docs/safit/ste_list.pdf. When new editions are published by SAFIT, they will supersede all previous editions. All editions will be posted at the State Water Board's SWAMP website.

ATTACHMENT F:
Active Treatment System (ATS) Requirements

Table 1 – Numeric Effluent Limitations, Numeric Action Levels, Test Methods, Detection Limits, and Reporting Units

Parameter	Test Method	Discharge Type	Min. Detection Limit	Units	Numeric Action Level	Numeric Effluent Limitation
Turbidity	EPA 0180.1 and/or field test with a calibrated portable instrument	For ATS discharges	1 NTU		N/A	10 NTU for Daily Flow-Weighted Average & 20 NTU for Any Single Sample

A. Dischargers choosing to implement an Active Treatment System (ATS) on their site shall comply with all of the requirements in this Attachment.

B. The discharger shall maintain a paper copy of each ATS specification onsite in compliance with the record retention requirements in the Special Provisions of this General Permit.

C. ATS Design, Operation and Submittals

1. The ATS shall be designed and approved by a Certified Professional in Erosion and Sediment Control (CPESC), a Certified Professional in Storm Water Quality (CPSWQ); a California registered civil engineer; or any other California registered engineer.

2. The discharger shall ensure that the ATS is designed in a manner to preclude the accidental discharge of settled floc[1] during floc pumping or related operations.

3. The discharger shall design outlets to dissipate energy from concentrated flows.

4. The discharger shall install and operate an ATS by assigning a lead person (or project manager) who has either a minimum of five years construction storm

[1] Floc is defined as a clump of solids formed by the chemical action in ATS systems.

water experience or who is a licensed contractors specifically holding a California Class A Contractors license.[2]

5. The discharger shall prepare an ATS Plan that combines the site-specific data and treatment system information required to safely and efficiently operate an ATS. The ATS Plan shall be electronically submitted to the State Water Board at least 14 days prior to the planned operation of the ATS and a paper copy shall be available onsite during ATS operation. At a minimum, the ATS Plan shall include:

   a. ATS Operation and Maintenance Manual for All Equipment.

   b. ATS Monitoring, Sampling & Reporting Plan, including Quality Assurance/Quality Control (QA/QC).

   c. ATS Health and Safety Plan.

   d. ATS Spill Prevention Plan.

6. The ATS shall be designed to capture and treat (within a 72-hour period) a volume equivalent to the runoff from a 10-year, 24-hour storm event using a watershed runoff coefficient of 1.0.

D. Treatment – Chemical Coagulation/Flocculation

1. Jar tests shall be conducted using water samples selected to represent typical site conditions and in accordance with ASTM D2035-08 (2003).

2. The discharger shall conduct, at minimum, six site-specific jar tests (per polymer with one test serving as a control) for each project to determine the proper polymer and dosage levels for their ATS.

3. Single field jar tests may also be conducted during a project if conditions warrant, for example if construction activities disturb changing types of soils, which consequently cause change in storm water and runoff characteristics.

E. Residual Chemical and Toxicity Requirements

1. The discharger shall utilize a residual chemical test method that has a method detection limit (MDL) of 10% or less than the maximum allowable threshold

[2] Business and Professions Code Division 3, Chapter 9, Article 4, Class A Contractor: A general engineering contractor is a contractor whose principal contracting business is in connection with fixed works requiring specialized engineering knowledge and skill. [http://www.cslb.ca.gov/General-Information/library/licensing-classifications.asp].

concentration[3] (MATC) for the specific coagulant in use and for the most sensitive species of the chemical used.

2. The discharger shall utilize a residual chemical test method that produces a result within one hour of sampling.

3. The discharger shall have a California State certified laboratory validate the selected residual chemical test. Specifically the lab will review the test protocol, test parameters, and the detection limit of the coagulant. The discharger shall electronically submit this documentation as part of the ATS Plan.

4. If the discharger cannot utilize a residual chemical test method that meets the requirements above, the discharger shall operate the ATS in Batch Treatment[4] mode.

5. A discharger planning to operate in Batch Treatment mode shall perform toxicity testing in accordance with the following:

   a. The discharger shall initiate acute toxicity testing on effluent samples representing effluent from each batch prior to discharge[5]. All bioassays shall be sent to a laboratory certified by the Department of Health Services (DHS) Environmental Laboratory Accreditation Program (ELAP). The required field of testing number for Whole Effluent Toxicity (WET) testing is E113.[6]

   b. Acute toxicity tests shall be conducted with the following species and protocols. The methods to be used in the acute toxicity testing shall be those outlined for a 96-hour acute test in "Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, USEPA-841-R-02-012" for Fathead minnow, *Pimephales promelas* (fathead minnow). Acute toxicity for *Oncorhynchus mykiss* (Rainbow Trout) may be used as a substitute for testing fathead minnows.

   c. All toxicity tests shall meet quality assurance criteria and test acceptability criteria in the most recent versions of the EPA test method for WET testing.

   d. The discharger shall electronically report all acute toxicity testing.

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[3] The Maximum Allowable Threshold Concentration (MATC) is the allowable concentration of residual, or dissolved, coagulant/flocculant in effluent. The MATC shall be coagulant/flocculant-specific, and based on toxicity testing conducted by an independent, third-party laboratory. A typical MATC would be:
The MATC is equal to the geometric mean of the NOEC (No Observed Effect Concentration) and LOEC (Lowest Observed Effect Concentration) Acute and Chronic toxicity results for most sensitive species determined for the specific coagulant. The most sensitive species test shall be used to determine the MATC.

[4] Batch Treatment mode is defined as holding or recirculating the treated water in a holding basin or tank(s) until treatment is complete or the basin or storage tank(s) is full.

[5] This requirement only requires that the test be initiated prior to discharge.

[6] http://www.dhs.ca.gov/ps/ls/elap/pdf/FOT_Desc.pdf.

F. Filtration

1. The ATS shall include a filtration step between the coagulant treatment train and the effluent discharge. This is commonly provided by sand, bag, or cartridge filters, which are sized to capture suspended material that might pass through the clarifier tanks.

2. Differential pressure measurements shall be taken to monitor filter loading and confirm that the final filter stage is functioning properly.

G. Residuals Management

1. Sediment shall be removed from the storage or treatment cells as necessary to ensure that the cells maintain their required water storage (i.e., volume) capability.

2. Handling and disposal of all solids generated during ATS operations shall be done in accordance with all local, state, and federal laws and regulations.

H. ATS Instrumentation

1. The ATS shall be equipped with instrumentation that automatically measures and records effluent water quality data and flow rate.

2. The minimum data recorded shall be consistent with the Monitoring and Reporting requirements below, and shall include:

   a. Influent Turbidity

   b. Effluent Turbidity

   c. Influent pH

   d. Effluent pH

   e. Residual Chemical

   f. Effluent Flow rate

   g. Effluent Flow volume

3. Systems shall be equipped with a data recording system, such as data loggers or webserver-based systems, which records each measurement on a frequency no longer than once every 15 minutes.

4. Cumulative flow volume shall be recorded daily. The data recording system shall have the capacity to record a minimum of seven days continuous data.

5. Instrumentation systems shall be interfaced with system control to provide auto shutoff or recirculation in the event that effluent measurements exceed turbidity or pH.

6. The system shall also assure that upon system upset, power failure, or other catastrophic event, the ATS will default to a recirculation mode or safe shut down.

7. Instrumentation (flow meters, probes, valves, streaming current detectors, controlling computers, etc.) shall be installed and maintained per manufacturer's recommendations, which shall be included in the QA/QC plan.

8. The QA/QC plan shall also specify calibration procedures and frequencies, instrument method detection limit or sensitivity verification, laboratory duplicate procedures, and other pertinent procedures.

9. The instrumentation system shall include a method for controlling coagulant dose, to prevent potential overdosing. Available technologies include flow/turbidity proportional metering, periodic jar testing and metering pump adjustment, and ionic charge measurement controlling the metering pump.

I. ATS Effluent Discharge

1. ATS effluent shall comply with all provisions and prohibitions in this General Permit, specifically the NELs.

2. NELs for discharges from an ATS:

   a. Turbidity of all ATS discharges shall be less than 10 NTU for daily flow-weighted average of all samples and 20 NTU for any single sample.

   b. Residual Chemical shall be < 10% of MATC[7] for the most sensitive species of the chemical used.

3. If an analytical effluent sampling result is outside the range of pH NELs (i.e., is below the lower NEL for pH or exceeds the upper NEL for pH) or exceeds the turbidity NEL (as listed in Table 1), the discharger is in violation of this General

[7] The Maximum Allowable Threshold Concentration (MATC) is the allowable concentration of residual, or dissolved, coagulant/flocculant in effluent. The MATC shall be coagulant/flocculant-specific, and based on toxicity testing conducted by an independent, third-party laboratory. The MATC is equal to the geometric mean of the NOEC (No Observed Effect Concentration) and LOEC (Lowest Observed Effect Concentration) Acute and Chronic toxicity results for most sensitive species determined for the specific coagulant. The most sensitive species test shall be used to determine the MATC.

Permit and shall electronically file the results in violation within 24-hours of obtaining the results.

4. If ATS effluent is authorized to discharge into a sanitary sewer system, the discharger shall comply with any pre-treatment requirements applicable for that system. The discharger shall include any specific criteria required by the municipality in the ATS Plan.

5. Compliance Storm Event:

   Discharges of storm water from ATS shall comply with applicable NELs (above) unless the storm event causing the discharges is determined after the fact to be equal to or larger than the Compliance Storm Event (expressed in inches of rainfall). The Compliance Storm Event for ATS discharges is the 10 year, 24 hour storm, as determined using these maps:

   http://www.wrcc.dri.edu/pcpnfreq/nca10y24.gif
   http://www.wrcc.dri.edu/pcpnfreq/sca10y24.gif

   This exemption is dependent on the submission of rain gauge data verifying the storm event is equal to or larger than the Compliance Storm.

J. Operation and Maintenance Plan

1. Each Project shall have a site-specific Operation and Maintenance (O&M) Manual covering the procedures required to install, operate and maintain the ATS.[8]

2. The O&M Manual shall only be used in conjunction with appropriate project-specific design specifications that describe the system configuration and operating parameters.

3. The O&M Manual shall have operating manuals for specific pumps, generators, control systems,and other equipment.

K. Sampling and Reporting Quality Assurance/ Quality Check (QA/QC) Plan

4. A project-specific QA/QC Plan shall be developed for each project. The QA/QC Plan shall include at a minimum:

   a. Calibration – Calibration methods and frequencies for all system and field instruments shall be specified.

   b. Method Detection Limits (MDLs) – The methods for determining MDLs shall be specified for each residual coagulant measurement method. Acceptable

[8] The manual is typically in a modular format covering generalized procedures for each component that is utilized in a particular system.

minimum MDLs for each method, specific to individual coagulants, shall be specified.

c. Laboratory Duplicates – Requirements for monthly laboratory duplicates for residual coagulant analysis shall be specified.

L. Personnel Training

1. Operators shall have training specific to using an ATS and liquid coagulants for storm water discharges in California.

2. The training shall be in the form of a formal class with a certificate and requirements for testing and certificate renewal.

3. Training shall include a minimum of eight hours classroom and 32 hours field training. The course shall cover the following topics:

   a. Coagulation Basics –Chemistry and physical processes

   b. ATS System Design and Operating Principles

   c. ATS Control Systems

   d. Coagulant Selection – Jar testing, dose determination, etc.

   e. Aquatic Safety/Toxicity of Coagulants, proper handling and safety

   f. Monitoring, Sampling, and Analysis

   g. Reporting and Recordkeeping

   h. Emergency Response

M. Active Treatment System (ATS) Monitoring Requirements

Any discharger who deploys an ATS on their site shall conduct the following:

1. Visual Monitoring

   a. A designated responsible person shall be on site daily at all times during treatment operations.

   b. Daily on-site visual monitoring of the system for proper performance shall be conducted and recorded in the project data log.

i. The log shall include the name and phone number of the person responsible for system operation and monitoring.

ii. The log shall include documentation of the responsible person's training.

2. Operational and Compliance Monitoring

a. Flow shall be continuously monitored and recorded at not greater than 15-minute intervals for total volume treated and discharged.

b. Influent and effluent pH must be continuously monitored and recorded at not greater than 15-minute intervals.

c. Influent and effluent turbidity (expressed in NTU) must be continuously monitored and recorded at not greater than 15-minute intervals.

d. The type and amount of chemical used for pH adjustment, if any, shall be monitored and recorded.

e. Dose rate of chemical used in the ATS system (expressed in mg/L) shall be monitored and reported 15-minutes after startup and every 8 hours of operation.

f. Laboratory duplicates – monthly laboratory duplicates for residual coagulant analysis must be performed and records shall be maintained onsite.

g. Effluent shall be monitored and recorded for residual chemical/additive levels.

h. If a residual chemical/additive test does not exist and the ATS is operating in a batch treatment mode of operation refer to the toxicity monitoring requirements below.

3. Toxicity Monitoring

A discharger operating in batch treatment mode shall perform toxicity testing in accordance with the following:

a. The discharger shall initiate acute toxicity testing on effluent samples representing effluent from each batch prior to discharge.[9] All bioassays shall be sent to a laboratory certified by the Department of Health Services (DHS) Environmental Laboratory Accreditation Program (ELAP). The required field of testing number for Whole Effluent Toxicity (WET) testing is E113.[10]

[9] This requirement only requires that the test be initiated prior to discharge.
[10] http://www.dhs.ca.gov/ps/ls/elap/pdf/FOT_Desc.pdf.

b. Acute toxicity tests shall be conducted with the following species and protocols. The methods to be used in the acute toxicity testing shall be those outlined for a 96-hour acute test in “Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, USEPA-841-R-02-012” for Fathead minnow, *Pimephales promelas or* Rainbow trout *Oncorhynchus mykiss* may be used as a substitute for fathead minnow.

c. All toxicity tests shall meet quality assurance criteria and test acceptability criteria in the most recent versions of the EPA test method for WET testing.[11]

4. Reporting and Recordkeeping

At a minimum, every 30 days a LRP representing the discharger shall access the State Water Boards Storm Water Mulit-Application and Report Tracking system (SMARTS) and electronically upload field data from the ATS. Records must be kept for three years after the project is completed .

5. Non-compliance Reporting

a. Any indications of toxicity or other violations of water quality objectives shall be reported to the appropriate regulatory agency as required by this General Permit.

b. Upon any measurements that exceed water quality standards, the system operator shall immediately notify his supervisor or other responsible parties, who shall notify the Regional Water Board.

c. If any monitoring data exceeds any applicable NEL in this General Permit, the discharger shall electronically submit a NEL Violation Report to the State Water Board within 24 hours after the NEL exceedance has been identified.

i. ATS dischargers shall certify each NEL Violation Report in accordance with the Special Provisions for Construction Activity in this General Permit.

ii. ATS dischargers shall retain an electronic or paper copy of each NEL Violation Report for a minimum of three years after the date the annual report is filed.

iii. ATS dischargers shall include in the NEL Violation Report:

(1) The analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as “less than the method detection limit”);

[11] http://www.epa.gov/waterscience/methods/wet/.

(2) The date, place, time of sampling, visual observation (inspections), and/or measurements, including precipitation; and

(3) A description of the current onsite BMPs, and the proposed corrective actions taken to manage the NEL exceedance.

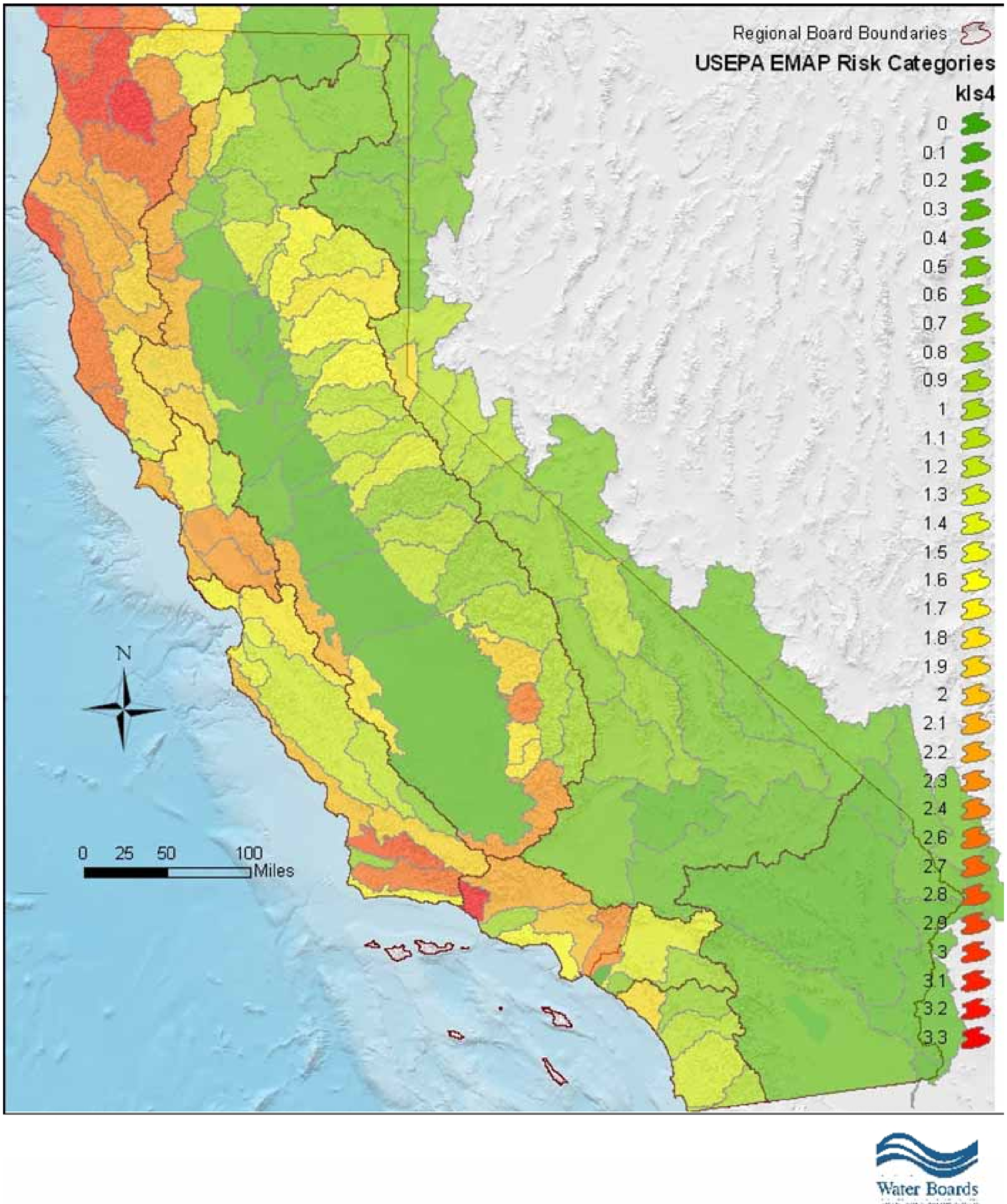
iv. Compliance Storm Exemption - In the event that an applicable NEL has been exceeded during a storm event equal to or larger than the Compliance Storm Event, ATS dischargers shall report the on-site rain gauge reading and nearby governmental rain gauge readings for verification.

Risk Determination Worksheet

Step 1	Determine Sediment Risk via one of the options listed: 1. GIS Map Method - EPA Rainfall Erosivity Calculator & GIS map 2. Individual Method - EPA Rainfall Erosivity Calculator & Individual Data
Step 2	Determine Receiving Water Risk via one of the options listed: 1. GIS map of Sediment Sensitive Watersheds provided (in development) 2. List of Sediment Sensitive Watersheds provided
Step 3	Determine Combined Risk Level

Sediment Risk Factor Worksheet	Entry
A) R Factor	
Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site. http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm	
R Factor Value	0
B) K Factor (weighted average, by area, for all site soils)	
The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted. Site-specific K factor guidance	
K Factor Value	0
C) LS Factor (weighted average, by area, for all slopes)	
The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction. LS Table	
LS Factor Value	0
Watershed Erosion Estimate (=RxKxLS) in tons/acre	0
Site Sediment Risk Factor Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >=15 and <75 tons/acre High Sediment Risk: >= 75 tons/acre	**Low**

For the GIS Map Method, the R factor for the project is calculated using the online calculator at (see cell to right). The product of K and LS are shown on the figure below. To determine soil loss in tons per acre, multiply the R factor times the value for K times LS from the map.
http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm



State Water Resources Control Board, January 15, 2008

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	**yes/no**	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? (For help with impaired waterbodies please check the attached worksheet or visit the link below) or has a **USEPA approved TMDL implementation plan for sediment**?: 2006 Approved Sediment-impared WBs Worksheet http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml **OR** A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp	**Yes**	**High**

Combined Risk Level Matrix

<table>
<tr><th></th><th></th><th colspan="3">Sediment Risk</th></tr>
<tr><th></th><th></th><th>Low</th><th>Medium</th><th>High</th></tr>
<tr><th rowspan="2">Receiving Water Risk</th><th>Low</th><td>Level 1</td><td colspan="2">Level 2</td></tr>
<tr><th>High</th><td colspan="2">Level 2</td><td>Level 3</td></tr>
</table>

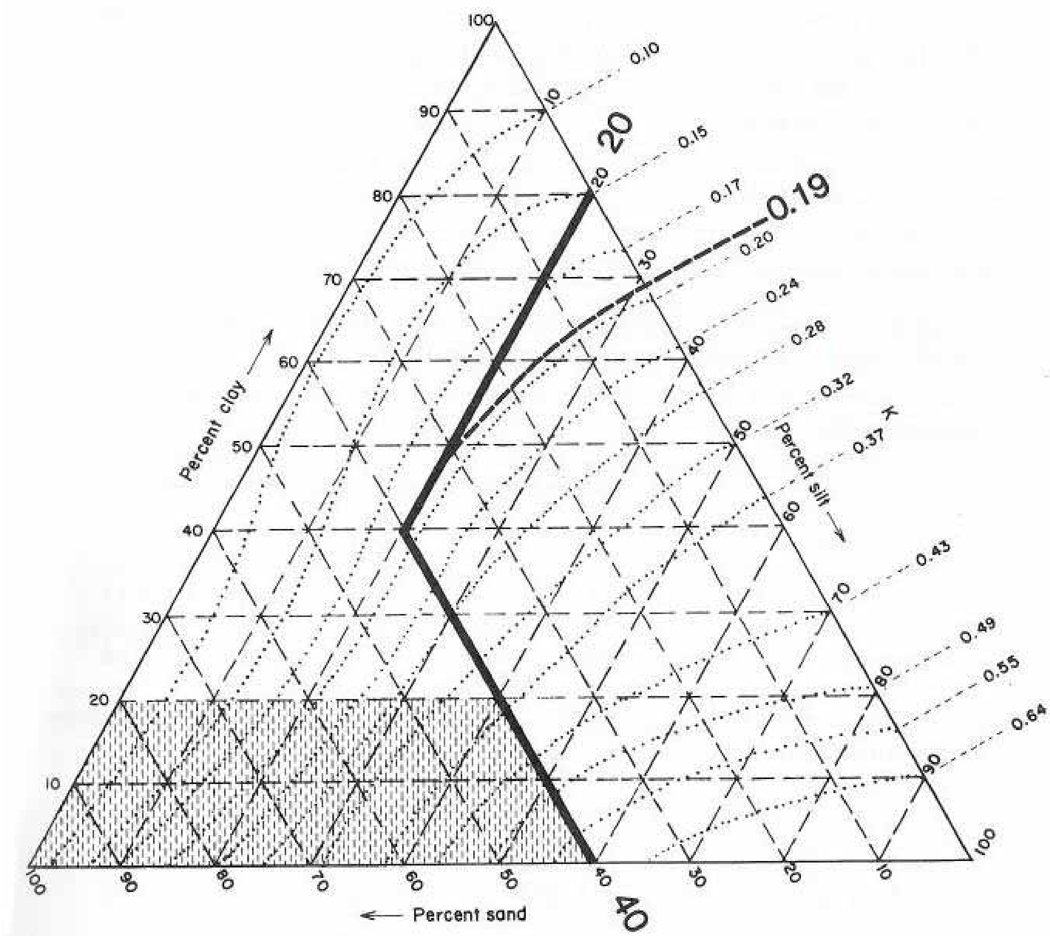
Project Sediment Risk: Low

Project RW Risk: High

Project Combined Risk: Level 2

Soil Erodibility Factor (K)

The K factor can be determined by using the nomograph method, which requires that a particle size analysis (ASTM D-422) be done to determine the percentages of sand, very fine sand, silt and clay. Use the figure below to determine appropriate K value.



Erickson triangular nomograph used to estimate soil erodibility (K) factor.
The figure above is the USDA nomograph used to determine the K factor for a soil, based on its texture (% silt plus very fine sand, % sand, % organic matter, soil structure, and permeability).
Nomograph from Erickson 1977 as referenced in Goldman et. al., 1986.

	Average Watershed Slope (%)														
Sheet Flow Length (ft)	**0.2**	**0.5**	**1.0**	**2.0**	**3.0**	**4.0**	**5.0**	**6.0**	**8.0**	**10.0**	**12.0**	**14.0**	**16.0**	**20.0**	
<3	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.35	0.36	0.38	0.39	0.41	
6	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.37	0.41	0.45	0.49	0.56	
9	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.38	0.45	0.51	0.56	0.67	
12	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.39	0.47	0.55	0.62	0.76	
15	0.05	0.07	0.09	0.13	0.17	0.20	0.23	0.26	0.32	0.40	0.49	0.58	0.67	0.84	
25	0.05	0.07	0.10	0.16	0.21	0.26	0.31	0.36	0.45	0.57	0.71	0.85	0.98	1.24	
50	0.05	0.08	0.13	0.21	0.30	0.38	0.46	0.54	0.70	0.91	1.15	1.40	1.64	2.10	
75	0.05	0.08	0.14	0.25	0.36	0.47	0.58	0.69	0.91	1.20	1.54	1.87	2.21	2.86	
100	0.05	0.09	0.15	0.28	0.41	0.55	0.68	0.82	1.10	1.46	1.88	2.31	2.73	3.57	
150	0.05	0.09	0.17	0.33	0.50	0.68	0.86	1.05	1.43	1.92	2.51	3.09	3.68	4.85	
200	0.06	0.10	0.18	0.37	0.57	0.79	1.02	1.25	1.72	2.34	3.07	3.81	4.56	6.04	
250	0.06	0.10	0.19	0.40	0.64	0.89	1.16	1.43	1.99	2.72	3.60	4.48	5.37	7.16	
300	0.06	0.10	0.20	0.43	0.69	0.98	1.28	1.60	2.24	3.09	4.09	5.11	6.15	8.23	1
400	0.06	0.11	0.22	0.48	0.80	1.14	1.51	1.90	2.70	3.75	5.01	6.30	7.60	10.24	1
600	0.06	0.12	0.24	0.56	0.96	1.42	1.91	2.43	3.52	4.95	6.67	8.45	10.26	13.94	1
800	0.06	0.12	0.26	0.63	1.10	1.65	2.25	2.89	4.24	6.03	8.17	10.40	12.69	17.35	2
1000	0.06	0.13	0.27	0.69	1.23	1.86	2.55	3.30	4.91	7.02	9.57	12.23	14.96	20.57	2

LS Factors for Construction Sites. *Table from Renard et. al., 1997.*

WBID	REGION NUMBER	REGION NAME	WATER BODY TYPE ABBR	WATER BODY TYPE	WATER BODY NAME	CALWATER WATERSHED	ESTIMATED SIZE AFFECTED	UNIT ABBR	UNIT	POLLUTANT CODE	POLLUTANT	SOURCE CODE	POTENTIAL SOURCES	PROPOSED TMDL COMPLETION	COMMENTS
CAE11530	1	North Coast	E	Estuaries	Bodega HU, Estero Americano HA, estuary	11530012	199	A	Acres	1100	Sedimentation/Siltation	1510	Range Grazing-Riparian	2019	Water Quality Attainment strategy is attempting to increase voluntary measures for attainment of standards & objectives, as was done in the Estero de San Antonio/Stemple Creek T Water Quality Attainment Strategy, adopted by NCRWQCB in Dec, 97.
CAE11530	1	North Coast	E	Estuaries	Bodega HU, Estero Americano HA, estuary	11530012	199	A	Acres	1100	Sedimentation/Siltation	7000	Hydromodification	2019	Water Quality Attainment strategy is attempting to increase voluntary measures for attainment of standards & objectives, as was done in the Estero de San Antonio/Stemple Creek T Water Quality Attainment Strategy, adopted by NCRWQCB in Dec, 97.
CAE11530	1	North Coast	E	Estuaries	Bodega HU, Estero Americano HA, estuary	11530012	199	A	Acres	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	Water Quality Attainment strategy is attempting to increase voluntary measures for attainment of standards & objectives, as was done in the Estero de San Antonio/Stemple Creek T Water Quality Attainment Strategy, adopted by NCRWQCB in Dec, 97.
CAE11530	1	North Coast	E	Estuaries	Bodega HU, Estero Americano HA, estuary	11530012	199	A	Acres	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	Water Quality Attainment strategy is attempting to increase voluntary measures for attainment of standards & objectives, as was done in the Estero de San Antonio/Stemple Creek T Water Quality Attainment Strategy, adopted by NCRWQCB in Dec, 97.
CAE11530	1	North Coast	E	Estuaries	Bodega HU, Estero Americano HA, estuary	11530012	199	A	Acres	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Water Quality Attainment strategy is attempting to increase voluntary measures for attainment of standards & objectives, as was done in the Estero de San Antonio/Stemple Creek T Water Quality Attainment Strategy, adopted by NCRWQCB in Dec, 97.
CAE11530	1	North Coast	E	Estuaries	Bodega HU, Estero Americano HA, estuary	11530012	199	A	Acres	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	Water Quality Attainment strategy is attempting to increase voluntary measures for attainment of standards & objectives, as was done in the Estero de San Antonio/Stemple Creek T Water Quality Attainment Strategy, adopted by NCRWQCB in Dec, 97.
CAR11111	1	North Coast	R	Rivers/Streams	Eel River HU, Lower Eel River HA, Eel River Delta	11110000	426	M	Miles	1100	Sedimentation/Siltation	1500	Range Grazing-Riparian and/or Upland	2019	
CAR11111	1	North Coast	R	Rivers/Streams	Eel River HU, Lower Eel River HA, Eel River Delta	11110000	426	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	
CAR11111	1	North Coast	R	Rivers/Streams	Eel River HU, Lower Eel River HA, Eel River Delta	11110000	426	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	1510	Range Grazing-Riparian	2004	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	1520	Range Grazing-Upland	2004	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2004	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	2100	Harvesting, Restoration, Residue Management	2004	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	2300	Logging Road Construction/Maintenance	2004	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2004	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	3200	Land Development	2004	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	7000	Hydromodification	2004	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	7550	Habitat Modification	2004	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2004	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2004	
CAR11141	1	North Coast	R	Rivers/Streams	Eel River HU, Middle Main HA	11140000	674	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2004	
CAR11162	1	North Coast	R	Rivers/Streams	Eel River HU, Upper Main HA (Includes Tomki Creek)	11160000	1141	M	Miles	1100	Sedimentation/Siltation	1935	Agriculture-grazing	2019	USEPA will develop a TMDL for Eel River, Upper Main Fork.
CAR11162	1	North Coast	R	Rivers/Streams	Eel River HU, Upper Main HA (Includes Tomki Creek)	11160000	1141	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	USEPA will develop a TMDL for Eel River, Upper Main Fork.
CAR11162	1	North Coast	R	Rivers/Streams	Eel River HU, Upper Main HA (Includes Tomki Creek)	11160000	1141	M	Miles	1100	Sedimentation/Siltation	2100	Harvesting, Restoration, Residue Management	2019	USEPA will develop a TMDL for Eel River, Upper Main Fork.
CAR11162	1	North Coast	R	Rivers/Streams	Eel River HU, Upper Main HA (Includes Tomki Creek)	11160000	1141	M	Miles	1100	Sedimentation/Siltation	2300	Logging Road Construction/Maintenance	2019	USEPA will develop a TMDL for Eel River, Upper Main Fork.
CAR11162	1	North Coast	R	Rivers/Streams	Eel River HU, Upper Main HA (Includes Tomki Creek)	11160000	1141	M	Miles	1100	Sedimentation/Siltation	2400	Silvicultural Point Sources	2019	USEPA will develop a TMDL for Eel River, Upper Main Fork.
CAR11162	1	North Coast	R	Rivers/Streams	Eel River HU, Upper Main HA (Includes Tomki Creek)	11160000	1141	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	USEPA will develop a TMDL for Eel River, Upper Main Fork.
CAR11162	1	North Coast	R	Rivers/Streams	Eel River HU, Upper Main HA (Includes Tomki Creek)	11160000	1141	M	Miles	1100	Sedimentation/Siltation	3100	Highway/Road/Bridge Construction	2019	USEPA will develop a TMDL for Eel River, Upper Main Fork.
CAR11162	1	North Coast	R	Rivers/Streams	Eel River HU, Upper Main HA (Includes Tomki Creek)	11160000	1141	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	USEPA will develop a TMDL for Eel River, Upper Main Fork.
CAR11162	1	North Coast	R	Rivers/Streams	Eel River HU, Upper Main HA (Includes Tomki Creek)	11160000	1141	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	USEPA will develop a TMDL for Eel River, Upper Main Fork.
CAR11162	1	North Coast	R	Rivers/Streams	Eel River HU, Upper Main HA (Includes Tomki Creek)	11160000	1141	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	USEPA will develop a TMDL for Eel River, Upper Main Fork.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Elk River	11000000	88	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	The Eureka Plain HU, Elk River, includes the following Calwater Planning Watersheds (PWS): 110.00021, 110.00030, 110.00032, and 110.00042. Sedimentation, threat sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Elk River	11000000	88	M	Miles	1100	Sedimentation/Siltation	2100	Harvesting, Restoration, Residue Management	2019	The Eureka Plain HU, Elk River, includes the following Calwater Planning Watersheds (PWS): 110.00021, 110.00030, 110.00032, and 110.00042. Sedimentation, threat sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Elk River	11000000	88	M	Miles	1100	Sedimentation/Siltation	2300	Logging Road Construction/Maintenance	2019	The Eureka Plain HU, Elk River, includes the following Calwater Planning Watersheds (PWS): 110.00021, 110.00030, 110.00032, and 110.00042. Sedimentation, threat sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Elk River	11000000	88	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	The Eureka Plain HU, Elk River, includes the following Calwater Planning Watersheds (PWS): 110.00021, 110.00030, 110.00032, and 110.00042. Sedimentation, threat sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Elk River	11000000	88	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	The Eureka Plain HU, Elk River, includes the following Calwater Planning Watersheds (PWS): 110.00021, 110.00030, 110.00032, and 110.00042. Sedimentation, threat sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Elk River	11000000	88	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	The Eureka Plain HU, Elk River, includes the following Calwater Planning Watersheds (PWS): 110.00021, 110.00030, 110.00032, and 110.00042. Sedimentation, threat sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Elk River	11000000	88	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2019	The Eureka Plain HU, Elk River, includes the following Calwater Planning Watersheds (PWS): 110.00021, 110.00030, 110.00032, and 110.00042. Sedimentation, threat sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Elk River	11000000	88	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	The Eureka Plain HU, Elk River, includes the following Calwater Planning Watersheds (PWS): 110.00021, 110.00030, 110.00032, and 110.00042. Sedimentation, threat sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Freshwater Creek	11000000	84	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	The Eureka Plain HU, Freshwater Creek, includes the following Calwater Planning Watersheds (PWS): 110.00011, 110.00012, 110.00014, 110.00040, and 110.00050. Sedimentation, threat of sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Freshwater Creek	11000000	84	M	Miles	1100	Sedimentation/Siltation	2100	Harvesting, Restoration, Residue Management	2019	The Eureka Plain HU, Freshwater Creek, includes the following Calwater Planning Watersheds (PWS): 110.00011, 110.00012, 110.00014, 110.00040, and 110.00050. Sedimentation, threat of sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Freshwater Creek	11000000	84	M	Miles	1100	Sedimentation/Siltation	2300	Logging Road Construction/Maintenance	2019	The Eureka Plain HU, Freshwater Creek, includes the following Calwater Planning Watersheds (PWS): 110.00011, 110.00012, 110.00014, 110.00040, and 110.00050. Sedimentation, threat of sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.

WBID	REGION NUMBER	REGION NAME	WATER BODY TYPE ABBR	WATER BODY TYPE	WATER BODY NAME	CALWATER WATERSHED	ESTIMATED SIZE AFFECTED	UNIT ABBR	UNIT	POLLUTANT CODE	POLLUTANT	SOURCE CODE	POTENTIAL SOURCES	PROPOSED TMDL COMPLETION	COMMENTS
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Freshwater Creek	11000000	84	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	The Eureka Plain HU, Freshwater Creek, includes the following Calwater Planning Watersheds (PWS): 110.00011, 110.00012, 110.00014, 110.00040, and 110.00050. Sedimentation, threat of sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Freshwater Creek	11000000	84	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	The Eureka Plain HU, Freshwater Creek, includes the following Calwater Planning Watersheds (PWS): 110.00011, 110.00012, 110.00014, 110.00040, and 110.00050. Sedimentation, threat of sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Freshwater Creek	11000000	84	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	The Eureka Plain HU, Freshwater Creek, includes the following Calwater Planning Watersheds (PWS): 110.00011, 110.00012, 110.00014, 110.00040, and 110.00050. Sedimentation, threat of sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Freshwater Creek	11000000	84	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2019	The Eureka Plain HU, Freshwater Creek, includes the following Calwater Planning Watersheds (PWS): 110.00011, 110.00012, 110.00014, 110.00040, and 110.00050. Sedimentation, threat of sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR11000	1	North Coast	R	Rivers/Streams	Eureka Plain HU, Freshwater Creek	11000000	84	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	The Eureka Plain HU, Freshwater Creek, includes the following Calwater Planning Watersheds (PWS): 110.00011, 110.00012, 110.00014, 110.00040, and 110.00050. Sedimentation, threat of sedimentation, impaired irrigation water quality, impaired domestic supply water quality, impaired spawning habitat, increased rate and depth of flooding due to sediment, property damage. NCRWQCB and California Department of forestry staff are involved in ongoing efforts to attain adherance to Forest Practice Rules.
CAR10511	1	North Coast	R	Rivers/Streams	Klamath River HU, Lower HA, Klamath Glen HSA	10511000	609	M	Miles	1100	Sedimentation/Siltation	9000	Source Unknown	2019	If this listing is determined to be on tribal lands, USEPA should place this water body and pollutant on the section 303d list for the tribal lands. It is not the State Water Board's inten this listing affect other actions related to decommissioning and removal of dams on the Klamath River
CAR10910	1	North Coast	R	Rivers/Streams	Mad River HU, Mad River	10900000	654	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	USEPA will develop TMDL for the Mad River. Sediment TMDLS will be developed for the area tributary to and including: (1) the Mad River (North Fork), (2) the mad River (Upper), (3) the Mad River (Middle).
CAR10910	1	North Coast	R	Rivers/Streams	Mad River HU, Mad River	10900000	654	M	Miles	1100	Sedimentation/Siltation	5000	Resource Extraction	2019	USEPA will develop TMDL for the Mad River. Sediment TMDLS will be developed for the area tributary to and including: (1) the Mad River (North Fork), (2) the mad River (Upper), (3) the Mad River (Middle).
CAR10910	1	North Coast	R	Rivers/Streams	Mad River HU, Mad River	10900000	654	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	USEPA will develop TMDL for the Mad River. Sediment TMDLS will be developed for the area tributary to and including: (1) the Mad River (North Fork), (2) the mad River (Upper), (3) the Mad River (Middle).
CAR11412	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Austin Creek HSA	11412000	81	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment.
CAR11412	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Austin Creek HSA	11412000	81	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment.
CAR11412	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Austin Creek HSA	11412000	81	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment.
CAR11412	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Austin Creek HSA	11412000	81	M	Miles	1100	Sedimentation/Siltation	7300	Dam Construction	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment.
CAR11412	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Austin Creek HSA	11412000	81	M	Miles	1100	Sedimentation/Siltation	7400	Flow Regulation/Modification	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment.
CAR11412	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Austin Creek HSA	11412000	81	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment.
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	1200	Irrigated Crop Production	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	1300	Specialty Crop Production	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	1915	Agriculture-storm runoff	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	1935	Agriculture-grazing	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	3100	Highway/Road/Bridge Construction	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	3200	Land Development	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	7000	Hydromodification	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	7100	Channelization	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	7300	Dam Construction	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	7350	Upstream Impoundment	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	7400	Flow Regulation/Modification	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	7550	Habitat Modification	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	7800	Drainage/Filling Of Wetlands	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11411	1	North Coast	R	Rivers/Streams	Russian River HU, Lower Russian River HA, Guerneville HSA	11411000	195	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11426	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Big Sulphur Creek HSA	11426000	85	M	Miles	1100	Sedimentation/Siltation	3210	Geothermal Development	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11426	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Big Sulphur Creek HSA	11426000	85	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11426	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Big Sulphur Creek HSA	11426000	85	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .

WBID	REGION NUMBER	REGION NAME	WATER BODY TYPE ABBR	WATER BODY TYPE	WATER BODY NAME	CALWATER WATERSHED	ESTIMATED SIZE AFFECTED	UNIT ABBR	UNIT	POLLUTANT CODE	POLLUTANT	SOURCE CODE	POTENTIAL SOURCES	PROPOSED TMDL COMPLETION	COMMENTS
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	1100	Nonirrigated Crop Production	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	1200	Irrigated Crop Production	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	1300	Specialty Crop Production	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	1510	Range Grazing-Riparian	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	1520	Range Grazing-Upland	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	1915	Agriculture-storm runoff	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	1935	Agriculture-grazing	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	3210	Geothermal Development	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	4501	Surface Runoff	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	5000	Resource Extraction	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	7100	Channelization	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	7500	Bridge Construction	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	7800	Drainage/Filling Of Wetlands	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11425	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Geyserville HSA	11425000	242	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment TMDL.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	3110	Road Construction	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	3200	Land Development	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	4000	Urban Runoff/Storm Sewers	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	1200	Irrigated Crop Production	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	1300	Specialty Crop Production	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	1500	Range Grazing-Riparian and/or Upland	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	1510	Range Grazing-Riparian	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	1600	Intensive Animal Feeding Operations	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	1915	Agriculture-storm runoff	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	1935	Agriculture-grazing	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	2100	Harvesting, Restoration, Residue Management	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	3100	Highway/Road/Bridge Construction	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	3200	Land Development	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	4300	Other Urban Runoff	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	4501	Surface Runoff	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .

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CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	7800	Drainage/Filling Of Wetlands	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	4300	Other Urban Runoff	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	4500	Highway/Road/Bridge Runoff	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	7000	Hydromodification	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	7100	Channelization	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	7800	Drainage/Filling Of Wetlands	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	8050	Erosion From Derelict Land	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	8300	Highway Maintenance and Runoff	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR11421	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Laguna de Santa Rosa	11421000	96	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	Entire Russian River watershed (including Laguna de Santa Rosa) is listed for sedimentation.
CAR30411	3	Central Coast	R	Rivers/Streams	San Vicente Creek	30411023	9.11953	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	
CAR31410	3	Central Coast	R	Rivers/Streams	Santa Ynez River (below city of Lompoc to Ocean)	31410040	3.8	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	
CAR31410	3	Central Coast	R	Rivers/Streams	Santa Ynez River (below city of Lompoc to Ocean)	31410040	3.8	M	Miles	1100	Sedimentation/Siltation	4000	Urban Runoff/Storm Sewers	2019	
CAR31410	3	Central Coast	R	Rivers/Streams	Santa Ynez River (below city of Lompoc to Ocean)	31410040	3.8	M	Miles	1100	Sedimentation/Siltation	5000	Resource Extraction	2019	
CAR31410	3	Central Coast	R	Rivers/Streams	Santa Ynez River (Cachuma Lake to below city o Lompoc)	31440050	43	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	
CAR31410	3	Central Coast	R	Rivers/Streams	Santa Ynez River (Cachuma Lake to below city o Lompoc)	31440050	43	M	Miles	1100	Sedimentation/Siltation	4000	Urban Runoff/Storm Sewers	2019	
CAR31410	3	Central Coast	R	Rivers/Streams	Santa Ynez River (Cachuma Lake to below city o Lompoc)	31440050	43	M	Miles	1100	Sedimentation/Siltation	5000	Resource Extraction	2019	
CAR31300	3	Central Coast	R	Rivers/Streams	Shuman Canyon Creek	31300041	8.5496	M	Miles	1100	Sedimentation/Siltation	9000	Source Unknown	2019	
CAR30413	3	Central Coast	R	Rivers/Streams	Valencia Creek	30413023	6.19	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2008	
CAR30413	3	Central Coast	R	Rivers/Streams	Valencia Creek	30413023	6.19	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2008	
CAR30412	3	Central Coast	R	Rivers/Streams	Zayante Creek	30412040	9.20875	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Zayante Creek	30412040	9.20875	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Zayante Creek	30412040	9.20875	M	Miles	1100	Sedimentation/Siltation	3110	Road Construction	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Zayante Creek	30412040	9.20875	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Zayante Creek	30412040	9.20875	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Zayante Creek	30412040	9.20875	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR11423	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Mark West Creek HSA	11423000	99	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	1100	Nonirrigated Crop Production	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	1200	Irrigated Crop Production	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	1300	Specialty Crop Production	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	1400	Pasture Grazing-Riparian and/or Upland	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	1510	Range Grazing-Riparian	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	1520	Range Grazing-Upland	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	1940	Dairies	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	3100	Highway/Road/Bridge Construction	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	3200	Land Development	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	4000	Urban Runoff/Storm Sewers	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	4100	Urban Runoff--Non-industrial Permitted	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	4300	Other Urban Runoff	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	4501	Surface Runoff	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.

WBID	REGION NUMBER	REGION NAME	WATER BODY TYPE ABBR	WATER BODY TYPE	WATER BODY NAME	CALWATER WATERSHED	ESTIMATED SIZE AFFECTED	UNIT ABBR	UNIT	POLLUTANT CODE	POLLUTANT	SOURCE CODE	POTENTIAL SOURCES	PROPOSED TMDL COMPLETION	COMMENTS
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	7000	Hydromodification	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	7100	Channelization	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	7500	Bridge Construction	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	7550	Habitat Modification	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	7800	Drainage/Filling Of Wetlands	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11422	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Santa Rosa Creek	11422000	87	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	Entire Russian River watershed (including Santa Rosa Creek) is listed for sedimentation.
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	1915	Agriculture-storm runoff	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	2300	Logging Road Construction/Maintenance	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	3100	Highway/Road/Bridge Construction	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	7000	Hydromodification	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	7100	Channelization	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	7300	Dam Construction	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	7350	Upstream Impoundment	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	7400	Flow Regulation/Modification	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	7550	Habitat Modification	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	7800	Drainage/Filling Of Wetlands	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11424	1	North Coast	R	Rivers/Streams	Russian River HU, Middle Russian River HA, Warm Springs HSA	11424000	255	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	Sediment impacts in Russian River tributaries prompted listing entire Russian River watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	7000	Hydromodification	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	7100	Channelization	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	7300	Dam Construction	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	7400	Flow Regulation/Modification	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	7500	Bridge Construction	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	7550	Habitat Modification	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	7800	Drainage/Filling Of Wetlands	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .

WBID	REGION NUMBER	REGION NAME	WATER BODY TYPE ABBR	WATER BODY TYPE	WATER BODY NAME	CALWATER WATERSHED	ESTIMATED SIZE AFFECTED	UNIT ABBR	UNIT	POLLUTANT CODE	POLLUTANT	SOURCE CODE	POTENTIAL SOURCES	PROPOSED TMDL COMPLETION	COMMENTS
CAR11432	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Coyote Valley HSA	11432000	171	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11433	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Forsythe Creek HSA	11433000	122	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11433	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Forsythe Creek HSA	11433000	122	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	5000	Resource Extraction	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	7550	Habitat Modification	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	7800	Drainage/Filling Of Wetlands	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	8300	Highway Maintenance and Runoff	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAR11431	1	North Coast	R	Rivers/Streams	Russian River HU, Upper Russian River HA, Ukiah HSA	11431000	460	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2019	Russian River Watershed tributary sediment impairments led to listing of entire watershed for sediment .
CAB20114	2	San Francisco Bay	B	Bays and Harbors	Tomales Bay	20114033	8545.46	A	Acres	1100	Sedimentation/Siltation	1000	Agriculture	2008	TMDL will be developed as part of ongoing watershed management effort. Tributary streams, Lagunitas Creek and Walker Creek, must be managed first. Additional monitoring assessment needed.
CAB20114	2	San Francisco Bay	B	Bays and Harbors	Tomales Bay	20114033	8545.46	A	Acres	1100	Sedimentation/Siltation	7350	Upstream Impoundment	2008	TMDL will be developed as part of ongoing watershed management effort. Tributary streams, Lagunitas Creek and Walker Creek, must be managed first. Additional monitoring assessment needed.
CAR20240	2	San Francisco Bay	R	Rivers/Streams	Butano Creek	20240031	3.62774	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	Impairment to steelhead habita
CAR20113	2	San Francisco Bay	R	Rivers/Streams	Lagunitas Creek	20113020	16.75	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2009	Tributary to Tomales Bay. TMDLs will be developed as part of evolving watershed management effort. Additional monitoring and assessment nee
CAR20113	2	San Francisco Bay	R	Rivers/Streams	Lagunitas Creek	20113020	16.75	M	Miles	1100	Sedimentation/Siltation	4000	Urban Runoff/Storm Sewers	2009	Tributary to Tomales Bay. TMDLs will be developed as part of evolving watershed management effort. Additional monitoring and assessment nee
CAR20650	2	San Francisco Bay	R	Rivers/Streams	Napa River	20650010	65.33	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2006	TMDL will be developed as part of ongoing watershed management effort. Additional monitoring and assessment nee
CAR20650	2	San Francisco Bay	R	Rivers/Streams	Napa River	20650010	65.33	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2006	TMDL will be developed as part of ongoing watershed management effort. Additional monitoring and assessment nee
CAR20650	2	San Francisco Bay	R	Rivers/Streams	Napa River	20650010	65.33	M	Miles	1100	Sedimentation/Siltation	3200	Land Development	2006	TMDL will be developed as part of ongoing watershed management effort. Additional monitoring and assessment nee
CAR20650	2	San Francisco Bay	R	Rivers/Streams	Napa River	20650010	65.33	M	Miles	1100	Sedimentation/Siltation	4000	Urban Runoff/Storm Sewers	2006	TMDL will be developed as part of ongoing watershed management effort. Additional monitoring and assessment nee
CAR20240	2	San Francisco Bay	R	Rivers/Streams	Pescadero Creek	20240013	26.03	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	If California Department of Fish and Game and the National Marine Fisheries Service find that for this water body fish populations are not impacted, the State Water Board supp removing this water body and pollutant from the list.
CAR20630	2	San Francisco Bay	R	Rivers/Streams	Petaluma River	20630020	21.566	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	
CAR20630	2	San Francisco Bay	R	Rivers/Streams	Petaluma River	20630020	21.566	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	
CAR20630	2	San Francisco Bay	R	Rivers/Streams	Petaluma River	20630020	21.566	M	Miles	1100	Sedimentation/Siltation	4000	Urban Runoff/Storm Sewers	2019	
CAR20550	2	San Francisco Bay	R	Rivers/Streams	San Francisquito Creek	20550040	12.05	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2008	Impairment to steelhead habita
CAR20230	2	San Francisco Bay	R	Rivers/Streams	San Gregorio Creek	20230014	11.14	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	Impairment to steelhead habita
CAR20640	2	San Francisco Bay	R	Rivers/Streams	Sonoma Creek	20640050	30.23	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2008	TMDL will be developed as part of ongoing watershed management effort. Additional monitoring and assessment nee
CAR20640	2	San Francisco Bay	R	Rivers/Streams	Sonoma Creek	20640050	30.23	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2008	TMDL will be developed as part of ongoing watershed management effort. Additional monitoring and assessment nee
CAR20640	2	San Francisco Bay	R	Rivers/Streams	Sonoma Creek	20640050	30.23	M	Miles	1100	Sedimentation/Siltation	3200	Land Development	2008	TMDL will be developed as part of ongoing watershed management effort. Additional monitoring and assessment nee
CAR20640	2	San Francisco Bay	R	Rivers/Streams	Sonoma Creek	20640050	30.23	M	Miles	1100	Sedimentation/Siltation	4000	Urban Runoff/Storm Sewers	2008	TMDL will be developed as part of ongoing watershed management effort. Additional monitoring and assessment nee
CAR20112	2	San Francisco Bay	R	Rivers/Streams	Walker Creek	20112013	15.8352	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2009	Tributary to Tomales Bay. TMDLs will be developed as part of evolving watershed management effort. Additional monitoring and assessment nee
CAB30600	3	Central Coast	B	Bays and Harbors	Moss Landing Harbor	30600014	79.2726	A	Acres	1100	Sedimentation/Siltation	1000	Agriculture	2019	
CAB30600	3	Central Coast	B	Bays and Harbors	Moss Landing Harbor	30600014	79.2726	A	Acres	1100	Sedimentation/Siltation	1200	Irrigated Crop Production	2019	
CAB30600	3	Central Coast	B	Bays and Harbors	Moss Landing Harbor	30600014	79.2726	A	Acres	1100	Sedimentation/Siltation	1915	Agriculture-storm runoff	2019	
CAB30600	3	Central Coast	B	Bays and Harbors	Moss Landing Harbor	30600014	79.2726	A	Acres	1100	Sedimentation/Siltation	7000	Hydromodification	2019	
CAB30600	3	Central Coast	B	Bays and Harbors	Moss Landing Harbor	30600014	79.2726	A	Acres	1100	Sedimentation/Siltation	7200	Dredging	2019	
CAB30600	3	Central Coast	B	Bays and Harbors	Moss Landing Harbor	30600014	79.2726	A	Acres	1100	Sedimentation/Siltation	7810	Channel Erosion	2019	
CAB30600	3	Central Coast	B	Bays and Harbors	Moss Landing Harbor	30600014	79.2726	A	Acres	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	
CAB30600	3	Central Coast	B	Bays and Harbors	Moss Landing Harbor	30600014	79.2726	A	Acres	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAE30600	3	Central Coast	E	Estuaries	Elkhorn Slough	30600014	2033.73	A	Acres	1100	Sedimentation/Siltation	1000	Agriculture	2015	
CAE30600	3	Central Coast	E	Estuaries	Elkhorn Slough	30600014	2033.73	A	Acres	1100	Sedimentation/Siltation	1200	Irrigated Crop Production	2015	
CAE30600	3	Central Coast	E	Estuaries	Elkhorn Slough	30600014	2033.73	A	Acres	1100	Sedimentation/Siltation	1915	Agriculture-storm runoff	2015	
CAE30600	3	Central Coast	E	Estuaries	Elkhorn Slough	30600014	2033.73	A	Acres	1100	Sedimentation/Siltation	7810	Channel Erosion	2015	
CAE30600	3	Central Coast	E	Estuaries	Elkhorn Slough	30600014	2033.73	A	Acres	1100	Sedimentation/Siltation	9100	Nonpoint Source	2015	
CAE30600	3	Central Coast	E	Estuaries	Moro Cojo Slough	30913011	62.4949	A	Acres	1100	Sedimentation/Siltation	1000	Agriculture	2019	
CAE30600	3	Central Coast	E	Estuaries	Moro Cojo Slough	30913011	62.4949	A	Acres	1100	Sedimentation/Siltation	1200	Irrigated Crop Production	2019	
CAE30600	3	Central Coast	E	Estuaries	Moro Cojo Slough	30913011	62.4949	A	Acres	1100	Sedimentation/Siltation	1915	Agriculture-storm runoff	2019	
CAE30600	3	Central Coast	E	Estuaries	Moro Cojo Slough	30913011	62.4949	A	Acres	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	
CAE30600	3	Central Coast	E	Estuaries	Moro Cojo Slough	30913011	62.4949	A	Acres	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAE30413	3	Central Coast	E	Estuaries	Soquel Lagoon	30413014	1.15873	A	Acres	1100	Sedimentation/Siltation	3000	Construction/Land Development	2011	
CAR30413	3	Central Coast	R	Rivers/Streams	Aptos Creek	30413023	8.40589	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2008	
CAR30413	3	Central Coast	R	Rivers/Streams	Aptos Creek	30413023	8.40589	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2008	
CAR30412	3	Central Coast	R	Rivers/Streams	Bean Creek	30412041	8.90707	M	Miles	1100	Sedimentation/Siltation	3110	Road Construction	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Bean Creek	30412041	8.90707	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Bean Creek	30412041	8.90707	M	Miles	1100	Sedimentation/Siltation	5000	Resource Extraction	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Bean Creek	30412041	8.90707	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Bean Creek	30412041	8.90707	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Bear Creek(Santa Cruz County	30412030	6.31531	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Bear Creek(Santa Cruz County	30412030	6.31531	M	Miles	1100	Sedimentation/Siltation	3110	Road Construction	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Bear Creek(Santa Cruz County	30412030	6.31531	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Bear Creek(Santa Cruz County	30412030	6.31531	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Bear Creek(Santa Cruz County	30412030	6.31531	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Boulder Creek	30412020	7.55958	M	Miles	1100	Sedimentation/Siltation	1300	Specialty Crop Production	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Boulder Creek	30412020	7.55958	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	

WBID	REGION NUMBER	REGION NAME	WATER BODY TYPE ABBR	WATER BODY TYPE	WATER BODY NAME	CALWATER WATERSHED	ESTIMATED SIZE AFFECTED	UNIT ABBR	UNIT	POLLUTANT CODE	POLLUTANT	SOURCE CODE	POTENTIAL SOURCES	PROPOSED TMDL COMPLETION	COMMENTS
CAR30412	3	Central Coast	R	Rivers/Streams	Boulder Creek	30412020	7.55958	M	Miles	1100	Sedimentation/Siltation	3110	Road Construction	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Boulder Creek	30412020	7.55958	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Boulder Creek	30412020	7.55958	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Boulder Creek	30412020	7.55958	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Branciforte Creek	30412051	5.78	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Branciforte Creek	30412051	5.78	M	Miles	1100	Sedimentation/Siltation	3110	Road Construction	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Branciforte Creek	30412051	5.78	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR31300	3	Central Coast	R	Rivers/Streams	Casmalia Canyon Creek	31300040	4.96262	M	Miles	1100	Sedimentation/Siltation	9000	Source Unknown	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Fall Creek	30412022	5.07242	M	Miles	1100	Sedimentation/Siltation	3110	Road Construction	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Fall Creek	30412022	5.07242	M	Miles	1100	Sedimentation/Siltation	7550	Habitat Modification	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Fall Creek	30412022	5.07242	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Fall Creek	30412022	5.07242	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Kings Creek	30412011	4.36837	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Kings Creek	30412011	4.36837	M	Miles	1100	Sedimentation/Siltation	3110	Road Construction	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Kings Creek	30412011	4.36837	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Kings Creek	30412011	4.36837	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Kings Creek	30412011	4.36837	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Love Creek	30412021	3.78816	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Love Creek	30412021	3.78816	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Love Creek	30412021	3.78816	M	Miles	1100	Sedimentation/Siltation	3110	Road Construction	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Love Creek	30412021	3.78816	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Love Creek	30412021	3.78816	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Love Creek	30412021	3.78816	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Mountain Charlie Gulch	30412040	3.92844	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Mountain Charlie Gulch	30412040	3.92844	M	Miles	1100	Sedimentation/Siltation	3110	Road Construction	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Mountain Charlie Gulch	30412040	3.92844	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Mountain Charlie Gulch	30412040	3.92844	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Newell Creek (Upper	30412031	3.50199	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Newell Creek (Upper	30412031	3.50199	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Newell Creek (Upper	30412031	3.50199	M	Miles	1100	Sedimentation/Siltation	3110	Road Construction	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Newell Creek (Upper	30412031	3.50199	M	Miles	1100	Sedimentation/Siltation	3215	Disturbed Sites (Land Develop.)	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Newell Creek (Upper	30412031	3.50199	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Newell Creek (Upper	30412031	3.50199	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	
CAR30412	3	Central Coast	R	Rivers/Streams	Newell Creek (Upper	30412031	3.50199	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR40422	4	Los Angeles	R	Rivers/Streams	Las Virgenes Creek	40422010	11.62	M	Miles	1100	Sedimentation/Siltation	9000	Source Unknown	2019	
CAR40421	4	Los Angeles	R	Rivers/Streams	Malibu Creek	40421000	10.85	M	Miles	1100	Sedimentation/Siltation	9000	Source Unknown	2019	
CAR40424	4	Los Angeles	R	Rivers/Streams	Medea Creek Reach 1 (Lake to Confl. with Lindero)	40424000	2.57	M	Miles	1100	Sedimentation/Siltation	9000	Source Unknown	2019	
CAR40312	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 2 (estuary to Potrero Rd was Calleguas Creek Reaches 1 and 2 on 1998 303d list)	40312000	4.31213	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40312	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 2 (estuary to Potrero Rd was Calleguas Creek Reaches 1 and 2 on 1998 303d list)	40312000	4.31213	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40312	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 3 (Potrero Road upstream to confluence with Conejo Creek on 1998 303d list)	40312000	3.46697	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40312	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 3 (Potrero Road upstream to confluence with Conejo Creek on 1998 303d list)	40312000	3.46697	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40311	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 4 (was Revolon Slough Main Branch: Mugu Lagoon to Central Avenue on 1998 303d list)	40311000	7.18751	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40311	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 4 (was Revolon Slough Main Branch: Mugu Lagoon to Central Avenue on 1998 303d list)	40311000	7.18751	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40361	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 5 (was Beardsley Channe on 1998 303d list)	40311000	4.34088	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40361	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 5 (was Beardsley Channe on 1998 303d list)	40311000	4.34088	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40362	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 6 (was Arroyo Las Posas Reaches 1 and 2 on 1998 303d list)	40362000	15.2966	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40362	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 6 (was Arroyo Las Posas Reaches 1 and 2 on 1998 303d list)	40362000	15.2966	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40362	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 7 (was Arroyo Simi Reaches 1 and 2 on 1998 303d list)	40367000	13.9129	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40362	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 7 (was Arroyo Simi Reaches 1 and 2 on 1998 303d list)	40367000	13.9129	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40367	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 8 (was Tapo Canyon Reach 1)	40366000	7.18869	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40364	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 11 (Arroyo Santa Rosa was part of Conejo Creek Reach 3 on 1998 303d list)	40365000	8.68888	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40364	4	Los Angeles	R	Rivers/Streams	Calleguas Creek Reach 11 (Arroyo Santa Rosa was part of Conejo Creek Reach 3 on 1998 303d list)	40365000	8.68888	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2005	For 2006, sedimentation/siltation was moved by USEPA from the being addressed list back to the 303(d) list pending completion and USEPA approval of a TMDL.
CAR40423	4	Los Angeles	R	Rivers/Streams	Medea Creek Reach 2 (Abv Confl. with Linderc	40423000	5.41	M	Miles	1100	Sedimentation/Siltation	9000	Source Unknown	2019	
CAR40424	4	Los Angeles	R	Rivers/Streams	Triunfo Canyon Creek Reach 1	40424000	2.51	M	Miles	1100	Sedimentation/Siltation	9000	Source Unknown	2019	
CAR40424	4	Los Angeles	R	Rivers/Streams	Triunfo Canyon Creek Reach 2	40424000	3.32	M	Miles	1100	Sedimentation/Siltation	9000	Source Unknown	2019	
CAR52641	5	Central Valley	R	Rivers/Streams	Fall River (Pit)	52641031	8.61219	M	Miles	1100	Sedimentation/Siltation	2105	Historical Land Management Activities	2016	The sedimentation is accumulated sand size sediment in the upper Fall River. The historic land management activities include logging, grazing, channelization, roads, and railroads.
CAR51732	5	Central Valley	R	Rivers/Streams	Humbug Creek	51732030	2.20272	M	Miles	1100	Sedimentation/Siltation	5000	Resource Extraction	2012	All resource extraction sources are abandoned mine
CAR55911	5	Central Valley	R	Rivers/Streams	Panoche Creek (Silver Creek to Belmont Avenue)	55112000	17.6357	M	Miles	1100	Sedimentation/Siltation	1000	Agriculture	2007	
CAR55911	5	Central Valley	R	Rivers/Streams	Panoche Creek (Silver Creek to Belmont Avenue)	55112000	17.6357	M	Miles	1100	Sedimentation/Siltation	1935	Agriculture-grazing	2007	

WBID	REGION NUMBER	REGION NAME	WATER BODY TYPE ABBR	WATER BODY TYPE	WATER BODY NAME	CALWATER WATERSHED	ESTIMATED SIZE AFFECTED	UNIT ABBR	UNIT	POLLUTANT CODE	POLLUTANT	SOURCE CODE	POTENTIAL SOURCES	PROPOSED TMDL COMPLETION	COMMENTS
CAR55911	5	Central Valley	R	Rivers/Streams	Panoche Creek (Silver Creek to Belmont Avenue)	55112000	17.6357	M	Miles	1100	Sedimentation/Siltation	3100	Highway/Road/Bridge Construction	2007	
CAL63030(	6	Lahontan	L	Lakes/Reservoirs	Bridgeport Reservoi	63030050	2614.34	A	Acres	1100	Sedimentation/Siltation	1350	Grazing-Related Sources	2006	
CAL63030(	6	Lahontan	L	Lakes/Reservoirs	Bridgeport Reservoi	63030050	2614.34	A	Acres	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2006	
CAL63030(	6	Lahontan	L	Lakes/Reservoirs	Bridgeport Reservoi	63030050	2614.34	A	Acres	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2006	
CAL63030(	6	Lahontan	L	Lakes/Reservoirs	Bridgeport Reservoi	63030050	2614.34	A	Acres	1100	Sedimentation/Siltation	8540	Sediment Resuspension	2006	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	1350	Grazing-Related Sources	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	2000	Silviculture	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	3100	Highway/Road/Bridge Construction	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	3200	Land Development	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	4000	Urban Runoff/Storm Sewers	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	4300	Other Urban Runoff	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	4500	Highway/Road/Bridge Runoff	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	4600	Urban Runoff--Erosion and Sedimentation	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	7000	Hydromodification	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	7100	Channelization	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	7600	Removal of Riparian Vegetation	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	7810	Channel Erosion	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	8100	Atmospheric Deposition	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	8540	Sediment Resuspension	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	8600	Natural Sources	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	8700	Recreational and Tourism Activities (non-boating)	2007	
CAL63430(	6	Lahontan	L	Lakes/Reservoirs	Tahoe, Lake	63430010	85364.1	A	Acres	1100	Sedimentation/Siltation	9100	Nonpoint Source	2007	
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	1500	Range Grazing-Riparian and/or Upland	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	4501	Surface Runoff	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	5000	Resource Extraction	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	7000	Hydromodification	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	8100	Atmospheric Deposition	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	8700	Recreational and Tourism Activities (non-boating)	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63420	6	Lahontan	R	Rivers/Streams	Blackwood Creek	63420021	5.87001	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2008	Creek affected by past gravel quarry operations and other watershed disturbance including grazing and timber harv
CAR63520	6	Lahontan	R	Rivers/Streams	Bronco Creek	63520053	1.34403	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2006	Watershed disturbance in naturally highly erosive watershe
CAR63520	6	Lahontan	R	Rivers/Streams	Bronco Creek	63520053	1.34403	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2006	Watershed disturbance in naturally highly erosive watershe
CAR63520	6	Lahontan	R	Rivers/Streams	Bronco Creek	63520053	1.34403	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2006	Watershed disturbance in naturally highly erosive watershe
CAR63040	6	Lahontan	R	Rivers/Streams	Clearwater Creek	63040051	12.4874	M	Miles	1100	Sedimentation/Siltation	1500	Range Grazing-Riparian and/or Upland	2006	Listed on basis of limited information; additional monitoring may support delisti
CAR63040	6	Lahontan	R	Rivers/Streams	Clearwater Creek	63040051	12.4874	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2006	Listed on basis of limited information; additional monitoring may support delisti
CAR63040	6	Lahontan	R	Rivers/Streams	Clearwater Creek	63040051	12.4874	M	Miles	1100	Sedimentation/Siltation	8300	Highway Maintenance and Runoff	2006	Listed on basis of limited information; additional monitoring may support delisti
CAR63010	6	Lahontan	R	Rivers/Streams	East Walker River, below Bridgeport Reservo	63030050	8.00973	M	Miles	1100	Sedimentation/Siltation	1350	Grazing-Related Sources	2019	
CAR63010	6	Lahontan	R	Rivers/Streams	East Walker River, below Bridgeport Reservo	63030050	8.00973	M	Miles	1100	Sedimentation/Siltation	4500	Highway/Road/Bridge Runoff	2019	
CAR63010	6	Lahontan	R	Rivers/Streams	East Walker River, below Bridgeport Reservo	63030050	8.00973	M	Miles	1100	Sedimentation/Siltation	4600	Urban Runoff--Erosion and Sedimentation	2019	
CAR63010	6	Lahontan	R	Rivers/Streams	East Walker River, below Bridgeport Reservo	63030050	8.00973	M	Miles	1100	Sedimentation/Siltation	7350	Upstream Impoundment	2019	
CAR63010	6	Lahontan	R	Rivers/Streams	East Walker River, below Bridgeport Reservo	63030050	8.00973	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2019	
CAR63520	6	Lahontan	R	Rivers/Streams	Gray Creek (Nevada County	63520052	2.8033	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2006	Sediment from disturbance of naturally highly erosive watershe
CAR63520	6	Lahontan	R	Rivers/Streams	Gray Creek (Nevada County	63520052	2.8033	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2006	Sediment from disturbance of naturally highly erosive watershe
CAR63520	6	Lahontan	R	Rivers/Streams	Gray Creek (Nevada County	63520052	2.8033	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2006	Sediment from disturbance of naturally highly erosive watershe
CAR63410	6	Lahontan	R	Rivers/Streams	Heavenly Valley Creek (USFS boundary to Trout Creek)	63410031	1.44732	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2019	
CAR63410	6	Lahontan	R	Rivers/Streams	Heavenly Valley Creek (USFS boundary to Trout Creek)	63410031	1.44732	M	Miles	1100	Sedimentation/Siltation	3200	Land Development	2019	
CAR63410	6	Lahontan	R	Rivers/Streams	Heavenly Valley Creek (USFS boundary to Trout Creek)	63410031	1.44732	M	Miles	1100	Sedimentation/Siltation	7000	Hydromodification	2019	
CAR63410	6	Lahontan	R	Rivers/Streams	Heavenly Valley Creek (USFS boundary to Trout Creek)	63410031	1.44732	M	Miles	1100	Sedimentation/Siltation	7550	Habitat Modification	2019	
CAR63410	6	Lahontan	R	Rivers/Streams	Heavenly Valley Creek (USFS boundary to Trout Creek)	63410031	1.44732	M	Miles	1100	Sedimentation/Siltation	8700	Recreational and Tourism Activities (non-boating)	2019	
CAR63410	6	Lahontan	R	Rivers/Streams	Heavenly Valley Creek (USFS boundary to Trout Creek)	63410031	1.44732	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAR63030	6	Lahontan	R	Rivers/Streams	Hot Springs Canyon Creek	63030042	2.8612	M	Miles	1100	Sedimentation/Siltation	1500	Range Grazing-Riparian and/or Upland	2008	Listed on basis of limited data; further monitoring may support delistir
CAR63520	6	Lahontan	R	Rivers/Streams	Squaw Creek	63520011	5.8	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2006	
CAR63520	6	Lahontan	R	Rivers/Streams	Squaw Creek	63520011	5.8	M	Miles	1100	Sedimentation/Siltation	4300	Other Urban Runoff	2006	
CAR63520	6	Lahontan	R	Rivers/Streams	Squaw Creek	63520011	5.8	M	Miles	1100	Sedimentation/Siltation	7000	Hydromodification	2006	
CAR63520	6	Lahontan	R	Rivers/Streams	Squaw Creek	63520011	5.8	M	Miles	1100	Sedimentation/Siltation	7800	Drainage/Filling Of Wetlands	2006	
CAR63520	6	Lahontan	R	Rivers/Streams	Squaw Creek	63520011	5.8	M	Miles	1100	Sedimentation/Siltation	8300	Highway Maintenance and Runoff	2006	
CAR63520	6	Lahontan	R	Rivers/Streams	Squaw Creek	63520011	5.8	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2006	
CAR63520	6	Lahontan	R	Rivers/Streams	Squaw Creek	63520011	5.8	M	Miles	1100	Sedimentation/Siltation	8700	Recreational and Tourism Activities (non-boating)	2006	
CAR63520	6	Lahontan	R	Rivers/Streams	Squaw Creek	63520011	5.8	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2006	
CAR63510	6	Lahontan	R	Rivers/Streams	Truckee River	63510010	39.1307	M	Miles	1100	Sedimentation/Siltation	1500	Range Grazing-Riparian and/or Upland	2006	Watershed disturbance including ski resorts, silvicultural activities, urban development, reservoir construction and management; highly erosive subwatersh
CAR63510	6	Lahontan	R	Rivers/Streams	Truckee River	63510010	39.1307	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2006	Watershed disturbance including ski resorts, silvicultural activities, urban development, reservoir construction and management; highly erosive subwatersh
CAR63510	6	Lahontan	R	Rivers/Streams	Truckee River	63510010	39.1307	M	Miles	1100	Sedimentation/Siltation	3000	Construction/Land Development	2006	Watershed disturbance including ski resorts, silvicultural activities, urban development, reservoir construction and management; highly erosive subwatersh
CAR63510	6	Lahontan	R	Rivers/Streams	Truckee River	63510010	39.1307	M	Miles	1100	Sedimentation/Siltation	3100	Highway/Road/Bridge Construction	2006	Watershed disturbance including ski resorts, silvicultural activities, urban development, reservoir construction and management; highly erosive subwatersh
CAR63510	6	Lahontan	R	Rivers/Streams	Truckee River	63510010	39.1307	M	Miles	1100	Sedimentation/Siltation	7700	Streambank Modification/Destabilization	2006	Watershed disturbance including ski resorts, silvicultural activities, urban development, reservoir construction and management; highly erosive subwatersh
CAR63510	6	Lahontan	R	Rivers/Streams	Truckee River	63510010	39.1307	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2006	Watershed disturbance including ski resorts, silvicultural activities, urban development, reservoir construction and management; highly erosive subwatersh
CAR63510	6	Lahontan	R	Rivers/Streams	Truckee River	63510010	39.1307	M	Miles	1100	Sedimentation/Siltation	7820	Erosion/Siltation	2006	Watershed disturbance including ski resorts, silvicultural activities, urban development, reservoir construction and management; highly erosive subwatersh
CAR63510	6	Lahontan	R	Rivers/Streams	Truckee River	63510010	39.1307	M	Miles	1100	Sedimentation/Siltation	8600	Natural Sources	2006	Watershed disturbance including ski resorts, silvicultural activities, urban development, reservoir construction and management; highly erosive subwatersh
CAR63510	6	Lahontan	R	Rivers/Streams	Truckee River	63510010	39.1307	M	Miles	1100	Sedimentation/Siltation	8700	Recreational and Tourism Activities (non-boating)	2006	Watershed disturbance including ski resorts, silvicultural activities, urban development, reservoir construction and management; highly erosive subwatersh
CAR63510	6	Lahontan	R	Rivers/Streams	Truckee River	63510010	39.1307	M	Miles	1100	Sedimentation/Siltation	8710	Snow skiing activities	2006	Watershed disturbance including ski resorts, silvicultural activities, urban development, reservoir construction and management; highly erosive subwatersh
CAR63510	6	Lahontan	R	Rivers/Streams	Truckee River	63510010	39.1307	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2006	Watershed disturbance including ski resorts, silvicultural activities, urban development, reservoir construction and management; highly erosive subwatersh
CAR63420	6	Lahontan	R	Rivers/Streams	Ward Creek	63420020	5.675	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2008	
CAR63420	6	Lahontan	R	Rivers/Streams	Ward Creek	63420020	5.675	M	Miles	1100	Sedimentation/Siltation	3200	Land Development	2008	
CAR63420	6	Lahontan	R	Rivers/Streams	Ward Creek	63420020	5.675	M	Miles	1100	Sedimentation/Siltation	4000	Urban Runoff/Storm Sewers	2008	

WBID	REGION NUMBER	REGION NAME	WATER BODY TYPE ABBR	WATER BODY TYPE	WATER BODY NAME	CALWATER WATERSHED	ESTIMATED SIZE AFFECTED	UNIT ABBR	UNIT	POLLUTANT CODE	POLLUTANT	SOURCE CODE	POTENTIAL SOURCES	PROPOSED TMDL COMPLETION	COMMENTS
CAR63420	6	Lahontan	R	Rivers/Streams	Ward Creek	63420020	5.675	M	Miles	1100	Sedimentation/Siltation	4500	Highway/Road/Bridge Runoff	2008	
CAR63420	6	Lahontan	R	Rivers/Streams	Ward Creek	63420020	5.675	M	Miles	1100	Sedimentation/Siltation	7810	Channel Erosion	2008	
CAR63420	6	Lahontan	R	Rivers/Streams	Ward Creek	63420020	5.675	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2008	
CAR63210	6	Lahontan	R	Rivers/Streams	Wolf Creek (Alpine County)	63210031	11.8207	M	Miles	1100	Sedimentation/Siltation	1500	Range Grazing-Riparian and/or Upland	2019	
CAR63210	6	Lahontan	R	Rivers/Streams	Wolf Creek (Alpine County)	63210031	11.8207	M	Miles	1100	Sedimentation/Siltation	2000	Silviculture	2019	
CAR63210	6	Lahontan	R	Rivers/Streams	Wolf Creek (Alpine County)	63210031	11.8207	M	Miles	1100	Sedimentation/Siltation	9100	Nonpoint Source	2019	
CAL80171(	8	Santa Ana	L	Lakes/Reservoirs	Big Bear Lake	80171000	2865.01	A	Acres	1100	Sedimentation/Siltation	3000	Construction/Land Development	2006	
CAL80171(	8	Santa Ana	L	Lakes/Reservoirs	Big Bear Lake	80171000	2865.01	A	Acres	1100	Sedimentation/Siltation	8710	Snow skiing activities	2006	
CAL80171(	8	Santa Ana	L	Lakes/Reservoirs	Big Bear Lake	80171000	2865.01	A	Acres	1100	Sedimentation/Siltation	9105	Unknown Nonpoint Source	2006	
CAR80171	8	Santa Ana	R	Rivers/Streams	Rathbone (Rathbun) Creek	80171000	4.68	M	Miles	1100	Sedimentation/Siltation	8710	Snow skiing activities	2006	
CAR80171	8	Santa Ana	R	Rivers/Streams	Rathbone (Rathbun) Creek	80171000	4.68	M	Miles	1100	Sedimentation/Siltation	9105	Unknown Nonpoint Source	2006	
CAE90431	9	San Diego	E	Estuaries	Agua Hedionda Lagoon	90431000	6.83187	A	Acres	1100	Sedimentation/Siltation	9201	Nonpoint/Point Source	2019	
CAE90421	9	San Diego	E	Estuaries	Buena Vista Lagoon	90421000	202.298	A	Acres	1100	Sedimentation/Siltation	9201	Nonpoint/Point Source	2019	
CAE90610	9	San Diego	E	Estuaries	Los Penasquitos Lagoon	90610000	468.918	A	Acres	1100	Sedimentation/Siltation	9201	Nonpoint/Point Source	2019	
CAE90461	9	San Diego	E	Estuaries	San Elijo Lagoon	90461000	565.804	A	Acres	1100	Sedimentation/Siltation	9201	Nonpoint/Point Source	2019	Estimated size of impairment is 150 acres

Post-Construction Water Balance Calculator

User may make changes from any cell that is orange or brown in color (similar to the cells to the immediate right). Cells in green are calculated for you.

(Step 1a) If you know the 85th percentile storm event for your location enter it in the box below

(Step 1b) If you can not answer 1a then select the county where the project is located (click on the cell to the right for drop-down): This will determine the average 85th percentile 24 hr. storm event for your site, which will appear under precipitation to left. — *SACRAMENTO*

(Step 1c) If you would like a more percise value select the location closest to your site. If you do not recgonize any of these locations, leave this drop-down menu at location. The average value for the County will be used. — **SACRAMENTO FAA ARPT**

Project Information	
Project Name:	*Optional*
Waste Discharge Identification (WDID):	*Optional*
Date:	*Optional*
Sub Drainage Area Name (from map):	*Optional*

Runoff Calculations	
(Step 2) Indicate the Soil Type (dropdown menu to right):	***Group C Soils*** — **Low infiltration. Sandy clay loam. Infiltration rate 0.05 to 0.15 inch/hr when wet.**
(Step 3) Indicate the existing **dominant** non-built land Use Type (dropdown menu to right):	***Wood & Grass: <50% ground cover***
(Step 4) Indicate the proposed **dominant** non-built land Use Type (dropdown menu to right):	***Lawn, Grass, or Pasture covering more than 75% of the open space***

Runoff Curve Numbers	
Existing Pervious Runoff Curve Number	**82**
Proposed Development Pervious Runoff Curve Number	**74**

	Complete Either: Sq Ft	Complete Either: Acres	Acres
(Step 5) Total Project Site Area:		5.00	**5.00**
(Step 6) Sub-watershed Area:		5.00	**5.00**
Percent of total project :			**100%**

Design Storm		
Based on the County you indicated above, we have included the 85 percentile average 24 hr event - P85 (in)^ for your area.	**0.62**	**in**
The Amount of rainfall needed for runoff to occur (Existing runoff curve number -P from existing RCN (in)^)	**0.44**	**In**
P used for calculations (in) (the greater of the above two criteria)	**0.62**	**In**

^Available at www.cabmphandbooks.com

(Step 7) Sub-watershed Conditions	Complete Either: Sq Ft	Complete Either: Acres	Calculated Acres
Sub-watershed Area (acres)			**5.00**
Existing Rooftop Impervious Coverage		**0**	**0.00**
Existing Non-Rooftop Impervious Coverage		**0**	**0.00**
Proposed Rooftop Impervious Coverage		**0**	**0.00**
Proposed Non-Rooftop Impervious Coverage		**0**	**0.00**

Credits	**Acres**	**Square Feet**
Porous Pavement	**0.00**	**0**
Tree Planting	**0.00**	**0**
Downspout Disconnection	**0.00**	**0**
Impervious Area Disconnection	**0.00**	**0**
Green Roof	**0.00**	**0**
Stream Buffer	**0.00**	**0**
Vegetated Swales	**0.00**	**0**
Subtotal	**0.00**	**0**
Subtotal Runoff Volume Reduction Credit	**0 Cu. Ft.**	

Pre-Project Runoff Volume (cu ft)	**247**	**Cu.Ft.**
Project-Related Runoff Volume Increase w/o credits (cu ft)	**0**	**Cu.Ft.**
Project-Related Volume Increase with Credits (cu ft)	**0**	**Cu.Ft.**

You have achieved your minimum requirements

(Step 9) Impervious Volume Reduction Credits	**Volume (cubic feet)**
Rain Barrels/Cisterns	**0 Cu. Ft.**
Soil Quality	**0 Cu. Ft.**
Subtotal Runoff Volume Reduction	**0 Cu. Ft.**
Total Runoff Volume Reduction Credit	**0 Cu. Ft.**

Porous Pavement Credit Worksheet

Please fill out a porous pavement credit worksheet for each project sub-watershed.

For the PROPOSED Development:

Proposed Porous Pavement	Runoff Reduction*	Fill in either Acres or SqFt In SqFt.	In Acres	Equivalent Acres
Area of **Brick without Grout** on less than 12 inches of base with at least 20% void space over soil	0.45			0.00
Area of **Brick without Grout** on more than 12 inches of base with at least 20% void space over soil	0.90			0.00
Area of **Cobbles** less than 12 inches deep and over soil	0.30			0.00
Area of **Cobbles** less than 12 inches deep and over soil	0.60			0.00
Area of **Reinforced Grass Pavement** on less than 12 inches of base with at least 20% void space over soil	0.45			0.00
Area of **Reinforced Grass Pavement** on at least 12 inches of base with at least 20% void space over soil	0.90			0.00
Area of **Porous Gravel Pavement** on less than 12 inches of base with at least 20% void space over soil	0.38			0.00
Area of **Porous Gravel Pavement** on at least 12 inches of base with at least 20% void space over soil	0.75			0.00
Area of **Poured Porous Concrete or Asphalt Pavement** with less than 4 inches of gravel base (washed stone)	0.40			0.00
Area of **Poured Porous Concrete or Asphalt Pavement** with 4 to 8 inches of gravel base (washed stone)	0.60			0.00
Area of **Poured Porous Concrete or Asphalt Pavement** with 8 to 12 inches of gravel base (washed stone)	0.80			0.00
Area of **Poured Porous Concrete or Asphalt Pavement** with 12 or more inches of gravel base (washed stone)	1.00			0.00

*=1-Rv** Return to Calculator

**Using Site Design Techniques to meet Development Standards for Stormwater Quality (BASMAA 2003)

**NCDENR Stormwater BMP Manual (2007)

Tree Planting Credit Worksheet

Please fill out a tree canopy credit worksheet for each project sub-watershed.

Tree Canopy Credit Criteria	Number of Trees Planted	Credit (acres)	
Number of proposed evergreen trees to be planted (credit = number of trees x 0.005)*	0	0.00	
Number of proposed deciduous trees to be planted (credit = number of trees x 0.0025)*		0.00	
	Square feet Under Canopy		
Square feet under an existing tree canopy, that will remain on the property, with an average diameter at 4.5 ft above grade (i.e., diameter at breast height or DBH) is LESS than 12 in diameter.		0.00	
Square feet under an existing tree canopy that will remain on the property, with an average diameter at 4.5 ft above grade (i.e., diameter at breast height or DBH) is 12 in diameter or GREATER.		0.00	0
Please describe below how the project will ensure that these trees will be maintained.			

Return to Calculator

* credit amount based on credits from Stormwater Quality Design Manual for the Sacramento and South Placer Regions

Downspout Disconnection Credit Worksheet

Please fill out a downspout disconnection credit worksheet for each project subwatershed. If you answer yes to all questions, all rooftop area draining to each downspout will be subtracted from your proposed rooftop impervious coverage.

Downspout Disconnection Credit Criteria					
Do downspouts and any extensions extend at least six feet from a basement and two feet from a crawl space or concrete slab?				○ Yes	◉ No
Is the area of rooftop connecting to each disconnected downspout 600 square feet or less?				○ Yes	◉ No
Is the roof runoff from the design storm event fully contained in a raised bed or planter box or does it drain as sheet flow to a landscaped area large enough to contain the roof runoff from the design storm event?				○ Yes	◉ No
The Stream Buffer and/or Vegetated Swale credits **will not** be taken in this sub-watershed area?				○ Yes	◉ No
Percentage of existing	0.00	Acres	of rooftop surface has disconnected downspouts		
Percentage of the proposed	0.00	Acres	of rooftop surface has disconnected downspouts	50	
				Return to Calculator	

Impervious Area Disconnection Credit Worksheet

Please fill out an impervious area disconnection credit worksheet for each project sub-watershed. If you answer yes to all questions, all non-rooftop impervious surface area will be subtracted from your proposed non-rooftop impervious coverage.

Non-Rooftop Disconnection Credit Criteria	Response
Is the maximum contributing impervious flow path length less than 75 feet or, if equal or greater than 75 feet, is a storage device (e.g. French drain, bioretention area, gravel trench) implemented to achieve the required disconnection length?	◉ Yes ○ No
Is the impervious area to any one discharge location less than 5,000 square feet?	◉ Yes ○ No
The Stream Buffer credit **will not** be taken in this sub-watershed area?	◉ Yes ○ No

Percentage of existing	0.00	Acres	non-rooftop surface area disconnected	
Percentage of the proposed	0.00	Acres	non-rooftop surface area disconnected	70

Return to Calculator

Green Roof Credit Worksheet

Please fill out a greenroof credit worksheet for each project sub-watershed. If you answer yes to all questions, 70% of the greenroof area will be subtracted from your proposed rooftop impervious coverage.

Green Roof Credit Criteria	Response
Is the roof slope less than 15% or does it have a grid to hold the substrate in place until it forms a thick vegetation mat?	◉ Yes ○ No
Has a professional engineer assessed the necessary load reserves and designed a roof structure to meet state and local codes?	◉ Yes ○ No
Is the irrigation needed for plant establishment and/or to sustain the green roof during extended dry periods, is the source from stored, recycled, reclaimed, or reused water?	◉ Yes ○ No
Percentage of existing 0.00 Acres rooftop surface area in greenroof	
Percentage of the proposed 0.00 Acres rooftop surface area in greenroof	

Return to Calculator

Stream Buffer Credit Worksheet

Please fill out a stream buffer credit worksheet for each project sub-watershed. If you answer yes to all questions, you may subtract all impervious surface draining to each stream buffer that has not been addressed using the Downspout and/or Impervious Area Disconnection credits.

Stream Buffer Credit Criteria				Response
Does runoff enter the floodprone width* or within 500 feet (whichever is larger) of a stream channel as sheet flow**?				○ Yes ◉ No
Is the contributing overland slope 5% or less, or if greater than 5%, is a level spreader used?				○ Yes ◉ No
Is the buffer area protected from vehicle or other traffic barriers to reduce compaction?				○ Yes ◉ No
Will the stream buffer be maintained in an ungraded and uncompacted condition and will the vegetation be maintained in a natural condition?				○ Yes ◉ No
Percentage of existing	0.00	Acres	impervious surface area draining into a stream buffer:	
Percentage of the proposed	0.00	Acres	impervious surface area that will drain into a stream buffer:	
Please describe below how the project will ensure that the buffer areas will remain in ungraded and uncompacted condition and that the vegetation will be maintained in a natural condition.				

Return to Calculator

* floodprone width is the width at twice the bankfull depth.
** the maximum contributing length shall be 75 feet for impervious area

Vegetated Swale Credit Worksheet

Please fill out a vegetated swale worksheet for each project subwatershed. If you answer yes to all questions, you may subtract all impervious surface draining to each stream buffer that has not been addressed using the Downspout Disconnection credit.

Vegetated Swale Credit Criteria

Have all vegetated swales been designed in accordance with Treatment Control BMP 30 (TC-30 - Vegetated Swale) from the California Stormwater BMP Handbook, New Development and Redevelopment (available at www.cabmphandbooks.com)?	○ Yes ◉ No
Is the maximum flow velocity for runoff from the design storm event less than or equal to 1.0 foot per second?	○ Yes ◉ No

Percentage of existing	0.00	Acres of impervious area draining to a vegetated swale	
Percentage of the proposed	0.00	Acres of impervious area draining to a vegetated swale	

Return to Calculator

Rain Barrel/Cistern Credit Worksheet

Please fill out a rain barrel/cistern worksheet for each project sub-watershed.

Rain Barrel/Cistern Credit Criteria	Response
Total number of rain barrel(s)/cisterns	
Average capacity of rain barrel(s)/cistern(s) (in gallons)	
Total capacity rain barrel(s)/cistern(s) (in cu ft) [1]	0

[1] accounts for 10% loss

Return to Calculator

Please fill out a soil quality worksheet for each project sub-watershed.

	Response
Will the landscaped area be lined with an impervious membrane?	
Will the soils used for landscaping meet the ideal bulk densities listed in Table 1 below? [1]	○ Yes ◉ No
If you answered yes to the question above, and you know the area-weighted bulk density within the top 12 inches for soils used for landscaping (in g/cm^3)* , fill in the cell to the right and skip to cell G11. If not select from the drop-down menu in G10.	1.3
If you answered yes to the question above, but you do not know the exact bulk density, which of the soil types in the drop down menu to the right best describes the top 12 inches for soils used for landscaping (in g/cm^3).	Sandy loams, loams
What is the average depth of your landscaped soil media meeting the above criteria (inches)?	12
What is the total area of the landscaped areas meeting the above criteria (in acres)?	2.97

Return to Calculator

Table 1

Sands, loamy sands	<1.6
Sandy loams, loams	<1.4
Sandy clay loams, loams, clay loams	<1.4
Silts, silt loams	<1.3
Silt loams, silty clay loams	<1.1
Sandy clays, silty clays, some clay loams (35-45% clay)	<1.1
Clays (>45% clay)	<1.1

[1] USDA NRCS. "Soil Quality Urban Technical Note No.2-Urban Soil Compaction". March 2000. http://soils.usda.gov/sqi/management/files/sq_utn_2.pdf

* To determine how to calculate density see: http://www.globe.gov/tctg/bulkden.pdf?sectionID=94

Porosity (%) 50.94%

Mineral grains in many soils are mainly quartz and feldspar, so 2.65 a good average for particle density. To determine percent porosity, use the formula: Porosity (%) = (1-Bulk Density/2.65) X 100

APPENDIX 2:
Post-Construction Water Balance Performance Standard Spreadsheet

The discharger shall submit with their Notice of Intent (NOI) the following information to demonstrate compliance with the New and Re-Development Water Balance Performance Standard.

Map Instructions

The discharger must submit a small-scale topographic map of the site to show the existing contour elevations, pre- and post-construction drainage divides, and the total length of stream in each watershed area. Recommended scales include 1 in. = 20 ft., 1 in. = 30 ft., 1 in. = 40 ft., or 1 in = 50 ft. The suggested contour interval is usually 1 to 5 feet, depending upon the slope of the terrain. The contour interval may be increased on steep slopes. Other contour intervals and scales may be appropriate given the magnitude of land disturbance.

Spreadsheet Instructions

The intent of the spreadsheet is to help dischargers calculate the project-related increase in runoff volume and select impervious area and runoff reduction credits to reduce the project-related increase in runoff volume to pre-project levels.

The discharger has the option of using the spreadsheet (**Appendix 2.1)** or a more sophisticated, watershed process-based model (e.g. Storm Water Management Model, Hydrological Simulation Program Fortran) to determine the project-related increase in runoff volume.

In* Appendix 4.1**, ***you must complete the worksheet for each land use/soil type combination for each project sub-watershed.

Steps 1 through 9 pertain specifically to the Runoff Volume Calculator:

Step 1: Enter the county where the project is located in cell H3.

Step 2: Enter the soil type in cell H6.

Step 3: Enter the existing pervious (dominant) land use type in cell H7.

Step 4: Enter the proposed pervious (dominant) land use type in cell H8.

Step 5: Enter the total project site area in cell H11 or J11.

Step 6: Enter the sub-watershed area in cell H12 or J12.

Step 7: Enter the existing rooftop area in cell H17 or J17, the existing non-rooftop impervious area in cell H18 or J18, the proposed rooftop area in cell H19 or J19, and the proposed non-rooftop impervious area in cell H20 or J20

Step 8: Work through each of the impervious area reduction credits and claim credits where applicable. Volume that cannot be addressed using non-structural practices must be captured in structural practices and approved by the Regional Water Board.

Step 9: Work through each of the impervious volume reduction credits and claim credits where applicable. Volume that cannot be addressed using non-structural practices must be captured in structural practices and approved by the Regional Water Board.

Non-structural Practices Available for Crediting

- ***Porous Pavement***
- ***Tree Planting***
- ***Downspout Disconnection***
- ***Impervious Area Disconnection***
- ***Green Roof***
- ***Stream Buffer***
- ***Vegetated Swales***
- ***Rain Barrels and Cisterns***
- ***Landscaping Soil Quality***

APPENDIX 3
Bioassessment Monitoring Guidelines

Bioassessment monitoring is required for projects that meet all of the following criteria:

1. The project is rated Risk Level 3 or LUP Type 3
2. The project directly discharges runoff to a freshwater wadeable stream (or streams) that is either: (a) listed by the State Water Board or USEPA as impaired due to sediment, and/or (b) tributary to any downstream water body that is listed for sediment; and/or have the beneficial use SPAWN & COLD & MIGRATORY
3. Total project-related ground disturbance exceeds 30 acres.

For all such projects, the discharger shall conduct bioassessment monitoring, as described in this section, to assess the effect of the project on the biological integrity of receiving waters.
Bioassessment shall include:
1. The collection and reporting of specified instream biological data
2. The collection and reporting of specified instream physical habitat data

<u>Bioassessment Exception</u>
If a site qualifies for bioassessment, but construction commences out of an index period for the site location, the discharger shall:
1. Receive Regional Water Board approval for the sampling exception
2. Make a check payable to: Cal State Chico Foundation (SWAMP Bank Account) or San Jose State Foundation (SWAMP Bank Account) and include the WDID# on the check for the amount calculated for the exempted project.
3. Send a copy of the check to the Regional Water Board office for the site's region
4. Invest **7,500.00 X The number of samples required** into the SWAMP program as compensation (upon Regional Water Board approval).
5. Conduct bioassessment monitoring, as described in Appendix 4
6. Include the collection and reporting of specified instream biological data and physical habitat
7. Use the bioassessment sample collection and Quality Assurance & Quality Control (QA/QC) protocols developed by the State of California's Surface Water Ambient Monitoring Program (SWAMP)

<u>Site Locations and Frequency</u>
Macroinvertebrate samples shall be collected both before ground disturbance is initiated and after the project is completed. The "after" sample(s) shall be collected after at least one winter season resulting in surface runoff has transpired after project-related ground disturbance has ceased. "Before" and "after" samples shall be collected both upstream and downstream of the project's

discharge. Upstream samples should be taken immediately before the sites outfall and downstream samples should be taken immediately after the outfall (when safe to collect the samples). Samples should be collected for each freshwater wadeable stream that is listed as impaired due to sediment, or tributary to a water body that is listed for sediment. Habitat assessment data shall be collected concurrently with all required macroinvertebrate samples.

Index Period (Timing of Sample Collection)
Macroinvertebrate sampling shall be conducted during the time of year (i.e., the "index period") most appropriate for bioassessment sampling, depending on ecoregion. This map is posted on the State Water Board's Website: http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml

Field Methods for Macroinvertebrate Collections
In collecting macroinvertebrate samples, the discharger shall use the "Reachwide Benthos (Multi-habitat) Procedure" specified in *Standard Operating Procedures for Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California* (Ode 2007).[1]

Physical - Habitat Assessment Methods
The discharger shall conduct, concurrently with all required macroinvertebrate collections, the "Full" suite of physical habitat characterization measurements as specified in *Standard Operating Procedures for Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California* (Ode 2007), and as summarized in the Surface Water Ambient Monitoring Program's *Stream Habitat Characterization Form — Full Version*.

Laboratory Methods
Macroinvertebrates shall be identified and classified according to the Standard Taxonomic Effort (STE) Level I of the Southwestern Association of Freshwater Invertebrate Taxonomists (SAFIT),[2] and using a fixed-count of 600 organisms per sample.

Quality Assurance
The discharger or its consultant(s) shall have and follow a quality assurance (QA) plan that covers the required bioassessment monitoring. The QA plan shall include, or be supplemented to include, a specific requirement for external QA checks (i.e., verification of taxonomic identifications and correction of data where errors are identified). External QA checks shall be performed on one of the

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[1] This document is available on the Internet at: http://www.swrcb.ca.gov/swamp/docs/phab_sopr6.pdf.
[2] The current SAFIT STEs (28 November 2006) list requirements for both the Level I and Level II taxonomic effort, and are located at: http://www.swrcb.ca.gov/swamp/docs/safit/ste_list.pdf. When new editions are published by SAFIT, they will supersede all previous editions. All editions will be posted at the State Water Board's SWAMP website.

discharger's macroinvertebrate samples collected per calendar year, or ten percent of the samples per year (whichever is greater). QA samples shall be randomly selected. The external QA checks shall be paid for by the discharger, and performed by the California Department of Fish and Game's Aquatic Bioassessment Laboratory. An alternate laboratory with equivalent or better expertise and performance may be used if approved in writing by State Water Board staff.

Sample Preservation and Archiving

The original sample material shall be stored in 70 percent ethanol and retained by the discharger until: 1) all QA analyses specified herein and in the relevant QA plan are completed; and 2) any data corrections and/or re-analyses recommended by the external QA laboratory have been implemented. The remaining subsampled material shall be stored in 70 percent ethanol and retained until completeness checks have been performed according to the relevant QA plan. The identified organisms shall be stored in 70 percent ethanol, in separate glass vials for each final ID taxon. (For example, a sample with 45 identified taxa would be archived in a minimum of 45 vials, each containing all individuals of the identified taxon.) Each of the vials containing identified organisms shall be labeled with taxonomic information (i.e., taxon name, organism count) and collection information (i.e., site name/site code, waterbody name, date collected, method of collection). The identified organisms shall be archived (i.e., retained) by the discharger for a period of not less than three years from the date that all QA steps are completed, and shall be checked at least once per year and "topped off" with ethanol to prevent desiccation. The identified organisms shall be relinquished to the State Water Board upon request by any State Water Board staff.

Data Submittal

The macroinvertebrate results (i.e., taxonomic identifications consistent with the specified SAFIT STEs, and number of organisms within each taxa) shall be submitted to the State Water Board in electronic format. The State Water Board's Surface Water Ambient Monitoring Program (SWAMP) is currently developing standardized formats for reporting bioassessment data. All bioassessment data collected after those formats become available shall be submitted using the SWAMP formats. Until those formats are available, the biological data shall be submitted in MS-Excel (or equivalent) format.[3]

The physical/habitat data shall be reported using the standard format titled *SWAMP Stream Habitat Characterization Form — Full Version*.[4]

[3] Any version of Excel, 2000 or later, may be used.
[4] Available at:
http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/reports/fieldforms_fullversion052908.pdf

Invasive Species Prevention

In conducting the required bioassessment monitoring, the discharger and its consultants shall take precautions to prevent the introduction or spread of aquatic invasive species. At minimum, the discharger and its consultants shall follow the recommendations of the California Department of Fish and Game to minimize the introduction or spread of the New Zealand mudsnail.[5]

[5] Instructions for controlling the spread of NZ mudsnails, including decontamination methods, can be found at: http://www.dfg.ca.gov/invasives/mudsnail/
More information on AIS More information on AIS
http://www.waterboards.ca.gov/water_issues/programs/swamp/ais/

Appendix 4 Sediment TMDLs

Implemented Sediment TMDLs in California. Construction was listed as a source in all fo these TMDLs in relation to road construction. Although construction was mentioned as a source, it was not given a specific allocation amount. The closest allocation amount would be for the road activity management WLA. **Implementation Phase** – Adoption process by the Regional Board, the State Water Resources Control Board, the Office of Administrative Law, and the US Environmental Protection Agency completed and TMDL being implemented.

A. Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres**	**WLA** tons mi^2 yr
1 R1.epa.albionfinaltmdl	R	Albion River	Sedimentation	Road Construction	2001	43 acres	See A (table 6)

B Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres**	**WLA** tons mi^2 yr
1 R1.epa.EelR-middle.mainSed.temp	R	Middle Main Eel River and Tributaries (from Dos Rios to the South Fork)	Sedimentation Road	Construction	2005-2006 521	mi^2	100

C Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres**	**WLA** tons mi^2 yr
1 R1.epa.EelRsouth.sed.temp	R	South Fork Eel River	Sedimentation	Road Construction	12 1999	See chart	473

D Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres**	**WLA** tons mi^2 yr
1 R1.epa.bigfinaltmdl	R Big	River	Sedimentation	Road Construction	12 2001	181 mi^2 watershed drainage	TMDL = loading capacity = nonpoint sources + background =

							393 t mi2 yr

E Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres**	**WLA** tons mi^2 yr
1 R1.epa.EelR-lower.Sed.temp-121807-signed	R	Lower Eel River	Sedimentation	Road Construction	12 2007	300 square-mile watershed	898

F Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres**	**WLA** tons mi^2 yr
1 R1.epa.EelR-middle.Sed.temp-	R	Middle Fork Eel River	Sedimentation	Road Construction	12 2003	753 mi^2 (approx. 482,000 acres)	82

G Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres** Mi^2	**WLA** tons mi^2 yr
1 R1.epa.EelRnorth-Sed.temp.final-121807-signed	R	North Fork Eel River	Sedimentation	Road Construction	12 30 2002	289 (180,020 acres)	20

H Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres** Mi^2	**WLA** tons mi^2 yr
1 R1.epa.EelR-upper.mainSed.temp-	R	Upper Main Eel River and Tributaries (including Tomki Creek, Outlet Creek and Lake Pillsbury)	Sedimentation	Road Construction	12 29 2004	688 (approx. 440,384 acres)	14

I Region	Type	Name	Pollutant Stressor	Potential Sources	TMDL Completion Date	Watershed Acres	WLA tons mi^2 yr
1 R1.epa.gualalafinaltmdl	R	Gualala River	Sedimentation	Road Construction	Not sure	300 (191,145 acres)	7

J Region	Type	Name	Pollutant Stressor	Potential Sources	TMDL Completion Date	Watershed Acres mi^2	WLA tons mi^2 yr
1 R1.epa.Mad-sed.turbidity	R	Mad River	Sedimentation	Road Construction	12 21 2007	480	174

K Region	Type	Name	Pollutant Stressor	Potential Sources	TMDL Completion Date	Watershed Acres mi^2	WLA tons mi^2 yr
1 R1.epa.mattole.sediment	R	Mattole River	Sedimentation	Road Construction	12 30 2003	296	27 or 520+27 = 547

L Region	Type	Name	Pollutant Stressor	Potential Sources	TMDL Completion Date	Watershed Acres mi^2	WLA tons mi^2 yr
1 R1.epa.navarro.sed.temp	R	Navarro River	Sedimentation	Road Construction	Not sure	315 (201,600 acres).	50

M Region	Type	Name	Pollutant Stressor	Potential Sources	TMDL Completion Date	Watershed Acres mi^2	WLA tons mi^2 yr
1 R1.epa.noyo.sediment	R	Noyo River	Sedimentation	Road Construction	12 16 1999	113 (72,323 acres)	68 (three areas measured) Table 16 in the TMDL

N Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres** mi^2	**WLA** tons mi^2 yr
1 R1.epa.RedwoodCk.sed	Cr	Redwood Creek	Sedimentation	Road Construction	12 30 1998	278	1900 Total allocation

O Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres** mi^2	**WLA – Roads** tons mi^2 yr
1 R1.epa.tenmile.sed	R	Ten Mile River	Sedimentation	Road Construction	2000	120	9

P Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres** mi^2	**WLA management** tons mi^2 yr
1 R1.epa.trinity.sed	R	Trinity River	Sedimentation	Road Construction	12 20 2001	2000 of 3000 covered in this TMDL	See rows below
1	Cr	Horse Linto Creek	Sedimentation	Road Construction	12 20 2001	64	528
1	Cr	Mill creek and Tish Tang	Sedimentation	Road Construction	12 20 2001	39	210
1	Cr	Willow Creek	Sedimentation	Road Construction	12 20 2001	43	94
1	Cr	Campbell Creek and Supply Creek	Sedimentation	Road Construction	12 20 2001	11	1961
1	Cr	Lower Mainstem and Coon Creek	Sedimentation	Road Construction	12 20 2001	32	63
1 R		Reference Subwatershed [1]	Sedimentation	Road Construction	12 20 2001	434	24
1	Cr	Canyon Creek	Sedimentation	Road	12 20 2001	64	326

				Construction			
1 R		Upper Tributaries[2]	Sedimentation	Road Construction	12 20 2001	72	67
1 R		Middle Tributaries[3]	Sedimentation	Road Construction	12 20 2001	54	53
1 R		Lower Tributaries[4]	Sedimentation	Road Construction	12 20 2001	96	55
1	Cr	Weaver and Rush Creeks	Sedimentation	Road Construction	12 20 2001	72	169
1 Cr		Deadwood Creek Hoadley Gulch Poker Bar	Sedimentation	Road Construction	12 20 2001	47	68
1	L	Lewiston Lake	Sedimentation	Road Construction	12 20 2001	25	49
1 Cr		Grassvalley Creek	Sedimentation	Road Construction	12 20 2001	37	44
1	Cr	Indian Creek	Sedimentation	Road Construction	12 20 2001	34	81
1	Cr	Reading and Browns Creek	Sedimentation	Road Construction	12 20 2001	104	66
1 Cr		Reference Subwatersheds[5]	Sedimentation	Road Construction	12 20 2001	235	281
1	L, Cr	Westside tributaries[6]	Sedimentation	Road Construction	12 20 2001	93	105
1 R,	Cr, G	Upper trinity[7]	Sedimentation	Road Construction	12 20 2001	161	690
1 R,	Cr, G	East Fork Tributaries[8]	Sedimentation	Road Construction	12 20 2001	115	65
1	R, L	Eastside Tributaries[9]	Sedimentation	Road Construction	12 20 2001	89	60

1 New River, Big French, Manzanita, North Fork, East Fork, North Fork
2 Dutch, Soldier, Oregon gulch, Conner Creek
3 Big Bar, Prairie Creek, Little French Creek
4 Swede, Italian, Canadian, Cedar Flat, Mill, McDonald, Hennessy, Quimby, Hawkins, Sharber
5 Stuarts Fork, Swift Creek, Coffee Creek
6 Stuart Arm, Stoney Creek, Mule Creek, East Fork, Stuart Fork, West Side Trinity Lake, Hatchet Creek, Buckeye Creek,
7 Upper Trinity River, Tangle Blue, Sunflower, Graves, Bear Upper Trinity Mainstream, Ramshorn Creek, Ripple Creek, Minnehaha Creek, Snowslide Gulch, Scorpion Creek
8 East Fork Trinity, Cedar Creek, Squirrel Gulch

9 East Side Tributaries, Trinity Lake

Q Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres** mi^2	**WLA** tons mi^2 yr
1 R1.epa.trinity.so.sed	R, Cr	South Fork Trinity River and Hayfork Creek	Sedimentation	Road Construction	12 1998	Not given, 19 miles long	33 (road total)

R Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres** mi^2	**WLA** tons mi^2 yr
1 R1.epa.vanduzen.sed	R, Cr	Van Duzen River and Yager Creek	Sedimentation	Various	12 16 1999	429	1353 total allocation
1		Upper Basin	Sedimentation	Road Construction			7
1		Middle Basin	Sedimentation	Road Construction			22
1		Lower Basin	Sedimentation	Road Construction			20

S Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres** mi^2	**WLA** tons mi^2 yr
6 R6.blackwood.sed Cr		Blackwood Creek (Placer County)	Bedded Sediment	Various	9 2007	11	17272 total

T Region	**Type**	**Name**	**Pollutant Stressor**	**Potential Sources**	**TMDL Completion Date**	**Watershed Acres** mi^2	**WLA** tons mi^2 yr
6 R6.SquawCk.sed R		Squaw Creek (Placer County)	Sedimentation /controllable sources	Various – basin plan amendment	4 13 2006	8.2	10,900

Adopted TMDLs for Construction Sediment Sources

Region	Type	Name	Pollutant Stressor	Potential Sources	**TMDL Completion Date**	**Watershed Area** mi^2	Waste load Allocation tons mi^2 yr
8 R		Newport Bay San Diego Creek Watershed	Sedimentation	Construction Land Development	1999 2.24	(1432 acres)	125,000 tons per Year (no more than 13,000 tons per year from construction sites)

Appendix 4 Non Sediment TMDLs

Region 1 Lost River-DIN and CBOD

Region 1 Source: Cal Trans Construction TMDL Completion Date: 12 30 2008 TMDL Type: River, Lake Watershed Area= 2996 mi^2	Pollutant Stressors/WLA	
	Dissolved inorganic nitrogen (DIN) (metric tons/yr)	**Carbonaceous biochemical oxygen demand (CBOD) (metric tons/yr)**
Lost River from the Oregon border to Tule Lake	.1 .2	
Tule Lake Refuge	.1	.2
Lower Klamath Refuge	.1	.2

Region 2 San Francisco Bay-Mercury

Region 2 Source:Non-Urban Stormwater Runoff TMDL Type: Bay	**Name**	**Pollutant Stressor/WLA**	**TMDL Completion Date**
	San Francisco Bay	Mercury 25 kg/year	08 09 2006

Region 4 Machado Lake Nutrients - Resolution No. 2008-006
(Effective Date - March 11, 2009)

General Construction Stormwater Permit WLAs	Years After Effective Date	Total Phosphorus (mg/L)	Total Nitrogen (TKN + NO3-N + NO2-N) (mg/L)
Interim WLAs[1]	At Effective Date	1.25	3.50
Interim WLAs[2] 5	years	1.25	2.45
Final WLAs[2]	9.5 years	0.10	1.00

[1] The compliance points for effective date interim WLAs are measured in the lake.
[2] No compliance points are specified for general construction stormwater permits for the year 5 interim WLAs and final WLAs

Region 4 Ballona Creek-Metals and Selenium – Resolution No. 2007-015
(Effective Date October 29, 2008)

Wet Weather WLAs

Region 4 Source: NPDES General Construction TMDL Completion Date: 10 29 2008 TMDL Type: Creek	Copper (Cu)		Lead (Pb)		Selenium (Se)		Zinc (Zn)	
	g/day	g/day/acre	g/day	g/day/acre	g/day	g/day/acre	g/day	g/day/acre
Ballona Creek	4.94E-07 x Daily storm volume (L)	2.20E-10 x Daily storm volume (L)	1.62E-06 x Daily storm volume (L)	7.20E-10 x Daily storm volume (L)	1.37E-07 x Daily storm volume (L)	6.10E-11 x Daily storm volume (L)	3.27E-06 x Daily storm volume (L)	1.45E-09 x Daily storm volume (L)

Wet-weather WLA Implementation

- Within seven years of the effective date of the TMDL, the construction industry will submit the results of BMP effectiveness studies to determine BMPs that will achieve compliance with the final waste load allocations assigned to construction storm water permittees.
- Regional Board staff will bring the recommended BMPs before the Regional Board for consideration within eight years of the effective date of the TMDL.
- General construction storm water permittees will be considered in compliance with final waste load allocations if they implement these Regional Board approved BMPs. All permittees must implement the approved BMPs within nine years of the effective date of the TMDL. If no effectiveness studies are conducted and no BMPs are approved by the Regional Board within eight years of the effective date of the TMDL, each general construction storm water permit holder will be subject to site-specific BMPs and monitoring requirements to demonstrate compliance with final waste load allocations.

Dry-weather WLAs

A waste load allocation of zero is assigned to all general construction storm water permits during dry weather.

Dry-weather WLA Implementation

Non-storm water flows authorized by the General Permit for Storm Water Discharges Associated with Construction Activity (Water Quality Order No. 99-08 DWQ), or any successor order, are exempt from the dry-weather waste load allocation equal to zero as long as they comply with the provisions of sections C.3 and A.9 of the Order No. 99-08 DWQ, which state that these authorized non-storm discharges shall be:

(1) infeasible to eliminate
(2) comply with BMPs as described in the Storm Water Pollution Prevention Plan prepared by the permittee, and
(3) not cause or contribute to a violation of water quality standards, or comparable provisions in any successor order.
Unauthorized non-storm water flows are already prohibited by Order No. 99-08 DWQ.

Region 4 Los Angeles River and Tributaries-Metals– Resolution No. 2007-014
(Effective Date October 29, 2008)

Wet Weather WLAs

	Cadmium (Cd)		**Copper (Cu)**		**Lead (Pb)**		**Zinc (Zn)**	
	kg/day	g/day/acre	kg/day	g/day/acre	kg/day	g/day/acre	kg/day	g/day/acre
5.9x10	$^{-11}$ x Daily storm volume (L)	7.6×10^{-12} x Daily storm volume (L)	3.2×10^{-10} x Daily storm volume (L)	4.2×10^{-11} x Daily storm volume (L)	1.2×10^{-9} x Daily storm volume (L)	1.5×10^{-10} x Daily storm volume (L)	3.01×10^{-9} x Daily storm volume (L)	3.9×10^{-10} x Daily storm volume (L)

Wet-weather WLA Implementation

- Within seven years of the effective date of the TMDL, the construction industry will submit the results of BMP effectiveness studies to determine BMPs that will achieve compliance with the final waste load allocations assigned to construction storm water permittees.
- Regional Board staff will bring the recommended BMPs before the Regional Board for consideration within eight years of the effective date of the TMDL.
- General construction storm water permittees will be considered in compliance with final waste load allocations if they implement these Regional Board approved BMPs. All permittees must implement the approved BMPs within nine years of the effective date of the TMDL. If no effectiveness studies are conducted and no BMPs are approved by the Regional Board within eight years of the effective date of the TMDL, each general construction storm water permit holder will be subject to site-specific BMPs and monitoring requirements to demonstrate compliance with final waste load allocations.

Dry-weather WLAs

A waste load allocation of zero is assigned to all general construction storm water permits during dry weather.

Dry-weather WLA Implementation

Non-storm water flows authorized by the General Permit for Storm Water Discharges Associated with Construction Activity (Water Quality Order No. 99-08 DWQ), or any successor order, are exempt from the dry-weather waste load allocation equal to zero as long as they comply with the provisions of sections C.3 and A.9 of the Order No. 99-08 DWQ, which state that these authorized non-storm discharges shall be:

(1) infeasible to eliminate
(2) comply with BMPs as described in the Storm Water Pollution Prevention Plan prepared by the permittee, and
(3) not cause or contribute to a violation of water quality standards, or comparable provisions in any successor order.
Unauthorized non-storm water flows are already prohibited by Order No. 99-08 DWQ.

Region 4 Calleguas Creek Metals TMDL – Resolution No. 2006-012
(Effective Date - March 26, 2007)

Interim Limits and Final WLAs for Total Recoverable Copper, Nickel, and Selenium
Interim limits and waste load allocations are applied to receiving water.

A. Interim Limits

Constituents	Calleguas and Conejo Creek			Revolon Slough		
	Dry CMC (ug/L)	Dry CCC (ug/L)	Wet CMC (ug/L)	Dry CMC (ug/L)	Dry CCC (ug/L)	Wet CMC (ug/L)
Copper*	23	19	204	23	19	204
Nickel	15	13	(a)	15	13	(a)
Selenium	(b)	(b)	(b)	14	13	(a)

(a) The current loads do not exceed the TMDL under wet conditions; interim limits are not required.
(b) Selenium allocations have not been developed for this reach as it is not on the 303(d) list.
(c) Attainment of interim limits will be evaluated in consideration of background loading data, if available.

B. Final WLAs for Total Recoverable Copper, Nickel, and Selenium

Dry-Weather WLAs in Water Column

Flow Range	Calleguas and Conejo Creek			Revolon Slough		
	Low Flow	Average Flow	Elevated Flow	Low Flow	Average Flow	Elevated Flow
Copper1 (lbs/day)	0.04*WER - 0.02	0.12*WER - 0.02	0.18*WER - 0.03	0.03*WER - 0.01	0.06*WER - 0.03	0.13*WER - 0.02
Nickel (lbs/day)	0.100	0.120	0.440	0.050	0.069	0.116
Selenium (lbs/day)	(a)	(a)	(a)	0.004	0.003	0.004

[1] If site-specific WERs are approved by the Regional Board, TMDL waste load allocations shall be implemented in accordance with the approved WERs using the equations set forth above. Regardless of the final WERs, total copper loading shall not exceed current loading.

(a) Selenium allocations have not been developed for this reach as it is not on the 303(d) list.

Wet-Weather WLAs in Water Column

Constituent	Calleguas Creek	Revolon Slough
Copper[1] (lbs/day)	(0.00054*Q^2*0.032*Q - 0.17)*WER - 0.06	(0.0002*Q2+0.0005*Q)*WER
Nickel[2] (lbs/day)	0.014*Q^2+0.82*Q	0.027*Q^2+0.47*Q
Selenium[2] (lbs/day)	(a)	0.027*Q^2+0.47*Q

[1] If site-specific WERs are approved by the Regional Board, TMDL waste load allocations shall be implemented in accordance with the approved WERs using the equations set forth above. Regardless of the final WERs, total copper loading shall not exceed current loading.

[2] Current loads do not exceed loading capacity during wet weather. Sum of all loads cannot exceed loads presented in the table

(a) Selenium allocations have not been developed for this reach as it is not on the 303(d) list.

Q: Daily storm volume.

Interim Limits and Final WLAs for Mercury in Suspended Sediment

Flow Range	Calleguas Creek		Revolon Slough	
	Interim (lbs/yr)	Final (lbs/yr)	Interim (lbs/yr)	Final (lbs/yr)
0-15,000 MGY	3.3	0.4	1.7	0.1
15,000-25,000 MGY	10.5	1.6	4	0.7
Above 25,000 MGY	64.6	9.3	10.2	1.8

MGY: million gallons per year.

In accordance with current practice, a group concentration-based WLA has been developed for all permitted stormwater discharges, including municipal separate storm sewer systems (MS4s), Caltrans, general industrial and construction stormwater permits, and Naval Air Weapons Station Point Mugu. Dischargers will have a required 25%, 50% and 100% reduction in the difference between the current loadings and the load allocations at 5, 10 and 15 years after the effective date, respectively. Achievement of required reductions will be evaluated based on progress towards BMP implementation as outlined in the urban water quality management plans (UWQMPs). If the interim reductions are not met, the dischargers will submit a report to the Executive Officer detailing why the reductions were not met and the steps that will be taken to meet the required reductions.

Region 4 Calleguas Creek-OC Pesticides, PCBs, and Siltation (Resolution 2005-010)
Effective Date - March 24, 2006

Interim Requirements

Region 4 Calleguas Creek	Pollutant Stressor	WLA Daily Max (µg/L)	WLA Monthly Ave (µg/L)
Source: Minor NPDES point sources/WDRs TMDL Completion Date: 3 24 2006 TMDL Type:Creek	Chlordane 1.2		0.59
	4,4-DDD 1.7		0.84
	4,4-DDE 1.2		0.59
	4,4-DDT 1.2		0.59
	Dieldrin 0.28		0.14
	PCB’s 0.34		0.17
	Toxaphene 0.33		0.16

Region 4 Calleguas Creek-Calleguas Creek Toxicicity (Resolution 2005-009)
Effective Date - March 24, 2006

Minor sources include NPDES permittees other than POTWs and MS4s, discharging to the Calleguas Creek Watershed. A wasteload of 1.0 TUc is allocated to the minor point sources discharging to the Calleguas Creek Watershed. Additionally, the following wasteloads for chlorpyrifos and diazinon are established. Final WLAs apply as of March 24, 2006.

Chlorpyrifos WLAs, ug/L
Final WLA
(4 day)
0.014
Diazinon WLAs, ug/L
Final WLA
Acute and Chronic
0.10

Region 4 Calleguas Creek-Salts (Resolution 2007-016)
Effective Date – December 2, 2008

Final Dry Weather Pollutant WLA (mg/L)					
Region 4 Calleaguas Creek Source Permitted Stormwater Dischargers TMDL Completion Date: 12 2 2008 TMDL Type:Creek	**Critical Condition Flow Rate (mgd)**	**Chloride (lb/day)**	**TDS (lb/day)**	**Sulfate (lb/day)**	**Boron (lb/day)**
Simi	1.39	1738 9849 2897 12			
Las Posas	0.13	157 887 261 N/A			
Conejo	1.26	1576 8931 2627 N/A			
Camarillo	0.06	72	406 119 N/A		
Pleasant Valley (Calleguas)	0.12	150 850 250 N/A			
Pleasant Valley (Revolon)	0.25	314	1778	523	2
Dry Weather Interim Pollutant WLA (mg/L)					
	Chloride (mg/L)	**TDS (mg/L)**	**Sulfate (mg/L)**	**Boron (mg/L)**	

Simi 230.0		1720.0	1289.0	1.3
Las Posas	230	1720	1289	1.3
Conejo 230		1720	1289	1.3
Camarillo 230		1720	1289	1.3
Pleasant Valley (Calleguas)	230	1720	1289	1.3
Pleasant Valley (Revolon)	230	1720	1289	1.3

- Dry- weather waste load allocations apply in the receiving water at the base of each subwatershed. Dry weather allocations apply when instream flow rates are below the 86th percentile flow and there has been no measurable precipitation in the previous 24 hours.
- Because wet weather flows transport a large mass of salts at low concentrations, these dischargers meet water quality objectives during wet weather. No wet weather allocations are assigned.

Ballona Creek Toxic Pollutants (Resolution No. 2005-008)
Effective Date - January 11, 2006

Each storm water permittee enrolled under the general construction or industrial storm water permits will receive an individual waste load allocation on a per acre basis, based on the acreage of their facility.

Metals per Acre WLAs for Individual General Construction or Industrial Storm Water Permittees (g/yr/ac)

Cadmium	Copper	Lead	Silver	Zinc
0.1	3 4 0.1			13

Organics per Acre WLAs for Individual General Construction or Industrial Storm Water Permittees (mg/yr/ac)

Chlordane	DDTs	Total PCBs	Total PAHs
0.04	0.14	2	350

Waste load allocations will be incorporated into the State Board general permit upon renewal or into a watershed spec ific general construction storm water permit developed by the Regional Board.

Within seven years of the effective date of the TMDL, the construction industry will submit the results of BMP effectiveness studies to determine BMPs that will achieve compliance with the waste load allocations assigned to construction storm water permittees. Regional Board staff will bring the recommended BMPs before the Regional Board for consideration within eight years of the effective date of the TMDL. General construction storm water permittees will be considered in compliance with waste load allocations if they implement these Regional Board approved BMPs.

All general construction permittees must implement the approved BMPs within nine years of the effective date of the TMDL. If no effectiveness studies are conducted and no BMPs are approved by the Regional Board within eight years of the effective date of the TMDL, each general construction storm water permit holder will be subject to site-specific BMPs and monitoring requirements to demonstrate compliance with waste load allocations.

Region 4 Marina Del Rey Harbor Toxic Pollutants TMDL (Resolution No. 2005-012)
Effective Date March 22, 2006

Each storm water permittee enrolled under the general construction or industrial storm water permits will receive an individual waste load allocation on a per acre basis, based on the acreage of their facility.

Metals per Acre WLAs for Individual General Construction or Industrial Storm Water Permittees (g/yr/ac)

Copper	Lead	Zinc
2.3	3.1	10

Organics per acre WLAs for Individual General Construction or Industrial Storm Water Permittees (mg/yr/ac)

Chlordane	Total PCBs
0.03	1.5

Waste load allocations will be incorporated into the State Board general permit upon renewal or into a watershed specific general construction storm water permit developed by the Regional Board.

Within seven years of the effective date of the TMDL, the construction industry will submit the results of BMP effectiveness studies to determine BMPs that will achieve compliance with the waste load allocations assigned to construction storm water permittees. Regional Board staff will bring the recommended BMPs before the Regional Board for consideration within eight years of the effective date of the TMDL. General construction storm water permittees will be considered in compliance with waste load allocations if they implement these Regional Board approved BMPs.

All general construction permittees must implement the approved BMPs within nine years of the effective date of the TMDL. If no effectiveness studies are conducted and no BMPs are approved by the Regional Board within eight years of the effective date of the TMDL, each general construction storm water permit holder will be subject to site-specific BMPs and monitoring requirements to demonstrate compliance with waste load allocations.

Region 4 San Gabriel River and Tributaries-Metals and Selenium (EPA-established TMDL – Effective date: 3/26/07)

Wet-weather allocations

Waterbody	Copper	Lead	Zinc
San Gabriel River Reach 2*		0.8 kg/d	
Coyote Creek**	0.513 kg/d	2.07 kg/d	3.0 kg/d

*Mass-based allocations are based on a flow of 260 cfs (daily storm volume = 6.4 x10^8 liters)

**Mass-based allocations are based on a flow of 156 cfs (daily storm volume = 3.8 x10^8 liters)

Dry-weather allocations

The dry-weather copper waste load allocation for general construction storm water permittees that discharge to San Gabriel Reach 1, Coyote Creek, and the Estuary is zero.

The dry-weather selenium allocation for general construction storm water permittees that discharge to San Jose Creek Reach 1 and Reach 2 is 5 µg/L (total recoverable metals).

Region 4 Upper Santa Clara River Chloride TMDL Adopted by Resolution No 2006-016 Effective Date June 12, 2008

"Other NPDES dischargers" have a chloride WLA equal to 100 mg/L.

This TMDL was revised by Resolution No 2008-012, which, when it becomes effective, includes the following conditional WLAs for "Other minor NPDES discharges":

Reach	Concentration-based Conditional WLA for Chloride (mg/L)*
6	150 (12-month Average), 230 (Daily Maximum)
5	150 (12-month Average), 230 (Daily Maximum)
4B	117 (3-month Average), 230 (Daily Maximum)

*The conditional WLAs for chloride for all point sources shall apply only when chloride load reductions and/or chloride export projects are in operation by the Santa Clarita Valley Sanitation District according to the implementation plan for the TMDL. If these conditions are not met, WLAs shall be based on existing water quality objectives for chloride of 100 mg/L.

Region 4 The Harbor Beaches of Ventura County-Bacteria (Adopted by Resolution No. 2007-017) Effective Date – December 18, 2008

Current and future enrollees in the Statewide Construction Activity Storm Water General Permit in the Channel Islands Harbor subwatershed are assigned WLAs of zero (0) days of allowable exceedances of the single sample limits and the rolling 30-day geometric mean limits.

Single Sample Limits are:
a. Total coliform density shall not exceed 10,000/100 ml.
b. Fecal coliform density shall not exceed 400/100 ml.
c. Enterococcus density shall not exceed 104/100 ml.
d. Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1.

Rolling 30-day Geometric Mean Limits are:
a. Total coliform density shall not exceed 1,000/100 ml.
b. Fecal coliform density shall not exceed 200/100 ml.
c. Enterococcus density shall not exceed 35/100 ml.

Los Angeles Harbor Bacteria TMDL (Adopted by Resolution No. 2004-001)
Effective Date – March 10, 2005

Current and future enrollees in the Statewide Construction Activity Storm Water General Permit in the watershed are assigned WLAs of zero (0) days of allowable exceedances of the single sample limits and the rolling 30-day geometric mean.

Single Sample Limits are:
a. Total coliform density shall not exceed 10,000/100 ml.
b. Fecal coliform density shall not exceed 400/100 ml.
c. Enterococcus density shall not exceed 104/100 ml.
d. Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1.

Rolling 30-day Geometric Mean Limits are:
a. Total coliform density shall not exceed 1,000/100 ml.
b. Fecal coliform density shall not exceed 200/100 ml.
c. Enterococcus density shall not exceed 35/100 ml.

Ballona Creek Bacteria TMDL (Adopted by Resolution No. 2006-011)
Effective Date – April 27, 2007

Current and future enrollees in the Statewide Construction Activity Storm Water General Permit in the watershed are assigned WLAs of zero (0) days of allowable exceedances of the single sample limits and the rolling 30-day geometric mean.

Single Sample Limits are:
a. Total coliform density shall not exceed 10,000/100 ml.
b. Fecal coliform density shall not exceed 400/100 ml.
c. Enterococcus density shall not exceed 104/100 ml.
d. Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1.

Rolling 30-day Geometric Mean Limits are:
a. Total coliform density shall not exceed 1,000/100 ml.
b. Fecal coliform density shall not exceed 200/100 ml.
c. Enterococcus density shall not exceed 35/100 ml.

Region 4 Resolution No. 03-009 Los Angeles River and Tributaries-Nutrients

Minor Point Sources

Waste loads are allocated to minor point sources enrolled under NPDES or WDR permits including but not limited to Tapia WRP, Whittier Narrows WRP, Los Angeles Zoo WRP, industrial and construction stormwater, and municipal storm water and urban runoff from municipal separate storm sewer systems (MS4s)

Region 4 Minor Point Sources for NPDES/WDR Permits TMDL Effective Date: 3 23 2004 TMDL Type: River	Pollutant Stressor/WLA				
	Total Ammonia (NH_3)		**Nitrate-nitrogen (NO_3-N)**	**Nitrite-nitrogen (NO_2-N)**	**NO_3-N + NO_3-N**
	1 Hr Ave mg/l	30 Day Ave mg/l	30 Day Ave mg/l		30 Day Ave mg/l
LA River Above Los Angeles-Glendale WRP (LAG)	4.7 1.6 8.0			1.0	8.0
LA River Below LAG	8.7	2.4	8.0	1.0	8.0
Los Angeles Tributaries 10.1		2.3	8.0	1.0	8.0

Malibu Creek Attachment A to Resolution No. 2004-019R-Bacteria

Effective date: 1 24 2006. The WLAs for permittees under the NPDES General Stormwater Construction Permit are zero (0) days of allowable exceedances for the single sample limits and the rolling 30-day geometric mean.

Single Sample Limits are:
a. Total coliform density shall not exceed 10,000/100 ml.
b. Fecal coliform density shall not exceed 400/100 ml.
c. Enterococcus density shall not exceed 104/100 ml.
d. Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1.

Rolling 30-day Geometric Mean Limits are:
a. Total coliform density shall not exceed 1,000/100 ml.
b. Fecal coliform density shall not exceed 200/100 ml.
c. Enterococcus density shall not exceed 35/100 ml.

Region 4 Marina del Rey Harbor, Mothers' Beach and Back Basins
Attachment A to Resolution No. 2003-012-Bacteria

Effective date: 3 18 2004. Discharges from general construction storm water permits are not expected to be a significant source of bacteria. Therefore, the WLAs for these discharges are zero (0) days of allowable exceedances for the single sample limits and the rolling 30-day geometric mean. Any future enrollees under a general NPDES permit, general industrial storm water permit or general construction storm water permit within the MdR Watershed will also be subject to a WLA of zero days of allowable exceedances.

Single Sample Limits are:
a. Total coliform density shall not exceed 10,000/100 ml.
b. Fecal coliform density shall not exceed 400/100 ml.
c. Enterococcus density shall not exceed 104/100 ml.
d. Total coliform density shall not exceed 1,000/100 ml, if the ratio of fecal-to-total coliform exceeds 0.1.

Rolling 30-day Geometric Mean Limits are:
a. Total coliform density shall not exceed 1,000/100 ml.
b. Fecal coliform density shall not exceed 200/100 ml.
c. Enterococcus density shall not exceed 35/100 ml.

Santa Clara River Nutrients TMDL (Adopted by Resolution No. 2003-011
Effective Date - March 23, 2004

Concentration-based wasteloads are allocated to municipal, industrial and construction stormwater sources regulated under NPDES permits. For stormwater permittees discharging into Reach 7, the thirty-day WLA for ammonia as nitrogen is 1.75 mg/L and the one-hour WLA for ammonia as nitrogen is 5.2 mg/L; the thirty-day average WLA for nitrate plus nitrite as nitrogen is 6.8 mg/L. For stormwater permittees discharging into Reach 3, the thirty-day WLA for ammonia as nitrogen is 2.0 mg/L and the one-hour WLA for ammonia as nitrogen is 4.2 mg/L; the thirty-day average WLA for nitrate plus nitrite nitrogen is 8.1 mg/L.

Region 8 RESOLUTION NO. R8-2007- 0024

Total Maximum Daily Loads (TMDLs) for San Diego Creek,
Upper and Lower Newport Bay, Orange County, California

Region 8 NPDES Construction Permit TMDL Completion Date: 1 24 1995	Organochlorine Compounds							
	Total DDT		**Chlordane**		**Total PCBs**		**Toxaphene**	
TMDL Type: River. Cr, Bay	g/day	g/yr	g/day	g/yr	g/day	g/yr	g/day	g/yr
San Diego Creek	.27	99.8	**.18***	**64.3***	**.09***	**31.5***	.004 1.5	
Upper Newport Bay	.11	40.3 .06		23.4 .06		23.2	**X**	**X**
Lower Newport Bay	.04	14.9	.02 8.6 .17	60.7			**X**	**X**

*Red= Informational WLA only, not for enforcement purposes

Organochlorine Compounds TMDLs Implementation Tasks and Schedule

Regional Board staff shall develop a SWPPP Improvement Program that identifies the Regional Board's expectations with respect to the content of SWPPPs, including documentation regarding the selection and implementation of BMPs, and a sampling and analysis plan. The Improvement Program shall include specific guidance regarding the development and implementation of monitoring plans, including the constituents to be monitored, sampling frequency and analytical protocols. The SWPPP Improvement Program shall be completed by (*the date of OAL approval of this BPA*). ***No later than two months*** from completion of the Improvement Program, Board staff shall assure that the requirements of the Program are communicated to interested parties, including dischargers with existing authorizations under the General Construction Permit. Existing, authorized dischargers shall revise their project SWPPPs as needed to address the Program requirements as soon as possible but ***no later than (three months of completion of the SWPPP Improvement Program)***. Applicable SWPPPs that do not adequately address the Program requirements shall be considered inadequate and enforcement by the Regional Board shall proceed accordingly. The Caltrans and Orange County MS4 permits shall be revised as needed to assure that the permittees communicate the Regional Board's SWPPP expectations, based on the SWPPP Improvement Program, with the Standard Conditions of Approval.

APPENDIX 5:
Glossary

Active Areas of Construction
All areas subject to land surface disturbance activities related to the project including, but not limited to, project staging areas, immediate access areas and storage areas. All previously active areas are still considered active areas until final stabilization is complete. [The construction activity Phases used in this General Permit are the Preliminary Phase, Grading and Land Development Phase, Streets and Utilities Phase, and the Vertical Construction Phase.]

Active Treatment System (ATS)
A treatment system that employs chemical coagulation, chemical flocculation, or electrocoagulation to aid in the reduction of turbidity caused by fine suspended sediment.

Acute Toxicity Test
A chemical stimulus severe enough to rapidly induce a negative effect; in aquatic toxicity tests, an effect observed within 96 hours or less is considered acute.

Air Deposition
Airborne particulates from construction activities. .

Approved Signatory
A person who has legal authority to sign, certify, and electronically submit Permit Registration Documents and Notices of Termination on behalf of the Legally Responsible Person.

Beneficial Uses
As defined in the California Water Code, beneficial uses of the waters of the state that may be protected against quality degradation include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

Best Available Technology Economically Achievable (BAT)
As defined by USEPA, BAT is a technology-based standard established by the Clean Water Act (CWA) as the most appropriate means available on a national basis for controlling the direct discharge of toxic and nonconventional pollutants to navigable waters. The BAT effluent limitations guidelines, in general, represent the best existing performance of treatment technologies that are economically achievable within an industrial point source category or subcategory.

Best Conventional Pollutant Control Technology (BCT)

As defined by USEPA, BCT is a technology-based standard for the discharge from existing industrial point sources of conventional pollutants including biochemical oxygen demand (BOD), total suspended sediment (TSS), fecal coliform, pH, oil and grease.

Best Professional Judgment (BPJ)
The method used by permit writers to develop technology-based NPDES permit conditions on a case-by-case basis using all reasonably available and relevant data.

Best Management Practices (BMPs)
BMPs are scheduling of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Chain of Custody (COC)
Form used to track sample handling as samples progress from sample collection to the analytical laboratory. The COC is then used to track the resulting analytical data from the laboratory to the client. COC forms can be obtained from an analytical laboratory upon request.

Coagulation
The clumping of particles in a discharge to settle out impurities, often induced by chemicals such as lime, alum, and iron salts.

Common Plan of Development
Generally a contiguous area where multiple, distinct construction activities may be taking place at different times under one plan. A plan is generally defined as any piece of documentation or physical demarcation that indicates that construction activities may occur on a common plot. Such documentation could consist of a tract map, parcel map, demolition plans, grading plans or contract documents. Any of these documents could delineate the boundaries of a common plan area. However, broad planning documents, such as land use master plans, conceptual master plans, or broad-based CEQA or NEPA documents that identify potential projects for an agency or facility are not considered common plans of development.

Daily Average Discharge
The discharge of a pollutant measured during any 24-hour period that reasonably represents a calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged during the day. For pollutants with limitations expressed in other units of measurement (e.g., concentration) the daily discharge is calculated as the average measurement of the pollutant

throughout the day (40 CFR 122.2). In the case of pH, the pH must first be converted from a log scale.

Debris
Litter, rubble, discarded refuse, and remains of destroyed inorganic anthropogenic waste.

Direct Discharge
A discharge that is routed directly to waters of the United States by means of a pipe, channel, or ditch (including a municipal storm sewer system), or through surface runoff.

Discharger
The Legally Responsible Person (see definition) or entity subject to this General Permit.

Dose Rate (for ATS)
In exposure assessment, dose (e.g. of a chemical) per time unit (e.g. mg/day), sometimes also called dosage.

Drainage Area
The area of land that drains water, sediment, pollutants, and dissolved materials to a common outlet.

Effluent
Any discharge of water by a discharger either to the receiving water or beyond the property boundary controlled by the discharger.

Effluent Limitation
Any numeric or narrative restriction imposed on quantities, discharge rates, and concentrations of pollutants which are discharged from point sources into waters of the United States, the waters of the contiguous zone, or the ocean.

Erosion
The process, by which soil particles are detached and transported by the actions of wind, water, or gravity.

Erosion Control BMPs
Vegetation, such as grasses and wildflowers, and other materials, such as straw, fiber, stabilizing emulsion, protective blankets, etc., placed to stabilize areas of disturbed soils, reduce loss of soil due to the action of water or wind, and prevent water pollution.

Field Measurements
Testing procedures performed in the field with portable field-testing kits or meters.

Final Stabilization
All soil disturbing activities at each individual parcel within the site have been completed in a manner consistent with the requirements in this General Permit.

First Order Stream
Stream with no tributaries.

Flocculants
Substances that interact with suspended particles and bind them together to form flocs.

Good Housekeeping BMPs
BMPs designed to reduce or eliminate the addition of pollutants to construction site runoff through analysis of pollutant sources, implementation of proper handling/disposal practices, employee education, and other actions.

Grading Phase (part of the Grading and Land Development Phase)
Includes reconfiguring the topography and slope including; alluvium removals; canyon cleanouts; rock undercuts; keyway excavations; land form grading; and stockpiling of select material for capping operations.

Hydromodification
Hydromodification is the alteration of the hydrologic characteristics of coastal and non-coastal waters, which in turn could cause degradation of water resources. Hydromodification can cause excessive erosion and/or sedimentation rates, causing excessive turbidity, channel aggradation and/or degradation.

Identified Organisms
Organisms within a sub-sample that is specifically identified and counted.

Inactive Areas of Construction
Areas of construction activity that are not active and those that have been active and are not scheduled to be re-disturbed for at least 14 days.

Index Period
The period of time during which bioassessment samples must be collected to produce results suitable for assessing the biological integrity of streams and rivers. Instream communities naturally vary over the course of a year,and sampling during the index period ensures that samples are collected during a time frame when communities are stable so that year-to-year consistency is obtained. The index period approach provides a cost-effective alternative to year-round sampling. Furthermore, sampling within the appropriate index period will yield results that are comparable to the assessment thresholds or criteria for a given region, which are established for the same index period. Because index

periods differ for different parts of the state, it is essential to know the index period for your area.

K Factor
The soil erodibility factor used in the Revised Universal Soil Loss Equation (RUSLE). It represents the combination of detachability of the soil, runoff potential of the soil, and the transportability of the sediment eroded from the soil.

Legally Responsible Person
The person who possesses the title of the land or the leasehold interest of a mineral estate upon which the construction activities will occur for the regulated site. For linear underground/overhead projects, it is in the person in charge of the utility company, municipality, or other public or private company or agency that owns or operates the LUP.

Likely Precipitation Event
Any weather pattern that is forecasted to have a 50% or greater chance of producing precipitation in the project area. The discharger shall obtain likely precipitation forecast information from the National Weather Service Forecast Office (e.g., by entering the zip code of the project's location at http://www.srh.noaa.gov/forecast).

Maximum Allowable Threshold Concentration (MATC)
The allowable concentration of residual, or dissolved, coagulant/flocculant in effluent. The MATC shall be coagulant/flocculant-specific, and based on toxicity testing conducted by an independent, third-party laboratory. A typical MATC would be:

The MATC is equal to the geometric mean of the NOEC (No Observed Effect Concentration) and LOEC (Lowest Observed Effect Concentration) Acute and Chronic toxicity results for most sensitive species determined for the specific coagulant. The most sensitive species test shall be used to determine the MATC.

Natural Channel Evolution
The physical trend in channel adjustments following a disturbance that causes the river to have more energy and degrade or aggrade more sediment. Channels have been observed to pass through 5 to 9 evolution types. Once they pass though the suite of evolution stages, they will rest in a new state of equilibrium.

Non-Storm Water Discharges
Discharges are discharges that do not originate from precipitation events. They can include, but are not limited to, discharges of process water, air conditioner condensate, non-contact cooling water, vehicle wash water, sanitary wastes, concrete washout water, paint wash water, irrigation water, or pipe testing water.

Non-Visible Pollutants

Pollutants associated with a specific site or activity that can have a negative impact on water quality, but cannot be seen though observation (ex: chlorine). Such pollutants being discharged are not authorized.

Numeric Action Level (NAL)
Level is used as a warning to evaluate if best management practices are effective and take necessary corrective actions. Not an effluent limit.

Original Sample Material
The material (i.e., macroinvertebrates, organic material, gravel, etc.) remaining after the subsample has been removed for identification.

pH
Unit universally used to express the intensity of the acid or alkaline condition of a water sample. The pH of natural waters tends to range between 6 and 9, with neutral being 7. Extremes of pH can have deleterious effects on aquatic systems.

Post-Construction BMPs
Structural and non-structural controls which detain, retain, or filter the release of pollutants to receiving waters after final stabilization is attained.

Preliminary Phase (Pre-Construction Phase - Part of the Grading and Land Development Phase)
Construction stage including rough grading and/or disking, clearing and grubbing operations, or any soil disturbance prior to mass grading.

Project

Qualified SWPPP Developer
Individual who is authorized to develop and revise SWPPPs.

Qualified SWPPP Practitioner
Individual assigned responsibility for non-storm water and storm water visual observations, sampling and analysis, and responsibility to ensure full compliance with the permit and implementation of all elements of the SWPPP, including the preparation of the annual compliance evaluation and the elimination of all unauthorized discharges.

Qualifying Rain Event
Any event that produces 0.5 inches or more precipitation with a 48 hour or greater period between rain events.

R Factor
Erosivity factor used in the Revised Universal Soil Loss Equation (RUSLE). The R factor represents the erosivity of the climate at a particular location. An

average annual value of R is determined from historical weather records using erosivity values determined for individual storms. The erosivity of an individual storm is computed as the product of the storm's total energy, which is closely related to storm amount, and the storm's maximum 30-minute intensity.

Rain Event Action Plan (REAP)
Written document, specific for each rain event, that when implemented is designed to protect all exposed portions of the site within 48 hours of any likely precipitation event.

Remaining Sub sampled Material
The material (e.g., organic material, gravel, etc.) that remains after the organisms to be identified have been removed from the subsample for identification. (Generally, no macroinvertebrates are present in the remaining subsampled material, but the sample needs to be checked and verified using a complete Quality Assurance (QA) plan)

Routine Maintenance
Activities intended to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Runoff Control BMPs
Measures used to divert runon from offsite and runoff within the site.

Run-on
Discharges that originate offsite and flow onto the property of a separate project site.

Revised Universal Soil Loss Equation (RUSLE)
Empirical model that calculates average annual soil loss as a function of rainfall and runoff erosivity, soil erodibility, topography, erosion controls, and sediment controls.

Sampling and Analysis Plan
Document that describes how the samples will be collected, under what conditions, where and when the samples will be collected, what the sample will be tested for, what test methods and detection limits will be used, and what methods/procedures will be maintained to ensure the integrity of the sample during collection, storage, shipping and testing (i.e., quality assurance/quality control protocols).

Sediment
Solid particulate matter, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

Sedimentation
Process of deposition of suspended matter carried by water, wastewater, or other liquids, by gravity. It is usually accomplished by reducing the velocity of the liquid below the point at which it can transport the suspended material.

Sediment Control BMPs
Practices that trap soil particles after they have been eroded by rain, flowing water, or wind. They include those practices that intercept and slow or detain the flow of storm water to allow sediment to settle and be trapped (e.g., silt fence, sediment basin, fiber rolls, etc.).

Settleable Solids (SS)
Solid material that can be settled within a water column during a specified time frame. It is typically tested by placing a water sample into an Imhoff settling cone and then allowing the solids to settle by gravity for a given length of time. Results are reported either as a volume (mL/L) or a mass (mg/L) concentration.

Sheet Flow
Flow of water that occurs overland in areas where there are no defined channels where the water spreads out over a large area at a uniform depth.

Site

Soil Amendment
Any material that is added to the soil to change its chemical properties, engineering properties, or erosion resistance that could become mobilized by storm water.

Streets and Utilities Phase
Construction stage including excavation and street paving, lot grading, curbs, gutters and sidewalks, public utilities, public water facilities including fire hydrants, public sanitary sewer systems, storm sewer system and/or other drainage improvements.

Structural Controls
Any structural facility designed and constructed to mitigate the adverse impacts of storm water and urban runoff pollution

Suspended Sediment Concentration (SSC)
The measure of the concentration of suspended solid material in a water sample by measuring the dry weight of all of the solid material from a known volume of a collected water sample. Results are reported in mg/L.

Total Suspended Solids (TSS)
The measure of the suspended solids in a water sample includes inorganic substances, such as soil particles and organic substances, such as algae,

aquatic plant/animal waste, particles related to industrial/sewage waste, etc. The TSS test measures the concentration of suspended solids in water by measuring the dry weight of a solid material contained in a known volume of a sub-sample of a collected water sample. Results are reported in mg/L.

Toxicity
The adverse response(s) of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies.

Turbidity
The cloudiness of water quantified by the degree to which light traveling through a water column is scattered by the suspended organic and inorganic particles it contains. The turbidity test is reported in Nephelometric Turbidity Units (NTU) or Jackson Turbidity Units (JTU).

Vertical Construction Phase
The Build out of structures from foundations to roofing, including rough landscaping.

Waters of the United States
Generally refers to surface waters, as defined by the federal Environmental Protection Agency in 40 C.F.R. § 122.2.[1]

Water Quality Objectives (WQO)
Water quality objectives are defined in the California Water Code as limits or levels of water quality constituents or characteristics, which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.

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[1] The application of the definition of "waters of the United States" may be difficult to determine; there are currently several judicial decisions that create some confusion. If a landowner is unsure whether the discharge must be covered by this General Permit, the landowner may wish to seek legal advice.

APPENDIX 6:
Acronym List

ASBS	Areas of Special Biological Significance
ASTM	American Society of Testing and Materials; Standard Test Method for Particle-Size Analysis of Soils
ATS	Active Treatment System
BASMAA	Bay Area Storm water Management Agencies Association
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
BPJ	Best Professional Judgment
CAFO	Confined Animal Feeding Operation
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGP	NPDES General Permit for Storm Water Discharges Associated with Construction Activities
CIWQS	California Integrated Water Quality System
CKD	Cement Kiln Dust
COC	Chain of Custody
CPESC	Certified Professional in Erosion and Sediment Control
CPSWQ	Certified Professional in Storm Water Quality
CSMP	Construction Site Monitoring Program
CTB	Cement Treated Base
CTR	California Toxics Rule
CWA	Clean Water Act
CWC	California Water Code
CWP	Center for Watershed Protection
DADMAC	Diallyldimethyl-ammonium chloride
DDNR	Delaware Department of Natural Resources
DFG	Department of Fish and Game
DHS	Department of Health Services
DWQ	Division of Water Quality
EC	Electrical Conductivity
ELAP	Environmental Laboratory Accreditation Program
EPA	Environmental Protection Agency
ESA	Environmentally Sensitive Area
ESC	Erosion and Sediment Control
HSPF	Hydrologic Simulation Program Fortran
JTU	Jackson Turbidity Units
LID	Low Impact Development
LOEC	Lowest Observed Effect Concentration
LRP	Legally Responsible Person
LUP	Linear Underground/Overhead Projects

MATC	Maximum Allowable Threshold Concentration
MDL	Method Detection Limits
MRR	Monitoring and Reporting Requirements
MS4	Municipal Separate Storm Sewer System
MUSLE	Modified Universal Soil Loss Equation
NAL	Numeric Action Level
NEL	Numeric Effluent Limitation
NICET	National Institute for Certification in Engineering Technologies
NOAA	National Oceanic and Atmospheric Administration
NOEC	No Observed Effect Concentration
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NTR	National Toxics Rule
NTU	Nephelometric Turbidity Units
O&M	Operation and Maintenance
PAC	Polyaluminum chloride
PAM	Polyacrylamide
PASS	Polyaluminum chloride Silica/sulfate
POC	Pollutants of Concern
PoP	Probability of Precipitation
POTW	Publicly Owned Treatment Works
PRDs	Permit Registration Documents
PWS	Planning Watershed
QAMP	Quality Assurance Management Plan
QA/QC	Quality Assurance/Quality Control
REAP	Rain Event Action Plan
Regional Board	Regional Water Quality Control Board
ROWD	Report of Waste Discharge
RUSLE	Revised Universal Soil Loss Equation
RW	Receiving Water
SMARTS	Storm water Multi Application Reporting and Tracking System
SS	Settleable Solids
SSC	Suspended Sediment Concentration
SUSMP	Standard Urban Storm Water Mitigation Plan
SW	Storm Water
SWARM	Storm Water Annual Report Module
SWAMP	Surface Water Ambient Monitoring Program
SWMM	Storm Water Management Model
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
TC	Treatment Control
TDS	Total Dissolved Solids

TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USACOE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WDID	Waste Discharge Identification Number
WDR	Waste Discharge Requirements
WLA	Waste Load Allocation
WET	Whole Effluent Toxicity
WRCC	Western Regional Climate Center
WQBEL	Water Quality Based Effluent Limitation
WQO	Water Quality Objective
WQS	Water Quality Standard

APPENDIX 7:
State and Regional Water Resources Control Board Contacts

NORTH COAST REGION (1)
5550 Skylane Blvd, Ste. A
Santa Rosa, CA 95403
(707) 576-2220 FAX: (707)523-0135

SAN FRANCISCO BAY REGION (2)
1515 Clay Street, Ste. 1400
Oakland, CA 94612
(510) 622-2300 FAX: (510) 622-2640

CENTRAL COAST REGION (3)
895 Aerovista Place, Ste 101
San Luis Obispo, CA 93401
(805) 549-3147 FAX: (805) 543-0397

LOS ANGELES REGION (4)
320 W. 4th Street, Ste. 200
Los Angeles, CA 90013
(213) 576-6600 FAX: (213) 576-6640

CENTRAL VALLEY REGION (5S)
11020 Sun Center Dr., #200
Rancho Cordova, CA 95670-6114
(916) 464-3291 FAX: (916) 464-4645

FRESNO BRANCH OFFICE (5F)
1685 E St.
Fresno, CA 93706
(559) 445-5116 FAX: (559) 445-5910

REDDING BRANCH OFFICE (5R)
415 Knollcrest Drive, Ste. 100
Redding, CA 96002
(530) 224-4845 FAX: (530) 224-4857

LAHONTAN REGION (6 SLT)
2501 Lake Tahoe Blvd.
South Lake Tahoe, CA 96150
(530) 542-5400 FAX: (530) 544-2271

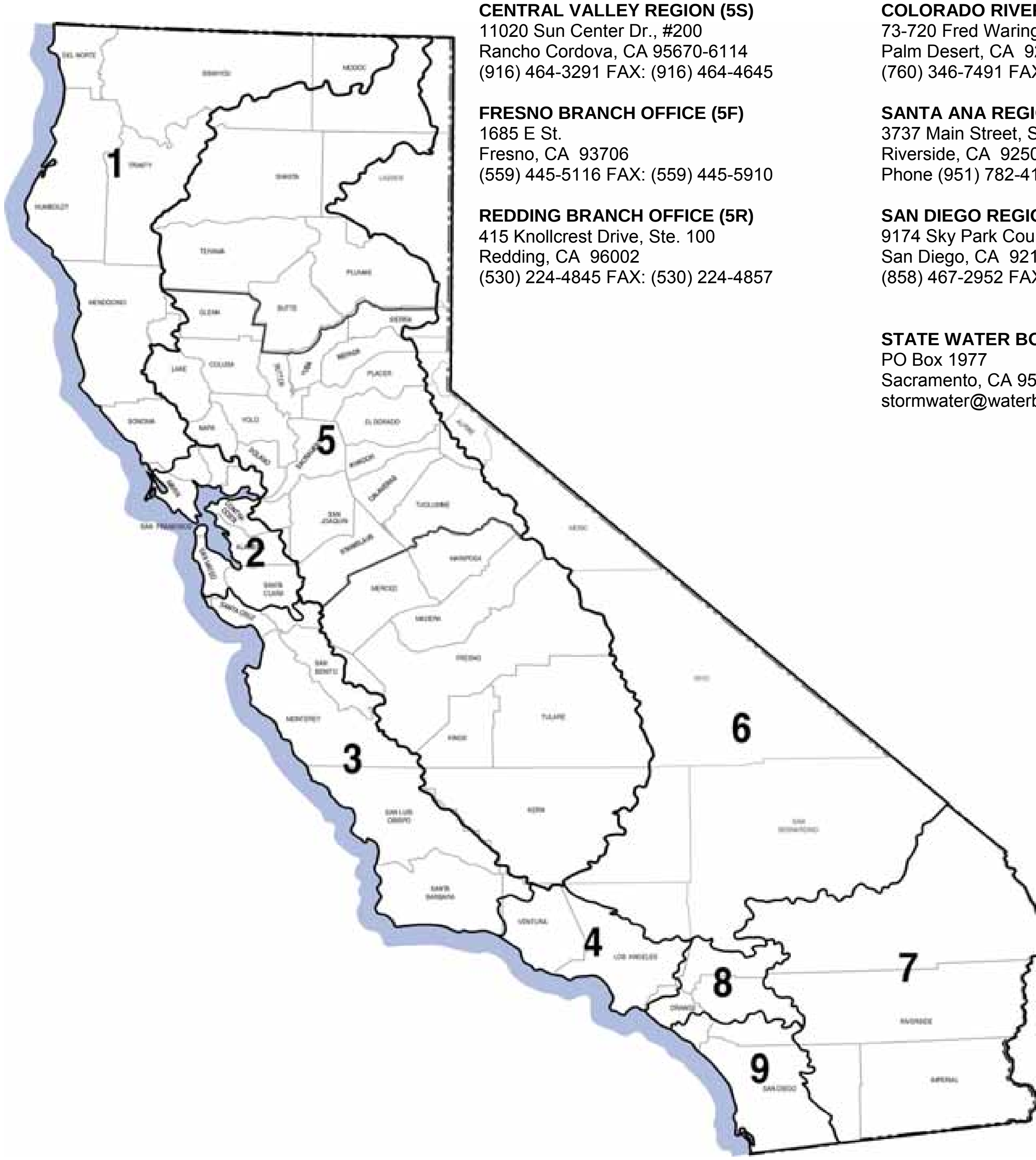
VICTORVILLE OFFICE (6V)
14440 Civic Drive, Ste. 200
Victorville, CA 92392-2383
(760) 241-6583 FAX: (760) 241-7308

COLORADO RIVER BASIN REGION (7)
73-720 Fred Waring Dr., Ste. 100
Palm Desert, CA 92260
(760) 346-7491 FAX: (760) 341-6820

SANTA ANA REGION (8)
3737 Main Street, Ste. 500
Riverside, CA 92501-3339
Phone (951) 782-4130 FAX: (951) 781-6288

SAN DIEGO REGION (9)
9174 Sky Park Court, Ste. 100
San Diego, CA 92123-4340
(858) 467-2952 FAX: (858) 571-6972

STATE WATER BOARD
PO Box 1977
Sacramento, CA 95812-1977
stormwater@waterboards.ca.gov



Linda S. Adams
Secretary for
Environmental Protection

State Water Resources Control Board

Division of Water Quality
1001 I Street • Sacramento, California 95814 • (916) 341-5538
Mailing Address: P.O. Box 1977 • Sacramento, California • 95812-1977
FAX (916) 341-5543 • Internet Address: http://www.waterboards.ca.gov/stormwtr/index.html

Arnold Schwarzengger
Governor

To: STORM WATER DISCHARGER

SUBJECT: CHECKLIST FOR SUBMITTING A NOTICE OF INTENT

In order for the State Water Resources Control Board to expeditiously process your Notice of Intent (NOI), the following items must be submitted to either of the addresses indicated below:

1. ______ NOI (please keep a copy for your files) with all applicable sections completed and original signature of the facility operator;

2. ______ Check made out to the "State Water Resources Control Board" with the appropriate fee. The regular fee is $**830.00** ($700 plus 18.5% surcharge).

3. ______ Site Map of the facility (see NOI instructions). DO NOT SEND BLUEPRINTS

U.S. Postal Service Address	Overnight Mailing Address
State Water Resources Control Board	State Water Resources Control Board
Division of Water Quality	Division Of Water Quality
Attn: Storm Water Section	Attn: Storm Water, 15th Floor
P.O. Box 1977	1001 I Street
Sacramento, CA 95812-1977	Sacramento, CA 95814

NOIs are processed in the order they are received. A NOI receipt letter will be mailed to the facility operator within approximately two weeks. Incomplete NOI submittals will be returned to the facility operator within the same timeframe and will specify the reason(s) for return. If you need a receipt letter by a specific date (for example, to provide to a local agency), we advise that you submit your NOI thirty (30) days prior to the date the receipt letter is needed.

Please do not call us to verify your NOI status. A copy of your NOI receipt letter will be available on our web page within twenty-four (24) hours of processing. Go to: http://www.waterboards.ca.gov/stormwtr/databases.html to retrieve an electronic copy of your NOI receipt letter. If you have any questions regarding this matter, please contact us at (916) 341-5538.

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FOR

STATE WATER RESOURCES CONTROL BOARD (STATE WATER BOARD)
WATER QUALITY ORDER NO. 97-03-DWQ
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT NO. CAS000001 (GENERAL PERMIT)

WASTE DISCHARGE REQUIREMENTS (WDRS)
FOR
DISCHARGES OF STORM WATER ASSOCIATED WITH INDUSTRIAL ACTIVITIES
EXCLUDING CONSTRUCTION ACTIVITIES

FACT SHEET
FOR

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FOR
DISCHARGES OF STORM WATER ASSOCIATED WITH INDUSTRIAL ACTIVITIES
EXCLUDING CONSTRUCTION ACTIVITIES

BACKGROUND

In 1972, the Federal Water Pollution Control Act (also referred to as the Clean Water Act [CWA]) was amended to provide that the discharge of pollutants to waters of the United States from any point source is effectively prohibited unless the discharge is in compliance with an NPDES permit. The 1987 amendments to the CWA added Section 402(p) that establishes a framework for regulating municipal and industrial storm water discharges under the NPDES Program. On November 16, 1990, the U.S. Environmental Protection Agency (U.S. EPA) published final regulations that establish application requirements for storm water permits. The regulations require that storm water associated with industrial activity (storm water) that discharges either directly to surface waters or indirectly through municipal separate storm sewers must be regulated by an NPDES permit.

U.S. EPA developed a four-tier permit issuance strategy for storm water discharges associated with industrial activity as follows:

Tier I, Baseline Permitting--One or more general permits will be developed to initially cover the majority of storm water discharges associated with industrial activity.

Tier II, Watershed Permitting--Facilities within watersheds shown to be adversely impacted by storm water discharges associated with industrial activity will be targeted for individual or watershed-specific general permits.

Tier III, Industry-Specific Permitting--Specific industry categories will be targeted for individual or Industry-specific general permits.

Tier IV, Facility-Specific Permitting--A variety of factors will be used to target specific facilities for individual permits.

The regulations allow authorized states to issue general permits or individual permits to regulate storm water discharges.

Consistent with Tier I, Baseline Permitting, of the U.S. EPA permitting strategy, the State Water Board issued a statewide General Permit on November 19, 1991 that applied to all storm water discharges requiring a permit except construction activity. The monitoring requirements of this General Permit were amended September 17, 1992. A separate statewide general permit has been issued for construction activity.

To obtain authorization for continued and future storm water discharge under this General Permit, each facility operator must submit a Notice of Intent (NOI). This approach is consistent with the four-tier permitting strategy described in Federal regulations, i.e., Tier 1, Baseline Permitting. Tier 1, Baseline Permitting, enables the State to begin reducing pollutants in industrial storm water in the most efficient manner possible.

This General Permit generally requires facility operators to:

1. Eliminate unauthorized non-storm water discharges;
2. Develop and implement a storm water pollution prevention plan (SWPPP); and
3. Perform monitoring of storm water discharges and authorized non-storm water discharges.

TYPES OF STORM WATER DISCHARGES COVERED BY THIS GENERAL PERMIT

This General Permit is intended to cover all new or existing storm water discharges and authorized non-storm water discharges from facilities required by Federal regulations to obtain a permit including those (1) facilities previously covered by the San Francisco Bay Regional Water Quality Control Board Order No. 92-011 (as amended by Order No. 92-116), (2) facilities designated by the Regional Water Quality Control Boards (Regional Water Boards), (3) facilities whose operators seek coverage under this General Permit, (4) and facilities required by future U.S. EPA storm water regulations.

The General Permit is intended to cover all facilities described in Attachment 1, whether the facility is primary or is auxiliary to the facility operator's function. For example, although a school district's primary function is education, a facility that it operates for vehicle maintenance of school buses is a transportation facility that is covered by this General Permit.

The definition of "storm water associated with industrial activity" is provided in Attachment 4, Definition 9, of this General Permit. Facilities that discharge storm water associated with industrial activity requiring a General Permit are listed by category in 40 Code of Federal Regulations (CFR) Section 122.26(b)(14) (Federal Register, Volume 55 on

Pages 48065-66) and in Attachment 1 of this General Permit. The facilities can be publicly or privately owned. General descriptions of these categories are:

1. Facilities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards (40 CFR Subchapter N);

2. Manufacturing facilities;

3. Mining/oil and gas facilities;

4. Hazardous waste treatment, storage, or disposal facilities;

5. Landfills, land application sites, and open dumps that receive industrial waste;

6. Recycling facilities such as metal scrap yards, battery reclaimers, salvage yards, automobile yards;

7. Steam electric generating facilities;

8. Transportation facilities that conduct any type of vehicle maintenance such as fueling, cleaning, repairing, etc.;

9. Sewage treatment plants;

10. Construction activity (covered by a separate general permit); and

11. Certain facilities (often referred to as "light industry") where industrial materials, equipment, or activities are exposed to storm water.

For the most part, these facilities are identified in the Federal regulations by a Standard Industrial Classification (SIC).

<u>Category 1 Dischargers</u>

The following categories of facilities currently have storm water effluent limitation guidelines for at least one of their subcategories. They are cement manufacturing (40 CFR Part 411); feedlots (40 CFR Part 412); fertilizer manufacturing (40 CFR Part 418); petroleum refining (40 CFR Part 419); phosphate manufacturing (40 CFR Part 422); steam electric power generation (40 CFR Part 423); coal mining (40 CFR Part 434); mineral mining and processing (40 CFR Part 436); ore mining and dressing (40 CFR Part 440); and asphalt emulsion (40 CFR Part 443). A facility operator whose facility falls into one of these general categories should examine the effluent guidelines to determine if the facility is categorized in one of the subcategories that have storm water effluent guidelines. If a facility is classified as one of those subcategories, that facility is subject to the standards listed in the CFR for that category and is subject to this General Permit. This General Permit contains additional requirements (see Section B.6.) for facilities with storm water effluent limitations guidelines.

Category 5 Dischargers

Inactive or closed landfills, land application sites, and open dumps that have received industrial wastes (Category 5) may be subject to this General Permit unless the storm water discharges from the sites are already regulated by an NPDES permit issued by the appropriate Regional Water Board. Facility operators of closed landfills that are regulated by waste discharge requirements (WDRs) may be required to comply with this General Permit. In some cases, it may be appropriate for closed landfills to be covered by the State Water Board's General Permit during closure activities. The Construction Activities General Permit should cover new landfill construction. Facility operators should contact their Regional Water Board to determine the appropriate permit coverage.

Category 10 Dischargers

Facility operators of Category 10 (light industry) facilities are not subject to this General Permit if they can certify that the following minimum conditions at their facilities are met:

1. All prohibited non-storm water discharges have been eliminated or otherwise permitted.

2. All areas of past exposure have been inspected and cleaned, as appropriate.

3. All materials related to industrial activity (including waste materials) are not exposed to storm water or authorized non-storm water discharges.

4. All industrial activities and industrial equipment are not exposed to storm water or authorized non-storm water discharges.

5. There is no exposure of materials associated with industrial activity through other direct or indirect pathways such as particulates from stacks and exhaust systems.

6. There is periodic re-evaluation of the facility to ensure Conditions 1, 3, 4, and 5 are continuously met.

Currently, facility operators that can certify that the above conditions are met are not required to notify the State Water

Board or Regional Water Board. These facility operators are advised to retain such certification documentation on site.

The Ninth Circuit Court of Appeals invalidated the exemption granted by U.S. EPA for storm water discharges from facilities in Category 11 that do not have exposure and remanded the regulation to U.S. EPA for further action. The State Water Board, at this time, is not requiring storm water discharges from facilities in Category 11 that do not have exposure to be covered by this General Permit. Instead, the State Water Board will await future U.S. EPA or court action clarifying the types of storm water discharges that must be permitted. If necessary, the State Water Board will reopen the General Permit to accommodate such a clarification.

Section 1068 of the Intermodal Surface Transportation Act of 1991 exempts municipal agencies serving populations of less than 100,000 from Phase I permit requirements for most facilities they operate (uncontrolled sanitary landfills, power plants, and airports are still required to be permitted in Phase I). Phase II of the Permit Program scheduled to begin August 7, 2001 will cover the facilities that are exempt from Phase I permit requirements.

TYPES OF DISCHARGES NOT COVERED BY THIS GENERAL PERMIT

1. CONSTRUCTION ACTIVITY: Discharges from construction activity of five acres or more, including clearing, grading, and excavation. A separate general permit was adopted on August 20, 1992 for this industrial category.

2. FACILITIES WHICH HAVE NPDES PERMITS CONTAINING STORM WATER PROVISIONS: Some storm water discharges may be regulated by other individual or general NPDES permits issued by the State Water Board or the Regional Water Boards. This General Permit shall not regulate these discharges. When the individual or general NPDES permits for such discharges expire, the State Water Board or Regional Water Board may authorize coverage under this General Permit or another general NPDES permit, or may issue a new individual NPDES permit consistent with the Federal and State storm water regulations. Interested parties may petition the State Water Board or appropriate Regional Water Board to issue individual or General NPDES Permits. General Permits may be issued for a particular industrial group or watershed area.

3. FACILITIES DETERMINED INELIGIBLE BY REGIONAL WATER BOARDS: Regional Water Boards may determine that discharges from a facility or groups of facilities, otherwise eligible for coverage under this General Permit, have potential water quality impacts that may not be appropriately addressed by

this General Permit. In such cases, a Regional Water Board may require such discharges to be covered by an individual or general NPDES permit. Interested persons may petition the appropriate Regional Water Board to issue individual NPDES permits. The applicability of this General Permit to such discharges will be terminated upon adoption of an individual NPDES permit or a different general NPDES permit.

4. FACILITIES WHICH DO NOT DISCHARGE STORM WATER TO WATERS OF THE UNITED STATES: The discharges from the following facilities are not required to be permitted:

   a. FACILITIES THAT DISCHARGE STORM WATER TO MUNICIPAL SANITARY SEWER SYSTEMS: Facilities that discharge storm water to municipal sanitary sewer systems or combined sewer systems are not required by Federal regulations to be covered by an NPDES storm water permit or to submit an NOI to comply with this General Permit. (It should be noted that many municipalities have sewer use ordinances that prohibit storm drain connections to their sanitary sewers.)

   b. FACILITIES THAT DO NOT DISCHARGE STORM WATER TO SURFACE WATERS OR SEPARATE STORM SEWERS: Storm water that is captured and treated and/or disposed of with the facility's NPDES permitted process wastewater and storm water that is disposed of to evaporation ponds, percolation ponds, or combined sewer systems are not required to obtain a storm water permit. To avoid liability, the facility operator should be certain that no discharge of storm water to surface waters would occur under any circumstances.

5. MOST SILVICULTURAL ACTIVITIES: Storm water discharges from most silvicultural activities such as thinning, harvesting operations, surface drainage, or road construction and maintenance are exempt from this permit. Log sorting or log storage facilities that fall within SIC 2411 are required to be permitted.

6. MINING AND OIL AND GAS FACILITIES: Oil and gas facilities that have not released storm water resulting in a discharge of a reportable quantity (RQ) for which notification is or was required pursuant to 40 CFR Parts 110, 117, and 302 at any time after November 19, 1987 are not required to be permitted unless the industrial storm water discharge contributed to a violation of a water quality standard. Mining facilities that discharge storm water that does not come into contact with any overburden, raw materials, intermediate product, finished product, by-product, or waste product located at the facility are not required to be permitted. These facilities must be permitted if they have a new release of storm water resulting in a discharge of an RQ.

7. FACILITIES ON INDIAN LANDS: the U.S. EPA will regulate Discharges from facilities on Indian lands.

NOTIFICATION REQUIREMENTS

Storm water discharges from facilities described in the section titled "Types of Storm Water Discharges Covered by This General Permit" must be covered by an NPDES permit. An NOI must be submitted by the facility operator for each individual facility to obtain coverage. Certification of the NOI signifies that the facility operator intends to comply with the provisions of the General Permit. Facility operators who have filed NOIs for the State Water Board Order No. 91-013-DWQ (as amended by Order No. 92-12-DWQ) or San Francisco Bay Regional Water Board Order No. 92-011 (as amended by Order No. 92-116) will be sent an abbreviated NOI soon after adopting this General Permit that must be completed and returned within 45 days of receipt. Where operations have discontinued and significant materials remain on site (such as at closed landfills), the landowner may be responsible for filing an NOI and complying with this General Permit. A landowner may also file an NOI for a facility if the landowner, rather than the facility operator(s), is responsible for compliance with this General Permit.

A facility operator that does not submit an NOI for a facility must submit an application for an individual NPDES permit. U.S. EPA's regulations [40 CFR 122.21 (a)] exclude facility operators covered by a general permit from requirements to submit an individual permit application unless required by the Regional Water Board. The NOI requirements of this General Permit are intended to establish a mechanism which can be used to establish a clear accounting of the number of facility operators complying with the General Permit, their identities, the nature of operations at the facilities, and location.

All facility operators filing an NOI after the adoption of this General Permit must comply with this General Permit. Existing facility operators who have filed NOIs prior to the adoption of this General Permit shall continue to complete the requirements of the previous General Permit through June 30, 1997 including submitting annual reports to the Regional Water Boards by July 1, 1997. Group Leaders are required to submit a 1996-97 Group Evaluation Report by August 1, 1997.

DESCRIPTION OF GENERAL PERMIT CONDITIONS

Prohibitions

This General Permit authorizes storm water and authorized non-storm water discharges from facilities that are required to be covered by a storm water permit. This General Permit prohibits discharges of material other than storm water (non-storm water discharges) that are not authorized by the General Permit and discharges containing hazardous substances in storm water in excess of reportable quantities established at 40 CFR 117.3 and 40 CFR 302.4. Authorized non-storm water discharges are addressed in the Special Conditions of the General Permit.

Effluent Limitations

NPDES Permits for storm water discharges must meet all applicable provisions of Sections 301 and 402 of the CWA. These provisions require control of pollutant discharges using best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT) to prevent and reduce pollutants and any more stringent controls necessary to meet water quality standards.

U.S. EPA regulations (40 CFR Subchapter N) establish effluent limitation guidelines for storm water discharges from facilities in ten industrial categories. For these facilities, compliance with the effluent limitation guidelines constitutes compliance with BAT and BCT for the specified pollutants and must be met to comply with this General Permit.

For storm water discharges from facilities not among the ten industrial categories listed in 40 CFR Subchapter N, it is not feasible at this time to establish numeric effluent limitations. The reasons why establishment of numeric effluent limitations is not feasible are discussed in detail in State Water Board Orders No. WQ 91-03 and WQ 91-04. Therefore, this General Permit allows the facility operator to implement best management practices (BMPs) to comply with the requirements of this General Permit. This approach is consistent with the U.S. EPA's August 1, 1996 "Interim Permitting Approach for Water Quality Based Effluent Limitations in Storm Water Permits".

Receiving Water Limitations

Storm water discharges shall not cause or contribute to a violation of an applicable water quality standard. The General Permit requires facility operators to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges through the development and implementation of BMPs which constitutes compliance with BAT and BCT and, in most cases, compliance with water quality standards. If receiving water quality standards are exceeded, facility operators are required to submit a written report providing additional BMPs that will be implemented to achieve water quality standards.

Storm Water Pollution Prevention Plans (SWPPPs)

All facility operators must prepare, retain on site, and implement an SWPPP. The SWPPP has two major objectives: (1) to help identify the sources of pollution that affect the quality of industrial storm water discharges and authorized non-storm water discharges, and (2) to describe and ensure the implementation of BMPs to reduce or prevent pollutants in industrial storm water discharges and authorized non-storm water discharges.

This General Permit requires development and implementation of an SWPPP emphasizing BMPs. This approach provides the flexibility necessary to establish appropriate BMPs for different types of industrial activities and pollutant sources. As this General Permit covers vastly different types of facilities, the State Water Board recognizes that there is no single best way of developing or organizing an SWPPP. The SWPPP requirements contain the essential elements that all facility operators must consider and address in the SWPPP. This General Permit's SWPPP requirements are more detailed than the previous general permit's SWPPP requirements, and the suggested order of the SWPPP elements have been rearranged (1) to correspond more closely with other storm water permits in effect throughout the country, and (2) to generally follow a more logical path. Facility operators that have already developed and implemented SWPPPs under previous general permits are required to review the SWPPP's requirements contained in this General Permit and then review their existing SWPPP for adequacy. If the existing SWPPP adequately identifies and assesses all potential sources of pollutants and describes the appropriate BMPs necessary to reduce or prevent pollutants, the facility operator is not required to revise the existing SWPPP.

One of the major elements of the SWPPP is the elimination of unauthorized non-storm water discharges to the facility's storm drain system. Unauthorized non-storm water discharges can be generated from a wide variety of potential pollutant sources. They include waters from the rinsing or washing of vehicles, equipment, buildings, or pavement; materials that have been improperly disposed of or dumped, and spilled; or leaked materials. Unauthorized non-storm water discharges can contribute a significant pollutant load to receiving waters. Measures to control spills, leakage, and dumping can often be addressed through BMPs. Unauthorized non-storm water discharges may enter the storm drain system via conveyances such as floor drains. All conveyances should be evaluated to determine whether they convey unauthorized non-storm water discharges to the storm drain system. Unauthorized non-storm water discharges (even when commingled with storm water) shall be eliminated or covered by a separate NPDES Permit.

There are many non-storm water discharges that, under certain conditions, should not contain pollutants associated with industrial activity (i.e., air conditioning condensate, potable water line testing, landscaping overflow, etc.). Item D, Special Conditions, provides the conditions where certain listed non-storm water discharges are authorized by this General Permit.

Monitoring Program

The General Permit requires development and implementation of a monitoring program. The objectives of the monitoring program are to (1) demonstrate compliance with the General Permit, (2) aid in the implementation of the SWPPP, and (3) measure the effectiveness of the BMPs in reducing or preventing pollutants in storm water discharges and authorized non-storm water discharges.

All facility operators (with the exception of inactive mining operations) are required to:

1. Perform visual observations of storm water discharges and authorized storm water discharges.

2. Collect and analyze samples of storm water discharges. Analysis must include pH, total suspended solids (TSS), total organic carbon (TOC), specific conductance, toxic chemicals, and other pollutants which are likely to be present in storm water discharges in significant quantities, and those parameters listed in Table D of this General Permit. The Table D parameters are those listed in the U.S. EPA Multi-Sector General Permit. Facility operators subject to Federal storm water effluent limitation guidelines in 40 CFR Subchapter N must also sample and analyze for any pollutant specified in the appropriate category of 40 CFR Subchapter N.

Facility operators are not required to collect samples or perform visual observations during adverse climatic conditions. Sample collection and visual observations are required only during scheduled facility operating hours. Visual observations are required only during daylight hours. Facility operators that are unable to collect any of the required samples or visual observations because of the above circumstances must provide documentation to the Regional Water Board in their annual report.

Facility operators may be exempt from performing sampling and analysis if they: (1) do not have areas of industrial activity exposed to storm water, (2) receive an exemption from a local agency which has jurisdiction over the storm sewer system, or (3) receive an exemption from the appropriate Regional Water Board. Facility operators must always perform sampling and analysis for any pollutant specified in storm water effluent limitation guidelines.

This General Permit contains a new procedure where facility operators, if they meet certain minimum conditions, may certify compliance with the General Permit and reduce the number of sampling events required to be sampled for the remaining term of the General Permit. Each Regional Water Board may develop instructions, guidance, and checklists to assist facility operators to complete sampling reduction requests.

Local agencies that wish to provide sampling and analysis exemptions or reductions to facility operators within their jurisdiction shall develop a certification program that clearly indicates the certification procedures and criteria used by the local agency. At a minimum, these programs should include site inspections, a review of the facility operator's SWPPP, and a review of other records such as monitoring data, receiving water data, etc. The certification program shall be approved by the local Regional Water Board before implementation.

Alternative Monitoring

Facility operators are required to develop a facility-specific monitoring program that satisfies both the minimum monitoring program requirements and the objectives of the monitoring program. Some facility operators have indicated that cost-effective alternative monitoring programs can be developed that provide equivalent or more accurate indicators of pollutants and/or BMP performance than a monitoring program based upon the minimum monitoring program requirements. An example of such an alternative monitoring program would be one that identifies sample locations at or near pollutant sources rather than sampling an entire drainage area where the storm water discharge has been diluted with storm water from areas with little or no industrial activity.

The State Water Board does not want to preclude facility operators from developing better, and perhaps more cost-effective, monitoring programs. This General Permit allows facility operators to submit alternative monitoring programs for approval by the Regional Water Board. For individual facilities, these proposals must be facility specific and demonstrate how the alternative monitoring program will result in an equivalent or more accurate indicator of pollutants and/or BMP effectiveness. Facility operators with similar industrial activities may also propose alternative monitoring programs for approval by the Regional Water Boards. These proposals must demonstrate how the alternative monitoring program will result in an equivalent or more accurate indicator of pollutants and/or BMP effectiveness for all of the participating facilities.

Facility operators shall continue to comply with the existing monitoring program requirements until receiving approval by the Regional Water Board.

Group Monitoring

Each facility operator may either perform sampling and analysis individually or participate in a group monitoring program. A group monitoring program may be developed either by a group leader representing a group of similar facilities or by a local agency which holds a storm water permit for a municipal separate storm sewer system for industrial facilities within its jurisdiction. The group leader or local agency responsible for the group monitoring program must schedule all participating facilities to sample two storm events over the life of this General Permit. Facility operators subject to Federal effluent limitations guidelines in 40 CFR Subchapter N must individually sample and analyze for pollutants listed in the appropriate Federal regulations.

Participants within a group may be located within the jurisdiction of more than one Regional Water Board. Multi-Regional Water Board groups must receive the approval of the State Water Board Executive Director (with the concurrence of the appropriate Regional Water Boards).

Each group leader or local agency responsible for group sampling must: (1) provide guidance or training so that the monitoring is done correctly, (2) recommend appropriate BMPs to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges from group participants, (3) evaluate and report the monitoring data to the State Water Board and/or the appropriate Regional Water Board(s), and (4) conduct two on-site inspections at each facility over the five year term of this General Permit to evaluate facility compliance and recommend BMPs to achieve compliance with this General Permit. The group leader or local agency may designate, hire, or train inspectors to conduct these inspections that are or are not directly affiliated with the group leader or local agency. It is the group leader's or local agency's responsibility to select inspectors that are capable of evaluating each facility's compliance with the General Permit and can recommend appropriate BMPs. All group monitoring plans are subject to State Water Board and/or Regional Water Board(s) review. Consistent with the four-tier permitting strategy described in the Federal regulations, the Regional Water Board(s) may evaluate the data and results from group monitoring to establish future permitting decisions. As appropriate, the State Water Board and/or the Regional Water Board(s) may terminate or require substantial amendment to the group monitoring plans. The State Water Board and/or the Regional Water Board(s) may terminate a facility's participation in group monitoring or require additional monitoring activities.

Retention of Records

The facility operator is required to retain records of all monitoring information, copies of all reports required by this General Permit, and records of all data used to complete the NOI for a period of five years from the date of measurement, report, or monitoring activity. This period may be extended by the State and/or Regional Water Boards. All records are public documents and must be provided to the Regional Water Boards on request.

<u>Watershed Management</u>

The State and Regional Water Boards are undertaking a focussed effort in watershed management throughout the State. In reissuing this General Permit, the State Water Board recognizes both the evolving nature of watershed management and the long-term desirability of structuring monitoring programs to support the Watershed Management Initiative. Therefore, the amended monitoring and reporting provisions provide flexibility for individual facility operators or groups of facility operators to propose and participate in, subject to Regional Water Board approval, watershed monitoring programs in lieu of some or all of the monitoring requirements contained in this General Permit.

<u>Facility Operator Compliance Responsibilities</u>

This General Permit has been written to encourage individual facility operators to develop their own SWPPP and monitoring programs. Many facility operators, however, choose to obtain compliance assistance either by hiring a consultant on an individual basis or by participating in a group monitoring plan. Regardless of how a facility operator chooses to pursue compliance, it is the facility operator that is responsible for compliance with this General Permit.

The State Water Board recognizes that industrial activities and operating conditions at many facilities change over time. In addition, new and more effective BMPs are being developed by various facility operators and by industrial groups. The SWPPP and monitoring program requirements include various inspections, reviews, and observations all of which recognize, encourage, and mandate an iterative self-evaluation process that is necessary to consistently comply with this General Permit. In general, facility operators that develop and implement SWPPPs that comply with this General Permit should not be penalized when discovering minor violations through this iterative self-evaluation process. The General Permit provides facility operators up to 90 days to revise and implement the SWPPP to correct such violations.

STATE WATER RESOURCES CONTROL BOARD (STATE WATER BOARD)
WATER QUALITY ORDER NO. 97-03-DWQ
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT NO. CAS000001 (GENERAL PERMIT)

WASTE DISCHARGE REQUIREMENTS (WDRS)
FOR
DISCHARGES OF STORM WATER ASSOCIATED WITH INDUSTRIAL ACTIVITIES
EXCLUDING CONSTRUCTION ACTIVITIES

The State Water Board finds that:

1. Federal regulations for storm water discharges were issued by the U.S. Environmental Protection Agency (U.S. EPA) on November 16, 1990 (40 Code of Federal Regulations [CFR] Parts 122, 123, and 124). The regulations require operators of specific categories of facilities where discharges of storm water associated with industrial activity (storm water) occur to obtain an NPDES permit and to implement Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to reduce or prevent pollutants associated with industrial activity in storm water discharges and authorized non-storm discharges.

2. This General Permit shall regulate storm water discharges and authorized non-storm water discharges from specific categories of industrial facilities identified in Attachment 1, storm water discharges and authorized non-storm water discharges from facilities as designated by the Regional Water Quality Control Boards (Regional Water Boards), and storm water discharges and authorized non-storm water discharges from other facilities seeking General Permit coverage. This General Permit may also regulate storm water discharges and authorized non-storm water discharges from facilities as required by U.S. EPA regulations. This General Permit shall regulate storm water discharges and authorized non-storm water discharges previously regulated by San Francisco Bay Regional Water Board Order, No.92-11 (as amended by Order No. 92-116). This General Permit excludes storm water discharges and non-storm water discharges that are regulated by other individual or general NPDES permits, storm water discharges and non-storm water discharges from construction activities, and storm water discharges and non-storm water discharges excluded by the Regional Water Boards for coverage by this General Permit. Attachment 2 contains the addresses and telephone numbers of each Regional Water Board office.

3. To obtain coverage for storm water discharges and authorized non-storm water discharges pursuant to this General Permit, operators of facilities (facility operators) must submit a Notice of Intent (NOI), in accordance with the Attachment 3

instructions, and appropriate annual fee to the State Water Board. This includes facility operators that have participated in U.S. EPA's group application process.

4. This General Permit does not preempt or supersede the authority of local agencies to prohibit, restrict, or control storm water discharges and authorized non-storm water discharges to storm drain systems or other water-courses within their jurisdictions as allowed by State and Federal law.

5. If an individual NPDES permit is issued to a facility operator otherwise subject to this General Permit or an alternative NPDES general permit is subsequently adopted which covers storm water discharges and/or authorized non-storm water discharges regulated by this General Permit, the applicability of this General Permit to such discharges is automatically terminated on the effective date of the individual NPDES permit or the date of approval for coverage under the subsequent NPDES general permit.

6. Effluent limitations and toxic and effluent standards established in Sections 208(b), 301, 302, 303(d), 304, 306, 307, and 403 of the Federal Clean Water Act (CWA), as amended, are applicable to storm water discharges and authorized non-storm water discharges regulated by this General Permit.

7. This action to adopt an NPDES general permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21100, et seq.) in accordance with Section 13389 of the California Water Code.

8. Federal regulations (40 CFR Subchapter N) establish effluent limitations guidelines for storm water discharges from some facilities in ten industrial categories.

9. For facilities which do not have established effluent limitation guidelines for storm water discharges in 40 CFR Subchapter N, it is not feasible at this time to establish numeric effluent limitations. This is due to the large number of discharges and the complex nature of storm water discharges. This is also consistent with the U.S. EPA's August 1, 1996 "Interim Permitting Approach for Water Quality Based Effluent Limitations in Storm Water Permits."

10. Facility operators are required to comply with the terms and conditions of this General Permit. Compliance with the terms and conditions of this General Permit constitutes compliance with BAT/BCT requirements and with requirements to achieve water quality standards. This includes the development and implementation of an effective Storm Water Pollution Prevention Plan (SWPPP) to reduce or prevent pollutants associated with industrial activity in storm water discharges and authorized non-storm water discharges.

11. Best Management Practices (BMPs) to reduce or prevent pollutants associated with industrial activity in storm water discharges and authorized non-storm water discharges are appropriate where numeric effluent limitations are infeasible, and the implementation of BMPs is adequate to achieve compliance with BAT/BCT and with water quality standards.

12. The State Water Board has adopted a Watershed Management Initiative that encourages watershed management throughout the State. This General Permit recognizes the Watershed Management Initiative by supporting the development of watershed monitoring programs authorized by the Regional Water Boards.

13. Following adoption of this General Permit, the Regional Water Boards shall enforce its provisions.

14. Following public notice in accordance with State and Federal laws and regulations, the State Water Board held a public hearing on November 12, 1996 and heard and considered all comments pertaining to this General Permit. A response to all significant comments has been prepared and is available for public review.

15. This Order is an NPDES General Permit in compliance with Section 402 of the CWA and shall take effect upon adoption by the State Water Board.

16. All terms that are defined in the CWA, U.S. EPA storm water regulations and the Porter-Cologne Water Quality Control Act will have the same definition in this General Permit unless otherwise stated.

IT IS HEREBY ORDERED that all facility operators required to be regulated by this General Permit shall comply with the following:

A. DISCHARGE PROHIBITIONS:

1. Except as allowed in Special Conditions (D.1.) of this General Permit, materials other than storm water (non-storm water discharges) that discharge either directly or indirectly to waters of the United States are prohibited. Prohibited non-storm water discharges must be either eliminated or permitted by a separate NPDES permit.

2. Storm water discharges and authorized non-storm water discharges shall not cause or threaten to cause pollution, contamination, or nuisance.

B. EFFLUENT LIMITATIONS:

1. Storm water discharges from facilities subject to storm water effluent limitation guidelines in Federal regulations (40 CFR

Subchapter N) shall not exceed the specified effluent limitations.

2. Storm water discharges and authorized non-storm water discharges regulated by this General Permit shall not contain a hazardous substance equal to or in excess of a reportable quantity listed in 40 CFR Part 117 and/or 40 CFR Part 302.

3. Facility operators covered by this General Permit must reduce or prevent pollutants associated with industrial activity in storm water discharges and authorized non-storm water discharges through implementation of BAT for toxic and non-conventional pollutants and BCT for conventional pollutants. Development and implementation of an SWPPP that complies with the requirements in Section A of the General Permit and that includes BMPs that achieve BAT/BCT constitutes compliance with this requirement.

C. RECEIVING WATER LIMITATIONS:

1. Storm water discharges and authorized non-storm water discharges to any surface or ground water shall not adversely impact human health or the environment.

2. Storm water discharges and authorized non-storm water discharges shall not cause or contribute to an exceedance of any applicable water quality standards contained in a Statewide Water Quality Control Plan or the applicable Regional Water Board's Basin Plan.

3. A facility operator will not be in violation of Receiving Water Limitation C.2. as long as the facility operator has implemented BMPs that achieve BAT/BCT and the following procedure is followed:

   a. The facility operator shall submit a report to the appropriate Regional Water Board that describes the BMPs that are currently being implemented and additional BMPs that will be implemented to prevent or reduce any pollutants that are causing or contributing to the exceedance of water quality standards. The report shall include an implementation schedule. The Regional Water Board may require modifications to the report.

   b. Following approval of the report described above by the Regional Water Board, the facility operator shall revise its SWPPP and monitoring program to incorporate the additional BMPs that have been and will be implemented, the implementation schedule, and any additional monitoring required.

4. A facility operator shall be in violation of this General Permit if he/she fails to do any of the following:

a. Submit the report described above within 60 days after either the facility operator or the Regional Water Board determines that discharges are causing or contributing to an exceedance of an applicable water quality standard;

b. Submit a report that is approved by the Regional Water Board; or

c. Revise its SWPPP and monitoring program as required by the approved report.

D. SPECIAL CONDITIONS

1. Non-Storm Water Discharges

a. The following non-storm water discharges are authorized by this General Permit provided that they satisfy the conditions specified in Paragraph b. below: fire hydrant flushing; potable water sources, including potable water related to the operation, maintenance, or testing of potable water systems; drinking fountain water; atmospheric condensates including refrigeration, air conditioning, and compressor condensate; irrigation drainage; landscape watering; springs; ground water; foundation or footing drainage; and sea water infiltration where the sea waters are discharged back into the sea water source.

b. The non-storm water discharges as provided in Paragraph a. above are authorized by this General Permit if all the following conditions are met:

i. The non-storm water discharges are in compliance with Regional Water Board requirements.

ii. The non-storm water discharges are in compliance with local agency ordinances and/or requirements.

iii. BMPs are specifically included in the SWPPP to (1) prevent or reduce the contact of non-storm water discharges with significant materials or equipment and (2) minimize, to the extent practicable, the flow or volume of non-storm water discharges.

iv. The non-storm water discharges do not contain significant quantities of pollutants.

v. The monitoring program includes quarterly visual observations of each non-storm water discharge and its sources to ensure that BMPs are being implemented and are effective.

vi. The non-storm water discharges are reported and described annually as part of the annual report.

c. The Regional Water Board or its designee may establish additional monitoring programs and reporting requirements for any non-storm water discharge authorized by this General Permit.

d. Discharges from firefighting activities are authorized by this General Permit and are not subject to the conditions of Paragraph b. above.

E. PROVISIONS

1. All facility operators seeking coverage by this General Permit must submit an NOI for each of the facilities they operate. Facility operators filing an NOI after the adoption of this General Permit shall use the NOI form and instructions (Attachment 3) attached to this General Permit. Existing facility operators who have filed an NOI pursuant to State Water Board Order No. 91-013-DWQ (as amended by Order No. 92-12-DWQ) or San Francisco Bay Regional Water Board Order No. 92-11 (as amended by Order No. 92-116) shall submit an abbreviated NOI form provided by the State Water Board. The abbreviated NOI form shall be submitted within 45 days of receipt.

2. Facility operators who have filed an NOI, pursuant to State Water Board Order No. 91-013-DWQ (as amended by Order No. 92-12-DWQ) or San Francisco Bay Regional Water Board Order No. 92-11 (as amended by Order No. 92-116), shall continue to implement their existing SWPPP and shall implement any necessary revisions to their SWPPP in accordance with Section A of this General Permit in a timely manner, but in no case later than August 1, 1997. Facility operators beginning industrial activities after adoption of this General Permit must develop and implement an SWPPP in accordance with Section A of this General Permit when the industrial activities begin.

3. Facility operators who have filed an NOI, pursuant to State Water Board Order No. 91-013-DWQ (as amended by Order No. 92-12-DWQ) or San Francisco Bay Regional Water Board Order No. 92-11 (as amended by Order No. 92-116), shall continue to implement their existing Monitoring Program and shall implement any necessary revisions to their Monitoring Program in accordance with Section B of the General Permit in a timely manner, but in no case later than August 1, 1997. Facility operators beginning industrial activities after adoption of this General Permit must develop and implement a Monitoring Program in

accordance with Section B of this General Permit when industrial activities begin.

4. Facility operators of feedlots as defined in 40 CFR Part 412 that are in full compliance with Section 2560 to Section 2565, Title 23, California Code of Regulations (Chapter 15) will be in compliance with all effluent limitations and prohibitions contained in this General Permit. Facility operators of feedlots that comply with Chapter 15, however, must perform monitoring in compliance with the requirements of Section B.4.d. and B.14. of this General Permit. Facility operators of feedlots must also comply with any Regional Water Board WDRs or NPDES general permit regulating their storm water discharges.

5. All facility operators must comply with lawful requirements of municipalities, counties, drainage districts, and other local agencies regarding storm water discharges and non-storm water discharges entering storm drain systems or other watercourses under their jurisdiction, including applicable requirements in municipal storm water management programs developed to comply with NPDES permits issued by the Regional Water Boards to local agencies.

6. All facility operators must comply with the standard provisions and reporting requirements for each facility covered by this General Permit contained in Section C, Standard Provisions.

7. Facility operators that operate facilities with co-located industrial activities (facilities that have industrial activities that meet more than one of the descriptions in Attachment 1) that are contiguous to one another are authorized to file a single NOI to comply with the General Permit. Storm water discharges and authorized non-storm water discharges from the co-located industrial activities are authorized if the SWPPP and Monitoring Program addresses each co-located industrial activity.

8. Upon reissuance of a successor NPDES general permit by the State Water Board, the facility operators subject to this reissued General Permit may be required to file an NOI.

9. Facility operators may request to terminate their coverage under this General Permit by filing a Notice of Termination (NOT) with the Regional Water Board. The NOT shall provide all documentation requested by the Regional Water Board. The facility operator will be notified when the NOT has been approved. Should the NOT be denied, facility operators are responsible for continued compliance with the requirements of this General Permit.

10. Facility operators who have filed an NOI, pursuant to State Water Board Order No. 91-013-DWQ (as amended by Order No. 92-12) or San Francisco Bay Regional Water Board Order No. 92-11 (as amended by Order No. 92-116) shall:

    a. Complete the 1996-97 activities required by those general permits. These include, but are not limited to, conducting any remaining visual observations, sample collection, annual site inspection, annual report submittal, and (for group monitoring leaders) Group Evaluation Reports; and

    b. Comply with the requirements of this General Permit no later than August 1, 1997.

11. If the Regional Water Board determines that a discharge may be causing or contributing to an exceedance of any applicable water quality standards contained in a Statewide Water Quality Control Plan or the applicable Regional Water Board's Basin Plan, the Regional Water Board may order the facility operator to comply with the requirements described in Receiving Water Limitation C.3. The facility operator shall comply with the requirements within the time schedule established by the Regional Water Board.

12. If the facility operator determines that its storm water discharges or authorized non-storm water discharges are causing or contributing to an exceedance of any applicable water quality standards, the facility operator shall comply with the requirements described in Receiving Water Limitation C.3.

13. State Water Board Order No. 91-013-DWQ (as amended by Order No. 92-12-DWQ) and San Francisco Bay Regional Water Board Order No. 91-011 (as amended by Order No. 92-116) are hereby rescinded.

F. REGIONAL WATER BOARD AUTHORITIES

1. Following adoption of this General Permit, Regional Water Boards shall:

    a. Implement the provisions of this General Permit, including, but not limited to, reviewing SWPPPs, reviewing annual reports, conducting compliance inspections, and taking enforcement actions.

    b. Issue other NPDES general permits or individual NPDES storm water permits as they deem appropriate to individual facility operators, facility operators of specific categories of industrial activities, or facility operators in a watershed or geographic area. Upon issuance of such NPDES permits by a Regional Water Board, the affected facility operator shall no longer be regulated by this General Permit. Any new NPDES permit issued by the Regional Water Board may contain different requirements than the requirements of this General Permit.

2. Regional Water Boards may provide guidance to facility operators on the SWPPP and the Monitoring Program and reporting implementation.

3. Regional Water Boards may require facility operators to conduct additional SWPPP and Monitoring Program and reporting activities necessary to achieve compliance with this General Permit.

4. Regional Water Boards may approve requests from facility operators whose facilities include co-located industrial activities that are not contiguous within the facilities (e.g., some military bases) to comply with this General Permit under a single NOI. Storm water discharges and authorized non-storm water discharges from the co-located industrial activities and from other sources within the facility that may generate significant quantities of pollutants are authorized provided the SWPPP and Monitoring Program addresses each co-located industrial activity and other sources that may generate significant quantities of pollutants.

CERTIFICATION

The undersigned, Administrative Assistant to the State Water Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on April 17, 1997.

AYE: John P. Caffrey
John W. Brown
James M. Stubchaer
Marc Del Piero
Mary Jane Forster

NO: None

ABSENT: None

ABSTAIN: None

Maureen Marché

Administrative Assistant to the Board

SECTION A: STORM WATER POLLUTION PREVENTION PLAN REQUIREMENTS

1. *Implementation Schedule*

A storm water pollution prevention plan (SWPPP) shall be developed and implemented for each facility covered by this General Permit in accordance with the following schedule.

a. Facility operators beginning industrial activities before October 1, 1992 shall develop and implement the SWPPP no later than October 1, 1992. Facility operators beginning industrial activities after October 1, 1992 shall develop and implement the SWPPP when industrial activities begin.

b. Existing facility operators that submitted a Notice of Intent (NOI), pursuant to State Water Resources Control Board (State Water Board) Order No. 91-013-DWQ (as amended by Order No. 92-12) or San Francisco Bay Regional Water Quality Control Board (Regional Water Board) Order No. 92-11 (as amended by Order No. 92-116), shall continue to implement their existing SWPPP and shall implement any necessary revisions to their SWPPP in a timely manner, but in no case later than August 1, 1997.

2. *Objectives*

The SWPPP has two major objectives: (a) to identify and evaluate sources of pollutants associated with industrial activities that may affect the quality of storm water discharges and authorized non-storm water discharges from the facility; and (b) to identify and implement site-specific best management practices (BMPs) to reduce or prevent pollutants associated with industrial activities in storm water discharges and authorized non-storm water discharges. BMPs may include a variety of pollution prevention measures or other low-cost and pollution control measures. They are generally categorized as non-structural BMPs (activity schedules, prohibitions of practices, maintenance procedures, and other low-cost measures) and as structural BMPs (treatment measures, run-off controls, over-head coverage.) To achieve these objectives, facility operators should consider the five phase process for SWPPP development and implementation as shown in Table A.

The SWPPP requirements are designed to be sufficiently flexible to meet the needs of various facilities. SWPPP requirements that are not applicable to a facility should not be included in the SWPPP.

A facility's SWPPP is a written document that shall contain a compliance activity schedule, a description of industrial activities and pollutant sources, descriptions of BMPs, drawings, maps, and relevant copies or references of parts of other plans. The SWPPP shall be revised whenever appropriate and shall be readily available for review by facility employees or Regional Water Board inspectors.

3. _Planning and Organization_

a. *Pollution Prevention Team*

The SWPPP shall identify a specific individual or individuals and their positions within the facility organization as members of a storm water pollution prevention team responsible for developing the SWPPP, assisting the facility manager in SWPPP implementation and revision, and conducting all monitoring program activities required in Section B of this General Permit. The SWPPP shall clearly identify the General Permit related responsibilities, duties, and activities of each team member. For small facilities, storm water pollution prevention teams may consist of one individual where appropriate.

b. *Review Other Requirements and Existing Facility Plans*

The SWPPP may incorporate or reference the appropriate elements of other regulatory requirements. Facility operators should review all local, State, and Federal requirements that impact, complement, or are consistent with the requirements of this General Permit. Facility operators should identify any existing facility plans that contain storm water pollutant control measures or relate to the requirements of this General Permit. As examples, facility operators whose facilities are subject to Federal Spill Prevention Control and Countermeasures' requirements should already have instituted a plan to control spills of certain hazardous materials. Similarly, facility operators whose facilities are subject to air quality related permits and regulations may already have evaluated industrial activities that generate dust or particulates.

4. _*Site Map*_

The SWPPP shall include a site map. The site map shall be provided on an 8-½ x 11 inch or larger sheet and include notes, legends, and other data as appropriate to ensure that the site map is clear and understandable. If necessary, facility operators may provide the required information on multiple site maps.

TABLE A

FIVE PHASES FOR DEVELOPING AND IMPLEMENTING INDUSTRIAL STORM WATER POLLUTION PREVENTION PLANS

PLANNING AND ORGANIZATION

*Form Pollution Prevention Team
*Review other plans

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ASSESSMENT PHASE

*Develop a site map
*Identify potential pollutant sources
*Inventory of materials and chemicals
*List significant spills and leaks
*Identify non-storm water discharges
*Assess pollutant Risks

↓

BEST MANAGEMENT PRACTICES IDENTIFICATION PHASE

*Non-structural BMPs
*Structural BMPs
*Select activity and site-specific BMPs

↓

IMPLEMENTATION PHASE

*Train employees
*Implement BMPs
*Conduct recordkeeping and reporting

↓

EVALUATION / MONITORING

*Conduct annual site evaluation
*Review monitoring information
*Evaluate BMPs
*Review and revise SWPPP

The following information shall be included on the site map:

a. The facility boundaries; the outline of all storm water drainage areas within the facility boundaries; portions of the drainage area impacted by run-on from surrounding areas; and direction of flow of each drainage area, on-site surface water bodies, and areas of soil erosion. The map shall also identify nearby water bodies (such as rivers, lakes, and ponds) and municipal storm drain inlets where the facility's storm water discharges and authorized non-storm water discharges may be received.

b. The location of the storm water collection and conveyance system, associated points of discharge, and direction of flow. Include any structural control measures that affect storm water discharges, authorized non-storm water discharges, and run-on. Examples of structural control measures are catch basins, berms, detention ponds, secondary containment, oil/water separators, diversion barriers, etc.

c. An outline of all impervious areas of the facility, including paved areas, buildings, covered storage areas, or other roofed structures.

d. Locations where materials are directly exposed to precipitation and the locations where significant spills or leaks identified in Section A.6.a.iv. below have occurred.

e. Areas of industrial activity. This shall include the locations of all storage areas and storage tanks, shipping and receiving areas, fueling areas, vehicle and equipment storage/maintenance areas, material handling and processing areas, waste treatment and disposal areas, dust or particulate generating areas, cleaning and rinsing areas, and other areas of industrial activity which are potential pollutant sources.

5. *List of Significant Materials*

The SWPPP shall include a list of significant materials handled and stored at the site. For each material on the list, describe the locations where the material is being stored, received, shipped, and handled, as well as the typical quantities and frequency. Materials shall include raw materials, intermediate products, final or finished products, recycled materials, and waste or disposed materials.

6. *Description of Potential Pollutant Sources*

a. The SWPPP shall include a narrative description of the facility's industrial activities, as identified in Section A.4.e above, associated potential pollutant sources, and potential pollutants that could be discharged in storm water discharges or authorized non-storm water discharges. At a minimum, the following items related to a facility's industrial activities shall be considered:

i. Industrial Processes

Describe each industrial process, the type, characteristics, and quantity of significant materials used in or resulting from the process, and a description of the manufacturing, cleaning, rinsing, recycling, disposal, or other activities related to the process. Where applicable, areas protected by containment structures and the corresponding containment capacity shall be described.

ii. Material Handling and Storage Areas

Describe each handling and storage area, type, characteristics, and quantity of significant materials handled or stored, description of the shipping, receiving, and loading procedures, and the spill or leak prevention and response procedures. Where applicable, areas protected by containment structures and the corresponding containment capacity shall be described.

iii. Dust and Particulate Generating Activities

Describe all industrial activities that generate dust or particulates that may be deposited within the facility's boundaries and identify their discharge locations; the characteristics of dust and particulate pollutants; the approximate quantity of dust and particulate pollutants that may be deposited within the facility boundaries; and a description of the primary areas of the facility where dust and particulate pollutants would settle.

iv. Significant Spills and Leaks

Describe materials that have spilled or leaked in significant quantities in storm water discharges or non-storm water discharges since April 17, 1994. Include toxic chemicals (listed in 40 CFR, Part 302) that have been discharged to storm water as reported on U.S. Environmental Protection Agency (U.S. EPA) Form R, and oil and hazardous substances in excess of reportable quantities (see 40 Code of Federal Regulations [CFR], Parts 110, 117, and 302).

The description shall include the type, characteristics, and approximate quantity of the material spilled or leaked, the cleanup or remedial actions that have occurred or are planned, the approximate remaining quantity of materials that may be exposed to storm water or non-storm water discharges, and the preventative measures taken to ensure spill or leaks do not reoccur. Such list shall be updated as appropriate during the term of this General Permit.

v. Non-Storm Water Discharges

Facility operators shall investigate the facility to identify all non-storm water discharges and their sources. As part of this investigation, all drains (inlets and outlets) shall be evaluated to identify whether they connect to the storm drain system.

All non-storm water discharges shall be described. This shall include the source, quantity, frequency, and characteristics of the non-storm water discharges and associated drainage area.

Non-storm water discharges that contain significant quantities of pollutants or that do not meet the conditions provided in Special Conditions D. are prohibited by this General Permit (Examples of prohibited non-storm water discharges are contact and non-contact cooling water, boiler blowdown, rinse water, wash water, etc.). Non-storm water discharges that meet the conditions provided in Special Condition D. are authorized by this General Permit. The SWPPP must include BMPs to prevent or reduce contact of non-storm water discharges with significant materials or equipment.

vi. Soil Erosion

Describe the facility locations where soil erosion may occur as a result of industrial activity, storm water discharges associated with industrial activity, or authorized non-storm water discharges.

b. The SWPPP shall include a summary of all areas of industrial activities, potential pollutant sources, and potential pollutants. This information should be summarized similar to Table B. The last column of Table B, "Control Practices", should be completed in accordance with Section A.8. below.

7. *<u>Assessment of Potential Pollutant Sources</u>*

a. The SWPPP shall include a narrative assessment of all industrial activities and potential pollutant sources as described in A.6. above to determine:

i. Which areas of the facility are likely sources of pollutants in storm water discharges and authorized non-storm water discharges, and

ii. Which pollutants are likely to be present in storm water discharges and authorized non-storm water discharges. Facility operators shall consider and evaluate various factors when performing this assessment such as current storm water BMPs; quantities of significant materials handled, produced, stored, or disposed of; likelihood of exposure to storm water or authorized non-storm water discharges; history of spill or leaks; and run-on from outside sources.

b. Facility operators shall summarize the areas of the facility that are likely sources of pollutants and the corresponding pollutants that are likely to be present in storm water discharges and authorized non-storm water discharges.

Facility operators are required to develop and implement additional BMPs as appropriate and necessary to prevent or reduce pollutants associated with each pollutant source. The BMPs will be narratively described in Section 8 below.

8. *Storm Water Best Management Practices*

The SWPPP shall include a narrative description of the storm water BMPs to be implemented at the facility for each potential pollutant and its source identified in the site assessment phase (Sections A.6. and 7. above). The BMPs shall be developed and implemented to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges. Each pollutant and its source may require one or more BMPs. Some BMPs may be implemented for multiple pollutants and their sources, while other BMPs will be implemented for a very specific pollutant and its source.

TABLE B
EXAMPLE
ASSESSMENT OF POTENTIAL POLLUTION SOURCES AND CORRESPONDING BEST MANAGEMENT PRACTICES SUMMARY

Area	Activity	Pollutant Source	Pollutant	Best Management Practices
Vehicle & Equipment Fueling	Fueling	Spills and leaks during delivery	fuel oil	- Use spill and overflow protection - Minimize run-on of storm water into the fueling area - Cover fueling area - Use dry cleanup methods rather than hosing down area - Implement proper spill prevention control program - Implement adequate preventative maintenance program to preventive tank and line leaks - Inspect fueling areas regularly to detect problems before they occur - Train employees on proper fueling, cleanup, and spill response techniques.
		Spills caused by topping off fuel tanks	fuel oil	
		Hosing or washing down fuel area	fuel oil	
		Leaking storage tanks	fuel oil	
		Rainfall running off fueling area, and rainfall running onto and off fueling area	fuel oil	

The description of the BMPs shall identify the BMPs as (1) existing BMPs, (2) existing BMPs to be revised and implemented, or (3) new BMPs to be implemented. The description shall also include a discussion on the effectiveness of each BMP to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges. The SWPPP shall provide a summary of all BMPs implemented for each pollutant source. This information should be summarized similar to Table B.

Facility operators shall consider the following BMPs for implementation at the facility:

a. Non-Structural BMPs

Non-structural BMPs generally consist of processes, prohibitions, procedures, schedule of activities, etc., that prevent pollutants associated with industrial activity from contacting with storm water discharges and authorized non-storm water discharges. They are considered low technology, cost-effective measures. Facility operators should consider all possible non-structural BMPs options before considering additional structural BMPs (see Section A.8.b. below). Below is a list of non-structural BMPs that should be considered:

i. Good Housekeeping

Good housekeeping generally consist of practical procedures to maintain a clean and orderly facility.

ii. Preventive Maintenance

Preventive maintenance includes the regular inspection and maintenance of structural storm water controls (catch basins, oil/water separators, etc.) as well as other facility equipment and systems.

iii. Spill Response

This includes spill clean-up procedures and necessary clean-up equipment based upon the quantities and locations of significant materials that may spill or leak.

iv. Material Handling and Storage

This includes all procedures to minimize the potential for spills and leaks and to minimize exposure of significant materials to storm water and authorized non-storm water discharges.

v. Employee Training

This includes training of personnel who are responsible for (1) implementing activities identified in the SWPPP, (2) conducting inspections, sampling, and visual observations, and (3) managing storm water. Training should address topics such as spill response, good housekeeping, and material handling procedures, and actions necessary to implement all BMPs identified in the SWPPP. The SWPPP shall identify periodic dates for such training. Records shall be maintained of all training sessions held.

vi. Waste Handling/Recycling

This includes the procedures or processes to handle, store, or dispose of waste materials or recyclable materials.

vii. Recordkeeping and Internal Reporting

This includes the procedures to ensure that all records of inspections, spills, maintenance activities, corrective actions, visual observations, etc., are developed, retained, and provided, as necessary, to the appropriate facility personnel.

viii. Erosion Control and Site Stabilization

This includes a description of all sediment and erosion control activities. This may include the planting and maintenance of vegetation, diversion of run-on and runoff, placement of sandbags, silt screens, or other sediment control devices, etc.

ix. Inspections

This includes, in addition to the preventative maintenance inspections identified above, an inspection schedule of all potential pollutant sources. Tracking and follow-up procedures shall be described to ensure adequate corrective actions are taken and SWPPPs are made.

x. Quality Assurance

This includes the procedures to ensure that all elements of the SWPPP and Monitoring Program are adequately conducted.

b. Structural BMPs

Where non-structural BMPs as identified in Section A.8.a. above are not effective, structural BMPs shall be considered. Structural BMPs generally consist of structural devices that reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges. Below is a list of structural BMPs that should be considered:

i. Overhead Coverage

This includes structures that provide horizontal coverage of materials, chemicals, and pollutant sources from contact with storm water and authorized non-storm water discharges.

ii. Retention Ponds

This includes basins, ponds, surface impoundments, bermed areas, etc. that do not allow storm water to discharge from the facility.

iii. Control Devices

This includes berms or other devices that channel or route run-on and runoff away from pollutant sources.

iv. Secondary Containment Structures

This generally includes containment structures around storage tanks and other areas for the purpose of collecting any leaks or spills.

v. Treatment

This includes inlet controls, infiltration devices, oil/water separators, detention ponds, vegetative swales, etc. that reduce the pollutants in storm water discharges and authorized non-storm water discharges.

9. <u>Annual Comprehensive Site Compliance Evaluation</u>

The facility operator shall conduct one comprehensive site compliance evaluation (evaluation) in each reporting period (July 1-June 30). Evaluations shall be conducted within 8-16 months of each other. The SWPPP shall be revised, as appropriate, and the revisions implemented within 90 days of the evaluation. Evaluations shall include the following:

a. A review of all visual observation records, inspection records, and sampling and analysis results.

b. A visual inspection of all potential pollutant sources for evidence of, or the potential for, pollutants entering the drainage system.

c. A review and evaluation of all BMPs (both structural and non-structural) to determine whether the BMPs are adequate, properly implemented and maintained, or whether additional BMPs are needed. A visual inspection of equipment needed to implement the SWPPP, such as spill response equipment, shall be included.

d. An evaluation report that includes, (i) identification of personnel performing the evaluation, (ii) the date(s) of the evaluation, (iii) necessary SWPPP revisions, (iv) schedule, as required in Section A.10.e, for implementing SWPPP revisions, (v) any incidents of non-compliance and the corrective actions taken, and (vi) a certification that the facility operator is in compliance with this General Permit. If the above certification cannot be provided, explain in the evaluation report why the facility operator is not in compliance with this General Permit. The evaluation report shall be submitted as part of the annual report, retained for at least five years, and signed and certified in accordance with Standard Provisions 9. and 10. of Section C. of this General Permit.

10. *SWPPP General Requirements*

a. The SWPPP shall be retained on site and made available upon request of a representative of the Regional Water Board and/or local storm water management agency (local agency) which receives the storm water discharges.

b. The Regional Water Board and/or local agency may notify the facility operator when the SWPPP does not meet one or more of the minimum requirements of this Section. As requested by the Regional Water Board and/or local agency, the facility operator shall submit an SWPPP revision and implementation schedule that meets the minimum requirements of this section to the Regional Water Board and/or local agency that requested the SWPPP revisions. Within 14 days after implementing the required SWPPP revisions, the facility operator shall provide written certification to the Regional Water Board and/or local agency that the revisions have been implemented.

c. The SWPPP shall be revised, as appropriate, and implemented prior to changes in industrial activities which (i) may significantly increase the quantities of pollutants in storm water discharge, (ii) cause a new area of industrial activity at the facility to be exposed to storm water, or (iii) begin an industrial activity which would introduce a new pollutant source at the facility.

d. Other than as provided in Provisions B.11, B.12, and E.2 of the General Permit, the SWPPP shall be revised and implemented in a timely manner, but in no case more than 90 days after a facility operator determines that the SWPPP is in violation of any requirement(s) of this General Permit.

e. When any part of the SWPPP is infeasible to implement by the deadlines specified in Provision E.2 or Sections A.1, A.9, A.10.c, and A.10.d of this General Permit due to proposed significant structural changes, the facility operator shall submit a report to the Regional Water Board prior to the applicable deadline that (i) describes the portion of the SWPPP that is infeasible to implement by the deadline, (ii) provides justification for a time extension, (iii) provides a schedule for completing and implementing that portion of the SWPPP, and (iv) describes the BMPs that will be implemented in the interim period to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges. Such reports are subject to Regional Water Board approval and/or modifications. Facility operators shall provide written notification to the Regional Water Board within 14 days after the SWPPP revisions are implemented.

f. The SWPPP shall be provided, upon request, to the Regional Water Board. The SWPPP is considered a report that shall be available to the public by the Regional Water Board under Section 308(b) of the Clean Water Act.

SECTION B. MONITORING PROGRAM AND REPORTING REQUIREMENTS

1. *Implementation Schedule*

   Each facility operator shall develop a written monitoring program for each facility covered by this General Permit in accordance with the following schedule:

   a. Facility operators beginning industrial activities before October 1, 1992 shall develop and implement a monitoring program no later than October 1, 1992. Facility operators beginning operations after October 1, 1992 shall develop and implement a monitoring program when the industrial activities begin.

   b. Facility operators that submitted a Notice Of Intent (NOI) pursuant to State Water Resources Control Board (State Water Board) Order No. 91-013-DWQ (as amended by Order No. 92-12) or San Francisco Bay Regional Water Quality Control Board (Regional Water Board) Order No. 92-11 (as amended by Order No. 92-116), shall continue to implement their existing monitoring program and implement any necessary revisions to their monitoring program in a timely manner, but in no case later than August 1, 1997. These facility operators may use the monitoring results conducted in accordance with those expired general permits to satisfy the pollutant/parameter reduction requirements in Section B.5.c., Sampling and Analysis Exemptions and Reduction certifications in Section B.12., and Group Monitoring Sampling credits in B.15.k. For facilities beginning industrial activities after the adoption of this General Permit, the monitoring program shall be developed and implemented when the facility begins the industrial activities.

2. *Objectives*

   The objectives of the monitoring program are to:

   a. Ensure that storm water discharges are in compliance with the Discharge Prohibitions, Effluent Limitations, and Receiving Water Limitations specified in this General Permit.

   b. Ensure practices at the facility to reduce or prevent pollutants in storm water discharges and authorized non-storm water discharges are evaluated and revised to meet changing conditions.

   c. Aid in the implementation and revision of the SWPPP required by Section A of this General Permit.

   d. Measure the effectiveness of best management practices (BMPs) to prevent or reduce pollutants in storm water discharges and authorized non-storm water discharges. Much of the information necessary to develop the monitoring program, such as discharge locations, drainage areas, pollutant sources, etc., should be found in the Storm Water Pollution Prevention Plan (SWPPP). The facility's monitoring program shall be a written, site-specific document that shall be revised whenever appropriate and be readily available for review by employees or Regional Water Board inspectors.

3. *Non-storm Water Discharge Visual Observations*

   a. Facility operators shall visually observe all drainage areas within their facilities for the presence of unauthorized non-storm water discharges;

   b. Facility operators shall visually observe the facility's authorized non-storm water discharges and their sources;

   c. The visual observations required above shall occur quarterly, during daylight hours, on days with no storm water discharges, and during scheduled facility operating hours[1]. Quarterly visual observations shall be conducted in each of the following periods: January-March, April-June, July-September, and October-December. Facility operators shall conduct quarterly visual observations within 6-18 weeks of each other.

   d. Visual observations shall document the presence of any discolorations, stains, odors, floating materials, etc., as well as the source of any discharge. Records shall be maintained of the visual observation dates, locations observed, observations, and response taken to eliminate unauthorized non-storm water discharges and to reduce or prevent pollutants from contacting non-storm water discharges. The SWPPP shall be revised, as necessary, and implemented in accordance with Section A of this General Permit.

4. *Storm Water Discharge Visual Observations*

   a. With the exception of those facilities described in Section B.4.d. below, facility operators shall visually

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[1] "Scheduled facility operating hours" are the time periods when the facility is staffed to conduct any function related to industrial activity, but excluding time periods where only routine maintenance, emergency response, security, and/or janitorial services are performed.

observe storm water discharges from one storm event per month during the wet season (October 1-May 30). These visual observations shall occur during the first hour of discharge and at all discharge locations. Visual observations of stored or contained storm water shall occur at the time of release.

b. Visual observations are only required of storm water discharges that occur during daylight hours that are preceded by at least three (3) working days[2] without storm water discharges and that occur during scheduled facility operating hours.

c. Visual observations shall document the presence of any floating and suspended material, oil and grease, discolorations, turbidity, odor, and source of any pollutants. Records shall be maintained of observation dates, locations observed, observations, and response taken to reduce or prevent pollutants in storm water discharges. The SWPPP shall be revised, as necessary, and implemented in accordance with Section A of this General Permit.

d. Feedlots (subject to Federal effluent limitations guidelines in 40 Code of Federal Regulations [CFR] Part 412) that are in compliance with Sections 2560 to 2565, Article 6, Chapter 15, Title 23, California Code of Regulations, and facility operators with storm water containment facilities shall conduct monthly inspections of their containment areas to detect leaks and ensure maintenance of adequate freeboard. Records shall be maintained of the inspection dates, observations, and any response taken to eliminate leaks and to maintain adequate freeboard.

5. *Sampling and Analysis*

a. Facility operators shall collect storm water samples during the first hour of discharge from (1) the first storm event of the wet season, and (2) at least one other storm event in the wet season. All storm water discharge locations shall be sampled. Sampling of stored or contained storm water shall occur at the time the stored or contained storm water is released. Facility operators that do not collect samples from the first storm event of the wet season are still required to collect samples from two other storm events of the wet season and shall explain in the Annual Report why the first storm event was not sampled.

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[2] Three (3) working days may be separated by non-working days such as weekends and holidays provided that no storm water discharges occur during the three (3) working days and the non-working days.

b. Sample collection is only required of storm water discharges that occur during scheduled facility operating hours and that are preceded by at least (3) three working days without storm water discharge.

c. The samples shall be analyzed for:

   i. Total suspended solids (TSS) pH, specific conductance, and total organic carbon (TOC). Oil and grease (O&G) may be substituted for TOC; and

   ii. Toxic chemicals and other pollutants that are likely to be present in storm water discharges in significant quantities. If these pollutants are not detected in significant quantities after two consecutive sampling events, the facility operator may eliminate the pollutant from future sample analysis until the pollutant is likely to be present again; and

   iii. Other analytical parameters as listed in Table D (located at the end of this Section). These parameters are dependent on the facility's standard industrial classification (SIC) code. Facility operators are not required to analyze a parameter listed in Table D when the parameter is not already required to be analyzed pursuant to Section B.5.c.i. and ii. or B.6 of this General Permit, and either of the two following conditions are met: (1) the parameter has not been detected in significant quantities from the last two consecutive sampling events, or (2) the parameter is not likely to be present in storm water discharges and authorized non-storm water discharges in significant quantities based upon the facility operator's evaluation of the facilities industrial activities, potential pollutant sources, and SWPPP. Facility operators that do not analyze for the applicable Table D parameters shall certify in the Annual Report that the above conditions have been satisfied.

   iv. Other parameters as required by the Regional Water Board.

6. *Facilities Subject to Federal Storm Water Effluent Limitation Guidelines*

Facility operators with facilities subject to Federal storm water effluent limitation guidelines, in addition to the requirements in Section B.5. above, must complete the following:

a. Collect and analyze two samples for any pollutant specified in the appropriate category of 40 CFR Subchapter N. The sampling and analysis exemptions and reductions described in Section B.12. of this General Permit do not apply to these pollutants.

b. Estimate or calculate the volume of storm water discharges from each drainage area;

c. Estimate or calculate the mass of each regulated pollutant as defined in the appropriate category of 40 CFR Subchapter N; and

d. Identify the individual(s) performing the estimates or calculations in accordance with Subsections b. and c. above.

7. *Sample Storm Water Discharge Locations*

a. Facility operators shall visually observe and collect samples of storm water discharges from all drainage areas that represent the quality and quantity of the facility's storm water discharges from the storm event.

b. If the facility's storm water discharges are commingled with run-on from surrounding areas, the facility operator should identify other visual observation and sample collection locations that have not been commingled by run-on and that represent the quality and quantity of the facility's storm water discharges from the storm event.

c. If visual observation and sample collection locations are difficult to observe or sample (e.g., sheet flow, submerged outfalls), facility operators shall identify and collect samples from other locations that represent the quality and quantity of the facility's storm water discharges from the storm event.

d. Facility operators that determine that the industrial activities and BMPs within two or more drainage areas are substantially identical may either (i) collect samples from a reduced number of substantially identical

drainage areas, or (ii) collect samples from each substantially identical drainage area and analyze a combined sample from each substantially identical drainage area. Facility operators must document such a determination in the annual report.

8. *Visual Observation and Sample Collection Exceptions*

Facility operators are required to be prepared to collect samples and conduct visual observations at the beginning of the wet season (October 1) and throughout the wet season until the minimum requirements of Sections B.4. and B.5. are completed with the following exceptions:

a. A facility operator is not required to collect a sample and conduct visual observations in accordance with Section B.4 and Section B.5 due to dangerous weather conditions, such as flooding, electrical storm, etc., when storm water discharges begin after scheduled facility operating hours or when storm water discharges are not preceded by three working days without discharge. Visual observations are only required during daylight hours. Facility operators that do not collect the required samples or visual observations during a wet season due to these exceptions shall include an explanation in the Annual Report why the sampling or visual observations could not be conducted.

b. A facility operator may conduct visual observations and sample collection more than one hour after discharge begins if the facility operator determines that the objectives of this Section will be better satisfied. The facility operator shall include an explanation in the Annual Report why the visual observations and sample collection should be conducted after the first hour of discharge.

9. *Alternative Monitoring Procedures*

Facility operators may propose an alternative monitoring program that meets Section B.2 monitoring program objectives for approval by the Regional Water Board. Facility operators shall continue to comply with the monitoring requirements of this Section and may not implement an alternative monitoring plan until the alternative monitoring plan is approved by the Regional Water Board. Alternative monitoring plans are subject to modification by the Regional Water Boards.

10. *Monitoring Methods*

a. Facility operators shall explain how the facility's monitoring program will satisfy the monitoring program objectives of Section B.2. This shall include:

i. Rationale and description of the visual observation methods, location, and frequency.

ii. Rationale and description of the sampling methods, location, and frequency; and

iii. Identification of the analytical methods and corresponding method detection limits used to detect pollutants in storm water discharges. This shall include justification that the method detection limits are adequate to satisfy the objectives of the monitoring program.

b. All sampling and sample preservation shall be in accordance with the current edition of "Standard Methods for the Examination of Water and Wastewater" (American Public Health Association). All monitoring instruments and equipment (including a facility operator's own field instruments for measuring pH and Electro Conductivity) shall be calibrated and maintained in accordance with manufacturers' specifications to ensure accurate measurements. All laboratory analyses must be conducted according to test procedures under 40 CFR Part 136, unless other test procedures have been specified in this General Permit or by the Regional Water Board. All metals shall be reported as total metals. With the exception of analysis conducted by facility operators, all laboratory analyses shall be conducted at a laboratory certified for such analyses by the State Department of Health Services. Facility operators may conduct their own sample analyses if the facility operator has sufficient capability (qualified employees, laboratory equipment, etc.) to adequately perform the test procedures.

11. *Inactive Mining Operations*
Inactive mining operations are defined in Attachment 1 of this General Permit. Where comprehensive site compliance evaluations, non-storm water discharge visual observations, storm water discharge visual observations, and storm water sampling are impracticable, facility operators of inactive mining operations may instead obtain certification once every three years by a Registered Professional Engineer that an SWPPP has been prepared for the facility and is being implemented in accordance with the requirements of this General Permit. By means of these certifications, the Registered Professional Engineer having examined the facility and being familiar with the provisions of this General Permit shall attest that the SWPPP has been prepared in accordance with good engineering practices. Facility operators of mining operations who cannot obtain a certification because of noncompliance must notify the appropriate Regional Water Board and, upon request, the local agency which receives the storm water discharge.

12. *Sampling and Analysis* Exemptions and Reductions

A facility operator who qualifies for sampling and analysis exemptions, as described below in Section B.12.a.i., or who qualifies for reduced sampling and analysis, as described below in Section B.12.b., must submit the appropriate certifications and required documentation to the Regional Water Boards prior to the wet season (October 1) and recertify as part of the Annual Report submittal. A facility operator that qualifies for either the Regional Water Board or local agency certification programs, as described below in Section B.12.a.ii. and iii., shall submit certification and documentation in accordance with the requirements of those programs. Facility operators who provide certifications in accordance with this Section are still required to comply with all other monitoring program and reporting requirements. Facility operators shall prepare and submit their certifications using forms and instructions provided by the State Water Board, Regional Water Board, or local agency or shall submit their information on a form that contains equivalent information. Facility operators whose facility no longer meets the certification conditions must notify the Regional Water Boards (and local agency) within 30 days and immediately comply with the Section B.5. sampling and analysis requirements. Should a Regional Water Board (or local agency) determine that a certification does not meet the conditions set forth below, facility operators must immediately comply with the Section B.5. sampling and analysis requirements.

a. Sampling and Analysis Exemptions

A facility operator is not required to collect and analyze samples in accordance with Section B.5. if the facility operator meets all of the conditions of one of the following certification programs:

i. No Exposure Certification (NEC)

This exemption is designed primarily for those facilities where all industrial activities are conducted inside buildings and where all materials stored and handled are not exposed to storm water. To qualify for this exemption, facility operators must certify that their facilities meet all of the following conditions:

(1) All prohibited non-storm water discharges have been eliminated or otherwise permitted.

(2) All authorized non-storm water discharges have been identified and addressed in the SWPPP.

(3) All areas of past exposure have been inspected and cleaned, as appropriate.

(4) All significant materials related to industrial activity (including waste materials) are not exposed to storm water or authorized non-storm water discharges.

(5) All industrial activities and industrial equipment are not exposed to storm water or authorized non-storm water discharges.

(6) There is no exposure of storm water to significant materials associated with industrial activity through other direct or indirect pathways such as from industrial activities that generate dust and particulates.

(7) There is periodic re-evaluation of the facility to ensure conditions (1), (2), (4), (5), and (6) above are continuously met. At a minimum, re-evaluation shall be conducted once a year.

ii. Regional Water Board Certification Programs

The Regional Water Board may grant an exemption to the Section B.5. Sampling and Analysis Requirements if it determines a facility operator has met the conditions set forth in a Regional Water Board certification program. Regional Water Board certification programs may include conditions to (1) exempt facility operators whose facilities infrequently discharge storm water to waters of the United States, and (2) exempt facility operators that demonstrate compliance with the terms and conditions of this General Permit.

iii. Local Agency Certifications

A local agency may develop a local agency certification program. Such programs must be approved by the Regional Water Board. An approved local agency program may either grant an exemption

from the Section B.5. Sampling and Analysis Requirements or reduce the frequency of sampling if it determines that a facility operator has demonstrated compliance with the terms and conditions of this General Permit.

b. Sampling and Analysis Reduction

i. A facility operator may reduce the number of sampling events required to be sampled for the remaining term of this General Permit if the facility operator provides certification that the following conditions have been met:

(1) The facility operator has collected and analyzed samples from a minimum of six storm events from all required drainage areas;

(2) All prohibited non-storm water discharges have been eliminated or otherwise permitted;

(3) The facility operator demonstrates compliance with the terms and conditions of the General Permit for the previous two years (i.e., completed Annual Reports, performed visual observations, implemented appropriate BMPs, etc.);

(4) The facility operator demonstrates that the facility's storm water discharges and authorized non-storm water discharges do not contain significant quantities of pollutants; and

(5) Conditions (2), (3), and (4) above are expected to remain in effect for a minimum of one year after filing the certification.

ii. Unless otherwise instructed by the Regional Water Board, facility operators shall collect and analyze samples from two additional storm events (or one additional storm event when certification filed for the wet season beginning October 1, 2001) during the remaining term of this General Permit in accordance with Table C below. Facility operators shall collect samples of the first storm event of the wet season. Facility operators that do not collect samples from the first storm event of the wet season shall collect samples from another storm event during the same wet season. Facility operators that do not collect a sample in a required wet season shall collect the sample from another storm event in the next wet season. Facility operators shall explain in the Annual Report why the first storm event of a wet season was not sampled or a sample was not taken from any storm event in accordance with the Table C schedule.

Table C
REDUCED MONITORING SAMPLING SCHEDULE

Facility Operator Filing Sampling Reduction Certification By	Samples Shall be Collected and Analyzed in These Wet Seasons	
	Sample 1	Sample 2
Oct. 1, 1997	Oct. 1, 1997-May 31, 1998	Oct. 1, 1999-May 31, 2000
Oct. 1, 1998	Oct. 1, 1998-May 31, 1999	Oct. 1, 2000-May 31, 2001
Oct. 1, 1999	Oct. 1, 1999-May 31, 2000	Oct. 1, 2001-May 31, 2002
Oct. 1, 2000	Oct. 1, 2000-May 31, 2001	Oct. 1, 2001-May 31, 2002
Oct. 1, 2001	Oct. 1, 2001-May 31, 2002	-

13. *Records*

Records of all storm water monitoring information and copies of all reports (including the Annual Reports) required by this General Permit shall be retained for a period of at least five years. These records shall include:

a. The date, place, and time of site inspections, sampling, visual observations, and/or measurements;

b. The individual(s) who performed the site inspections, sampling, visual observations, and or measurements;

c. Flow measurements or estimates (if required by Section B.6);

d. The date and approximate time of analyses;

e. The individual(s) who performed the analyses;

f. Analytical results, method detection limits, and the analytical techniques or methods used;

g. Quality assurance/quality control records and results;

h. Non-storm water discharge inspections and visual observations and storm water discharge visual observation records (see Sections B.3. and 4.);

i. Visual observation and sample collection exception records (see Section B.5.a, 7.d, 8, and 12.b.ii.);

j. All calibration and maintenance records of on-site instruments used;

k. All Sampling and Analysis Exemption and Reduction certifications and supporting documentation (see Section B.12);

l. The records of any corrective actions and follow-up activities that resulted from the visual observations.

14. *Annual Report*

All facility operators shall submit an Annual Report by July 1 of each year to the Executive Officer of the Regional Water Board responsible for the area in which the facility is located and to the local agency (if requested).

The report shall include a summary of visual observations and sampling results, an evaluation of the visual observation and sampling and analysis results, laboratory reports, the Annual Comprehensive Site Compliance Evaluation Report required in Section A.9., an explanation of why a facility did not implement any activities required by the General Permit (if not already included in the Evaluation Report), and records specified in Section B.13.i. The method detection limit of each analytical parameter shall be included. Analytical results that are less than the method detection limit shall be reported as "less than the method detection limit." The Annual Report shall be signed and certified in accordance with Standard Provisions 9. and 10. of Section C of this General Permit. Facility operators shall prepare and submit their Annual Reports using the annual report forms provided by the State Water Board or Regional Water Board or shall submit their information on a form that contains equivalent information.

15. *Group Monitoring*

Facility operators may participate in group monitoring as described below. A facility operator that participates in group monitoring shall develop and implement a written site-specific SWPPP and monitoring program in accordance with the General Permit and must satisfy any group monitoring requirements. Group monitoring shall be subject to the following requirements:

a. A group monitoring plan (GMP) shall be developed and implemented by a group leader representing a group of similar facility operators regulated by this General Permit or by a local agency which holds an NPDES permit (local agency permittee) for a municipal separate storm sewer system. GMPs with participants that discharge storm water within the boundaries of a single Regional Water Board shall be approved by that Regional Water Board. GMPs with participants that discharge storm water within the boundaries of multiple Regional Water Boards shall be approved by the State Water Board. The State Water Board and/or Regional Water Board(s) may disapprove a facility's participation in a GMP or require a GMP participant to conduct additional monitoring activities.

b. Each GMP participant shall collect and analyze samples from at least two storm events in accordance with Section B.5. over the five-year period of this General Permit. The two storm event minimum applies to new and existing members. The group leader or local agency permittee shall schedule sampling to meet the following conditions: (i) to evenly distribute the sample collection over the five-year term of this General Permit, and (ii) to collect samples from the two storm events at each participant's facility in different and non-consecutive wet seasons. New participants who join in Years 4 and 5 of this General Permit are not subject to Condition (ii) above. Group leaders shall explain in the annual Group Evaluation Report why any scheduled samples were not collected and reschedule the sampling so that all required samples are collected during the term of this General Permit.

c. The group leader or local agency permittee must have the appropriate resources to develop and implement the GMP. The group leader or local agency permittee must also have the authority to terminate any participant who is not complying with this General Permit and the GMP.

d. The group leader or local agency permittee is responsible for:

   i. Developing, implementing, and revising the GMP;

   ii. Developing and submitting an annual Group Evaluation Report to the State Water Board and/or Regional Water Board by August 1 of each year that includes:

      (1) An evaluation and summary of all group monitoring data,

      (2) An evaluation of the overall performance of the GMP participants in complying with this General Permit and the GMP,

(3) Recommended baseline and site-specific BMPs that should be considered by each participant based upon Items (1) and (2) above, and

(4) A copy of each evaluation report and recommended BMPs as required in Section B.15.d.v. below.

iii. Recommending appropriate BMPs to reduce or prevent pollutants associated with industrial activities in storm water discharges and authorized non-storm water discharges;

iv. Assisting each participant in completing their Annual Comprehensive Site Compliance Evaluation and Annual Report;

v. Conducting a minimum of two on-site inspections of each participant's facility (it is recommended that these inspections be scheduled during the Annual Comprehensive Site Compliance Evaluation) during the term of this General Permit to evaluate the participant's compliance with this General Permit and the GMP, and to recommend any additional BMPs necessary to achieve compliance with this General Permit. Participants that join in Years 4 and 5 shall be scheduled for one evaluation. A copy of the evaluation and recommended BMPs shall be provided to the participants;

vi. Submitting a GMP (or revisions, as necessary), to the appropriate Regional Water Board(s) and State Water Board no later than September 1, 1997 (or August 1 in subsequent years). Once approved, a group leader or local agency permittee shall submit a letter of intent by August 1 of each year to continue the approved GMP. The letter of intent must include a roster of participants, participant's Waste Discharge Identification number (WDID#), updated sampling schedules, and any other revisions to the GMP;

vii. Revising the GMP as instructed by the Regional Water Board or the State Water Board; and

viii. Providing the State Water Board and/or Regional Water Board with quarterly updates of any new or deleted participants and corresponding changes in the sampling and inspection schedule.

e. The GMP shall:

i. Identify the participants of the GMP by name, location, and WDID number;

ii. Include a narrative description summarizing the industrial activities of participants of the GMP and explain why the participants, as a whole, have sufficiently similar industrial activities and BMPs to be covered by a group monitoring plan;

iii. Include a list of typical potential pollutant sources associated with the group participant's facilities and recommended baseline BMPs to prevent or reduce pollutants associated with industrial activity in the storm water discharges and authorized non-storm water discharges;

iv. Provide a five-year sampling and inspection schedule in accordance with Subsections b. and d.v. above.

v. Identify the pollutants associated with industrial activity that shall be analyzed at each participant's facility in accordance with Section B.5. The selection of these pollutants shall be based upon an assessment of each facility's potential pollutant sources and likelihood that pollutants associated with industrial activity will be present in storm water discharges and authorized non-storm water discharges in significant quantities.

f. Sampling and analysis shall be conducted in accordance with the applicable requirements of this Section.

g. Unless otherwise instructed by the Regional Water Board or the State Water Board Executive Director, the GMPs shall be implemented at the beginning of the wet season (October 1).

h. All participants in an approved GMP that have not been selected to sample in a particular wet season are required to comply with all other monitoring program and reporting requirements of this Section including the submittal of an Annual Report by July 1 of each year to the appropriate Regional Water Board.

i. GMP participants subject to Federal storm water effluent limitation guidelines must perform the monitoring described in Section B.6. and submit the results of the monitoring to the appropriate Regional Water Board within the facility operator's Annual Report.

j. GMPs and Group Evaluation Reports should be prepared in accordance with State Water Board (or Regional Water Board) guidance.

k. GMP participants may receive Sampling and Analysis Reduction sampling credit in accordance with the following conditions:

   i. Current or prior participants (group participants) of approved GMPs, who have not collected and analyzed samples from six storm events as required in Section B.7.b.i.(1), may substitute credit earned through participation in a GMP for up to four of the six required storm events. Credits for GMP participation shall be calculated as follows:

      (1) Credit may only be earned in years of participation where the GMP participant was not scheduled to sample and the GMP was approved.

      (2) One credit will be earned for each year of valid GMP participation.

      (3) One additional credit may be earned for each year the overall GMP sample collection performance is greater than 75 percent.

   ii. GMP participants substituting credit as calculated above shall provide proof of GMP participation and certification that all the conditions in Section B.12.b.i. have been met. GMP participants substituting credit in accordance with Section B.15.k.i.(3) shall also provide GMP sample collection performance documentation.

   iii. GMP participants that qualify for Sampling and Analysis Reduction and have already sampled a storm event after October 1, 1997 shall only be required to sample one additional storm event during the remainder of this General Permit in accordance with the "Sample 2" schedule (or "Sample 1" schedule when certification filed for the wet season beginning October 1, 2001) in Table C of this Section.

n. Group leaders shall furnish, within 60 days of receiving a request from the State Water Board or Regional Water Board, any GMP information and documentation necessary to verify the Section B.15.k. sampling credits. Group leaders may also provide this information and documentation to the group participants.

16. *Watershed Monitoring Option*

Regional Water Boards may approve proposals to substitute watershed monitoring for some or all of the requirements of this Section if the Regional Water Board finds that the watershed monitoring will provide substantially similar monitoring information in evaluating facility operator compliance with the requirements of this General Permit.

TABLE D
ADDITIONAL ANALYTICAL PARAMETERS

Subsector	SIC	Activity Represented	Parameters
SECTOR A. TIMBER PRODUCTS			
A1	2421	General Sawmills and Planing Mills	**COD;TSS;Zn**
A2	2491	Wood Preserving	**As;Cu**
A3	2411	Log Storage and Handling	**TSS**
A4	2426	Hardwood Dimension and Flooring Mills	**COD;TSS**
A4	2429	Special Product Sawmills, Not Elsewhere Classified	**COD;TSS**
A4	243X	Millwork, Veneer, Plywood, and Structural Wood	**COD;TSS**
A4	(except 2434--Wood Kitchen Cabinet Manufacturers)		
A4	244X	Wood Containers	**COD;TSS**
A4	245X	Wood Buildings and Mobile Homes	**COD;TSS**
A4	2493	Reconstituted Wood Products	**COD;TSS**
A4	2499	Wood Products, Not Elsewhere Classified	
SECTOR B. PAPER AND ALLIED PRODUCTS MANUFACTURING			
B1	261X	Pulp Mills	
B2	262X	Paper Mills	
B3	263X	Paperboard Mills	**COD**
B4	265X	Paperboard Containers and Boxes	
B5	267X	Converted Paper and Paperboard Products, Except Containers and Boxes	
SECTOR C. CHEMICAL AND ALLIED PRODUCTS MANUFACTURING			
C1	281X	Industrial Inorganic Chemicals	**Al;Fe;N+N**
C2	282X	Plastics Materials and Synthetic Resins, Synthetic Rubber, Cellulosic, and Other Manmade Fibers Except Glass	**Zn**
C3	283X	Drugs	
C4	284X	Soaps, Detergents, and Cleaning Preparations; Perfumes, Cosmetics, and Other Toilet Preparations	**N+N;Zn**
C5	285X	Paints, Varnishes, Lacquers, Enamels, and Allied Products	
C6	286X	Industrial Organic Chemicals	
C7	287X	Nitrogenous and Phosphatic Basic Fertilizers, Mixed Fertilizer, Pesticides, and Other Agricultural Chemicals	**Fe;N+N;Pb;Zn;P**
C8	289X	Miscellaneous Chemical Products	
	3952	Inks and Paints, Including China Painting Enamels, India Ink, (limited to list) Drawing Ink, Platinum Paints for Burnt Wood or Leather Work, Paints for China Painting, Artist's Paints, and Artist's Watercolors	
SECTOR D. ASPHALT PAVING/ROOFING MATERIALS MANUFACTURERS AND LUBRICANT MANUFACTURERS			
D1	295X	Asphalt Paving and Roofing Materials	**TSS**
D2	2992	Lubricating Oils and Greases	

Parameter Names

Al - Aluminum	Cd - Cadmium	Cu - Copper	Mg - Magnesium	BOD - Biochemical Oxygen Demand
As - Arsenic	CN - Cyanide	Fe - Iron	Ag - Silver	N + N - Nitrate & Nitrite Nitrogen
NH_3- Ammonia	Hg - Mercury	P - Phosphorus	Se - Selenium	Pb - Lead
Zn - Zinc	TSS -Total Suspended Solids	COD - Chemical Oxygen Demand		

Subsector **SIC** **Activity Represented** **Parameters**

SECTOR E. GLASS, CLAY, CEMENT, CONCRETE, AND GYPSUM PRODUCT MANUFACTURING

E1	3211	Flat Glass	
E1	322X	Glass and Glassware, Pressed or Blown	
E1	323X	Glass Products Made of Purchased Glass	
E2	3241	Hydraulic Cement	
E3	325X	Structural Clay Products	**Al**
E3	326X	Pottery and Related Products	**Al**
E3	3297	Non-Clay Refractories	**Al**
E4	327X	Concrete, Gypsum, and Plaster Products (Except Lime) (except 3274).	**TSS;Fe**
E4	3295	Minerals and Earths, Ground, or Otherwise Treated	**TSS;Fe**

SECTOR F. PRIMARY METALS

F1	331X	Steel Works, Blast Furnaces, Rolling & Finishing Mill	**Al;Zn**
F2	332X	Iron and Steel Foundries	**Al;TSS;Cu;Fe;Zn**
F3	333X	Primary Smelting and Refining of Nonferrous Metals	
F4	334X	Secondary Smelting and Refining of Nonferrous Metals	
F5	335X	Rolling, Drawing, and Extruding of Nonferrous Metals	**Cu;Zn**
F6	336X	Nonferrous Foundries (Castings)	**Cu;Zn**
F7	339X	Miscellaneous Primary Metal Products	

SECTOR G. METAL MINING (ORE MINING AND DRESSING) EXCEPT INACTIVE METAL MINING ACTIVITIES ON FEDERAL LANDS WHERE AN OPERATOR CANNOT BE IDENTIFIED

G1	101X	Iron Ores	
G2	102X	Copper Ores	**TSS;COD;N+N**
G3	103X	Lead and Zinc Ores	
G4	104X	Gold and Silver Ores	
G5	106X	Ferroalloy Ores, Except Vanadium	
G6	108X	Metal Mining Services	
G7	109X	Miscellaneous Metal Ores	

SECTOR H. COAL MINES AND COAL MINING-RELATED FACILITIES

NA	12XX	Coal Mines and Coal Mining-Related Facilities	**TSS;Al;Fe**

SECTOR I. COAL MINES AND COAL MINING-RELATED FACILITIES

I1	131X	Crude Petroleum and Natural Gas	
I2	132X	Natural Gas Liquids	
I3	138X	Oil and Gas Field Services	

SECTOR J. MINERAL MINING AND DRESSING EXCEPT INACTIVE MINERAL MINING ACTIVITIES OCCURRING ON FEDERAL LANDS WHERE AN OPERATOR CANNOT BE IDENTIFIED

J1	141X	Dimension Stone	**TSS**
J1	142X	Crushed and Broken Stone, Including Rip Rap	**TSS**
J1	148X	Nonmetallic Minerals, Except Fuels	**TSS**
J2	144X	Sand and Gravel	**TSS;N+N**
J3	145X	Clay, Ceramic, and Refractory Materials	
J4	147X	Chemical and Fertilizer Mineral Mining	
J4	149X	Miscellaneous Nonmetallic Minerals, Except Fuels	

Subsector	SIC	Activity Represented	Parameters
SECTOR K. HAZARDOUS WASTE TREATMENT STORAGE OR DISPOSAL FACILITIES			
NA	4953	Hazardous Waste Treatment Storage or Disposal	**NH_3;Mg;COD;As Cd;CN;Pb Hg;Se;**Ag
SECTOR L. LANDFILLS AND LAND APPLICATION SITES			
NA	4953	Landfills and Land Application Sites That Receive or Have Received Industrial Wastes, Except Inactive Landfills or Land Applications Sites Occurring on Federal Lands Where an Operator Cannot be Identified	**TSS;Fe**
SECTOR M. AUTOMOBILE SALVAGE YARDS			
NA	5015	Facilities Engaged in Dismantling or Wrecking Used Motor Vehicles for Parts Recycling or Resale and for Scrap	**TSS;Fe;Pb;Al**
SECTOR N. SCRAP RECYCLING FACILITIES			
NA	5093	Processing, Reclaiming, and Wholesale Distribution of Scrap and Waste Materials	**TSS;Fe;Pb Al;Cu;Zn;COD**
SECTOR O. STEAM ELECTRIC GENERATING FACILITIES			
NA	4911	Steam Electric Power Generating Facilities	**Fe**
SECTOR P. LAND TRANSPORTATION FACILITIES THAT HAVE VEHICLE AND EQUIPMENT MAINTENANCE SHOPS AND/OR EQUIPMENT CLEANING OPERATIONS			
P1	40XX	Railroad Transportation	
P2	41XX	Local and Highway Passenger Transportation	
P3	42XX	Motor Freight Transportation and Warehousing	
P4	43XX	United States Postal Service	
P5	5171	Petroleum Bulk Stations and Terminals	
SECTOR Q. WATER TRANSPORTATION FACILITIES THAT HAVE VEHICLE (VESSEL) & EQUIPMENT MAINTENANCE SHOPS AND/OR EQUIPMENT CLEANING OPERATIONS			
NA	44XX	Water Transportation	**Al;Fe;Pb;Zn**
SECTOR R. SHIP AND BOAT BUILDING OR REPAIRING YARDS			
NA	373X	Ship and Boat Building or Repairing Yards	
SECTOR S. AIR TRANSPORTATION FACILITIES			
NA	45XX	Air Transportation Facilities That Have Vehicle Maintenance Ships, Material Handing Facilities, Equipment Cleaning Operations, or Airport and/or Aircraft Deicing/Anti-icing Operations	**BOD;COD;NH_3;pH**

Subsector	SIC	Activity Represented	Parameters
SECTOR T. TREATMENT WORKS			
NA	4952	Treatment Works Treating Domestic Sewage or Any Other Sewage Sludge or Wastewater Treatment Device or System Used in the Storage, treatment, recycling, or Reclamation of Municipal or Domestic Sewage with a Design Flow of 1.0 MGD or More or Required to Have an Approved Pretreatment Program	
SECTOR U. FOOD AND KINDRED PRODUCTS			
U1	201X	Meat Products	
U2	202X	Dairy Products	
U3	203X	Canned, Frozen and Preserved Fruits, Vegetables and Food Specialties	
U4	204X	**Grain Mill Products**	**TSS**
U5	205X	Bakery Products	
U6	206X	Sugar and Confectionery Products	
U7	207X	**Fats and Oils**	**BOD;COD;TSS;N+N**
U8	208X	Beverages	
U9	209X	Miscellaneous Food Preparations and Kindred Products	
NA	21XX	Tobacco Products	
SECTOR V. TEXTILE MILLS, APPAREL, AND OTHER FABRIC PRODUCT MANUFACTURING			
V1	22XX	Textile Mill Products	
V2	23XX	Apparel and Other Finished Products Made From Fabrics and Similar Materials	
SECTOR W. FURNITURE AND FIXTURES			
NA	25XX	Furniture and Fixtures	
NA	2434	Wood Kitchen Cabinets	
SECTOR X. PRINTING AND PUBLISHING			
NA	2732	Book Printing	
NA	2752	Commercial Printing, Lithographic	
NA	2754	Commercial Printing, Gravure	
NA	2759	Commercial Printing, Nor Elsewhere Classified	
NA	2796	Platemaking and Related Services	
SECTOR Y. RUBBER, MISCELLANEOUS PLASTIC PRODUCTS, AND MISC. MANUFACTURING INDUSTRIES			
Y1	301X	**Tires and Inner Tubes**	**Zn**
Y1	302X	**Rubber and Plastics Footwear**	**Zn**
Y1	305X	Gaskets, Packing, and Sealing Devices and Rubber and Plastics Hose and Belting	**Zn**
Y1	306X	**Fabricated Rubber Products, Not Elsewhere Classified**	**Zn**
Y2	308X	Miscellaneous Plastics Products	

Subsector	SIC	Activity Represented	Parameters
Y2	393X	Musical Instruments	
Y2	394X	Dolls, Toys, Games, and Sporting and Athletic Goods	
Y2	395X	Pens, Pencils, and Other Artists' Materials	
Y2	396X	Costume Jewelry, Costume Novelties, Buttons, and Miscellaneous Notions, Except Precious Metal	
Y2	399X	Miscellaneous Manufacturing Industries	
SECTOR Z. LEATHER TANNING AND FINISHING			
NA	311X	Leather Tanning and Finishing	
NA	NA	Facilities that Make Fertilizer Solely From Leather Scraps and Leather Dust	
SECTOR AA. FABRICATED METAL PRODUCTS			
AA1	3429	Hardware, Not Elsewhere Classified	**Zn;N+N;Fe;Al**
AA1	3441	Fabricated Structural Metal	**Zn;N+N;Fe;Al**
AA1	3442	Metal Doors, Sash, Frames, Molding, and Trim	**Zn;N+N;Fe;Al**
AA1	3443	Fabricated Plate Work (Boiler Shops)	**Zn;N+N;Fe;Al**
AA1	3444	Sheet Metal Work	**Zn;N+N;Fe;Al**
AA1	3451	Screw Machine Products	**Zn;N+N;Fe;Al**
AA1	3452	Bolts, Nuts, Screws, Rivets, and Washers	**Zn;N+N;Fe;Al**
AA1	3462	Iron and Steel Forgings	**Zn;N+N;Fe;Al**
AA1	3471	Electroplating, Plating, Polishing, Anodizing, and Coloring	**Zn;N+N;Fe;Al**
AA1	3494	Valves and Pipe Fittings, Not Elsewhere Classified	**Zn;N+N;Fe;Al**
AA1	3496	Miscellaneous Fabricated Wire Products.	**Zn;N+N;Fe;Al**
AA1	3499	Fabricated Metal Products, Not Elsewhere Classified	**Zn;N+N;Fe;Al**
AA1	391X	Jewelry, Silverware, and Plated Ware	**Zn;N+N;Fe;Al**
AA2	3479	Coating, Engraving, and Allied Services	**Zn;N+N**
SECTOR AB. TRANSPORTATION EQUIPMENT, INDUSTRIAL OR COMMERCIAL MACHINERY			
NA	35XX	Industrial and Commercial Machinery (except 357X Computer and Office Equipment)	
NA	37XX	Transportation Equipment (except 373X Ship and Boat Building and Repairing	
SECTOR AC. ELECTRONIC, ELECTRICAL. PHOTOGRAPHIC, AND OPTICAL GOODS			
NA	36XX	Electronic and Other Electrical Equipment and Components, Except Computer Equipment	
NA	38XX	Measuring, Analyzing, and Controlling Instruments; Photographic, Medical, and Optical Goods; Watches and Clocks	
NA	357X	Computer and Office Equipment	

Section C: STANDARD PROVISIONS

1. Duty to Comply

The facility operator must comply with all of the conditions of this General Permit. Any General Permit noncompliance constitutes a violation of the Clean Water Act (CWA) and the Porter-Cologne Water Quality Control Act and is grounds for (a) enforcement action for (b) General Permit termination, revocation and reissuance, or modification or (c) denial of a General Permit renewal application.

The facility operator shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this General Permit has not yet been modified to incorporate the requirement.

2. General Permit Actions

This General Permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the facility operator for a General Permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any General Permit condition.

If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the CWA for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this General Permit, this General Permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition, and the facility operator so notified.

3. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for a facility operator in an enforcement action that it would have been necessary to halt or reduce the general permitted activity in order to maintain compliance with the conditions of this General Permit.

4. Duty to Mitigate

The facility operator shall take all responsible steps to minimize or prevent any discharge in violation of this General Permit which has a reasonable likelihood of adversely affecting human health or the environment.

5. Proper Operation and Maintenance

The facility operator at all times shall properly operate and maintain any facilities and systems of treatment and control (and related appurtenances) which are installed or used by the facility operator to achieve compliance with the conditions of this General Permit and with the requirements of storm water pollution prevention plans (SWPPPs). Proper operation and maintenance also include adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance may require the operation of backup or auxiliary facilities or similar systems installed by a facility operator when necessary to achieve compliance with the conditions of this General Permit.

6. Property Rights

This General Permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

7. Duty to Provide Information

The facility operator shall furnish the Regional Water Quality Control Board (Regional Water Board), State Water Resources Control Board (State Water Board), U.S. Environmental Protection Agency (U.S. EPA), or local storm water management agency, within a reasonable time specified by the agencies, any requested information to determine compliance with this General Permit. The facility operator shall also furnish, upon request, copies of records required to be kept by this General Permit.

8. Inspection and Entry

The facility operator shall allow the Regional Water Board, State Water Board, U.S. EPA, and local storm water management agency, upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the facility operator's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this General Permit;

b. Have access to and copy at reasonable times any records that must be kept under the conditions of this General Permit;

c. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment) that are related to or may impact storm water discharge or authorized non-storm water discharge; and

d. Conduct monitoring activities at reasonable times for the purpose of ensuring General Permit compliance.

9. Signatory Requirements

a. All Notices of Intent (NOIs) submitted to the State Water Board shall be signed as follows:

(1) For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: (a) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or (b) the manager of the facility if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. The principal executive officer of a Federal agency includes the chief executive officer of the agency or the senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of U.S. EPA).

b. All reports, certifications, or other information required by the General Permit or requested by the Regional Water Board, State Water Board, U.S. EPA, or local storm water management agency shall be signed by a person described above or by a duly authorized representative. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above and retained as part of the SWPPP.

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for named position.)

(3) If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be attached to the SWPPP prior to submittal of any reports, certifications, or information signed by the authorized representative.

10. Certification

Any person signing documents under Provision 9. above shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

11. Reporting Requirements

a. Planned changes: The facility operator shall give advance notice to the Regional Water Board and local storm water management agency of any planned physical alteration or additions to the general permitted facility. Notice is required under this provision only when the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged.

b. Anticipated noncompliance: The facility operator will give advance notice to the Regional Water Board and local storm water management agency of any planned changes at the permitted facility which may result in noncompliance with General Permit requirements.

c. Compliance schedules: Reports of compliance or noncompliance with or any progress reports on interim and final requirements contained in any compliance schedule of this General Permit shall be submitted no later than 14 days following each scheduled date.

d. Noncompliance reporting: The facility operator shall report any noncompliance at the time monitoring reports are submitted. The written submission shall contain (1) a description of the noncompliance and its cause; (2) the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and (3) steps taken or planned to reduce and prevent recurrence of the noncompliance.

12. Oil and Hazardous Substance Liability

Nothing in this General Permit shall be construed to preclude the institution of any legal action or relieve the facility operator from any responsibilities, liabilities, or penalties to which the facility operator is or may be subject under Section 311 of the CWA.

13. Severability

The provisions of this General Permit are severable; and if any provision of this General Permit or the application of any provision of this General Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this General Permit shall not be affected thereby.

14. Reopener Clause

This General Permit may be modified, revoked, and reissued, or terminated for cause due to promulgation of amended regulations, receipt of U.S. EPA guidance concerning regulated activities, judicial decision, or in accordance with 40 CFR 122.62, 122.63, 122.64, and 124.5. This General Permit may be reopened to modify the provisions regarding authorized non-storm water discharges specified in Section D. Special Conditions.

15. Penalties for Violations of General Permit Conditions.

a. Section 309 of the CWA provides significant penalties for any person who violates a General Permit condition implementing Sections 301, 302, 306, 307 308, 318, or 405 of the CWA, or any General Permit condition or limitation implementing any such section in a General Permit issued under Section 402. Any person who violates any General Permit condition of this General Permit is subject to a civil penalty not to exceed $25,000 per day of such violation, as well as any other appropriate sanction provided by Section 309 of the CWA.

b. The Porter-Cologne Water Quality Control Act also provides for civil and criminal penalties in some cases greater than those under the CWA.

16. Availability

A copy of this General Permit shall be maintained at the facility and be available at all times to the appropriate facility personnel and to Regional Water Board and local agency inspectors.

17. Transfers

This General Permit is not transferable from one facility operator to another facility operator nor may it be transferred from one location to another location. A new facility operator of an existing facility must submit an NOI in accordance with the requirements of this General Permit to be authorized to discharge under this General Permit.

18. Continuation of Expired General Permit

This General Permit continues in force and effect until a new general permit is issued or the State Water Board rescinds the General Permit. Facility operators authorized to discharge under the expiring general permit are required to file an NOI to be covered by the reissued General Permit.

19. Penalties for Falsification of Reports

Section 309(c)(4) of the CWA provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this General Permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than two years, or by both.

FACILITIES COVERED BY THIS GENERAL PERMIT

Industrial facilities include Federal, State, municipally owned, and private facilities from the following categories:

1. FACILITIES SUBJECT TO STORM WATER EFFLUENT LIMITATIONS GUIDELINES, NEW SOURCE PERFORMANCE STANDARDS, OR TOXIC POLLUTANT EFFLUENT STANDARDS (40 Code of Federal Regulations (CFR) SUBCHAPTER N). Currently, categories of facilities subject to storm water effluent limitations guidelines are Cement Manufacturing (40 CFR Part 411), Feedlots (40 CFR Part 412), Fertilizer Manufacturing (40 CFR Part 418), Petroleum Refining (40 CFR Part 419), Phosphate Manufacturing (40 CFR Part 422), Steam Electric (40 CFR Part 423), Coal Mining (40 CFR Part 434), Mineral Mining and Processing (40 CFR Part 436), Ore Mining and Dressing (40 CFR Part 440), and Asphalt Emulsion (40 CFR Part 443).

2. MANUFACTURING FACILITIES: Standard Industrial Classifications (SICs) 24 (except 2434), 26 (except 265 and 267), 28 (except 283 and 285) 29, 311, 32 (except 323), 33, 3441, and 373.

3. OIL AND GAS/MINING FACILITIES: SICs 10 through 14 including active or inactive mining operations (except for areas of coal mining operations meeting the definition of a reclamation area under 40 CFR 434.11(l) because of performance bond issued to the facility by the appropriate Surface Mining Control and Reclamation Act (SMCRA) authority has been released, or except for area of non-coal mining operations which have been released from applicable State or Federal reclamation requirements after December 17, 1990); oil and gas exploration, production, processing, or treatment operations; or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with any overburden, raw material, intermediate products, finished products, by-products, or waste products located on the site of such operations. Inactive mining operations are mined sites that are not being actively mined but which have an identifiable facility operator. Inactive mining sites do not include sites where mining claims are being maintained prior to disturbances associated with the extraction, beneficiation, or processing of mined material; or sites where minimal activities are undertaken for the sole purpose of maintaining a mining claim.

4. HAZARDOUS WASTE TREATMENT, STORAGE, OR DISPOSAL FACILITIES: Includes those operating under interim status or a general permit under Subtitle C of the Federal Resource, Conservation, and Recovery Act (RCRA).

5. LANDFILLS, LAND APPLICATION SITES, AND OPEN DUMPS: Sites that receive or have received industrial waste from any of

the facilities covered by this General Permit, sites subject to regulation under Subtitle D of RCRA, and sites that have accepted wastes from construction activities (construction activities include any clearing, grading, or excavation that results in disturbance of five acres or more).

6. RECYCLING FACILITIES: SICs 5015 and 5093. These codes include metal scrapyards, battery reclaimers, salvage yards, motor vehicle dismantlers and wreckers, and recycling facilities that are engaged in assembling, breaking up, sorting, and wholesale distribution of scrap and waste material such as bottles, wastepaper, textile wastes, oil waste, etc.

7. STEAM ELECTRIC POWER GENERATING FACILITIES: Includes any facility that generates steam for electric power through the combustion of coal, oil, wood, etc.

8. TRANSPORTATION FACILITIES: SICs 40, 41, 42 (except 4221-25), 43, 44, 45, and 5171 which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication) or other operations identified herein that are associated with industrial activity.

9. SEWAGE OR WASTEWATER TREATMENT WORKS: Facilities used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility with a design flow of one million gallons per day or more or required to have an approved pretreatment program under 40 CFR Part 403. Not included are farm lands, domestic gardens, or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with Section 405 of the Clean Water Act.

10. MANUFACTURING FACILITIES WHERE INDUSTRIAL MATERIALS, EQUIPMENT, OR ACTIVITIES ARE <u>EXPOSED</u> TO STORM WATER: SICs 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31 (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39, and 4221-4225.

STORM WATER CONTACTS FOR THE STATE AND REGIONAL WATER BOARDS

See Storm Water Contacts at:
http://www.waterboards.ca.gov/stormwtr/contact.html

NOTICE OF INTENT (NOI) INSTRUCTIONS

TO COMPLY WITH STATE WATER RESOURCES CONTROL BOARD WATER QUALITY ORDER NO. 97-03-DWQ NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT NO. CAS000001

Who Must Submit

The facility operator must submit an NOI for each industrial facility that is required by U.S. Environmental Protection Agency (U.S.EPA) regulations to obtain a storm water permit. The required industrial facilities are listed in Attachment 1 of the General Permit and are also listed in 40 Code of Federal Regulations Section 122.26(b)(14).

The facility operator is typically the owner of the business or operation where the industrial activities requiring a storm water permit occur. The facility operator is responsible for all permit related activities at the facility.

Where operations have discontinued and significant materials remain on site (such as at closed landfills), the landowner may be responsible for filing an NOI and complying with this General Permit. Landowners may also file an NOI for a facility if the landowner, rather than the facility operator, is responsible for compliance with this General Permit.

How and Where to Apply

The completed NOI form, a site map, and appropriate fee must be mailed to the State Water Resources Control Board (State Water Board) at the following address:

State Water Resources Control Board
Division of Water Quality
P.O. Box 1977
Sacramento, CA 95812-1977
Attn: Storm Water Permitting Unit

Please Note: Do not send the original or copies of the NOI submittal to the Regional Water Quality Control Board (Regional Water Board). The original NOI will be forwarded to the Regional Water Board after processing.

Do not send a copy of your Storm Water Pollution Prevention Plan (SWPPP) with your NOI submittal. Your SWPPP is to be kept on site and made available for review upon request.

When to Apply

Facility operators of existing facilities must file an NOI in accordance with these instructions by March 30, 1992. Facility

operators of new facilities (those beginning operations after March 30, 1992) must file an NOI in accordance with these instructions at least 14 days prior to the beginning of operations.

Once the completed NOI, site map, and appropriate fee have been submitted to the State Water Board, your NOI will be processed and you will be issued a receipt letter with a Waste Discharge Identification (WDID) Number. Please refer to this number when you contact either the State or Regional Water Boards.

Fees

The total annual fee is $830. Checks should be made payable to: SWRCB

Change of Information

If the information provided on the NOI or site map changes, you should report the changes to the State Water Board using an NOI form. Section I of the line-by-line instructions includes information regarding changes to the NOI.

Questions

If you have any questions completing the NOI, please call the appropriate Regional Water Board (Attachment 2) or the State Water Board at (916) 341-5538.

NOI LINE-BY-LINE INSTRUCTIONS

Please type or print your responses on the NOI. Please complete the NOI form in its entirety and sign the certification.

Section I--NOI STATUS

Check box "A" if this is a new NOI registration.

Check box "B" if you are reporting changes to the NOI (e.g., new contact person, phone number, mailing address). Include the facility WDID #. Highlight all the information that has been changed.

Please note that a change of information **does not** apply to a change of facility operator or a change in the location of the facility. These changes require a Notice of Termination (NOT) and submittal of a new NOI and annual fee. Contact the State Water Board or Regional Water Boards for more information on the NOT Form and instructions.

Regardless of whether you are submitting a new or revised NOI, you must complete the NOI in its entirety and the NOI must be signed.

Section II--Facility Operator Information

Part A: The facility operator is the legal entity that is responsible for all permit related compliance activities at the facility. In most cases, the facility operator is the owner of the business or operation where the industrial activity occurs. Give the legal name and the address of the person, firm, public organization, or any other entity that is responsible for complying with the General Permit.

Part B: Check the box that indicates the type of operation.

Section III--Facility Site Information

Part A: Enter the facility's official or legal name and provide the address. Facilities that do not have a street address must provide cross-streets or parcel numbers. <u>Do not include a P.O. Box address in Part A</u>.

Part B: Enter the mailing address of the facility if different than Part A. This address may be a P.O. Box.

The contact person should be the plant or site manager who is familiar with the facility and responsible for overseeing compliance of the General Permit requirements.

Part C: Enter the total size of the facility in either acres or square feet. Also include the percentage of the site that is impervious (areas that water cannot soak into the ground, such as concrete, asphalt, and rooftops).

Part D: Determine the Standard Industrial Classification (SIC) code which best identifies the industrial activity that is taking place at the facility. This information can be obtained by referring to the <u>Standard Industrial Classification Manual</u> prepared by the Federal Office of Management and Budget which is available at public libraries. The code you determine should identify the industrial activity that requires you to submit the NOI. (For example, if the business is high school education and the activity is school bus maintenance, the code you choose would be bus maintenance, not education.) Most facilities have only one code; however, additional spaces are provided for those facilities that have more than one activity.

Part E: Identify the title of the industrial activity that requires you to submit the NOI (e.g., the title of SIC Code 2421 is Sawmills and Planing Mills, General). If you cannot identify the title, provide a description of the regulated activity(s).

Section IV--Address for Correspondence

Correspondence relative to the permit will be mailed occasionally. Check the box which indicates where you would like such correspondence delivered. If you want correspondence sent to another contact person or address different than indicated in Section II or Section III then include the information on an extra sheet of paper.

Section V--Billing Address Information

To continue coverage under the General Permit, the annual fee must be paid. Use this section to indicate where the annual fee invoices should be mailed. Enter the billing address if different than the address given in Sections II or III.

Section VI--Receiving Water Information

Provide the name of the receiving water where storm water discharge flows from your facility. A description of each option is included below.

1. Directly to waters of the United States: Storm water discharges directly from the facility to a river, creek, lake, ocean, etc. Enter the name of the receiving water (e.g., Boulder Creek).

2. Indirectly to waters of the United States: Storm water discharges over adjacent properties or right-of-ways prior to discharging to waters of the United States. Enter the name of the closest receiving water (e.g., Clear Creek).

Section VII--Implementation of Permit Requirements

Parts A and B:	Check the boxes that best describe the status of the Storm Water Pollution Prevention Plan (SWPPP) and the Monitoring Program.
Part C:	Check yes or no to questions 1 through 4. If you answer no to any question, you need to assign a person to these tasks immediately.

As a permit holder you are required to have an SWPPP and Monitoring Program in place prior to the beginning of facility operations. Failure to do so is in direct violation of the General Permit. Do not send a copy of your SWPPP with your NOI submittal.

Please refer to Sections A and B of the General Permit for additional information regarding the SWPPP and Monitoring Program.

Section VIII--Site Map

Provide a "to scale" drawing of the facility and its immediate surroundings. Include as much detail about the site as possible. At a minimum, indicate buildings, material handling and storage areas, roads, names of adjacent streets, storm water discharge points, sample collection points, and a north arrow. Whenever possible limit the map to a standard size sheet of paper (8.5" x 11" or 11" x 17"). **Do not send blueprints** unless you are sending one page and it meets the size limits as defined above.

A location map may also be included, especially in cases where the facility is difficult to find, but are not to be submitted as a substitute for the site map. The location map can be created from local street maps and U.S. Geological Survey (USGS) quadrangle maps, etc.

A revised site map must be submitted whenever there is a significant change in the facility layout (e.g., new building, change in storage locations, boundary change, etc.).

Section IX--Certification

This section should be read by the facility operator. The certification provides assurances that the NOI and site map were completed by the facility operator in an accurate and complete fashion and with the knowledge that penalties exist for providing false information. It also requires the Responsible Party to certify that the provisions in the General Permit will be complied with.

The NOI must be signed by:

For a Corporation: a responsible corporate officer (or authorized individual).

For a Partnership or Sole Proprietorship: a general partner or the proprietor, respectively.

For a Municipality, State, or other non-Federal Public Agency: either a principal executive officer or ranking elected official.

For a Federal Agency: either the chief or senior executive officer of the agency.

State of California
State Water Resources Control Board

NOTICE OF INTENT

TO COMPLY WITH THE TERMS OF THE
GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH **INDUSTRIAL ACTIVITY** (WQ ORDER No. 97-03-DWQ)
(*Excluding Construction Activities*)

SECTION I. NOI STATUS (please check only one box)

A. [ ] New Permittee B. [ ] Change of Information WDID # |__|__|__|__|__|__|__|__|__|__|__|

SECTION II. FACILITY OPERATOR INFORMATION (See instructions)

A. NAME:		Phone: |__|__| -- |__|__| -- |__|__|__|
Mailing Address:		
City:	State:	Zip Code: |__|__|__|__|__| -- |__|__|__|__|
Contact Person:		

B. OPERATOR TYPE:
(check one) 1.[ ] Private Individual 2.[ ]Business 3.[ ]Municipal 4.[ ]State 5.[ ]Federal 6.[ ]Other

SECTION III. FACILITY SITE INFORMATION

A. FACILITY NAME		Phone: |__|__| -- |__|__| -- |__|__|__|
Facility Location:		County:
City:	State: C A	Zip Code: |__|__|__|__|__| -- |__|__|__|__|
B. MAILING ADDRESS:		
City:	State:	Zip Code: |__|__|__|__|__| -- |__|__|__|__|
Contact Person:		

C. FACILITY INFORMATION (check one)
Total Size of Site: ______________ Acres [ ] Sq. Ft. [ ]

Percent of Site Impervious (*including rooftops*) |______| %

D. SIC CODE(S) OF REGULATED ACTIVITY:

E. REGULATED ACTIVITY (*describe each SIC code*)**:**

1. |__|__|__|__|
2. |__|__|__|__|
3. |__|__|__|__|

FOR STATE USE ONLY:

SECTION IV. ADDRESS FOR CORRESPONDENCE

I__I Facility Operator Mailing Address (Section II)   I__I Facility Mailing Address (Section III, B.)   I__I Both

SECTION V. BILLING ADDRESS INFORMATION

SEND BILL TO: [ ] Facility Operator Mailing Address (Section II) [ ] Facility Mailing Address (Section III, B.) [ ] Other (*enter information below*)

Name: I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I	Phone: I__I__I__I -- I__I__I__I -- I__I__I__I__I
Mailing Address: I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I	
City: I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I	State: __I__
Zip Code: I__I__I__I__I__I -- I__I__I__I__I	
Contact Person: I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I	

SECTION VI. RECEIVING WATER INFORMATION

Your facility's storm water discharges flow: (*check one*) [ ] Directly OR [ ] Indirectly to waters of the United States.

Name of receiving water: I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I__I
(river, lake, stream, ocean, etc.)

SECTION VII. IMPLEMENTATION OF PERMIT REQUIREMENTS

A. STORM WATER POLLUTION PREVENTION PLAN (SWPPP) (*check one*)
[ ] A SWPPP has been prepared for this facility and is available for review.
[ ] A SWPPP will be prepared and ready for review by (enter date): ____/____/____.

B. MONITORING PROGRAM (check one)
[ ] A Monitoring Program has been prepared for this facility and is available for review.
[ ] A Monitoring Program will be prepared and ready for review by (enter date): ____/____/____.

C. PERMIT COMPLIANCE RESPONSIBILITY
Has a person been assigned responsibility for:
1. Inspecting the facility throughout the year to identify any potential pollution problems? .... ____YES ____NO
2. Collecting storm water samples and having them analyzed?........ ____YES ____NO
3. Preparing and submitting an annual report by July 1 of each year? .... ____YES ____NO
4. Eliminating discharges other than storm water (*such as equipment or vehicle wash-water*) into the storm drain?........ ____YES ____NO

SECTION VIII. SITE MAP

I HAVE ENCLOSED A SITE MAP   YES [ ]   A new NOI submitted without a site map will be rejected.

SECTION IX. CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. In addition, I certify that I have read the entire General Permit, including all attachments, and agree to comply with and be bound by all of the provisions, requirements, and prohibitions of the permit, including the development and implementation of a Storm Water Pollution Pervention Plan and a Monitoring Program Plan will be complied with."

Printed Name: ______________________________

Signature: ______________________________ Date ______________

Title: ______________________________

DEFINITIONS

1. "Best Management Practices" ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment measures, operating procedures, and practices to control facility site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may include any type of pollution prevention and pollution control measure necessary to achieve compliance with this General Permit.

2. Clean Water Act (CWA) means the Federal Water Pollution Control Act enacted by Public Law 92-500 as amended by Public Laws 95-217, 95-576, 96-483, and 97-117; 33 USC. 1251 et seq.

3. "Facility" is a collection of industrial processes discharging storm water associated with industrial activity within the property boundary or operational unit.

4. "Non-Storm Water Discharge" means any discharge to storm sewer systems that is not composed entirely of storm water.

5. "Significant Materials" includes, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under Section 101(14) of Comprehensive Environmental Response, Compensation, and Liability Act (CERLCA); any chemical the facility is required to report pursuant to Section 313 of Title III of Superfund Amendments and Reauthorization Act (SARA); fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

6. "Significant Quantities" is the volume, concentrations, or mass of a pollutant that can cause or threaten to cause pollution, contamination, or nuisance; adversely impact human health or the environment; and/or cause or contribute to a violation of any applicable water quality standards for the receiving water.

7. "Significant Spills" includes, but is not limited to: releases of oil or hazardous substances in excess of reportable quantities under Section 311 of the CWA (see 40 CFR 110.10 and 117.21) or Section 102 of CERCLA (see 40 CFR 302.4).

8. "Storm water" means storm water runoff, snow melt runoff, and storm water surface runoff and drainage. It excludes infiltration and runoff from agricultural land.

9. "Storm Water Associated with Industrial Activity" means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NPDES program. For the facilities identified in Categories 1 through 9 of Attachment 1 of this General Permit, the term includes, but is not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials; manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process wastewaters (as defined at 40 CFR Part 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water.

   For the facilities identified in Category 10 of Attachment 1 of this General Permit, the term only includes storm water discharges from all areas listed in the previous sentence where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery <u>are exposed to storm water</u>.

   Material handling activities include the: storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, finished product, by-product, or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with storm water drained from the above described areas. Industrial facilities (including industrial facilities that are federally, State, or municipally owned or operated that meet the description of the facilities listed in this paragraph) include those facilities designated under 40 CFR 122.26(a)(1)(v).

ACRONYM LIST

BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BMPs	Best Management Practices
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Federal Superfund)
CFR	Code of Federal Regulations
CWA	Clean Water Act
General Permit	General Industrial Activities Storm Water Permit
GMP	Group Monitoring Plan
NEC	No Exposure Certification
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
O&G	Oil and Grease
RCRA	Resource, Conservation, and Recovery Act
Regional Water Board	Regional Water Quality Control Board
RQ	Reportable Quantity
SARA	Superfund Amendments and Reauthorization Act of 1986
SIC	Standard Industrial Classification
SMCRA	Surface Mining Control and Reclamation Act
SPCC	Spill Prevention Control and Countermeasures
State Water Board	State Water Resources Control Board
SWPPP	Storm Water Pollution Prevention Plan
TOC	Total Organic Carbon
TSS	Total Suspended Solids
U.S. EPA	U.S. Environmental Protection Agency
WDID	Waste Discharger Identification
WDRs	Waste Discharge Requirements

Attachment O

Water Pollution Control Cost Breakdown

INSTRUCTIONS

- The following Water Pollution Control Cost Breakdown form is provided for use by the Contractor for estimating the lump sum item for "Water Pollution Control." Modify the table as follows:

  - Caution: Do not use "Strike and Hide" to eliminate rows; delete rows. Do not "underline" text in the table.

  - If a BMP is included as a separate bid item, such as Silt Fence, delete that Item from the table as it is not to be duplicated in the cost break down.

  - For all Items in the table, delete those that are not applicable for water pollution control for the specific project. The Contractor will select from among the remaining items per the "Construction Site BMPs Consideration Checklist" and designate an Estimated Quantity, Value, and Amount for each Item selected on the cost break down submitted with the SWPPP.

Project Name: Gregory Canyon Landfill

Project Number:

ITEM	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	VALUE	AMOUNT
EC-3	Hydraulic Mulch	FT^2			
EC-4	Hydroseeding	FT^2			
EC-5	Soil Binders	FT^2			
EC-6	Straw Mulch	FT^2			
EC-7	Geotextiles & Mats	FT^2			
EC-8	Wood Mulching	FT^2			
EC-9	Earth Dikes & Drainage Swales	FT			
EC-10	Velocity Dissipation Devices	EA			
EC-11	Slope Drains	EA			
EC-12	Streambank Protection	LS			
EC-13	Polyacrylamide	LS			
SE-1	Silt Fence	FT			
SE-2	Sediment Basin	EA			
SE-3	Sediment Trap	EA			
SE-4	Check Dam	EA			
SE-5	Fiber Rolls	FT			
SE-6	Gravel Bag Berm	FT			
SE-7	Street Sweeping and Vacuuming	LS			
SE-8	Sandbag Barrier	FT			
SE-9	Straw Bale Barrier	FT			
SE-10	Storm Drain Inlet Protection	EA			
WE-1	Wind Erosion Control	LS			
TC-1	Stabilized Construction Entrance/Exit	EA			
TC-2	Stabilized Construction Roadway	EA			
TC-3	Entrance/Outlet Tire Wash	EA			
NS-1	Water Conservation Practices	LS			
NS-2	Dewatering Operations	EA			
NS-3	Paving and Grinding Operations	LS			

ITEM	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	VALUE	AMOUNT
NS-4	Temporary Stream Crossing	EA			
NS-5	Clear Water Diversion	EA			
NS-6	Illicit Connection/ Discharge	LS			
NS-7	Potable Water/Irrigation	LS			
NS-8	Vehicle and Equipment Cleaning	LS			
NS-9	Vehicle and Equipment Fueling	LS			
NS-10	Vehicle and Equipment Maintenance	LS			
NS-11	Pile Driving Operations	LS			
NS-12	Concrete Curing	LS			
NS-13	Material and Equipment Use Over Water	LS			
NS-14	Concrete Finishing	LS			
NS-15	Demolition Adjacent to Water	LS			
NS-16	Temporary Batch Plants	LS			
WM-1	Material Delivery and Storage	LS			
WM-2	Material Use	LS			
WM-3	Stockpile Management	LS			
WM-4	Spill Prevention and Control	LS			
WM-5	Solid Waste Management	LS			
WM-6	Hazardous Waste Management	LS			
WM-7	Contaminated Soil Management	LS			
WM-8	Concrete Waste Management	LS			
WM-9	Sanitary/Septic Waste Management	LS			
WM-10	Liquid Waste Management	LS			
			TOTAL		

Attachment P

Notice of Termination

INSTRUCTIONS

- The Notice of Termination (NOT) of construction will be inserted at the end of the project.

Attachment Q

BMPs Selected for the Project

Attachment R

Sampling Activity Log

RAIN EVENT GENERAL INFORMATION				
Project Name	Gregory Canyon Landfill			
Project Number				
Contractor				
Sampler's Name				
Signature				
Date of Sampling				
Season (Check Applicable)	❒ Rainy		❒ Non-Rainy	
Storm Data	Storm Start Date & Time:		Storm Duration (hrs):	
	Time elapsed since last storm (Circle Applicable Units)	Min. Hr. Days	Approximate Rainfall Amount (inches)	

For rainfall information: http://cdec.water.ca.gov/weather.html or http://www.wrh.noaa.gov/wrhq/nwspage.html

SAMPLE LOG		
Sample Identification	**Sample Location**	**Sample Collection Date and Time**

Specific sample locations descriptions may include: 100 ft upstream from discharge at eastern boundary, runoff from northern waste storage area, downgradient of inlet located near the intersection of A Street and B avenue, etc.

FIELD ANALYSIS		
	❑Yes ❑ No	
Sample Identification	**Test**	**Result**

Attachment S

Pollutant Testing Guidance Table

Attachment S
Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Asphalt Products	Hot Asphalt	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
	Asphalt Emulsion				
	Liquid Asphalt (tack coat)				
	Cold Mix				
	Crumb Rubber	Yes – Black, solid material	Visually Observable - No Testing Required		
	Asphalt Concrete (Any Type)	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		
Cleaning Products	Acids	No	**pH** Acidity Anions (acetic acid, phosphoric acid, sulfuric acid, nitric acid, hydrogen chloride)	pH Meter Acidity Test Kit	EPA 150.1 (pH)
					SM 2310B (Acidity)
					EPA 300.0 (Anion)
	Bleaches	No	Residual Chlorine	Chlorine	SM 4500-CL G (Res. Chlorine)
	Detergents	Yes - Foam	Visually Observable - No Testing Required		
	TSP	No	Phosphate	Phosphate	EPA 365.3 (Phosphate)
	Solvents	No	**VOC**	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)

Attachment S
Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Portland Concrete Cement & Masonry Products	Portland Cement (PCC)	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Masonry products	No	**pH**	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
			Alkalinity		SM 2320 (Alkalinity)
	Sealant (Methyl Methacrylate - MMA)	No	Methyl Methacrylate	None	EPA 625 (SVOC)
			Cobalt		EPA 200.8 (Metal)
			Zinc		
	Incinerator Bottom Ash Bottom Ash Steel Slag Foundry Sand Fly Ash Municipal Solid Waste	No	**Aluminum** **Calcium** **Vanadium** **Zinc**	Calcium Test	EPA 200.8 (Metal) EPA 200.7 (Calcium)
	Mortar	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Concrete Rinse Water	Yes - Milky Liquid	Visually Observable - No Testing Required		
	Non-Pigmented Curing Compounds	No	Acidity	pH Meter Alkalinity or Acidity Test Kit	SM 2310B (Acidity)
			Alkalinity		SM 2320 (Alkalinity)
			pH		EPA 150.1 (pH)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)

Attachment S
Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Landscaping and Other Products	Aluminum Sulfate	No	Aluminum	TDS Meter Sulfate	EPA 200.8 (Metal)
			TDS		EPA 160.1 (TDS)
			Sulfate		EPA 300.0 (Sulfate)
	Sulfur-Elemental	No	Sulfate	Sulfate	EPA 300.0 (Sulfate)
	Fertilizers-Inorganic [4]	No	Nitrate	Nitrate	EPA 300.0 (Nitrate)
			Phosphate	Phosphate	EPA 365.3 (Phosphate)
			Organic Nitrogen	None	EPA 351.3 (TKN)
			Potassium	None	EPA 200.8 (Metal)
	Fertilizers-Organic	No	TOC	Nitrate	EPA 415.1 (TOC)
			Nitrate		EPA 300.0 (Nitrate)
			Organic Nitrogen		EPA 351.3 (TKN)
			COD		EPA 410.4 (COD)
	Natural Earth (Sand, Gravel, and Topsoil)	Yes - Cloudiness and turbidity	Visually Observable - No Testing Required		
	Herbicide	No	Herbicide	None	Check lab for specific herbicide or pesticide
	Pesticide		**Pesticide**		
	Lime		Alkalinity	pH Meter Alkalinity or Acidity Test Kit	SM 2320 (Alkalinity)
			pH		EPA 150.1 (pH)

Attachment S
Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Painting Products	Paint	Yes	Visually Observable - No Testing Required		
	Paint Strippers	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			SVOC	None	EPA 625 (SVOC)
	Resins	No	COD	None	EPA 410.4 (COD)
			SVOC		EPA 625 (SVOC)
	Sealants	No	COD	None	EPA 410.4 (COD)
	Solvents	No	COD	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Lacquers, Varnish, Enamels, and Turpentine	No	COD	None	EPA 410.4 (COD)
			VOC		EPA 601/602 or EPA 624 (VOC)
			SVOC		EPA 625 (SVOC)
	Thinners	No	VOC	None	EPA 601/602 or EPA 624 (VOC)
			COD		EPA 410.4 (COD)
Portable Toilet Waste Products	Portable Toilet Waste	Yes	Visually Observable - No Testing Required		

Attachment S
Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Contaminated Soil [5]	Aerially Deposited Lead[3]	No	Lead	None	EPA 200.8 (Metal)
	Petroleum	Yes – Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required		
	Other	No	Contaminant Specific	Contaminant Specific	Contaminant Specific
Line Flushing Products	Chlorinated Water	No	Total chlorine	Chlorine	SM 4500-CL G (Res. Chlorine)
Adhesives	Adhesives	No	COD	None	EPA 410.4 (COD)
			Phenols	Phenol	EPA 420.1 (Phenol)
			SVOC	None	EPA 625 (SVOC)
Dust Palliative Products	Salts (Magnesium Chloride, Calcium Chloride, and Natural Brines)	No	Chloride	Chloride	EPA 300.0 (Chloride)
			TDS	TDS Meter	EPA 160.1 (TDS)
			Cations (Sodium, Magnesium, Calcium)	None	EPA 200.7 (Cations)
Vehicle	Antifreeze and Other Vehicle Fluids	Yes - Colored Liquid	Visually Observable - No Testing Required		
	Batteries	No	Sulfuric Acid	None	EPA 300.0 (Sulfate)
			Lead	None	EPA 200.8 (Metal)
			pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
	Fuels, Oils, Lubricants	Yes - Rainbow Surface Sheen and Odor	Visually Observable - No Testing Required		

Attachment S
Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Soil Amendment/Stabilization Products	Polymer/Copolymer [6, 7]	No	Organic Nitrogen	None	EPA 351.3 (TKN)
			BOD	None	EPA 405.1 (BOD)
			COD	None	EPA 410.4 (COD)
			DOC	None	EPA 415.1 (DOC)
			Nitrate	Nitrate	EPA 300.0 (Nitrate)
			Sulfate	Sulfate	EPA 300.0 (Sulfate)
			Nickel	None	EPA 200.8 (Metal)
	Straw/Mulch	Yes - Solids	Visually Observable - No Testing Required		
	Lignin Sulfonate	No	Alkalinity	Alkalinity	SM 2320 (Alkalinity)
			TDS	TDS Meter	EPA 160.1 (TDS)
	Psyllium	No	COD	None	EPA 410.4 (COD)
			TOC		EPA 415.1 (TOC)
	Guar/Plant Gums	No	COD	None	EPA 410.4 (COD)
			TOC		EPA 415.1 (TOC)
			Nickel		EPA 200.8 (Metal)
	Gypsum	No	pH	pH Meter Alkalinity or Acidity Test Kit	EPA 150.1 (pH)
			Calcium	Calcium	EPA 200.7 (Calcium)
			Sulfate	Sulfate	EPA 300.0 (Sulfate)
			Aluminum	None	EPA 200.8 (Metal)
			Barium		
			Manganese		
			Vanadium		

Attachment S
Pollutant Testing Guidance Table [1]

Category	Construction Site Material	Visually Observable?	Pollutant Indicators [2]	Suggested Analyses Field [3]	Laboratory
Treated Wood Products	Ammoniacal-Copper-Zinc-Arsenate (ACZA) Copper-Chromium-Arsenic (CCA) Ammoniacal-Copper-Arsenate (ACA) Copper Naphthenate	No	Arsenic	Total Chromium	EPA 200.8 (Metal)
			Total Chromium		
			Copper		
			Zinc		
	Creosote	Yes - Rainbow Surface or Brown Suspension	Visually Observable - No Testing Required		

Notes:

1. 1 If specific pollutant is known, analyze only for that specific pollutant. See MSDS to verify.
2. For each construction material, test for one of the pollutant indicators. Bolded pollutant indicates lowest analysis cost or best indicator. However, the composition of the specific construction material, if known, is the first criterion for selecting which analysis to use.
3. See www.hach.com, www.lamotte.com, www.ysi.com and www.chemetrics.com for some of the test kits
4. If the type of inorganic fertilizer is unknown, analyze for all pollutant indicators listed.
5. Only if special handling requirements are required in the contract documents for aerially deposited lead (ADL)
6. If used with a dye or fiber matrix, it is considered visually observable and no testing is required.
7. Based upon research conducted by the State of California Department of Transportation (Caltrans), the following copolymers/polymers do not discharge pollutants and water quality sampling and analysis is **not** required: Super Tak™, M-Binder™, Fish Stik™, Pro40dc™, Fisch-Bond™, and Soil Master WR™.

Attachment T

Discharge Reporting Log

Project Name: Gregory Canyon Landfill

Project Number: ____________________

Date	Material(s) Discharged	Estimated Quantity	Observed By

Attachment U

Operations Phase Monitoring Program and Reporting Requirements Plan (MPRR) Revision Form

I certify that the following revisions were made to the MPRR in accordance with the pollution prevention committee. Revision explanations and descriptions have been sent to the MPRR record keeper

Revision Number	Date of Change	Brief Description of Change	Name of Person Entering Change	Signature of Person Entering Change

Attachment V

Sample Chain of Custody Form

Laboratory Name
Address

CHAIN OF CUSTODY RECORD

Laboratory Phone
Laboratory Fax

Sample I.D. #:______________________________

Customer Name	P.O.#	Project Location
Address	Phone#	Sampled by
City, State, Zip	Report Attention	

Lab #	Date Sampled	Time Sampled	Comp or Grab	Type **see below	SAMPLE DESCRIPTION	No. Rec	Required Tests	Preservatives	Bottle Type

Laboratory Instructions: (1) Equally combine and mix multiple bottles for the same sample; (2) split mixed sample into appropriate sample bottles; (3) filter (analyte dependent) and preserve; (4) perform analyses, QC, and report data in accordance with

Signature	Print Name	Company	Date	Time
Relinquished by				
Received by				
Relinquished by				
Received by				
Relinquished by				
Received by				

pH __________________

Temperature __________________

Initial Flow **NA**__________________

Final Flow **NA**__________________

** Type AQ = Aqueous NA = Nonaqueous SL = Sludge
SO = Soil PE = Petroleum OT = Other

Note: Samples are discarded 30 days after results are reported, unless other arrangements are made.
Hazardous samples will be returned to client or disposed at the CLIENTS expense.

Sampler Instructions:
(1) Sampler complete "Sampled by", "Date Sampled", "Time Sampled", "**Sample Description**", "Relinquished by", "Date", and "Time"

(2) Request Courier to complete "Signature, "Name", "Company", "Date", and "Time"

(3) Sampler to photo copy form and submit to

APPENDIX D-1

SUMMARY OF PERMITS
EXCERPT FROM FEIR (DATED DECEMBER 2002)

TABLE 3-6
SUMMARY OF PERMITS

PERMIT NAME	ISSUING AGENCY	PURPOSE OF PERMIT
Solid Waste Facilities Permit (SWFP)	San Diego County Department of Environmental Health (concurrence by California Integrated Waste Management Board)	Defines operating conditions
Waste Discharge Requirements (WDRs), including a Variance for Engineered Alternative [a]	Regional Water Quality Control Board	Defines operating conditions and groundwater and surface water protection and monitoring procedures; variance to allow engineered alternative for bottom design
National Pollution Discharge Elimination System Permit (NPDES) [b]	State Water Resources Control Board	1) Establishes requirements for discharges to storm drains 2) Allows discharge of groundwater to surface water.
Section 401 Water Quality Certification	Regional Water Quality Control Board	Addresses water quality impacts on waterways
Permit to Construct/Operate (Air Quality)	San Diego Air Pollution Control District (APCD)	Specifies equipment and standards for collection, processing, and combustion of landfill gas
Section 404 Permit	U.S. Army Corps of Engineers	Addresses disturbances to "waters of the U.S."
Section 7 Consultation[c]	U.S. Fish and Wildlife Service	Addresses Endangered Species Act
Streambed Alteration (Section 1603) Agreement	California Department of Fish and Game	Addresses disturbances to natural streambeds and mitigation measures
Water Appropriation Permit	State Water Resources Board	Addresses water appropriation
Encroachment Permit	California Department of Transportation	Defines modifications to SR 76
Bridge Permit	San Diego County Public Works Department	Addresses crossing of waterways
Water Course Alteration Permit	San Diego County Public Works Department	Addresses alteration to waterways
Habitat Loss Permit (Rule 4d)[c]	San Diego County Department of Planning and Land Use	Addresses loss of habitat
Blasting Permit	San Diego County Sheriff's Department	Defines standards for blasting
Grading Permit	San Diego County Department of Planning and Land Use—Building Division	Defines standards for grading
Relocation Approval	Public Utilities Commission	Relocation of the easement and towers
Approval of Reclamation Plan and Financial Assurances [d]	San Diego County Department of Planning and Land Use	Reclamation of stockpiles, processing areas, and road; (as required by State Surface Mining and Reclamation Act)

PERMIT NAME	ISSUING AGENCY	PURPOSE OF PERMIT
Building Permit	San Diego County Department of Planning and Land Use—Building Division	Defines standards for construction of structures
Section 106 [e]	State Historic Preservation Office	Consultation regarding cultural resources
Major Use Permit[f]	San Diego County Department of Planning and Land Use	Exportation or sale of aggregate material

[a] Two alternatives that do not require a variance have been included in Chapter 6 of this Final EIR.
[b] For the landfill and ancillary facilities, including the RO system.
[c] Either a Section 7 or Habitat Loss Permit may be obtained to authorize an incidental take.
[d] A reclamation plan may not be required because the State Surface Mining and Reclamation Act does not apply to certain activities as provided in Public Resources Code Section 2714(b).
[e] Section 106 consultation under the National Historic Preservation Act (NHPA), if and to the extent required, if applicable.
[f] The San Diego County Ordinance, under the definition of borrow pit, allows for nine exceptions to the requirement for a MUP for the exportation and sale of aggregate material. Some of the exceptions include site preparation that is completed within a one-year timeframe. Therefore, the initial construction phase may be exempt from the requirement for a MUP. However, the project has been designed to accommodate the storage of all excavated material on-site. If the exportation or sale of aggregate material were to occur, the applicant would obtain the MUP, if necessary, prior to the exportation or sale of material.

Sources: Proposition C; David Evans and Associates, Inc.; San Diego County Department of Planning and Land Use, PCR Services Corporation, 2002

APPENDIX D-2

MITIGATION MONITORING AND REPORTING PROGRAM
FOR PROJECT IMPACTS
EXCERPT FROM REVISED FINAL EIR
(DATED MARCH 2007)
AND
FEIR (DATED 2008)

TABLE 10-1
MITIGATION MONITORING AND REPORTING PROGRAM
FOR PROJECT IMPACTS

Gregory Canyon Landfill
Mitigation Monitoring and Reporting Program for Project Impacts

Mitigation Measure No.	Mitigation Measure	Method of Verification	Timing of Verification	Responsible Party	Verification of Completion Initials	Date
	4.1 Land Use					
MM 4.1-1	The applicant or operator of the landfill shall establish a Citizen Environmental Review Board as required in Proposition C (Section 5Q). The applicant shall provide written verification to the County Department of Environmental Health after at least five public agencies have executed waste supply agreements with the operator.	Written verification	After at least five public agencies have executed waste supply agreements with the applicant	County Department of Environmental Health		
MM 4.1-2	In compliance with Section 3B of Proposition C, prior to commencement of operation of the landfill, the applicant shall either dedicate 1,313 acres of the site as permanent open space or create a permanent open space easement consisting of not less than 1,313 acres for long-term preservation of sensitive habitat and species, including coastal sage scrub, coast live oak woodlands, and cottonwood-willow riparian forests. The applicant shall convey or dedicate this land or easement in perpetuity to the satisfaction of the County of San Diego. The applicant shall provide a copy of the recorded fee conveyance or open space easement to the County Department of Environmental Health prior to commencement of operation.	Copy of recorded fee conveyance or open space easement	Prior to commencement of operation	County Department of Environmental Health		
MM 4.1-3	Before commencing any construction work related to the landfill, the applicant shall provide the Local Enforcement Agency with a copy of the executed agreement between Gregory Canyon, Ltd. and the San Diego County Water Authority providing for relocation and protection of the San Diego Aqueduct pipelines.	Copy of executed agreement	Prior to commencement of construction	County Department of Environmental Health		
	4.2 Geology and Soils					
MM 4.2-1	Before the liner is buttressed with refuse, the geosynthetic materials (i.e., plastic geomembranes and geotextile fabrics) shall be anchored at the head of the slope, and weighted throughout their extent with 20-pound sand bags on five-foot vertical spacing. If the liner system were to be damaged before it is weighted down by refuse, the applicant shall repair, and if necessary reconstruct, the liner. Repairs to the	Field observation	Prior to placement of waste As necessary during construction and	Regional Water Quality Control Board		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION	
					INITIALS	DATE
	geosynthetic materials will be completed and tested in accordance with regulations and project specifications. The RWQCB may be present to perform field observations at any time during the repair to ensure compliance.		operation			
MM 4.2-2	Following significant seismic events, inspection of all facilities and structures, as well as surrounding natural features, will be performed, and necessary repairs will be made. If a tear in the liner is identified, repairs to the geosynthetic materials shall be completed immediately by placing a patch over the torn sections and fusing the materials by patch-welding. The operator shall perform vacuum testing on the patch welds to ensure compliance with the standards established for the original liner construction. Patching will be performed under strict construction quality assurance protocols used during original liner construction and the RWQCB may be present to perform field observations at any time during the repair to ensure compliance with applicable regulations.	Field observation and letter from operator if additional testing required	If tear in liner is identified	Regional Water Quality Control Board		
MM 4.2-3	A monitoring and maintenance program that includes annual topographic surveys to measure settlement, quarterly visual inspections to identify damage to the final cover or gas systems, and repair of these systems as required shall be implemented. The frequency of monitoring may be reduced after closure of the landfill. The gas collection system shall be flexible to accommodate settlement and allow for repair. The County of San Diego Department of Environmental Health will perform inspections to ensure compliance.	Letter from operator based on field verification	Annual—topographic surveys Quarterly—visual inspections	County Department of Environmental Health		
MM 4.2-4	Additional inspection of the rock masses surrounding the landfill will be completed every 5 years and/or after a significant earthquake event in order to identify new areas of potential rockfall concerns. The applicant's geotechnical consultant shall submit a letter to the County of San Diego Department of Environmental Health after any such inspection summarizing findings and necessary actions.	Letter from applicant's geotechnical consultant	Every five years and/or after a significant seismic event	County Department of Environmental Health		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
	4.3 HYDROGEOLOGY					
MM 4.3-1a	For the purpose of providing additional environmental assurance to the San Luis Rey Municipal Water District, in addition to the 13 monitoring wells surrounding the landfill, the water quality monitoring shall include at a minimum monitoring of two production wells (downgradient SLRMWD well #34 and upgradient Lucio well #2), upgradient alluvial monitoring well GMW-3, and downgradient alluvial monitoring well GLA-16 located within the project boundary).	Written report by applicant's hydrogeologist	Annually	San Luis Rey Municipal Water District		
MM 4.3-1b	If contamination is detected in any monitored well, the landfill operator shall be responsible for treatment and disposal of contaminated water. The landfill operator shall ensure that impacted water is treated to acceptable water quality standards, consistent with existing background water quality as provided in CCR Title 27, Section 20400 (a)(1). Adequate treatment shall be implemented to maintain background levels established by the RWQCB at the time of issuance of the waste discharge requirements.	Field inspection and monitoring by applicant's hydrogeologist	If contamination is detected	Regional Water Quality Control Board and San Luis Rey Municipal Water District		
MM 4.3-1c	The Applicant shall provide to the San Luis Rey Municipal Water District simultaneously with the submission to the RWQCB data collected from the groundwater monitoring program and shall provide to the District and its consultants split samples from any groundwater monitoring station upon reasonable notice given before the next regularly scheduled sampling to enable the District to verify the data collected.	Data prepared by applicant's hydrogeologist	Simultaneously with submission to Regional Water Quality Control Board	San Luis Rey Municipal Water District		
MM 4.3-1d	Prior to the commencement of Phase I construction project grading, the Applicant shall provide the San Luis Rey Municipal Water District and the other parties to the Mitigation agreement with an irrevocable letter of credit in accordance with Section 9 and Exhibit C of the Mitigation Agreement. The Letter of Credit shall be automatically renewed annually.	Irrevocable letter of credit	Prior to commencement of Phase 1 construction grading	San Luis Rey Municipal Water District and other parties to the agreement[1]		

[1] *The Agreement is between the San Luis Rey Municipal Water District, certain surrounding landowners, and Gregory Canyon, Ltd.*

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
MM 4.3-1e	Prior to commencement of project operation, the Applicant shall establish, maintain, and administer a trust fund or third party custodial account for the benefit of the San Luis Rey Municipal Water District and the other parties to the Mitigation Agreement in accordance with Section 9 and Exhibit C of the Mitigation Agreement.	Verification of establishment of trust fund	Prior to commencement of operation	San Luis Rey Municipal Water District and other parties to the agreement		
MM 4.3-1f	As a condition of any water rights appropriation permit that may be granted by the State Water Resources Control Board, the Applicant shall reduce its diversion of water if the amount of groundwater available within the San Luis Rey Municipal Water District based upon water rights as they existed on April 15, 1996 within the boundaries defined in the Mitigation Agreement, is insufficient to meet the reasonable and beneficial needs of the District or any of the landowners within the District.	Written verification of water usage	If groundwater supply is deemed to be insufficient	San Luis Rey Municipal Water District and other parties to the agreement		
MM 4.3-1g	The Applicant shall identify and use an alternate water supply for construction and operation of the project if the amount of groundwater available within the San Luis Rey Municipal Water District is insufficient to meet the reasonable and beneficial needs of the District or any of the landowners within the District.	Written verification of alternate supply	If groundwater supply is deemed to be insufficient	San Luis Rey Municipal Water District		
MM 4.3-1h	If the construction, operation, or closure of the landfill causes degradation of the Pala Basin water or quality of foreign water stored in the Pala Basin for use within the Pala Basin so that it cannot be used for domestic uses and for irrigation, the Applicant shall be liable to the San Luis Rey Municipal Water District to the extent of any degradation of the quality of Pala Basin water or the quality of foreign water stored in the Pala Basin caused by the construction, operation or closure of the landfill, including the cost of remediating the degradation of water quality attributable to the construction, operation or closure of the landfill, or if such remediation is not technologically or economically feasible, of providing an alternative water supply pending permanent remediation measures to the extent necessary to meet the reasonable needs for domestic and irrigation uses of the parties who signed the Mitigation Agreement. The applicant's liability with respect to foreign water shall be limited to remediation of a maximum of 17,694 acre-feet. Remediating the water quality of the Pala Basin or providing an	Testing as required by RWQCB after consultation with SLRMWD	Reporting as required by RWQCB or SLRMWD Agreement	Regional Water Quality Control Board; San Luis Rey Municipal Water District		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
	alternative water supply, shall be part of the closure plan and part of the cost estimate required by 14 CCR § 17782.					
MM 4.3-1i	The Applicant shall notify the San Luis Rey Municipal Water District and each of the parties to the Mitigation Agreement of any request to modify or to be released from the requirements of the closure plan or the post closure maintenance plan for the project.	Copy of request	At time of request	San Luis Rey Municipal Water District and other parties to SLRMWD Agreement		
MM 4.3-1j	The Applicant shall consult with the San Luis Rey Municipal Water District concerning the number, specifications, location, and frequency of data collection at the monitoring stations. The final decision regarding the need for and adequacy of the number, specifications, location of and frequency of data collection from the monitoring stations will be made by the RWQCB.	Discussion with SLRMWD	During discussions of monitoring with RWQCB	Regional Water Quality Control Board; San Luis Rey Municipal Water District		
	4.5 TRAFFIC AND CIRCULATION					
MM 4.5-1	The project applicant shall conduct a structural analysis of SR 76 and determine the structural requirements along SR 76 from the Rosemary Mountain Palomar Aggregates project to the proposed landfill entrance to determine whether the existing foundation can accommodate anticipated heavy truck loads. The applicant shall obtain certification from Caltrans for adequate pavement surface to be enforced by the County Department of Public Works. This analysis shall be extended west of the I-15 ramps if the Palomar Aggregate project is not implemented. Construction of the recommended pavement improvements, consistent with Caltrans requirements shall be implemented prior to operation of the landfill, if determined necessary, and fair share contribution made by the applicant.	Written report by applicant's traffic consultant Field inspection if improvements are necessary	Prior to acceptance of solid waste Prior to acceptance of solid waste	Caltrans and County Department of Public Works		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
MM 4.5-2	Total project traffic from all sources on any day shall not exceed 2,085 PCE trips or maximum of 675 trucks from all sources. The project shall maintain computerized daily records of total truck trips per day and total project traffic from all sources. These records shall be available for review by the Department of Environmental Health during operational hours. When the project traffic equals 2,085 PCE trips or 675 trucks in any day, the landfill shall be shut down for the balance of that day. The facility will notify the LEA prior to closure. Once 95% of the maximum daily traffic limit is reached, the landfill operator shall immediately notify commercial waste haulers to curtail waste deliveries, pursuant to the contract arrangements described in MM 4.5-3, as needed to assure compliance with the maximum daily traffic limits. Notwithstanding the above, the landfill operator may not refuse acceptance of any waste collection vehicle that was traveling on SR 76 east of I-15 at the time notice was given.	Daily operational records of project traffic	As required	County Department of Environmental Health		
MM 4.5-3	Project traffic shall be limited to the following total trips: TIME — TOTAL TRIPS 2:00 P.M. – 3:00 P.M. — 215 PCE trips or 72 trucks 3:00 P.M. – 4:00 P.M. — 111 PCE trips or 37 trucks 4:00 P.M. – 5:00 P.M. — 111 PCE trips or 37 trucks These hourly restrictions shall terminate when SR 76 is widened to four lanes between I-15 and the landfill access road. Each contract for waste delivery at the landfill shall notify the customer of the peak hour traffic restrictions, shall require that the customer cooperate in good faith in scheduling deliveries to adhere to peak hour restrictions, and shall implement a notification system whereby the customer would be directed to use alternative disposal facilities as needed to assure compliance with the peak hour traffic restrictions. Compliance with peak hour traffic restrictions shall be monitored on the inbound lane of the landfill access road at a location as near as feasible to SR 76. Vehicle trips will be counted manually or, if	Daily operational records of project traffic	As required	County Department of Environmental Health		

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	feasible, electronically, and where appropriate converted into PCE. If traffic counts are obtained or compiled electronically, and if feasible, traffic count data shall be made available to the Department of Environmental Health at its offices on a real-time basis. The landfill operator shall report traffic count information to the Department of Environmental Health weekly in writing. Once 75% of the peak hourly restriction is reached, the landfill operator shall immediately notify commercial waste haulers to curtail waste deliveries, pursuant to the contract arrangements described above, as needed to assure compliance with the peak hour traffic restrictions. Notwithstanding the above, the landfill operator may not refuse acceptance of any waste collection vehicle that was traveling on SR 76 east of I-15 at the time notice was given.					
MM 4.5-4	At the commencement of operation, the project applicant shall pay the County's Transportation Impact Fee to fund its fair share of improvements to address cumulative impacts. The Regional Transportation Plan (RTP) adopted by SANDAG includes freeway build-out over the next 30 years including the necessary improvements to SR 76 and its intersections with Highway 395 and I-15. The project will receive a credit against this fee for the value of monetary and non-monetary contributions to improvements of SR 76 undertaken by the project as a project design feature or mitigation in accordance with and consistent with Proposition C and County policies and procedures.	Payment of County Transportation Impact Fee	At commencement of operation	County Department of Public Works		
MM 4.5-5	At the commencement of operation, the project applicant shall make a fair-share contribution for the addition of an eastbound left turn lane and westbound through lane on the I-15 overcrossing.	Payment of fair share contribution	At commencement of operation	Caltrans and County Department of Public Works		
MM 4.5-6a	At the commencement of operation, the project applicant shall pay the County's Transportation Impact Fee to fund its fair share of cumulative impacts to SR 76 and the intersections subject to the credits described in mitigation measure 4.5-4.	Payment of County Transportation Impact Fee	At commencement of operation	County Department of Public Works		

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MM 4.5-6b	The Project Applicant shall make an irrevocable offer of dedication for right-of-way to 108 feet in width within the Project boundary for the widening of SR 76 to four lanes for the County of San Diego Circulation Element, including a designated bike route.	Dedication of easement	Request by Caltrans	Caltrans and County Department of Public Works		
MM 4.5-7	The project shall conduct a structural integrity test on the Maranatha Drive pavement to determine ultimate load bearing of the roadway. If necessary, the project shall provide the required pavement overlay to support the heavy vehicle loads that would occur on Maranatha Drive. Any necessary repaving or construction along Maranatha Drive shall be done outside of the operation of the school (i.e., weekends or school breaks) so as to not disrupt school activities.	Written report by applicant's traffic consultant; Field inspection if improvement are necessary	Prior to trucking of recycled water from the Reservoir Site to the landfill site	County Department of Public Works		
	4.6 NOISE AND VIBRATION					
MM 4.6-1a	The applicant shall monitor noise levels at the property lines adjacent to residential uses in the first year of the initial construction and whenever the construction operation changes. If noise levels exceed 62.5 dBA L_{eq} at the property line, the applicant shall implement some or all of the following measures to reduce the noise levels to below 62.5 dBA L_{eq}: • Build temporary noise barriers or berms between construction activities and residences. Such barriers or berms shall be disassembled when construction is complete. Sound barriers made of plywood would likely be sufficient, given the topography of the site and adjacent area. Other design parameters (e.g., height, length, and location) for these temporary noise barriers or berms shall be determined by a qualified noise expert. • Reduce the amount or size of construction equipment. For example, equipment with smaller engines could be used. This would be feasible for most types of equipment. However, the geology of the site may dictate the minimum size of certain types of rock moving or other equipment. If the 62.5 dBA L_{eq} threshold is not exceeded, no action beyond monitoring shall be necessary.	Monitoring at southern property line by applicant's noise expert to determine noise levels at nearby residences	Quarterly during initial construction and within 30 days after any change in construction phases	County Department of Environmental Health		

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MM 4.6-1b	All construction activities shall be limited to between the hours of 7:00 A.M. and 6:00 P.M., Monday through Friday and 8:00 A.M. to 5:00 P.M. on Saturday as required under Proposition C. Construction shall not occur on Sundays or federal holidays.	Field inspection	During construction	County Department of Environmental Health		
MM 4.6-1c	The applicant shall ensure that construction equipment and trucks are properly tuned and have noise muffling equipment that meets or exceeds applicable EPA standards.	Field inspection	During construction	County Department of Environmental Health		
MM 4.6-2a	The operator shall ensure that the tire shredding and rock crushing shall not occur at the same time.	Field inspection	During operation	County Department of Environmental Health		
MM 4.6-2b	Tire shredding operations shall be monitored the first time such activity is conducted on-site to ensure that noise levels do not exceed the residential and wildlife thresholds. If the noise levels exceed either threshold, the applicant shall implement noise abatement measures which may include such measures as equipment silencers, enclosures, noise baffling, and/or berms. If the thresholds are not exceeded, no additional action beyond monitoring shall be required.	Field inspection	During operation	County Department of Environmental Health		
MM 4.6-3	Noise verification shall be conducted specifically for the flare station prior to commencement of its operation to ensure compliance with the 62.5 dBA L_{eq} and 60 dBA L_{eq} at the property line and for wildlife habitat, respectively.	Noise analysis prepared by applicant's noise specialist	Prior to installation of the flare station	County Department of Environmental Health		
MM 4.6-4a	Unless determined infeasible by Caltrans, the project applicant shall provide a fair share contribution for the cost to install a sound wall in the right-of-way along SR 76 to reduce noise levels from cumulative traffic at the existing residences.[2]					

[2] *A sound wall would also reduce the project-related increase in traffic noise levels.*

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	4.7 AIR QUALITY & AIR TOXIC HEALTH RISKS					
MM 4.7-1	The construction contractor shall implement the following dust control measures: • The construction contractor shall use water trucks to keep all areas of vehicle movement sufficiently damp to prevent the raising of dust by travel in these areas. • All unpaved haul roads shall be watered every two hours, unless the road surface appears visibly damp. • The construction contractor shall wet down the site in the late morning and after work is completed for the day. • At least once per day, the construction contractor shall wet down non-active construction areas that have not been reseeded to minimize windblown dust. • As soon as feasible, the construction contractor shall re-establish groundcover on areas disturbed by construction—through seeding and watering those areas that will not be disturbed for extended periods (e.g., two months or more). • The construction contractor shall reduce traffic speeds on all unpaved road surfaces to no more than ten miles per hour. In addition, to reduce vehicle exhaust emissions: • The construction contractor shall maintain construction equipment engines by keeping them tuned in accordance with manufacturers specifications. • The construction contractor will only utilize California diesel fuel in heavy duty vehicles. • The construction contractor will only employ construction equipment that meets California Exhaust Emission Standards for Post-1996 Off-Road Compression-Ignition Engines.	Field verification	Field inspection during construction	San Diego Air Pollution Control District		

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MM 4.7-2	The landfill operator shall implement the following dust control measures: • The landfill operator shall use water trucks to keep all areas of vehicle movement sufficiently damp to prevent the raising of dust by travel in these areas. • The landfill operator shall wet down the site in the late morning and after work is completed for the day. • At least once per day, the landfill operator shall wet down non-active construction areas that have not been reseeded to minimize windblown dust. • The landfill operator shall reduce traffic speeds on all onsite, unpaved road surfaces to no more than ten miles per hour. In addition, to reduce vehicle exhaust emissions: • The landfill operator shall maintain trucks and construction equipment engines by keeping them tuned in accordance with manufacturers specifications. • The landfill operation shall only utilize California diesel fuel in heavy-duty vehicles. • The landfill operator shall only employ construction equipment that meet California Exhaust Emission Standards for Post-1996 Off-Road Compression-Ignition Engines.	Field verification	Field inspection during operation	San Diego Air Pollution Control District		
	4.9 BIOLOGICAL RESOURCES					
MM 4.9a:	A pre-construction meeting shall take place with a qualified biologist and construction personnel. The biologist shall explain the access restrictions on site, the importance of remaining within construction zones, the sensitivity of the habitats and species on site, and shall explain the potential consequences of violating the access restrictions and impacting biological resources outside the construction zones. Any accidental impacts to sensitive habitat that occur outside the designated impact area shall be mitigated at a 3:1 ratio. A letter from the applicant's biologist and contractor(s) verifying receipt of biological information shall be provided to the County Department of Environmental Health prior to commencement of construction.	Letter from applicant's contractor(s) verifying receipt of biological information	Prior to commencement of construction	County Department of Environmental Health		

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MM 4.9b	In the event any final judgment is entered in San Diego Superior Court Case No. GIN038227 determining that the creation or enhancement of habitat on the landfill site within the 1313 acres of dedicated open space provided by Proposition C violates any provision of Proposition C, or cannot be relied upon as mitigation for purposes of compliance with CEQA because of Proposition C, then any of these mitigation measures permitting the creation or enhancement of habitat on-site shall be construed to mandate off-site acquisition of this habitat. Off-site acquisitions may occur either through a direct purchase or through mitigation credits from a habitat manager, mitigation bank, or environmental group. The landfill operator shall prepare and submit for approval a Habitat Resource Management Plan or equivalent with respect to off-site dedicated open space. Provided the off-site acquisition is consistent with that approved plan, the off-site acquisition may occur anywhere within the unincorporated area of San Diego County. A conservation easement shall be placed across the mitigation area to permanently protect the resources.	Review of Court order	Upon Court decision	County Department of Environmental Health		
MM 4.9-1a:	Impacts to 170.8 acres of coastal sage scrub, 1.7 acres of disturbed coastal sage scrub, and 51.5 acres of coastal sage scrub/chaparral shall be mitigated at a minimum ratio of 2:1 through on-site creation or enhancement of 63.6 acres of coastal sage scrub habitat or coastal sage scrub/chaparral habitat, and the off-site acquisition of 384.4 acres of coastal sage scrub or coastal sage scrub/chaparral habitat. The final amounts of mitigation of these habitats shall be a total of 448 acres with at least 345 acres of coastal sage scrub and 103 acres of either coastal sage scrub or coastal sage scrub/chaparral habitat. The on-site creation or enhancement of this resource shall be in a dedicated open space area. Off-site acquisitions may occur anywhere within the unincorporated area of San Diego County and a conservation easement shall be placed across the mitigation area to permanently protect the resource. Off-site acquisitions may occur either through a direct purchase or through mitigation credits from a habitat manager, mitigation bank, or environmental group. The landfill operator shall prepare and submit for approval a Habitat Resource Management Plan or equivalent with respect to any off-site properties for which	Verification of recordation of open space easement on site encompassing the coastal sage scrub and coastal sage scrub/chaparral mitigation areas or verification of off-site acquisition	Prior to commencement of brushing or clearing of coastal sage scrub and coastal sage scrub/ chaparral or at a point in time determined appropriate through consultation with the applicable regulatory agencies	U.S. Fish & Wildlife Service, California Department of Fish & Game, County Department of Environmental Health and Department of Planning and Land Use		

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	management practices in accordance with County requirements have not already been established. The implementation of this mitigation shall be prior to or concurrent with the first construction that disturbs the coastal sage scrub habitat on site or as determined in consultation with the resource agencies.					
MM 4.9-1b:	Impacts to 22.6 acres of coast live woodland shall be mitigated at a minimum ratio of 3:1 by the on-site creation of 67.8 acres of coast live oak woodland. The on-site creation or enhancement of this resource shall be in a dedicated open space area. The implementation of this mitigation shall be prior to or concurrent with the first construction that impacts coast live oak woodland or as determined in consultation with the resource agencies.	Preparation of mitigation plan by applicant's biologist. Letter approval of plan by resource agencies or verification of off-site acquisition	Prior to commencement of clearing or grading of the coast live oak woodland or as otherwise determined in consultation with resource agencies	U.S. Fish and Wildlife Service, Army Corps of Engineers, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-1c:	Impacts to 0.6 acres of native perennial grassland shall be mitigated at a minimum ratio of 3:1 through off-site acquisition of 1.8 acres of native perennial grassland. The off-site acquisition may occur anywhere within the unincorporated area of San Diego County and a conservation easement shall be placed across the mitigation area to permanently protect the resource. Off-site acquisitions may occur either through a direct purchase or through mitigation credits from a habitat manager, mitigation bank, or environmental group. The landfill operator shall prepare and submit for approval a Habitat Resource Management Plan or equivalent with respect to any off-site properties for which management practices in accordance with County requirements have not already been established. The implementation of this mitigation shall be prior to or concurrent with the first construction that disturbs the native perennial grassland on site or as determined in consultation with the appropriate agencies.	Preparation of a habitat enhancement plan by the applicant's biologist or verification of off-site acquisition	Prior to or concurrent with construction that first disturbs native perennial grassland or as determined in consultation with the appropriate agencies	County Department of Environmental Health and Department of Planning and Land Use		
MM 4.9-1d:	Impacts to 0.4 acres of southern willow scrub and 0.4 acres of disturbed southern willow scrub shall be mitigated at a minimum ratio of 4:1 by the on-site creation or enhancement of 3.2 acres of southern willow	Preparation of a habitat enhancement plan	Prior to commencement of clearing or	California Department of Fish and Game, County Department of		

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	scrub habitat. On-site creation or enhancement shall be in an area dedicated as open space. The implementation of this mitigation shall be prior to or concurrent with the first construction that disturbs the southern willow scrub or as determined in consultation with the resource agencies.	by the applicant's biologist or verification of off-site acquisition	grading of the southern willow scrub or as otherwise determined in consultation with the resource agencies	Environmental Health and Department of Planning and Land Use		
MM 4.9-1e	Impacts to 0.2 acre of open channel shall be mitigated through implementation of the Wetland Mitigation and Habitat Enhancement Plan described in MM 4.9-18 to restore habitat in the San Luis Rey River watershed on site.	Preparation of mitigation plan by applicant's biologist	After residences and dairy removed.	US Fish & Wildlife Service, Army Corps of Engineers, California Department of Fish and Game, County Department of Environmental Health and department of Planning and Land Use		
MM 4.9-1f:	Impacts to 0.2 acres of cottonwood willow riparian forest shall be mitigated at a minimum ratio of 4:1 by the on-site creation or enhancement of 0.8 acres of cottonwood willow riparian forest. On-site creation or enhancement shall be in an area dedicated as open space. The implementation of this mitigation shall be prior to or concurrent with the first construction that disturbs the cottonwood-willow riparian forest on site or as determined in consultation with the appropriate agencies.	Preparation of mitigation plan by applicant's biologist and letter approval of plan by resource agencies or verification of off-site acquisition	Prior to or concurrent with construction that impacts the cottonwood willow riparian forest or as determined in consultation with the County	County Department of Environmental Health and County Department of Planning and Land Use		

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MM 4.9-1g:	Impacts to 27.4 acres of chaparral and 15.8 acres of non-native grassland shall be mitigated at a minimum ratio of 0.5:1 through off-site acquisition of 13.7 acres of chaparral and 7.9 acres of non-native grassland. Off-site acquisitions may occur anywhere within the unincorporated area of San Diego County and a conservation easement shall be placed across the mitigation area to permanently protect the resource. Off-site acquisitions may occur either through a direct purchase or through mitigation credits from a habitat manager, mitigation bank, or environmental group. The landfill operator shall prepare and submit for approval a Habitat Resource Management Plan or equivalent with respect to any off-site properties for which management practices in accordance with County requirements have not already been established. The implementation of this mitigation shall be prior to or concurrent with the first construction that disturbs the chaparral or non-native grassland habitat on site or as determined in consultation with the resource agencies.	Preparation of mitigation plan by applicant's biologist and letter approval of plan by resource agencies or verification of off-site acquisition	Prior to or concurrent with construction that impacts Chaparral and non-native grassland as determined in consultation with the County	County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-1h:	Temporary construction fencing shall be erected under the supervision of a qualified biologist outside the delineated boundary of dedicated open space where it interfaces with impact areas and permanent fencing marked with signs shall be installed around the mitigation areas. Where impact areas are adjacent to coast live oak woodland, fencing shall be erected outside the canopy area at a distance of 1.5 times the canopy radius of the outer trees. This fencing shall be erected prior to commencement of brushing or grading activities. The fencing (for example, strand wire or split rail) shall restrict human and equipment access but shall allow for wildlife movement.	Letter from applicant's biologist/field verification	Prior to commencement of brush clearing or grading	County Department of Environmental Health		

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MM 4.9-2:	A 3:1 minimum replacement acreage (based on canopy area) of Engelmann oak trees shall be created by on-site creation or enhancement of this replacement acreage within the same area designated for creation or enhancement of coast live oak woodland, if possible. Otherwise, a separate acquisition of Engelmann oak trees at 3:1 minimum replacement acreage shall be required. Any on-site creation or enhancement shall be in an area dedicated as open space. Off-site acquisitions may occur anywhere within the unincorporated area of San Diego County and a conservation easement shall be placed across the mitigation area to permanently protect the resource. Off-site acquisitions may occur either through a direct purchase or through mitigation credits from a habitat manager, mitigation bank, or environmental group. This acreage shall then be subtracted from the coast live oak woodland mitigation requirement (MM 4.9-1b) to avoid duplicate mitigation. The landfill operator shall prepare and submit for approval a Habitat Resource Management Plan or equivalent with respect to any off-site properties for which management practices in accordance with County requirements have not already been established. The implementation of this mitigation shall be prior to or concurrent with the first construction that disturbs Engelmann oak or as determined in consultation with the resource agencies	Letter from applicant's biologist	Prior to commencement of construction in the area of Engelmann oak or at a point in time as determined appropriate through consultation with the County of San Diego	County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-3a:	In addition to the riparian habitat creation or enhancement described in MM4.9-1d and f, implementation of the Wetland Mitigation and Habitat Enhancement Program described in MM4.9-18 shall be undertaken to mitigate impacts to arroyo southwestern toad riparian breeding habitat.	See MM 4.9-1b and MM 4.9-1d	See MM 4.9-1b and MM 4.9-1d	See MM 4.9-1b and MM 4.9-1d		
MM 4.9-3b:	The removal of toad riparian breeding habitat from riparian vegetation clearing and channel excavation for the bridge shall occur from October through December to minimize potential impacts to breeding adults (including potential sedimentation impacts to toad eggs) and dispersing juveniles.	Construction contract addressing Timing	Prior to commencement of construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		

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MM 4.9-4:	Impacts to the 17.5 acres of suitable arroyo southwestern toad upland habitat on site impacted by the project shall be mitigated through on site creation or enhancement of 88 acres of arroyo toad habitat The on-site creation or enhancement of this resource shall be in a dedicated open space area. The implementation of the mitigation shall be prior to or concurrent with the first construction that impacts the upland arroyo toad habitat on site or as determined in consultation with the resource agencies.	Preparation of mitigation plan by applicant's biologist and letter approval of plan by resource agencies or verification of off-site acquisition	Prior to commencement of clearing or grading that disturbs arroyo toad habitat	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-5a:	The construction zone for the bridge shall be fenced with exclusion fencing to prevent toad access to the construction zone. The fencing shall be a silt-screen type barrier comprised of a minimum 24-inch high fence with the remainder (minimum 12 inches) anchored firmly against the ground. The fence may be buried if necessary to exclude toad access. The fence locations shall be identified by a qualified biologist and adjusted as necessary.	Letter from applicant's biologist based on field verification	Prior to commencement of construction of bridge	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
	Exclusion fencing shall be monitored daily by a qualified biologist, and maintained in its original condition by construction personnel for the entire length of the construction period.	Written report from applicant's biologist monthly	Daily monitoring	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health, County Department of Planning and Land Use		
MM 4.9-5b:	Pre- and post-exclusion fencing surveys within the construction zone for the bridge shall be conducted for arroyo southwestern toads by a biologist permitted by the USFWS to handle the toad. Prior to construction commencement, a minimum of three surveys shall be conducted by this biologist following installation of the fencing. Daily surveys shall be conducted each morning prior to construction activity. Any toads found shall be relocated to appropriate similar habitat outside project impact areas and in dedicated open space.	Written report from biologist permitted by U.S. Fish and Wildlife Service to handle toad	Prior to construction, minimum of 3 surveys following installation of the fencing, then daily surveys	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		

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			before construction begins			
MM 4.9-5c:	Exclusion fencing shall be installed along both sides of the access road for its entire length (except where sides of bridge act as barrier) as part of access road construction. The same exclusion fencing shall also wrap around the northern edge of the facilities area and continue east and south around the 1.8-acre desiltation basin. The fencing shall continue until the topography becomes too steep or rocky on the east side of the landfill footprint as determined by a qualified biologist. The fencing shall be of a corrugated metal or other similar durable material and shall be a minimum of 24 inches high.	Field verification	At the time of access road construction	County Department of Environmental Health or County Department of Planning and Land Use		
MM 4.9-5d:	A minimum of three surveys shall be conducted by a biologist permitted by the USFWS to handle the arroyo southwestern toad following installation of the exclusion fencing along the access road and prior to access road use. Any toads found shall be relocated to appropriate similar habitat outside project impact areas and in dedicated open space.	Written report from biologist permitted by U.S. Fish and Wildlife Service to handle toad	Following installation of exclusion fencing and prior to access road use	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-5e:	A minimum of three surveys shall be conducted by a biologist permitted by the USFWS to handle the arroyo southwestern toad following installation of exclusion fencing around the facilities area and desiltation basin as described in MM 4.9-5c. Up to three additional surveys shall be conducted if favorable temperature and moisture conditions for toad activity have not already occurred during the first three surveys. Any toads found shall be relocated to appropriate similar habitat outside project impact areas and in dedicated open space.	Written report from biologist permitted by U.S. Fish and Wildlife Service to handle toad	Following installation of exclusion fencing	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		

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MM 4.9-5f:	At least one road undercrossing shall be installed in the fill beneath the access road north and south of the river. The design of the undercrossings shall be approved by the USFWS.	Field verification	At the time of access road construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-5g:	Exclusion fencing of the material and design described in MM 4.9-5c shall be installed on the north side of the haul road to Borrow/Stockpile Area A. The fencing shall be installed prior to initial project construction and shall be removed when initial project construction is complete, and the haul road is no longer in use. The exclusion fencing shall be re-installed prior to the use of Borrow/Stockpile Area A, which begins again in approximately year 25. The fencing shall be removed once the landfill is completely closed and the haul road is no longer in use.	Field verification	Prior to construction and during inspection by Department of Environmental Health	County Department of Environmental Health or County Department of Planning and Land Use		
MM 4.9-5h:	A minimum of three surveys shall be conducted by a biologist permitted by the USFWS to handle the arroyo southwestern toad following installation and re-installation of the exclusion fencing along the access road to Borrow/Stockpile Area A prior to its use. Up to three additional surveys shall be conducted during the use period if favorable temperature and moisture conditions for toad movement have not already occurred during the three original surveys. Any toads found shall be relocated to appropriate similar habitat outside project impact areas and in dedicated open space.	Written report from biologist permitted by U.S. Fish and Wildlife Service to handle toad	Following installation and re-installation of exclusion fencing along the access road to Borrow/Stockpile Area A	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		

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MM 4.9-5i:	Exclusion fencing of the material and design described in MM 4.9-5c shall be installed along both sides of the low-flow crossing until the road connects with the haul road described in MM 4.9-5g. The fencing shall be installed during initial project construction and shall be removed when initial project construction is complete, and the crossing is no longer in use. A minimum of three surveys shall be conducted by a biologist permitted by the USFWS to handle the arroyo southwestern toad following installation of the fencing, and daily surveys shall be conducted each morning prior to use of the low-flow crossing. Any toads found shall be relocated to appropriate similar habitat outside project impact areas and in dedicated open space.	Field verification	During initial project construction (3 surveys following installation of fencing and daily prior to use of low-flow crossing) and after crossing is no longer in use.	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-6:	The USFWS (1999c) has indicated in the Final Recovery Plan for the species that short-term negative effects to individual toads from such activities may be offset by the long-term positive effects of implementing such a habitat enhancement program. Therefore, the habitat enhancement plan described in MM 4.9-18 shall be implemented. The final plan shall include precautions where possible to avoid impacts to the arroyo southwestern toad.	Preparation and acceptance of habitat enhancement plan	Prior to construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-7:	Prior to final design, the bridge abutment design specifications shall indicate that gaps in the riprap be filled with concrete.	Approval of final design plans	Final design submittal	County Department of Environmental Health, County Department of Planning and Land Use		
MM 4.9-8:	The northernmost tower shall be replaced during the period of July through October to avoid the golden eagle breeding season.	Construction contract addressing timing	Prior to commencement of construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
MM 4.9-9a:	Access to the Gregory Canyon nesting site(s) shall be restricted to eagle specialists and researchers conducting monitoring.	Field verification	Prior to commencement of construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-9b:	Prior to ground disturbance, a pre-construction survey for the eagle pair shall be conducted to determine if and where the eagles are nesting on site. Weekly monitoring of the eagle pair shall be conducted by an eagle specialist during the breeding season (December through May) to confirm the eagle pair is exhibiting reproductive behavior patterns, such as nest building. After one year of construction activity, if the monitoring determines that the eagles have abandoned the site, the applicant shall create a habitat acquisition fund for purchase and preservation of off-site known or potential golden eagle nesting habitat or shall purchase an equivalent amount of golden eagle nesting habitat to be included in the MSCP Preserve. The amount of funding or habitat purchase shall be negotiated with the County.	Written report by biologist, payment of fees, if applicable	Prior to construction weekly during breeding season, and one year after construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-9c:	Initial landfill construction activity less than 2,000 feet from the eagle's nest shall begin as close to the end of the eagle breeding season in June to allow the eagle pair on site to become conditioned to the activity prior to the next breeding season starting in December.	Field verification	Prior to commencement of construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		

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MM 4.9-10:	The southernmost tower shall be moved during the period of June through November or at any time when the nest is not active. Likewise, any raptor nest removal shall only occur when the nest is inactive. A qualified biologist shall determine whether or not a raptor nest is active.	Construction contract addressing timing and field verification	During June through November or when nest is inactive	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-11a:	Removal of any riparian habitat shall only occur from October through December to avoid the breeding seasons of these bird species and to minimize potential impacts to the arroyo southwestern toad.	Preparation of mitigation plan by applicant's biologist. Letters of appropriate planning resource agencies	Prior to commencement of clearing or grading of riparian habitat	U.S. Fish and Wildlife Service, Army Corps of Engineers, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-11b:	Impacts to vireo and flycatcher habitat shall be mitigated through riparian habitat creation as described under MM 4.9-1d. The Wetland Mitigation and Habitat Enhancement Plan described under MM 4.9-18 would also benefit these species.	Preparation of mitigation plan by applicant's biologist. Letters of appropriate planning resource agencies	Prior to commencement of clearing or grading of vireo and flycatcher habitat or as otherwise determined in consultation with resource agencies	U.S. Fish and Wildlife Service, Army Corps of Engineers, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		

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MM 4.9-11c:	The project applicant shall provide funding for cowbird trapping along the San Luis Rey River on the project site for a period of five years from initial landfill operation.	Written report prepared by the applicant's biologist or the land manager of the 1,313 acres of open space	Annually	California Department of Fish and Game, U.S. Fish and Wildlife Service		
MM 4.9-12a:	Daily noise monitoring by a qualified acoustician shall be conducted between March 15 and September 15 during initial construction to verify that noise levels are below 60 dB(A) L_{eq} in vireo and flycatcher habitat. If the 60 dB(A) L_{eq} is exceeded, the acoustician shall work with the construction contractor to make operational changes and/or barriers designed by the acoustician shall be installed prior to March 15 or immediately if during the breeding season, to reduce noise levels during the breeding season. Weekly noise monitoring shall occur following operational changes and/or installation of barriers to ensure their effectiveness. If ineffective, the acoustician shall work with the construction contractor to make additional operational changes or to install other barriers that would reduce noise to less than 60 dB(A) L_{eq}.	Noise analysis prepared by applicant's noise specialist	Daily between March 15th and September 15th during initial construction. If noise barriers are required, weekly monitoring to ensure their effectiveness	County Department of Environmental Health		
MM 4.9-12b:	The low-flow crossing shall only be used between September 15 and March 15. Use of the crossing could occur outside of that time period if daily monitoring by a qualified biologist determines that vireos and flycatchers have not yet arrived on site or have migrated out of the area early, or if operational changes can be made and/or barriers designed by an acoustician can be installed prior to March 15 to reduce noise levels to less than 60 dB(A) L_{eq} in the vireo and flycatcher habitat. Daily noise monitoring shall be conducted in accordance with MM 4.9-12a and noise reduction measures contained in MM 4.9-12a shall be implemented, if necessary.	Field verification by biologist. Noise analysis prepared by applicant's noise specialist	Daily between September 15th and March 15th	County Department of Environmental Health		

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MM 4.9-12c:	Bridge construction shall only occur between September 15 and March 15 unless daily monitoring by a qualified biologist during the breeding season determines that vireos and flycatchers have not yet arrived on site or have migrated out of the area early or if operational changes can be made and/or barriers designed by an acoustician can be installed prior to March 15 to reduce noise levels to less than 60 dB(A) L_{eq} in vireo and flycatcher habitat. Daily noise monitoring shall be conducted in accordance with MM 4.9-12a and noise reduction measures contained in MM 4.9-12a shall be implemented, if necessary.	Field verification by biologist. Noise analysis prepared by applicant's noise specialist	Daily between September 15th and March 15th	County Department of Environmental Health		
MM 4.9-13:	Mitigation activities shall only occur between September 15 and March 15 unless operational changes can be made and/or barriers designed by an acoustician can be installed prior to March 15 to reduce noise levels to less than 60 dB(A) L_{eq} in vireo and flycatcher habitat. Daily noise monitoring shall be conducted between March 15 and September 15 to verify that the measures are effective. If the 60 dB(A) L_{eq} is exceeded, the acoustician shall work with the contractor to make additional operational changes or to install additional barriers that would reduce noise to less than 60 dB(A) L_{eq}.	Field verification by biologist. Noise analysis prepared by applicant's noise specialist	Daily between September 15th and March 15th	County Department of Environmental Health		
MM 4.9-14:	Indirect impacts to a total of 20.0 acres of vireo and flycatcher habitat caused by project traffic noise shall be mitigated through on-site creation or enhancement of 17.1 acres of vireo and flycatcher habitat, and the off-site acquisition of 2.9 acres of vireo and flycatcher habitat. On-site and off-site mitigation areas would not be affected by noise levels of 60 dB (A) L_{eq} or greater as a result of project-generated or cumulative traffic. Any on-site creation or enhancement shall be in area dedicated as open space. Any off-site acquisition may occur anywhere within the unincorporated area of San Diego County and a conservation easement shall be placed across the area to permanently protect the resource. Off-site acquisitions may occur either through a direct purchase or mitigation credits from a habitat manager, mitigation bank or environmental group. The landfill operator shall prepare and submit for approval a Habitat Resource Management Plan or equivalent with respect to any off-site properties for which management practices in accordance with County requirements have not already been established. The implementation of this mitigation shall be prior to or	Verification of on-site creation or off-site acquisition of 20.0 acres of vireo and flycatcher habitat	Prior to construction that disturbs the vireo and flycatcher habitat	U.S. Fish and Wildlife Service, Army Corps of Engineers, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
	concurrent with construction that impacts vireo or flycatcher habitat or as otherwise determined in consultation with the resource agencies.					
MM 4.9-15a:	A temporary 12-foot high wall or berm shall be constructed along the northern edge of Borrow/Stockpile Area A outside the vireo/flycatcher breeding season (March 15 to September 15) and prior to the use of Borrow/Stockpile Area A. The barrier can be removed once topography provides the necessary noise barrier to reduce noise levels in the habitat during the breeding seasons to less than 60 dB(A) L_{eq}.	Construction contract addressing timing and noise analysis	Prior to use of Borrow/ Stockpile Area A	County Department of Environmental Health		
MM 4.9-15b:	Noise monitoring shall be conducted weekly for up to one month by a qualified acoustician to verify that operational noise levels are below 60 dB(A) L_{eq} in vireo and flycatcher habitat. If noise levels equal or exceed 60 dB(A) L_{eq}, a 16-foot high permanent noise wall shall be installed prior to the vireo breeding season (March 15 to September 15, includes flycatcher breeding season) or immediately if during the breeding season. If noise levels exceed 60 dB(A) L_{eq} during the breeding season, operational changes shall be made to reduce noise levels to less than 60 dB(A) while the noise wall is being constructed. The noise wall shall be constructed east of the knoll between the internal haul road and the top of slope for the facilities area to block truck noise emanating into the habitat.	Noise analysis prepared by applicant's noise specialist	During operations weekly, up to one month March 15th to September 15th, in necessary	County Department of Environmental Health		
MM 4.9-16:	Throughout the life of the project, access routes shall be restricted to existing roads, and entry into non-impact areas shall be restricted by the landfill operator. Areas not directly impacted by the project shall be posted with signs precluding access due to habitat sensitivity. A public education program shall be developed by a qualified biologist and shall be implemented to inform landfill staff and visitors about access restrictions and the sensitivity of habitats on site.	Field verification. Preparation and submittal of public education program	Throughout life of project	County Department of Environmental Health		

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MM 4.9-17a:	Control of invasive, exotic plant species shall occur as described in the habitat enhancement plan presented in MM 4.9-18 and shall include the channel excavation area associated with construction of the bridge.	Preparation and acceptance of Habitat Enhancement Plan	Prior to construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-17b:	Temporary and permanent slopes shall be revegetated with native plant species to inhibit the growth of non-natives.	Preparation and acceptance of Habitat Enhancement Plan	Prior to construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-18:	The project applicant shall implement a habitat enhancement plan to improve the San Luis Rey River watershed on site as described below and within the enhancement area shown in Exhibit 4.9-6 of the Revised Final EIR in accordance with the Wetland Mitigation and Habitat Enhancement Plan set forth in Appendix L, as updated and modified. Beyond the mitigation obligation associated with compensating for direct and indirect project impacts to vegetation communities, the project applicant for the Gregory Canyon Landfill shall be required to implement a habitat enhancement program for improvements to the San Luis Rey River watershed. In addition to the proposed open space dedication (1,313 acres), the project applicant shall create or enhance 131.4 acres of upland areas and 81.2 acres of riparian areas within the portion of the San Luis Rey River corridor contained on site (Exhibit 4.9-6). The restoration would likely be phased and would not occur all at one time. The habitat enhancement program shall focus on the restoration of riparian and upland habitats within the San Luis Rey River floodplain on site, in the areas indicated on Exhibit 4.9-6, above and beyond the	Preparation and acceptance of Habitat Enhancement Plan	Prior to construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
	project's direct mitigation obligations for vegetation community impacts. The San Luis Rey River has been identified as one of the most easily restorable rivers in southern California (ACOE 1981). This portion of the program shall consist of the restoration of lost and/or damaged habitat and water quality caused by the long-term agricultural use of the property and the removal of highly invasive, exotic plant species. The project applicant is proposing to remove the existing Verboom dairy operations and most structures and all equipment associated with the Verboom and Lucio dairies from the site in concert with the initial construction of the landfill. Under this enhancement program, man-made berms and weed seed banks in the river's watershed shall be excavated to restore more historic river flows and invasive, non-native plant species would be replaced with native plantings. The excavation shall be focused on bringing the ground elevations down to a level that would connect the areas hydrologically with the existing groundwater system and to create a series of terraces that taper into the existing upland habitat. The excavation would be done in a manner that would prevent adverse effects on upstream and downstream properties. All upland and drier riparian areas shall be planted with tree species known from the site and hand-seeded to initiate native plant re-establishment. Weed control and monitoring shall be implemented regularly during the first five years of the project to prevent the re-establishment of non-native plant species. The goal of the restoration shall be to provide breeding and upland habitat for endangered species and widen the vegetative buffer around the riparian corridor present on site. The dedicated open space on-site, including the restored river corridor, shall be managed with a financial contribution provided by the project applicant. The project applicant shall work with the USFWS and the CDFG to identify a qualified conservancy or other non-profit organization to be responsible for implementing long-term management activities for the restored river. The type of management activities shall depend upon the condition of the site, the resources present, and the funds available to manage those resources. Management activities shall include restriction of vehicular and human access through the installation of fencing and signs, control of exotic					

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	species [e.g., brown-headed cowbirds and giant reed (*Arundo donax*)], control of illegal dumping and monitoring endangered species populations. The landfill operator shall prepare and submit for approval a Habitat Resource Management Plan or equivalent with respect to on-site dedicated open space, or created or enhanced habitat areas.					
MM 4.9-20:	If project construction activities for the improvements of the Reservoir Site are scheduled to occur during the breeding season for coastal California gnatcatcher (February 15 through August 31), three surveys pursuant to U.S. Fish and Wildlife Service protocol shall be conducted to determine the presence or absence of the species in coastal sage scrub habitat within 500 feet of the improvement. If it is determined that the species is absent, construction may proceed without restrictions. If the coastal California gnatcatcher is present within 500 feet of the improvement, no construction activities shall be allowed between February 15 and August 31, unless shielding is used to reduce construction noise levels to less than 60 dBA L_{eq} at the species' habitat. Shielding shall be approved by a qualified acoustician. No coastal California gnatcatcher-related restrictions will be placed on construction activities outside of the coastal California gnatcatcher breeding season.	If construction of the improvements at the Reservoir Site occurs February 15 through August 31; field verification by biologist	Prior to construction of the improvements at the Reservoir Site	County Department of Environmental Health		
	4.10 PALEONTOLOGICAL RESOURCES					
MM 4.10-1a	Prior to issuance of the grading permit by the County, the applicant shall retain a qualified paleontologist to monitor excavations on site. Initially monitoring shall occur eight hours per week (e.g., two four-hour days or four two-hour days) during earthmoving activities in the Quaternary Alluvium. (This earthwork is to occur during construction of the bridge footings and roads and the excavation of the borrow sites.) The contractor shall notify the qualified paleontologist at the time such activities will be initiated so that a monitor can be present. (A paleontological monitor is defined as an individual who has experience in the collection and salvage of fossil materials. The paleontological monitor shall work under the direction of a qualified	Letter to County identifying paleontologist and paleontological monitor prior to grading; Field observation initially eight hours per week with weekly letter prepared by	During construction of bridge footings and roads and the excavation of the borrow sites	County Department of Environmental Health		

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	paleontologist.) The applicant shall submit a letter to the Department of Environmental Health identifying the monitor. Weekly letters shall be prepared by the monitor and provided to the Department of Environmental Health.	paleontological monitor				
MM 4.10-1b	If unique fossils are discovered, the applicant shall have a qualified paleontologist (or paleontological monitor) recover them. If an extended salvage period is required, the paleontologist (or paleontological monitor) shall be allowed to temporarily direct, divert, or halt grading to allow recovery of fossils in a timely manner. If necessary, the paleontologist shall be allowed to set up a screen-washing operation to process the matrix to bulk sample selected geologic beds. If unique fossils are found, the applicant's paleontologist shall provide a letter to the Department of Environmental Health documenting the find and procedures followed on-site.	Letter from applicant's paleontologist based on field observation	After recovery of unique fossils, if any are found	County Department of Environmental Health		
MM 4.10-1c	The applicant shall have a qualified paleontologist clean, repair, and catalog any fossil remains collected during monitoring and salvage operations. Prepared fossils, along with copies of all pertinent field notes, photos, and maps, shall be deposited (as a donation) in a scientific institution with permanent paleontological collections such as, the San Diego Natural History Museum. Donation of the fossils shall be accompanied by financial support from the applicant for initial specimen storage. If fossil remains are found, the Department of Environmental Health shall review the preserved materials.	Review of preserved materials	If fossil remains are found on site	County Department of Environmental Health		
MM 4.10-1d	The applicant shall have a qualified paleontologist prepare regular biannual progress reports during earth moving activities in the Quaternary Alluvium (this earthwork to occur during construction of the bridge footings and roads and the excavation of the borrow sites) and a final summary report that outline the results of the resources mitigation program. These reports shall include discussions of the methods used, stratigraphic section(s) exposed, fossils collected, and the significance of recovered fossils. These reports shall be submitted to the Department of Environmental Health.	Written reports by applicant's paleontologist	Biannual and final summary report	County Department of Environmental Health		

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	4.11 ARCHAEOLOGICAL & CULTURAL RESOURCES					
MM 4.11-1	Prior to project activity occurring at the cemetery, the applicant shall remove the cemetery by excavation of burials and rebury in a nearby active cemetery. Exhumation and re-interment of all remains from this cemetery shall be conducted in accordance with Section 7050.5 of the California Health and Safety Code.	Written verification from the applicant's archaeologist	Prior to project activity occurring in the area	County Department of Environmental Health		
MM 4.11-2	It is possible that additional cultural resources could be discovered during grading and construction. Therefore, prior to issuance of a grading permit, the applicant shall retain a professional, registered archaeologist who is approved by the County and, if appropriate, a Native American monitor, who is selected from a list of suitable candidates obtained from the Native American Heritage Commission. The archaeologist and, if appropriate, the Native American monitor shall implement a monitoring and data recovery program to the satisfaction of the County's Director of Planning and Land Use, to mitigate potential impacts to previously undiscovered archaeological resources. The monitoring program shall consist of the monitor(s) attending a pre-grading meeting with the contractors to explain and coordinate the requirements of the program. In addition, the archaeologist and, if appropriate, the Native American monitor shall monitor initial grading and ground surface preparation on all previously undisturbed areas. The requirements of the monitoring program shall be noted on the final grading or improvement plan and all site workers shall be informed in writing by the project archaeologist of the restrictions regarding disturbance and removal of cultural resources as well as procedures to follow should a resource deposit be detected.	Requirements of monitoring program noted on construction documents; copy of letter to site workers; written report by applicant's archaeologist	Prior to issuance of grading permit; during construction	County Department of Planning and Land Use		
	In the event of notification by the project archaeologist that a potentially significant or unique find has been unearthed, grading operations shall cease immediately in the area of the find until the geographic extent and scientific value of the resource can be reasonably verified. Isolates and clearly non-significant deposits shall be minimally documented in the field. If significant archaeological materials are discovered, the County archaeologist shall be consulted and the resources shall be recorded and recovered using standard	Consultation with County archaeologist, as needed; written report by applicant's archaeologist	During construction	County Department of Planning and Land Use		

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	professional archaeological methods. Once recovered, such resources shall be cleaned, catalogued, and permanently curated according to current professional repository standards. Construction in the affected area shall not resume until the archaeologist determines it to be appropriate.					
	In the event that human remains are discovered, other than those located at the Higgins Family Cemetery, during the monitoring program, there shall be no further excavation or disturbance of the site, nor shall there be any disposition of such human remains, other than in accordance with the procedures and requirements set forth in Section 7050.5 of the California Health and Safety Codes. If Native American burial sites are discovered, the project shall comply with the Public Resources Code 5097.98 and CEQA Guidelines Section 15064.5(e).	Written report by applicant's archaeologist	During construction	County Department of Planning and Land Use		
	Upon completion of earth disturbing activities and prior to operation of the project, the archaeological monitor shall prepare a report documenting the findings. This report shall be completed to the satisfaction of the County's Director of Planning and Land Use.	Written report by applicant's archaeologist	Prior to operation of the project	County Department of Planning and Land Use		
MM 4.11-3	Prior to commencement of any construction activities, the applicant shall have a registered, professional archaeologist who is approved by the County and, if appropriate, a Native American monitor who is selected from a list of suitable candidates obtained from the Native American Heritage Commission provide measures to ensure the avoidance of impacts to known significant/CR-eligible cultural sites that could be indirectly affected by the proposed project (including: CA-SDI-683; CA-SDI-744B/12,584 A and B; CA-SDI-12,585; CA-SDI-14,609; and CA-SDI-14,610H). Such measures, which would serve to prohibit access to these sites, may include fencing, barricades, or remote monitoring devices. These devices shall be installed by the applicant prior to disturbance in the area of the above sites.	Mitigation monitoring program prepared by applicant's archaeologist	Prior to commencement of construction	County Department of Planning and Land Use		
	In addition, the archaeologist and, if appropriate, the Native American monitor shall implement a monitoring program to the satisfaction of the County's Director of Planning and Land Use. The requirements of the monitoring program shall be clearly noted on the final grading or improvement plan and all site workers shall be informed in writing of	Requirements of monitoring program noted on construction	Prior to construction	County Department of Planning and Land Use		

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	the restrictions and procedures of the program. In addition, the monitor(s) shall attend a pre-grading meeting with the contractors to explain and coordinate these requirements as they pertain to these significant/CR-eligible cultural sites.	drawings; copy of letter to site workers				
	In addition, the archaeologist and, if appropriate, the Native American monitor shall monitor initial grading and ground surface preparation on all previously undisturbed areas. Concurrent to the monitoring of grading, the monitor(s) shall identify and evaluate whether adverse impacts (e.g., erosion, looting, vandalism, etc.) have occurred at any of these sites.	Field observation by applicant's archaeologist; written report by applicant's archaeologist	During construction activities; approval of written report prior to operation of the project	County Department of Planning and Land Use		
	In the event that monitoring reveals deteriorating conditions at any of the significant/CR eligible cultural sites, the County archaeologist shall be consulted and the appropriate site preservation and/or data recovery efforts shall be implemented. Such efforts could include implementation of erosion control measures, capping of the affected portion of the site, or planting of native vegetation. If the monitor(s) determine that deterioration has resulted from landfill operations, a change in operational methods may be required.	Consultation with County archaeologist, if necessary; written report by applicant's archaeologist	During construction	County Department of Planning and Land Use		
	Upon completion of earth disturbing activities, the archaeological monitor shall prepare a report. The report shall include the results of the fieldwork and all appropriate laboratory and analytical studies that were performed in conjunction with any resource excavation that may have been performed. Such analyses could include radiocarbon dating, hydration and sourcing analysis, and mass spectrometer and thin sectioning, as appropriate. The report shall be submitted to the County's Director of Planning and Land Use for review and approval prior to operation of the project.	Written report by applicant's archaeologist	Prior to operation of the project	County Department of Planning and Land Use		

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MM 4.11-4	The Research Requirements and Research Design for CA-SDI-745, included in Appendix N of this Final EIR, shall be followed. The Research Requirements and Research Design guides the analysis and curation of resources already recovered from Locus A and outlines the steps necessary for the completion of additional fieldwork and monitoring at Locus F. Included therein is the requirement for artifacts to be processed and curated according to current professional repository standards and transferred, including title, to an appropriate curation facility within San Diego County. The applicant is also required to pay the necessary fees for permanent curation. A report documenting the analysis and fieldwork results shall be prepared and submitted to the satisfaction of the County's Director of Planning and Land Use.	Written report by applicant's archaeologist	Prior to acceptance of waste	County Department of Planning and Land Use		
MM 4.11-5	A complete analysis of materials collected from CA-SDI-14,611H, the Maggie Lovell Homestead, shall be conducted under the supervision of a registered, professional archaeologist. These artifacts shall be processed and curated according to current professional repository standards and shall be transferred, including title, to an appropriate curation facility within San Diego County. The applicant shall pay the necessary fees for permanent curation. A report documenting the analysis results shall be prepared and submitted to the satisfaction of the County's Director of Planning and Land Use prior to operation of the project.	Written report by applicant's archaeologist	Prior to acceptance of waste	County Department of Planning and Land Use		
MM 4.11-6a	Increased intervals of water application (every three hours) on access roads, stockpiles, and cleared areas will mitigate impacts from dust to a less than significant level. Landscaping shall be installed between the landfill and CA-SDI-313/4,356 will serve as a dust screen and will reduce visual impacts created by fugitive dust and landfill operations. The landscaping should be installed a sufficient distance from the project site so as not to create a fire hazard.	Field inspection	At time of field inspection	County Department of Environmental Health		
MM 4.11-6b	In addition to mitigation measures MM 4.11-6a, the applicant shall have a professional rock art conservator provide baseline data and periodically assess the condition of Medicine Rock. The method for monitoring shall be developed in consultation with the Pala Band of	Field inspection	Prior to any construction activities on site; and once every	County Department of Environmental Health		

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	Mission Indians and approved by County DEH. Baseline data shall be collected prior to any construction activity on the project site. Because the archaeological site is not located on the project site or on the Pala Reservation, implementation of the measure would require approval by the adjacent property owner.		six months during construction			
	4.12 ETHNOHISTORY & NATIVE AMERICAN INTERESTS					
MM 4.12-1a	Prior to commencement of operation of the landfill and as partial fulfillment of MM 4.1-2, the applicant shall either dedicate the portion of the site east of the landfill footprint and relocated SDG&E easement including the western slopes and the top of Gregory Mountain, as permanent open space or execute and convey a permanent open space easement over this area.	Execution of easement	Prior to operation of landfill	County Counsel and County Department of Environmental Health		
MM 4.12-1b	Prior to commencement of operation of the landfill the applicant shall execute and record an access easement to the Pala Band of Mission Indians from the western boundary of the land owned by the Pala Band of Mission Indians to the summit of Gregory Mountain. The access easement shall grant the Pala Band of Mission Indians the right to walk or hike only within the access easement area.	Recordation of access easement	Prior to operation of landfill	County Counsel and County Department of Environmental Health		
MM 4.12-1c	Should the Pala Band agree, the applicant shall, upon commencement of operation of the landfill, pay to the Pala Band of Mission Indians a fixed dollar amount as determined below. Such amount shall be used by the Pala Band to implement measures to enhance and improve access to Gregory mountain from the Pala Reservation. Such measures may include, but are not limited to, a new footpath, clearing of an existing footpath, or the marking of new footpath trail as determined by Pala in its sole discretion. Such dollar amount shall be equal to the estimated cost of restoring the footpath that previously existed from the eastern base of Gregory Mountain to the top of the mountain. This estimate shall be obtained by the applicant from a company experienced in restoring footpaths.	Letter from applicant	Prior to operation of landfill	County Department of Environmental Health		

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MM 4.12-1d	In addition to the construction of the trail, should the Pala Band agree, the applicant shall provide funding as needed for the annual maintenance of the trail from the eastern base to the top of the mountain during the operational life of the landfill.	Letter from applicant	Annual	County Department of Environmental Health		
MM 4.12-1e	The applicant shall postpone landfilling activities on the western slope of Gregory Mountain above the existing San Diego Gas & Electric transmission line for as long as its practically possible.	Letter from applicant	Annual	County Department of Environmental Health		
MM 4.12-2a	The applicant shall apply water on access roads, storage piles, and cleared areas in greater intervals, such as every three hours, during high wind periods to reduce the dust generated by vehicles.	Field inspection	At the time of field inspections	County Department of Environmental Health		
MM 4.12-2b	The applicant shall install landscaping between the landfill operations and Medicine Rock to create a dust screen. The landscape screen shall include shrubs and trees, such as manzanita and ceanothus.	Field inspection	Prior to operation of landfill	County Department of Environmental Health		
MM 4.12-3	The applicant shall monitor noise levels at the ridgeline during the relocation of the SDG&E transmission towers. If noise levels exceed 62.5 dBA L_{eq} at the ridgeline, the applicant shall implement some or all of the following measures to reduce the noise levels to below 62.5 dBA L_{eq}: • Build temporary noise barriers or berms between construction activities and the ridgeline. Design parameters (e.g., height, length, and location) for these temporary noise barriers or berms shall be determined by a qualified noise expert. • Reduce the amount or size of construction equipment. For example, equipment with smaller engines could be used. If the 62.5 dBA L_{eq} threshold is not exceeded, no action beyond monitoring shall be necessary.	Noise monitoring and written report by applicant's noise expert	During relocation of the transmission towers	County Department of Environmental Health		
MM 4.12-4	The project shall mitigate for the loss of ethnobotanical plants in southern willow scrub, mulefat scrub, cotton-willow riparian forest, and native perennial grassland by the creation of in-kind habitats on the landfill site that include ethnobotanical species listed in Appendix O. This revegetated habitat shall be incorporated into the Habitat Enhancement Plan and/or the dedicated open space areas. Before the	Letter from applicant's biologist	Prior to construction activities	County Department of Environmental Health		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION	
					INITIALS	DATE
	mitigation plans for these areas are finalized, the Tribe would have the opportunity to provide input concerning the selection of specific ethnobotanical resources. In addition, the Tribe shall be given the opportunity to provide input regarding the location of the in-kind habitats to ensure that tribal members have adequate access to the areas					
	4.13 AESTHETICS					
MM 4.13-1	As required by Proposition C, an overall conceptual landscape treatment plan shall be prepared by a licensed landscape architect and a qualified biologist incorporating the detailed measures for each project element as indicated in MM 4.13-2 through MM 4.13-10. The conceptual landscape plan is shown in Exhibit 4.13-18. The plan shall address the timing of the installation of each element. The elements shall be implemented so as to provide the necessary screening but also to allow efficient operation of the project. The landscape treatment plan shall be approved by the Department of Environmental Health prior to the operation of the landfill.	Landscape plan	Prior to operation of landfill	County Department of Environmental Health		
MM 4.13-2a	Existing trees and shrubs along SR 76 shall be saved and supplemented by like species and other fast growing trees to create a naturally landscaped transportation corridor through the property, where appropriate to screen the landfill. All on-site highway frontage along the south side of SR 76, shall be planted with a minimum 20-foot wide screen of native or indigenous trees and shrub species The applicant's landscape architect shall verify to the County Department of Environmental Health in writing within two years of commencement of the landfill operation that this measure has been implemented.	Letter from applicant's landscape architect	Two years after commencement of operation of landfill	County Department of Environmental Health		
MM 4.13-2b	Major tree groupings and transplants as well as native revegetation and rock outcrop placement shall be completed along the edges of the landfill. The placement shall not be too far out from the sides of the landfill, taking into consideration the drainage and settlement of the landfill. A transitional blending of the flat landfill face shall be undertaken along the bottom and perimeter edges where it meets the existing terrain. Large boulders and trees could be placed to resemble the ribbon of oak woodland impacted by the landfill. Tree groupings	Letter from applicant's landscape architect	After installation as determined in landscape plan	County Department of Environmental Health		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
	could be placed in groves below existing swales that contain oaks and sycamores. This extension of natural vegetation communities would help break the geometric lines of the landfill and would help the face blend with the surrounding hillsides. The applicant's landscape architect shall verify to the County Department of Environmental Health in writing after implemented as determined in the landscape plan.					
MM 4.13-2c	Permanent slopes shall be stabilized with appropriate native plant seed mix and container stock around the edges. In some cases, where phasing may result in changes and/or transitions to the slopes, more temporary erosion control techniques could be utilized. The County Department of Environmental Health shall field verify implementation of this measure.	Field verification	At time of field inspections	County Department of Environmental Health		
MM 4.13-2d	Any landfill slope that would remain unchanged beyond one full year shall be hydroseeded or revegetated. Revegetation shall take into account the contrast, color, and texture so that it can blend back into the local setting. The County Department of Environmental Health shall field verify implementation of this measure.	Field verification	At time of field inspections	County Department of Environmental Health		
MM 4.13-2e	Drainage and methane extraction structures and pipes shall be painted or be made of materials that fit into the local color environment and that match adjacent textures. Painting of the structures, pipelines and other facilities associated with surface drainage, subsurface drainage and methane gas control would help blend them into the background of the areas that they are traversing. At the time of installation of the drainage and methane extraction structures and pipes, the operator shall provide a letter to the San Diego Air Pollution Control District and the County Department of Environmental Health indicating that the measure has been implemented.	Letter from landfill operator	At time of installation of drainage and methane extraction structures and pipes	San Diego Air Pollution Control District and County Department of Environmental Health		
MM 4.13-2f	Brow ditches shall be constructed with outside bench lips slightly higher than inside edges. Culverts and other pipelines connecting brow ditches shall be painted to blend with landfill slopes. Integral or stained color shall be used on all brow ditches. A natural brown, beige or sand colored staining shall be used so that the ditch will not contrast	Letter from landfill operator	At time of installation of brow ditches, culverts and pipelines	County Department of Environmental Health		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
	with adjacent colors. Painting of miscellaneous structures shall use a variety of colors that match the revegetation patch and soil color that the pipeline is going through. At the time of installation of the brow ditches, culverts and pipelines, the operator shall provide a letter to the County Department of Environmental Health indicating that the measure has been implemented.					
MM 4.13-2g	The applicant shall explore the feasibility of obtaining a landscape easement along SR 76 to the west of the site on the adjacent property or the Caltrans right-of-way as shown on Exhibit 4.13-17 of the Final EIR. The easement, if obtained, shall be planted with a screen of native or indigenous trees and shrub species to create a naturally landscaped transportation corridor similar to the screening on the project site. The landscaping shall provide screening of the landfill for drivers traveling west along SR 76 towards the site.	Written correspondence from applicant demonstrating good faith effort	Prior to commencement of operation	County Department of Planning and Land Use		
MM 4.13-3	The benches and lifts shall be graded to minimize the significant landform quality impact. Blending of created landforms with adjacent landforms can be achieved by manipulating the landform to resemble or meld with its surroundings, planting to create the pattern resembling the adjacent vegetation matrix and its colors, and incorporating boulders into the final grades to create the rocky texture of the surrounding hillsides. The County Department of Environmental Health shall field verify implementation of this measure.	Field verification	At time of field inspections	County Department of Environmental Health		
MM 4.13-4	Areas within public view, such as along SR 76, adjacent to the facility area or within the abandoned Lucio Dairy parcels, shall be revegetated to mitigate for the loss of visual resources in accordance with the landscape plan (MM 4.13.1). The revegetation shall contain both oak woodland habitats and riparian plantings. Wherever possible, boulders and rock outcrops should be relocated from disturbed areas to replanted areas. The plan shall incorporate and compliment the mitigation for biological resources (Section 4.9). The revegetation shall be implemented within two years after the commencement of the landfill operation.	Landscape plan	Two years after commencement of operation of the landfill	County Department of Environmental Health		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
MM 4.13-5	Large riparian trees along with the associated understory found within these riparian zones shall be planted along the access road and bridge to screen the project elements and the excavation in accordance with the landscape plan (MM 4.13.1). The plan shall incorporate and compliment the mitigation for biological resources (Section 4.9). Landscaping shall be installed immediately after completion of the access road and bridge and implementation of this measure shall be verified in writing to the County Department of Environmental Health by the applicant's landscape architect.	Letter from applicant's landscape architect	Immediately after completion of the access road and bridge	County Department of Environmental Health		
MM 4.13-6a	In consultation with the landfill engineer, rock outcrops removed from the landfill footprint shall be placed in strategic locations around the facilities area. Implementation of this measure shall occur after completion of the facilities area or in accordance with the landscape plan (MM 4.13.1). Completion of this measure shall be verified in writing to the County Department of Environmental Health by the applicant's landscape architect.	Letter from applicant's landscape architect	After completion of facilities area or in accordance with the landscape plan (MM 4.13-1)	County Department of Environmental Health		
MM 4.13-6b	Areas adjacent to the ancillary facilities area and next to the water tank shall be planted with mature trees in major tree groupings to screen visual access to those structures. In addition, disturbed slopes shall be revegetated with native species. These concepts and the timing of implementation shall be incorporated into the landscape plan (MM 4.13.1). Completion of this measure shall be verified in writing to the County Department of Environmental Health by the applicant's landscape architect.	Letter from applicant's landscape architect	After completion of facilities area or in accordance with the landscape plan (MM 4.13-1)	County Department of Environmental Health		
MM 4.13-6c	The facilities and miscellaneous structures shall be painted or be made of materials that fit into the local color environment and shall also match adjacent textures. Implementation shall be field verified by the County Department of Planning and Land Use—Building Division after construction of the facilities area.	Building permit/ Plan review	After construction of facilities area	County Department of Planning and Land Use—Building Division		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
MM 4.13-7	Landscape plans shall include vegetative screening on the side slopes and in areas below the crest to hide the grading for the western desilting basin. Landscaping shall be installed after completion of the western desilting basin. The applicant's landscape architect shall verify in writing to the County Department of Environmental Health that this measure has been implemented.	Letter from applicant's landscape architect	After installation of western desilting basin	County Department of Environmental Health		
MM 4.13-8a	Landform screening shall be implemented, including major tree groupings, at the edges of the Borrow/Stockpile Area A to help block the views of the area. The Department of Environmental Health shall field verify the implementation of this measure after commencement of operation.	Letter from applicant's landscape architect	After closure of Borrow/Stockpile Area A	County Department of Environmental Health		
MM 4.13-8b	The project grading plan shall include contouring of landforms to help blend the general forms of land masses on part of the lower stockpile areas. Gentle grading and curvilinear shapes shall be used to help blend top and side slopes in with the natural topography. Large, undifferentiated, flat slopes shall be avoided. The Department of Environmental Health shall field verify the implementation of this measure after commencement of operation.	Field verification	At the time of field inspections after commencement of operation	County Department of Environmental Health		
MM 4.13-8c	After initial construction, Borrow/Stockpile Area A shall be revegetated. Contrast, texture, and color matching shall be achieved in all revegetation. All areas shall be replanted with native plant materials that will decrease the amount of value and color contrast with surrounding areas. The Department of Environmental Health shall field verify the implementation of this measure after commencement of operation.	Field verification	At the time of field inspections after closure of Borrow/Stockpile Area A	County Department of Environmental Health		
MM 4.13-9a	The project grading plan shall include contouring of landforms to help blend the general forms of land mass on part of the upper stockpile areas. Gentle grading and curvilinear shapes shall be used to help blend top and side slopes in with the natural topography. Large, undifferentiated, flat slopes or pads shall be avoided. Leading edge landforms shall be created within the first two years of the creation of Borrow/Stockpile Area B to help block the views of the working face of the stockpile. The Department of Environmental Health shall field	Field verification	At the time of field inspections after commencement of use of Borrow/Stockpile Area B	County Department of Environmental Health		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
	verify the implementation of this measure after commencement of use of Borrow/Stockpile Area B.					
MM 4.13-9b	If a stockpile landform were to remain beyond one full year, the area shall be hydroseeded or other revegetation efforts undertaken. Contrast, texture, and color matching shall be achieved in all revegetation. All areas shall be replanted with native plant materials that will decrease the amount of value and color contrast with surrounding areas. Temporary revegetation of slopes shall also be used to reduce contrast, insofar as the proper colors and textures are utilized in the plant selection process. The Department of Environmental Health shall annually field verify the implementation of this measure after commencement of use of Borrow/Stockpile Area B.	Field verification	Annually upon commencement of use of borrow/stockpile areas	County Department of Environmental Health		
MM 4.13-9c	Landform screening shall be planted, including major tree groupings, at the edges of the Borrow/Stockpile Area B to screen the area from view. After installation as determined in the landscape plan (MM 4.13.1), the applicant's landscape architect shall verify implementation of this measure in writing to the Department of Environmental Health.	Letter from applicant's landscape architect	After installation as determined in landscape plan	County Department of Environmental Health		
MM 4.13-10	In consultation with SDG&E, the applicant shall minimize the pad areas needed for the relocated powerline towers. Related cut slopes shall be permanently revegetated and landform grading techniques shall be used to blend the pads in with adjacent landforms. The cut face of these pads shall be sculpted to allow rock outcrops to remain and be prominent. Additional rock outcrops shall be placed where they do not interfere with the access and maintenance requirements of the towers. The applicant's landscape architect shall provide a letter to the County Department of Environmental Health verifying that these measures shall be implemented prior to the relocation of the towers.	Letter from applicant's landscape architect	Prior to relocation of transmission towers	SDG&E and County Department of Environmental Health		
MM 4.13-11	If the landfill face is disturbed to repair any surface cracking, settlement, and/or surficial slumping, the area shall be recontoured to match the approved contours and the area shall be revegetated immediately, using the approved plant palette in the Final Closure Plan (see Table 3-5 of the EIR for a plant species list), after the completion of the repair work.	Letter from applicant's engineer and landscape architect	After the completion of the repair work	County Department of Environmental Health		

TABLE 10-2
MITIGATION MONITORING AND REPORTING PROGRAM
PROPOSITION C MEASURES

Gregory Canyon Landfill
Proposition C Measures
Mitigation Monitoring and Reporting Program

Proposition C Mitigation Measure No.	Mitigation Measure	Method of Verification	Timing of Verification	Responsible Party	Verification of Completion Initials	Date
	Land Use					
MM4.1.C5A	*The solid waste facilities shall remain open for the receipt of refuse a minimum of eight (8) hours a day, six (6) days a week, excepting those holidays observed by County-owned landfills.*[1]	Field Verification	At the time of field inspections	County Department of Environmental Health		
MM 4.1.C5B	*Solid waste operation shall occur only between the hours of 7:00 AM and 6:00 PM, Monday through Friday, and 8:00 AM and 5:00 PM on Saturday unless different hours are established by the Integrated Waste Management Board.*[2] *For the purposes of this mitigation measure "solid waste operations" shall include the receipt, handling, processing, and/or disposal of solid waste or recyclable materials; cover operations; site grading and/or excavation, including blasting and rock crushing; and heavy equipment operation. Other site activities such as the operation of gas and leachate collection and treatment systems, remedial activities required by a regulatory agency, maintenance within the maintenance yard, and activities conducted in a completely enclosed building shall not be limited to these hours of operation.*	Field Verification	At the time of field inspections	County Department of Environmental Health		
MM 4.1.C5Q	*A Citizen Environmental Review Board (the "Board") shall be established by agreement between the Applicant and the cities or other governmental entities agreeing to supply waste to the Project. The members of such Board shall be appointed by each such city or entity and shall be individual citizens who are not employees or officials of such city or entity. The Board shall have the authority to inspect and review all reports submitted by the Project to any other regulatory agency and to make recommendations to any such regulatory agency with respect to the operation of the Project, including any enforcement actions the Board may deem appropriate. The Board shall establish an*	Letter from applicant	After commencement of operation when at least five (5) public agencies execute waste supply agreements with the operator	County Department of Environmental Health		

1 *Effective October 31, 1998, there are no County-owned landfills. Since this measure was contained in Proposition C, it is provided verbatim.*
2 *Although stated this way in Proposition C, the Local Enforcement Agency, which is County DEH, will be the agency regulating and enforcing hours of operation.*

PROPOSITION C MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
	environmental review team consisting of qualified personnel to monitor the operations of the landfill which team shall have reasonable access to the landfill during all hours of operation of the landfill.					
	Geology and Soils					
MM 4.2.C5H	*All structures located at the Gregory Canyon site shall be designed by a qualified engineer to withstand the maximum probable earthquake, to avoid potential impacts associated with earthquakes and ground shaking.*	Plan review	Prior to issuance of building permit	Department of Planning and Land Use—Building Division		
	Hydrogeology & Surface Hydrology					
MM 4.3.C5E	*A liner and leachate collection system shall be installed and monitored as required by the Regional Water Quality Control Board.*	Joint technical document; field verification and reporting by applicant's hydrogeologist	Phased installation of liner—verification as needed	Regional Water Quality Control Board		
MM 4.3.C5G	*The project shall comply with all requirements of the Regional Water Quality Control Board to ensure protection of surface and underground water quality.*	Joint technical document; field verification and reporting by consultant	Phased implementation of regulations—as needed	Regional Water Quality Control Board		
	Traffic and Circulation					
M 4.5.C5I	*In order to mitigate traffic impacts, the Applicant shall widen and realign State Route 76 on either side of the access road to improve sight distance and to facilitate truck movements. The realigned segment will provide approximately 1,000 feet of sight distance in both directions for traffic leaving the landfill. The Applicant shall contribute on a fair share basis to the widening of State Route 76 west of the access road to applicable state standards. The fair share shall be based upon the state standard average daily trips. Striping will be provided for acceleration/*	Field verification of SR 76 improvements identified in the project description	Prior to acceptance of solid waste	Caltrans and County Department of Public Works		

PROPOSITION C MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION	
					INITIALS	DATE
	deceleration lanes and an over-take lane for through traffic. These realignment plans may be modified as necessary to meet Caltrans requirements.					
	Noise and Vibration					
MM 4.6.C5K	*The applicant shall prepare a Noise Abatement Plan to include:* • *Physical design provisions to ensure that ambient noise levels do not exceed 65 CNEL at the boundaries of the Gregory Canyon site.* • *Installation of landfill equipment and vehicles with noise suppressing equipment to assist in meeting the above restrictions.*	Joint technical document; written plan by applicant; written report by applicant's noise expert after testing; letters prior to blasting	Annual report	County Department of Environmental Health		
	• *Provisions for at least 24-hour in advance written notice of any blasting on-site to residents within a one-mile radius of the blast site.* *Where ambient noise levels exceed 65 CNEL at the boundaries of the Gregory Canyon site, the applicant shall retain a qualified noise expert to evaluate the problem and recommend mitigation measures. These mitigation measures will be implemented by the applicant.*		Letters prior to blasting	Sheriff's Department and County Department of Environmental Health (Blasting)		
	Air Quality					
MM 4.7.C5F	*The Project shall include a network of vertical extraction wells, lateral transmission pipes to a gas recovery facility, and perimeter gas monitoring probes. With this system, the landfill gas will be extracted from the landfill and combusted in an enclosed flare.*	Plan review	Prior to issuance of a permit for gas recovery system	San Diego Air Pollution Control District		

PROPOSITION C MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION	
					INITIALS	DATE
MM 4.7.C5J	*Air quality impacts associated with the Project shall be mitigated by meeting all requirements imposed by the San Diego Air Pollution Control District for the Authority to Construct and Authority to Operate permits.*	Plan review	Prior to issuance of Authority to Construct and Authority to Operate permits	San Diego Air Pollution Control District		
MM 4.7.C5L	*To control odors on-site, the Applicant shall submit an Odor Control Plan to the San Diego County Air Pollution Control District for review and approval.*	Written plan	Prior to acceptance of solid waste	San Diego Air Pollution Control District		
MM 4.7.C5M	*To control dust from Project operations, the Applicant shall submit a Dust Control Plan to the San Diego County Air Pollution Control District for review and approval.*	Written plan	Prior to acceptance of solid waste	San Diego Air Pollution Control District		
	Biological Resources					
MM 4.9.C5N	*All sensitive species and habitat impacted by the Project shall be mitigated in accordance with requirements imposed by the United States Fish & Wildlife Service as part of the Section 7 consultation.*	Biological opinion	Prior to issuance of grading permit	U.S. Department of Interior (U.S. Fish and Wildlife)		
MM 4.9.C5C	*At least five (5) days each week, the Applicant shall inspect for, and clean up, all litter and illegal dumping which occurs on, or adjacent to, the landfill access road and that portion of SR 76 between the intersection with Interstate 15 and the site. The clean up team shall consist of at least one truck with a minimum crew of two persons.*	Field verification	At the time of field inspections	County Department of Environmental Health and Department of Planning and Land Use—Codes Division		
	Ethnohistory and Native American Interests & Archaeological and Cultural Resources					
MM 4.11.C5P & MM4.12.C5P	*Impacts to Native American resources impacted by the Project shall be mitigated through the development of a Memorandum of Agreement between the Applicant and the appropriate regulatory agencies in accordance with Section 106 of the National Historic Preservation Act.*[3]	Memorandum of Agreement only if Section 106 applies	Prior to issuance of grading permit	State Historic Preservation Office		

[3] *Section 106 consultation under the NHPA, if and to the extent required, will occur with issuance of the nationwide permit.*

PROPOSITION C MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
	To mitigate archaeological impacts caused by the Project, the Applicant shall retain a qualified archaeologist to investigate and recommend appropriate mitigation measures. These mitigation measures shall be implemented by the Applicant.	Letter from applicant's cultural expert	Prior to certification of the Final EIR or prior to or during construction as stated in mitigation measures 4.11-1 through 4.11-7	County Department of Environmental Health		
	Aesthetics					
MM 4.13.C5O	*In order to mitigate visual impacts associated with the Project, the Applicant shall employ extensive use of landscaping emphasizing native vegetation, and rounding/undulation of slopes on the refuse column and changes in slope angles. All landscaping shall be performed by a licensed landscape architect in the State of California. This licensed architect shall prepare a detailed landscape plan designed to minimize visual impacts associated with the Project to the maximum feasible extent. The plan prepared [by] the licensed architect shall be implemented by the Applicant upon completion.*	Landscape plan prepared by applicant's landscape architect	Prior to commencement of operation	County Department of Environmental Health		
	Human Health and Safety					
MM 4.16.C5C	*At least five (5) days each week, the Applicant shall inspect for, and clean up, all litter and illegal dumping which occurs on, or adjacent to, the landfill access road and that portion of Highway 76 between the intersection with Interstate 15 and the site. The clean up team shall consist of at least one truck with a minimum crew of two persons.*	Field inspection	At the time of field inspections	County Department of Environmental Health		
MM4.16.C5D	*The Applicant shall maintain trained, full-time personnel engaged exclusively and continuously in the inspection of incoming refuse loads for hazardous waste. These personnel shall be stationed at the working face of the landfill whenever the landfill is open to accept waste and shall inspect loads as they are tipped. Hazardous wastes encountered in this fashion shall be handled and disposed of in accordance with state regulations.*	Field inspection	At the time of field inspections	County Department of Environmental Health		

Proposition C Mitigation Measure No.	Mitigation Measure	Method of Verification	Timing of Verification	Responsible Party	Verification of Completion Initials	Date
MM 4.16.C5F	*The Project shall include a network of vertical extraction wells, lateral transmission pipes to a gas recovery facility, and perimeter gas monitoring probes. With this system, the landfill gas will be extracted from the landfill and combusted in an enclosed flare.*	Plan review	Installation of extraction wells, transmission pipes and perimeter gas monitoring probes when determined appropriate	San Diego County Air Pollution Control District		

TABLE 10-3
MITIGATION MONITORING AND REPORTING PROGRAM
FIRST SAN DIEGO AQUEDUCT RELOCATION OPTION

Gregory Canyon Landfill
First San Diego Aqueduct Relocation Option
Mitigation Monitoring and Reporting Program

Mitigation Measure No.	Mitigation Measure	Method of Verification	Timing of Verification	Responsible Party	Verification of Completion Initials	Date
	4.4 Surface Hydrology					
MM 4.4-1	If relocation of the First San Diego Aqueduct pipelines is implemented, the applicant shall design and engineer the relocation so that no flood related impacts to the pipelines would occur, in accordance with SDCWA approval. Alternately, the relocation shall be adjusted to avoid placement of the pipelines within the 100-year floodplain.	Agreement with SDCWA	Prior to First San Diego Aqueduct Relocation Option construction	SDCWA		
	4.7 Air Quality & Air Toxics Health Risks					
MM 4.7-3	The construction contractor responsible for the relocation of the First San Diego Aqueduct shall implement the following measures: • Use water trucks to keep all areas of vehicle movement sufficiently damp to prevent the raising of dust by travel; • Wet down the site in the late morning and after work is complete for the day; • At least once per day wet down non-active construction areas that have not be reseeded to minimize windblown dust; • As soon as feasible, re-establish groundcover on areas disturbed by construction through seeding and watering those areas that will not be disturbed for extended periods (e.g., two months or more); • Reduce traffic speeds on all unpaved road surfaces to no more than 15 miles per hour; and • Maintain construction equipment engines by keeping them tuned in accordance with manufacturers specifications.	Field verification	Field inspection during First San Diego Aqueduct Relocation Option construction	San Diego Air Pollution Control District		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS DATE	
	4.9 BIOLOGICAL RESOURCES					
MM 4.9a	A pre-construction meeting shall take place with a qualified biologist and construction personnel. The biologist shall explain the access restrictions on site, the importance of remaining within construction zones, the sensitivity of the habitats and species on site, and shall explain the potential consequences of violating the access restrictions and impacting biological resources outside the construction zones. Any accidental impacts to sensitive habitat occur outside the designated impact area shall be mitigated at a 3:1 ratio. A letter from the applicant's biologist and contractor(s) verifying receipt of biological information shall be provided to the County Department of Environmental Health prior to commencement of construction.	Letter from applicant's contractor(s) verifying receipt of biological information	Prior to commencement of construction	County Department of Environmental Health		
MM 4.9-19a	The construction easement (minus permanent access road) shall be revegetated with coastal sage scrub immediately following completion of the pipeline relocation on the landfill site. The landscape plans shall incorporate this revegetation requirement.	Preparation of landscape plans	Prior to commencement of construction	County Department of Environmental Health and Department of Planning and Land Use		
MM 4.9-19b:	Impacts to coastal sage scrub shall be mitigated at a minimum ratio of 2:1 through off-site acquisition of 19.0 acres of coastal sage scrub. The off-site acquisition may occur anywhere within the unincorporated area of San Diego County and a conservation easement shall be placed on the mitigation area to permanently protect the resource. Off-site acquisitions may occur either through a direct purchase or through mitigation credits from a habitat manager, mitigation bank, or environmental group. The landfill operator shall	Recordation of conservation easement; submittal of Habitat Resource Management Plan	Prior to commencement of construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
	prepare and submit for approval a Habitat Resource Management Plan or equivalent with respect to on-site dedicated open space, or created or enhanced habitat areas.			Department of Planning and Land Use		
MM 4.9-19c	Coast live oak woodland shall be mitigated at a 3:1 ratio by the off-site acquisition of 2.4 acres of existing coast live oak woodland of like quality. The off-site acquisition shall occur in an unincorporated area of San Diego County. A conservation easement shall be placed across the off-site mitigation area to permanently protect the resource. If possible, individual oak trees shall be salvaged from the impact area and transplanted to appropriate open space habitat on the landfill site. The implementation of this mitigation shall be prior to or concurrent with construction or as otherwise determined in consultation with the County.	Letter from Applicant's biologist	Prior to commencement of construction	County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-19d	Temporary construction fencing shall be erected under the supervision of a qualified biologist outside the delineated boundary of dedicated open space (Figure 3b) where it interfaces with impact areas. Where impact areas are adjacent to coast live oak woodland, fencing shall be erected outside the canopy area at a distance of 1.5 times the canopy radius of the outer trees. This fencing shall be erected prior to commencement of brushing or grading activities. The fencing (for example, strand wire or split rail) shall restrict human and equipment access but shall allow for wildlife movement.	Letter from applicant's biologist/field verification	Prior to commencement of brush clearing or grading	County Department of Environmental Health		
MM 4.9-19e	Impacts to potential arroyo southwestern toad upland habitat from the relocation of the pipelines shall be mitigated through the Wetland Mitigation and Habitat Enhancement Plan to be implemented as part of the landfill project.	Preparation and acceptance of habitat enhancement plan	Prior to construction	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environ-		

Mitigation Measure No.	Mitigation Measure	Method of Verification	Timing of Verification	Responsible Party	Verification of Completion Initials	Date
				mental Health and County Department of Planning and Land Use		
MM 4.9-19f	Temporary erosion control measures such as silt fencing, sand bags, and straw matting shall be used to reduce potential siltation of drainage courses including the San Luis Rey River.	Preparation of erosion control plan	Prior to commencement of construction	County Department of Environmental Health and Department of Planning and Land Use		
MM 4.9-19g	The pipeline easement shall be fenced within two kilometers of the San Luis Rey River with exclusion fencing to prevent arroyo southwestern toad access to the construction zone. The fencing shall be a silt-screen type barrier comprised of a minimum 24-inch high fence with the remainder (minimum 12 inches) anchored firmly against the ground. The fence may be buried if necessary to exclude toad access. The fence locations shall be identified by a qualified biologist and adjusted as necessary. Exclusion fencing shall be monitored by a qualified biologist and maintained in its original condition by construction personnel for the entire length of the construction period.	Letter from applicant's biologist based on field verification	Prior to commencement of construction of bridge	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-19h	Pre- and post- exclusion fencing surveys within the construction zone shall be conducted for arroyo southwestern toads by a biologist permitted by the USFWS to handle the toad. Prior to construction commencement, a minimum of three surveys shall be conducted by this biologist following installation of the fencing. Any toads found shall be relocated to appropriate similar habitat outside project impact areas and in dedicated open space on the landfill site.	Written report from biologist permitted by U.S. Fish and Wildlife Service to handle toad	Prior to construction, minimum of 3 surveys following installation of the fencing, then daily surveys before construction begins	U.S. Fish and Wildlife Service, California Department of Fish and Game, County Department of Environmental Health		

MITIGATION MEASURE NO.	MITIGATION MEASURE	METHOD OF VERIFICATION	TIMING OF VERIFICATION	RESPONSIBLE PARTY	VERIFICATION OF COMPLETION INITIALS	DATE
				and County Department of Planning and Land Use		
MM 4.9-19i	The trench dug for relocation of the pipelines shall be securely covered at the end of construction each day such that wildlife does not become trapped in the trench.	Field verification by applicant's biologist	Daily during construction within 2 km of river	County Department of Environmental Health and County Department of Planning and Land Use		
MM 4.9-19j	Construction noise shall not result in exceedances of 60 dB(A) L_{eq} on least Bell's vireo and southwestern willow flycatcher habitat between March 15 and September 15 unless noise attenuation measures designed by an acoustician are implemented to reduce noise levels in vireo/flycatcher habitat to below 60 dB(A) L_{eq}.	Construction contract addressing timing or noise analysis prepared by applicant's noise specialist	Daily between March 15th and September 15th during initial construction. If noise barriers are required, weekly monitoring to ensure their effectiveness	County Department of Environmental Health and County Department of Planning and Land Use		
	4.13 AESTHETICS					
MM 4.13-12a	Disturbed areas shall be graded to blend the area with the existing landform. Gentle grading and curvilinear shapes shall be used to help blend slopes in with the natural topography. Large, undifferentiated, flat slopes or pads shall be avoided. The applicant's landscape architect shall provide plans to SDCWA for review and approval. County Department of Environmental Health shall field verify implementation of this measure.	Letter from Applicant's landscape architect; field verification	During First San Diego Aqueduct Relocation Option construction	County Department of Environmental Health; SDCWA		
MM 4.13-12b	After construction, disturbed areas within and around the SDCWA aqueduct easement shall be revegetated with native	Letter from Applicant's landscape architect; field	After First San Diego Aqueduct Relocation	County Department of Environ-		

Mitigation Measure No.	Mitigation Measure	Method of Verification	Timing of Verification	Responsible Party	Verification of Completion Initials	Date
	species in accordance with an approved landscape treatment plan. County Department of Environmental Health shall field verify implementation of this measure.	verification	Option construction	mental Health; SDCWA		
MM 4.13-12c	Aqueduct portals and air vents shall be designed to blend in with the landscape through the use of a variety of colors that match the revegetation patch and soil color that the facility is going through. County Department of Environmental Health shall field verify implementation of this measure.	Letter from Applicant's landscape architect; field verification	After First San Diego Aqueduct Relocation Option construction	County Department of Environmental Health; SDCWA		

PROJECT DESIGN FEATURES EXCERPTED FROM FINAL EIR, REVISED FINAL EIR, AND EIR APPENDICEES

PROJECT DESIGN FEATURES
EXCERPTED FROM FINAL EIR, REVISED FINAL EIR, AND EIR APPENDICES

The following is a summary of the project design features that are incorporated into the project. The section headings refer back to the sections in the CEQA documents.

4.2 Geology and Soils

- The engineered drainage system for the project includes desilting basins to control soil erosion and siltation.
- Reinforced slabs will be placed over the aqueduct easement so that earth-moving equipment places no weight on the pipelines while crossing the easement.
- A pre-blast survey will be conducted by a qualified geologist to identify areas of potential rockfall concern. Identified isolated rock masses will be removed as necessary if deemed insecure.
- Natural vegetation will be maintained to the maximum extent possible. Diversion structure(s) will be constructed within Basin 1 prior to the start of grading activities where debris flow risk is anticipated.

4.3 Hydrogeology

- A composite liner and leachate collection system will be installed and monitored as required by the RWQCB. The performance of the landfill will be monitored with the subdrain and groundwater monitoring systems. The subdrain system will be constructed to collect and control groundwater that intersects the subgrade surface. The subdrain system will serve to maintain the separation of five feet between the refuse and groundwater required by federal regulations (40 CFR, Subtitle D, Part 258). The subdrain system will be monitored for the presence of contamination in accordance with the WDR parameters. Monitoring procedures will also be designed consistent with the requirements of the RWQCB.
- The water quality monitoring system will include the installation of monitoring wells at both upgradient (background) and downgradient (point of compliance) locations to the landfill and surface water sampling points both upstream (background) and downstream of the landfill as required by Section 20415 (b) of the Title 27 CCR.
- The project incorporates a combination of engineering controls, (e.g., interim covering of the refuse, suitable slopes for efficient drainage, culverts), and a water quality monitoring program, to ensure that water quality is adequately protected.

- A reverse osmosis (RO) system will be installed in the southwestern portion of the ancillary facilities area. The RO equipment and interconnecting piping will be constructed above ground inside a concrete containment area with a slatted chain link fence around the area. The RO system will be sized to process 50 gpm (although the housing will be sized to allow for a larger system).
- Two 10,000-gallon leachate collection storage tanks will be located in the southwestern portion of the ancillary facilities area. The collection tanks will be monitored for capacity at least once per day.
- Water discharge from the subdrain system will be collected in a 10,000-gallon holding tank in the southwest portion of the ancillary facilities area. Although greater volumes are not anticipated, if needed, additional above ground tanks will be added to collect all of the subdrain system water. Subdrain system drainage water will be reused on-site or may be discharged to the San Luis Rey River only after tests determine the water is not contaminated in accordance with the NPDES permit. Any contaminated water will be treated at the landfill by the on-site reverse osmosis system for on-site use or transported to an appropriate off-site disposal facility.

4.4 Surface Hydrology

- Excavation in the river channel will be implemented upstream and downstream of the new bridge to maintain the 100-year flood elevations at or below existing levels.
- The proposed bridge structure will be founded on deep pile-supported foundations to protect against potential stream scour effects. Standard seat type abutments on pile footing, and five intermediate bents will be used to support the bridge superstructure. Seat type abutments will be protected from local scour by a surrounding blanket of rock slope protection and deeply founded concrete piles.
- To reduce scouring, rip-rap or some other protective material (gabions, armorflex, etc.) will be used at the bridge abutments. It may also be placed at the low flow culvert at the south end of the bridge structure, and in limited areas along the banks of the access road south of the bridge. (The exact location of rip-rap placement will be determined during the final engineering design phase.)
- Sediment and erosion will be controlled with BMPs.
- The landfill working face and stockpile/borrow areas have been designed to direct runoff away from the landfill working face. On-site drainage features are designed to control stormwater that falls on the landfill and surrounding support facilities. The berm around the landfill deck perimeter would intercept stormwater flows and direct water into the downdrains which would convey the flows to perimeter channels. Water in the perimeter channels will flow into one of two desilting basins and will be tested prior to discharge to the San Luis Rey River.
- Before each rainy season, after each major storm, and monthly during the rainy season, all drainage facilities will be inspected and any required maintenance performed to ensure that the drainage channels and desilting basins function properly.

4.5 Traffic and Circulation

- SR 76 will be improved at the access road as shown on Exhibit 3-6 to provide an eastbound deceleration lane and a westbound left-turn lane and to improve sight distance per Caltrans requirements. The improvements, which are approximately 1,700 linear feet, will realign SR 76 to the south of the existing alignment and will widen the roadway to 52 to 64 feet.
- Non-regulatory signs will be posted on Maranatha Drive cautioning drivers about the school activities and the presence of children, if not installed by the school.*
- Construction traffic to complete the improvements at the Reservoir Site and recycled water trucks will be prohibited from using Maranatha Drive from 6:45 A.M. to 8:15 A.M. and from 2:30 P.M. to 4:15 P.M. daily on days when the Maranatha School is in session.*
- The installation of a traffic signal at the intersection of SR-76 and the landfill access road subject to the approval of Caltrans.
- Recycled water truck drivers may only utilize Maranatha Drive, Camino del Norte/Camino del Sur between Maranatha Drive and I-15, I-15 between Camino del Norte and SR-76 and SR-76 east of I-15 and the landfill access road.

* No longer applicable, recycled water will not be provided by Olivenhain Municipal Water District.

4.6 Noise and Vibration

- The project includes the preparation of a blasting plan which will incorporate the following measures:
  - Blasting operations will be performed in accordance with criteria adopted in San Diego County Water Authority design procedure manual 02229-3 (February 1995). Blasting will not occur within 500 feet of the existing pipelines 1 and 2, unless approved by SDCWA.
  - All drilling and blasting operations shall be conducted by a State-licensed blasting contractor with adequate blasting insurance.
  - Seismograph instrumentation will be placed along the aqueduct alignment in the vicinity of any blasting operations.
  - All drilling and blasting will be performed during hours designated by local, State, or federal ordinances.
  - Monitoring of the blasting operations within close proximity to the SDG&E towers will be performed to verify that peak vibration levels and U.S. Bureau of Mines RI 8507 standards are not exceeded.
  - Blasting operations will not occur within 150 feet of the SDG&E towers.
- Rock crushing or tire shredding will be located a minimum of 1,500 feet from locations 1 through 5 (Exhibit 4.6-4) unless other forms of noise attenuation, such as

berms or acoustical curtains, are used to reduce combined landfill noise levels to below 62.5 dBA Leq.

- Written notice to residents within a one-mile radius of the blast site will be provided at least 24 hours in advance of any blasting on-site.
- A 15- to 20-foot high berm will be constructed and maintained along the northern boundary of Borrow/Stockpile Area A from the haul road westward wrapping around the western boundary of Borrow/Stockpile Area A during initial construction and during future operations. The base elevation of the berm would change whenever the elevation of the stockpile increases or decreases; however, the height relative to the stockpile would remain at 15- to 20-feet above the top of the stockpile.
- Five-foot high berms will be constructed along the southern edge of the Borrow/Stockpile Area B and the landfill working face, which face the residential zoned property south of Gregory Canyon Landfill. The berms shall block line of sight from the residential property to the heavy equipment working the southern portions of Borrow/Stockpile Area B and the landfill working face.
- A 10- to 16-foot high sound wall will be constructed along the northern edge of the facilities area and the truck route east of the facilities area.
- The flare station will be designed and located so that the flare does not generate noise levels that will exceed 49 dBA at a distance of 400 feet from the flare. Measures may include a sound wall at the base of the flare as well as any needed silencers on the equipment.

4.7 Air Quality and Air Toxics Health Risks

The following project design features from Section 4.7 and dust control measures from Section 3.5.8 shall be implemented:

- As needed, the landfill operator will wash off the tires of trucks and construction equipment after traveling on on-site unpaved roads.
- All unpaved haul roads shall be watered every two hours, unless the road surface appears visibly damp.
- The landfill operator will regularly sweep the paved portion of the site access road and water the paved portion of this road at least twice daily.
- The access road to the unloading area will be paved until the last 500 feet of the road, which will be unpaved.
- The unloading area will always be located adjacent to the active face or area where waste is being actively covered.
- Crushed rock will be used on the unpaved haul roads, which results in a two percent silt content on the unpaved roads.
- All on-site haul roads will be watered every two hours, unless the road surface appears to be visibly damp. This results in a 95 percent control efficiency for the haul roads (SDAPCD, 1996.

- Traffic speeds of no more than ten mph will be maintained on all on-site unpaved road surfaces, to prevent excessive PM10 emissions.
- The landfill operator will apply water and/or plant temporary vegetation on intermediate soil cover areas.
- The landfill operator will plant and maintain a vegetative cover on completed fill and excavation slopes.
- The use of tarps on commercial vehicles will be required.
- Water spraying of dusty loads during tipping will be performed.
- Groundcover on areas disturbed by construction will be re-established through seeding and watering those areas that will not be disturbed for extended periods (e.g., two months or more).
- The landfill operator will apply cover soil or approved ADC to the working face of the landfill on a daily basis.
- Alternative daily cover (ADC), such as synthetic tarps and processed green material (PGM) may be used at the project site, as feasible.
- The project design includes the installation of a gas recovery and flaring system and incorporate BACT for NOX control.
- The landfill operator will utilize Best Available Dust Control Technology to reduce diesel particulate emissions from on-site diesel equipment.
- The landfill operator will utilize on-site diesel equipment that meets California certified (post-1996) off-road engine requirements.

4.9 Biological Resources

Construction Features

- Dairy removal will occur as part of the initial construction phase, which will enhance wildlife foraging opportunities, remove a significant cowbird attractant and reduce existing edge effects adjacent to the river.
- Borrow/Stockpile Area A will only be used during the initial construction period and then during landfill closure beginning in approximately year 25 and will be revegetated with native species between use periods and after final landfill closure.
- The haul road to Borrow/Stockpile Area A will only be used during the initial nine-construction period and at final landfill closure beginning in approximately year 25. No improvements to the internal haul road are required; the only grading would occur where turnouts are proposed on the site plan.
- The low-flow crossing will only be used during initial construction (and would be abandoned following completion of the bridge) during daylight hours.
- Access road and bridge construction will occur during daylight hours when wildlife movement by species such as mammals is less frequent.

- The bridge pilings will be drilled in place, rather than driven, to minimize construction noise.
- Riparian habitat adjacent to the proposed bridge structure will only be cleared beneath and within 50 feet of the east side of the structure.
- Diversion structure placement to avoid impacts from debris flow will not occur during the eagle breeding season.

Operational Features

- The dedication of a minimum of 1,313 acres of land for permanent open space will occur prior to operation and the open space will be managed in perpetuity for the protection of sensitive habitat and species.
- Upon final closure, the remaining undedicated portions of the landfill site will be placed in open space in perpetuity.
- Excavation and filling of the landfill will be phased to minimize ground disturbance and will only occur during the operational hours of the landfill.
- Native vegetative cover will be established on disturbed areas, including the borrow/stockpile areas and landfill footprint.
- Landfill perimeter fencing will allow for wildlife movement where topography is the barrier to human access during the life of the landfill. The chain link fencing will be replaced with three to five strand wire fencing at the time of closure of the landfill.
- The block of habitat between the two borrow/stockpile areas will be maintained to provide for riparian to upland movement opportunities for most species.
- The deck of the bridge will be 17.5 feet above the river bed allowing for wildlife movement underneath.
- The bridge support will consist of five sets of two bridge pilings separated by more than 100 feet to allow wildlife movement under the bridge.
- Reflective strips will be used on the inside structure of the bridge. No lighting will be installed on the bridge.
- Slow traffic speeds would be required on the access road and bridge to reduce potential impacts to wildlife (for example, birds potentially being struck as they fly across the bridge).
- The entire access road (including bridge) will be gated and locked to prevent human access during the non-operational hours of the landfill.
- Low impact, focused, and shielded lighting will be installed at the facilities area for security.
- A minimum of a 100-foot riparian buffer will be maintained between the landfill operations and the river habitat, except where the access road/bridge crosses the river.
- Vector control measures, including the use of daily cover, will be implemented to prevent nuisance species attracted to the landfill to cause predation impacts on native

species. The methods for controlling or deterring nuisance species will be compatible with native species protection. (The Vector and Bird Control Measures (Plan) will be included in the JTD.)

- No permanent sources of standing or flowing water will be produced on site to prevent increased amphibian predation by non-native ants and bullfrogs.
- The relocated electrical transmission lines will be parallel to the existing topography of Gregory Mountain to avoid indirect impacts on the golden eagle and other raptors.
- Litter control and removal would minimize the introduction of invasive non-native plant species caused by illegal dumping of lawn and garden clippings, trash and other refuse.
- An 18- to 20-foot berm will be constructed and maintained along the northern edge of the landfill footprint between the facilities areas and the landfill footprint.
- Rock crushing/processing and tire shredding will occur within the landfill footprint at least 1,500 feet from the nearest least Bell's vireo and southwestern willow flycatcher habitat.

4.13 Aesthetics

- Retention of the existing knoll north of the facilities area to screen views of the site.

4.15 Public Services and Utilities

The following project design features have been incorporated into the project design to reduce the potential for fire hazards at the project site:

- No burning of refuse will be allowed.
- A firebreak of 150 foot minimum clearance around the perimeters of the landfill footprint will be maintained unless soil cover is placed regularly throughout the day in compliance with California Public Resources Code Section 4373.
- The application of daily and intermediate cover will be performed.
- Load checking for smoldering or burning wastes will be performed. Smoldering wastes will be separated if spotted.
- Covering of any fire with soil will occur.
- Extraction wells will be monitored for temperature and oxygen content.
- Equipment with internal combustion engines will have spark arrestors.
- The removal of flammable debris from the under carriages and engine compartments of heavy equipment will occur on a regular basis.
- Fire extinguishers will be placed at the entrance facilities, in the administration and operations trailers, and in landfill equipment and vehicles.
- Hazardous materials, collected as part of the Hazardous Waste Exclusion Program, will be stored in fire proof containers located in the ancillary facilities area.

- Storage of tires within the landfill footprint will occur in compliance with the County's 1994 Uniform Fire Code, Section 1103.3.6, Outside Storage of Tires, as well as Title 14, Section 1354 of CCR.
- Tire shredding will occur a minimum of every six months.

The following project design features relate to the use of recycled water:

- Approximately 1000 feet of 24 foot wide asphalt roadway will be constructed around Olivenhain's blending reservoir to accommodate recycled water trucks and remove them from the road system.*
- A concrete loading pad and a six inch meter will be provided to fill the trucks at Olivenhain's reservoir site to fill the recycled water trucks and avoid spillage.*
- A 20,000 gallon recycled water storage tank will be installed on the landfill site that includes a containment tank constructed of an impervious material capable of accommodating the entire volume of water in the tank to avoid spillage of recycled water on site.
- A fill pipe will be used to gravity feed the recycled water from recycled water delivery trucks into the recycled water storage tank to avoid spillage from hand use on site.
- A spill containment area and distribution fill pipe will be constructed on the landfill site to fill trucks for on-site recycled water to avoid a spillage of recycled water and to control and contain any spilled recycled water within the containment area.
- A recycled water supervisor will be retained at the landfill site to supervise and educate all on-site personnel on the proper use and handling of recycled water and to ensure proper operation and handling of recycled water on site.
- Non-Regulatory signs will be posted on Maranatha Drive caution drivers about the presence of the school and children to enhance safety on Maranatha Drive.*
- Recycled water trucks will be prohibited from using Maranatha Drive from 6:45 A.M. to 8:15 A.M. and from 2:30 P.M. to 4:15 P.M daily on days when the Maranatha School is in session.*
- The recycled water tank and recycled water trucks will be posted with a large sign stating "RECYCLED WATER – DO NOT DRINK" in large readable English and Spanish print and all distribution piping will be colored purple or wrapped in purple tape to designate it as recycled water.
- Disinfecting of all water trucks and tanks prior to reuse with other than recycled water.
- Readily available potable or bottled water on site for drinking and hand-washing.
- Project water resources shall be prioritized so that, when available, on-site riparian underflow or percolating groundwater shall be used first, before recycled water is used, for any areas not within the landfill footprint.

- Recycled water truck trips from the recycled water facility to the Landfill Site shall be scheduled to correspond to the hourly distribution of trips set forth in Table 4 of the 2009 Addendum.
- Any recycled water transport truck remaining on the Landfill Site at 2:00 P.M. shall not depart the site prior to 9:00 A.M. on the following operational day.
- As part of contracting for recycled water trucks, efforts shall be taken to ensure the use of trucks with particulate traps or trucks that use clean diesel or compressed natural gas, or other options that serve to reduce the emissions of diesel particulates.

The following project design features are related to the use of riparian underflow:

- The extent of the riparian areas on the landfill footprint shall be marked using monuments or other markings placed by the operator, following a survey performed by a licensed surveyor.
- Water storage tanks and water trucks shall be installed with a bracket to hold removable signs. A sign shall be placed on each storage tank or water truck noting whether its contents include riparian underflow, percolating groundwater or recycled water.
- Riparian underflow will not be commingled with percolating groundwater in any water storage tank.
- Riparian underflow shall not be commingled with percolating groundwater or recycled water in any water truck where discharged outside of the riparian areas. When riparian underflow and recycled water are commingled in a water truck, the signage shall indicate that both types of water are present. Use of that product shall then be limited to riparian portions of the landfill property.
- Installation of pipelines and electric lines from the existing riparian wells shall be underground and completed prior to or concurrent with construction of the landfill access road and implementation of the habitat resource management plan.
- Temporary disturbance to native vegetation resulting from maintenance activities on the portion of the water pipelines and electric lines within the habitat restoration area shall be promptly repaired through re-planting or re-vegetation, as needed.

The following project design features are related to the use of percolating groundwater from all on-site percolating groundwater wells:

- Each pumping well shall be installed with a totalizer meter, as well as a level control to cycle the pump on and off at a rate that matches the well's production capability. The settings for the level control shall be determined through pump testing and a sustainable yield calculation using RockWorks Drawdown Calculator software (or an equivalent method approved by the LEA).
- In order to provide ongoing verification, each pumping well shall undergo a new pumping test on a biennial basis (every other year), and the sustainable yield re-calculated using RockWorks Drawdown Calculator software (or an equivalent method approved by the LEA). If needed, the level controls shall be re-set based on the results of the calculation of long term sustainable yield.

- In order to provide ongoing verification, an updated safe yield analysis will be undertaken on a biennial basis within each watershed, with the results compared with actual pumping rates obtained from the totalizer meters. Based on this comparison, coupled with the biennial sustainable yield analysis, a recommendation regarding additional modifications to pumping rates will be submitted to LEA for review and concurrence.

- Alluvial groundwater capture shall be evaluated on a biennial basis to ensure that groundwater extracted from bedrock wells do not draw groundwater from the alluvial aquifer. Alluvial well MW-3 and proposed alluvial well GMW-2A shall be used as observation wells during the initial and biennial pumping tests performed for bedrock wells GLA-3, GLA-12, GLA-13, GLA-B, GLA-C, GLA-G, and GMW-1. If drawdown is measured in the adjacent alluvial observation wells during the pumping test, the pumping rate shall be adjusted so that no measurable drawdown is indicated in these alluvial observation wells.

The following project design features are related to the use of percolating groundwater from on-site percolating groundwater wells located outside of the landfill footprint and facilities area:

- Installation of the pipeline and electric line from the Area 1 wells within the habitat restoration area shall be underground and completed prior to or concurrent with construction of the SR 76 realignment, construction of the landfill access road, and implementation of the habitat resource management plan.

- Any temporary disturbance to native vegetation resulting from maintenance activities on the portion of the Area 1 pipeline within the habitat restoration area shall be promptly repaired through re-planting or re-vegetation, as needed.

- An alluvial observation well shall be installed in the vicinity of the Area 1 and Area 3 pumping wells. Alluvial groundwater capture shall be evaluated as part of the initial and biennial pump tests for the Area 1 and Area 3 bedrock pumping wells. If drawdown is measured in the adjacent alluvial observation well during the pumping test, the pumping rate shall be adjusted so that no measurable drawdown is indicated in the alluvial observation well.

* No longer applicable, recycled water will not be provided by Olivenhain Municipal Water District.

4.16 Human Health and Safety

- A Hazardous Waste Exclusion Program (HWEP) which will be implemented to discover and discourage attempts to dispose of hazardous or other unacceptable wastes at the landfill; the HWEP shall be in addition to MM 4.15.C5D.

- Tire storage will be within the landfill footprint in compliance with the County's 1994 Uniform Fire Code, Section 1103.3.6, Outside Storage of Tires, as well as Title 14, Section 17354 of CCR.

The following vector control measures will be employed for the proposed project:

- Daily compaction and application of daily cover will occur.

- Materials that attract vectors will be stored in closed containers and/or enclosed structures.
- Repairs of building openings, ground holes and deficiencies in perimeter fencing will be performed to deter intrusion of ground vectors.
- Proper grading/drainage to eliminate puddles and wet areas will be performed.
- The desilting basins will be self draining within 72 hours, and will be regularly cleaned out.
- Tire shredding will occur at a minimum of every six months.
- Other deterrents for vectors will include the playback of distress vocalizations, falcon kites, owl decoys, dispersal by humans and/or dogs.
- The use of conventional slap-traps and anticoagulant rodenticide will be employed.
- The use of professional pest control services will occur.

A litter control program will be implemented to minimize the potential for a litter problem within the project site and will include the following:

- Compaction and application of daily cover will occur.
- Temporary fencing around active disposal area will be provided.
- The use of tarps on commercial vehicles will be required.
- At least five days each week a clean up team, consisting of one truck with a minimum two-person crew, will inspect for and clean up all litter and illegal dumping on or adjacent to the access road and SR 76 between I-15 and the project site. A litter inspection will be performed every day the landfill is open to accept refuse and litter will be cleaned up on the sixth day as determined necessary by the inspectors.

APPENDIX E

EMERGENCY CONTACT LIST

EMERGENCY CONTACT LIST

GREGORY CANYON LIMITED

160 Industrial Street, Suite 200
San Marcos, California 92708
Office: (760) 471-2365
President: James Simmons

HERZOG ENVIRONMENTAL, INC.

600 S. Riverside Road
P.O. Box 1089
St. Joseph, MO
Office: (816) 233-9001
Vice President: George Zanter

APPENDIX F

HAZARDOUS WASTE EXCLUSION PROGRAM

HAZARDOUS WASTE EXCLUSION PROGRAM (HWEP)
FOR THE
GREGORY CANYON LANDFILL

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SECTION 1

INTRODUCTION

1.0 INTRODUCTION

1.1 PURPOSE

A Hazardous Waste Exclusion Program (HWEP) for the Gregory Canyon Landfill (GCLF) has been developed to discover and discourage attempts to dispose hazardous to other unacceptable wastes, including polychlorinated biphenyls (PCBs), at the landfill. In addition, the HWEP is designed to prevent, to the extent possible, the acceptance of prohibited wastes into the landfill's waste stream.

1.2 REGULATIONS

The HWEP complies with State and federal regulations under Title 27 California Code of Regulations (27 CCR), Section 20220 and 20870. These regulations state that the "Owners or operators of all Municipal Solid Waste Landfills (MSWLF) units must implement a program at the facility for detecting and preventing the disposal of regulated hazardous wastes as defined in Part 261 of this chapter (40 CFR Chapter 1) and PCB wastes as defined in part 761 of this chapter (40 CFR Chapter 1)". This program must include at a minimum:

1. Random inspections of incoming loads unless the owner or operator takes other steps to ensure that incoming loads do not contain regulated hazardous wastes or PCB wastes.
2. Records of any inspections.
3. Training of facility personnel to recognize regulated hazardous wastes and PCB wastes.
4. Notification of the Enforcement Agency (EA), the Director of the California Department of Toxic Substances Control (DTSC) or delegated agent, and the Regional Water Quality Control Board (RWQCB), if regulated hazardous waste or PCB waste is discovered at the facility in accordance with 27 CCR, Section 20870(a)(4).
5. Descriptions of acceptable and prohibited wastes.

1.3 SITE DESCRIPTION/BACKGROUND

The proposed GCLF is located in northern San Diego County, approximately three miles east of Interstate 15 (I-15) and two miles southwest of the community of Pala. The site is adjacent to State Route 76 (SR-76), the San Luis Rey River, and lies along the western slope of Gregory Mountain. The GCLF is situated on approximately 1,770 aces of which 308 acres will be developed with a 183-acre refuse disposal area footprint. The 308-acre area will also include 13 acres for power pole pads and 87 acres designated as soil stockpile and borrow areas. The remaining 25 acres will be utilized for the main access roads and bridge, desilting basins, stockpile/borrow areas, haul roads, and the ancillary facilities. The proposed GCLF will operate as a Class III waste disposal site in accordance with applicable local, State, and federal regulations.

1.4 REPORT ORGANIZATION

The HWEP is divided into four main components, Sections 1.0, 2.0, 3.0 and 4.0. Section 1.0 provides an introduction to the site, regulations affecting the site, and report organization. Section 2.0 describes the HWEP designated storage area. Section 3.0 includes information of the HWEP disposal operations including staff responsibility and handling procedures. Section 4.0 describes the various recordkeeping requirements.

SECTION 2

STORAGE AREA AND SIGNAGE

2.0 STORAGE AREA AND SIGNAGE

2.1 DESIGNATED HAZARDOUS WASTE STORAGE AREA

The designated hazardous waste storage area will be located in the southeast corner of the ancillary facilities area for the temporary disposition of wastes collected as part of the HWEP. This area will be specifically designed for the handling and storage of hazardous wastes, including secondary containment and approved storage containers which are safe and convenient for storing identified wastes.

On-site hazardous waste storage will be limited to 90 days or as required by applicable state laws and regulations prior to being transported to a permitted treatment, storage and disposal facility (TSDF). The "Accumulation Start Date" on the California hazardous waste label of each overpack drum containing hazardous waste will be monitored on a regular basis. Prior to shipment off site, all materials will be overpacked and manifested with a licenses hazardous waste hauler/disposer.

Unauthorized hazardous waste discharges will be reported to the following agencies:

California Regional Water Quality Control Board
San Diego Region
(858) 467-2952

Department of Toxic Substances Control
Cal-EPA Cypress Regional Office
(714) 484-5300

County of San Diego
Department of Environmental Health
(858) 694-2888

County of San Diego
Department of Environmental Health
Hazardous Materials Division
(619) 338-2222
(800) 253-9933

2.2 SIGNAGE

As part of the HWEP, signs which describe unsuitable waste will be posted at all entrances and the working face area (see Appendix A). The warning signs shall be located in visible areas with the legend on the sign legible to the public from a distance of at least 25 feet. In addition, warning signs will be posted around the hazardous waste storage disposal area discussed in Section 2.1.

SECTION 3

DISPOSAL OPERATIONS

3.0 DISPOSAL OPERATIONS

3.1 PROPOSED LANDFILL OPERATIONS

The following proposed operations will be conducted at the GCLF as part of regular disposal activities:

- The average daily inflow rate over the life of the project is estimated to be approximately 3,200 tons per day (tpd). The peak daily loading will be 5,000 tpd.
- Refuse will be disposed of utilizing the canyon and area fill methods and covered with soil and/or an approved alternative daily cover material in accordance with 27 CCR, Section 20690.
- The hours of operation will be 7:00 a.m. to 6:00 p.m., Monday through Friday, and 8:00 a.m. to 5:00 p.m. on Saturday. The landfill will operate six days a week for a total of 307 operating days per year.
- The site life will be approximately 30 years.

3.2 WASTE IDENTIFICATION

3.2.1 Nonhazardous Waste

The definition of non-hazardous solid waste as included in 27 CCR, Sections 20220(a) and 20230 includes all putrescible and non- putrescible solid and semi-solid wastes such as household refuse, paper, rubbish, ashes, commercial wastes, industrial wastes, construction and demolition wastes, abandoned vehicles, tires, vehicle parts, discarded home and industrial appliances, manure, animal solids, dewatered sewage sludge, and other solid or semi-solid waste, provided that such wastes do not contain wastes that must be managed as hazardous wastes, or wastes that contain soluble pollutants in concentrations which may exceed applicable water quality objectives or could cause degradation of the waters of the State.

3.2.2 Hazardous and Polychlorinated Biphenyl Waste

Hazardous solid waste, including PCB waste, is categorized as ignitable, corrosive, reactive, toxicity characteristic, acute hazardous, and toxic waste. A list of hazardous waste, identified by 40 CFR, Part 261and California Code of Regulations, Title 22, Division 4.5, Chapter 11, Articles 1 through 5..

3.3 PERSONNEL TRAINING

All GCLF employees involved in the handling of waste must be properly trained in the HWEP prior to or at the time of initial assignment and at least annually thereafter. The personnel training program shall include but not limited to:

- The ability to recognize acceptable and regulated hazardous waste and PCB wastes.
- Random inspections of incoming loads unless the owner or operator takes other steps to ensure that incoming loads do not contain regulated hazardous wastes or PCB wastes.
- Recordkeeping of any inspections.
- The measures required to safeguard life and control release should there be an exposure of hazardous waste. These measures should include, but not limited to, personnel protective equipment, containment and clean-up practices, housekeeping procedures, hygiene facilities, decontamination procedures, and emergency procedures, waste disposal procedures.
- Any employee directly handling waste will be given hazardous material training.

The GCLF shall maintain trained, full-time personnel engaged exclusively and continuously in the inspection of incoming refuse loads for hazardous waste. These personnel shall be stationed at the working face of the landfill whenever the landfill is open to accept waste and shall inspect loads as they are tipped. Personnel training records shall be maintained on site.

3.4 LOAD CHECKING PROGRAM

The load checking program shall consist of random, suspicious load, and disposal area load checks.

3.4.1 Random Load Checks

Random load checks shall be conducted at a frequency of at least one incoming load per week does not include suspicious load checks. These load checks are conducted on any waste carrying vehicle (commercial or residential) entering the site. Load check procedures are as follows:

1. The load checker shall indicate to the driver of a load check being conducted on the vehicle and redirect the driver to a designated area.
2. The vehicle will be unloaded in a flat area away from the commercial and private unloading areas and the material will be spread, as necessary, to properly inspect, search and sort through the load looking for hazardous wastes or PCB wastes.
3. If hazardous wastes or PCB wastes are not found within the load, a dozer will push the load to the working face.
4. If hazardous wastes or PCB wastes are identified within the load, the area will be corded off and then the driver (and company if appropriate) will be cited and asked to remove the load from the site.
5. Documentation on the load check will be recorded and filed appropriately (see attached forms in Appendix B).

3.4.2 Suspicious Load Checks

Suspicious load checks shall be conducted as often as necessary. Suspicious load checks shall be conducted on vehicles which include, but are not limited to:

- "Known-offenders" or vehicles which have a history of hazardous wastes, PCB wastes or questionable waste.
- Vehicles whose waste appears to contain hazardous wastes or PCB wastes (odor, color, etc.).
- Regulatory agency concerns on a particular vehicle.

3.4.3 Disposal Area Load Checks

Disposal area load checks shall be conducted when random or suspicious load checks are not being performed. All personnel stationed at the working face of the landfill shall be trained and assist in identifying hazardous wastes or PCB wastes. Should hazardous, PCB or questionable wastes be found by any personnel, the designated load checker will be called and steps 2 through 4 of Section 3.4.1 will be followed. If the material is found to be hazardous wastes or PCB wastes, personnel should follow procedures from Section 3.5.

3.5 UNSUITABLE WASTE PROCEDURE

Unsuitable wastes identified through the HWEP will be handled as follows:

- If the wastes pose an immediate risk to health, safety and/or the environment, site personnel will notify the emergency response unit of the Hazardous Incident Response Team (HIRT), a Joint Powers Authority (JPA) entity administered by the City of San Diego and the County of San Diego, Department of Environmental Health. The generator of the hazardous waste will be responsible for the cleanup and if the generator cannot be identified, then the landfill operator will be responsible for cleanup of the wastes. The wastes will be transported by a licensed hazardous waste hauler for disposal at a permitted hazardous waste treatment and disposal facility.
- If wastes are in adequate containers and can be safely handled, waste will be stored on-site in the designated area to await proper disposition by a licensed hazardous waste hauler/recycler or, if the hauler who brought the waste can be identified, the hauler will be asked to remove the waste.

SECTION 4

RECORDKEEPING

4.0 RECORDKEEPING

4.1 RECORDKEEPING

HWEP record files must be maintained and kept on site at all times. Recordkeeping forms are enclosed in Appendix B. The record files will include, but are not limited to, the following:

1. Load check Forms
2. Special Occurrence Log Forms
3. HWEP Storage Log
4. HWEP Inspection Forms
5. Agency Notification Forms

Load checking documentation records include, but are not limited to, the following information: (1) date, (2) time of inspection, (3) location, (4) name of hauling firm or vehicle identification (i.e., vehicle license plate number, vehicle description, etc.), (5) type of business, if known, (6) type of prohibited waste identified, if any (7) brief summary of the incident including resolution, and (8) name of load checker. Addresses and telephone numbers will be requested. In addition, load checking personnel will maintain a list of customers who repeatedly attempt to dispose of prohibited wastes in the municipal waste stream. These names may be turned over to the EA for appropriate action.

APPENDIX A

SIGN

Entrance and working face area signage:

GREGORY CANYON LANDFILL

WARNING: NO HAZARDOUS OR PCB WASTE ACCEPTED AT THIS SITE.

Offenders may be subject to a fine.

NOTICE

CUSTOMERS UTILIZING GCLF MAY BE SUBJECT TO A RANDOM INSPECTION OF THEIR LOAD UPON RECEIPT

Hazardous waste storage area signage:

DANGER

HAZARDOUS WASTE STORAGE AREA

AUTHORIZED PERSONNEL ONLY

APPENDIX B

RECORDKEEPING FORMS

WEEKLY HWEP STORAGE AREA
INSPECTION FORM

Date: ____________

Time: ____________

		YES	NO
1.	Is the area free of spills or leaks?	____	____
2.	Is the secondary containment free from spills or leakages?	____	____
3.	Are materials properly labeled and on secondary containment in shed?	____	____
4.	Is the gate properly locked and secured?	____	____
5.	Is the safety equipment adequate for spills or emergencies and is it in a feasible location and easily accessible?	____	____
7.	Is the area properly identified with warning signs?	____	____
8.	Are fire extinguishers and eyewash in working condition?	____	____
9.	Are different hazard classes properly segregated?	____	____

Comments:

____

____

____

Inspector:_________________________________

GREGORY CANYON LANDFILL
LOADCHECK FORM

Date:______________ Page No. _____

Time:______________

Hauling Firm or Vehicle Identification:____

Type of Business:____

Driver's Name:_______________________________

Vehicle License Plate No.:_____________________

Truck No.:___________________________________

Type of Waste:____

Was Prohibited Waste Found? ( ) Yes ( ) No

If Yes, Type of Prohibited Waste:____

Brief Summary of Incident:____

____

____

Resolution:____

____

____

Notification to Agencies Required: ( ) Yes ( ) No

Loadchecker Name (print):__________________________

Loadchecker Signature:_____________________________

GREGORY CANYON LANDFILL
SPECIAL OCCURRENCE REPORT

Date:______________ Page No. _____

Time:______________

Mark Occurrence:

( ) Injury
( ) Fire
( ) Property Damage
( ) Accident
( ) Explosion
( ) Incidents
( ) Incidents Regarding Hazardous/PCB Wastes
( ) Earthquake
( ) Flooding
( ) Other (specify:___________________________)

Summary of Occurrence (include names of persons, companies, and agencies involved and attach any accident or injury reports and any backup information):

____

____

____

Resolution:____

____

____

Report Made By (print):________________________ Position:______________________

Signature:_____________________________________

GREGORY CANYON LANDFILL
HAZARDOUS WASTE STORAGE LOG

Log Number	Accumulation Date	Material Type	Quantity	Gen. Site / Cust	Loc. Bin	Date Remove	Hauler

L:\Gregory\97139\Reports\JTD\HWEP\FORM-HWL.XLS:1/28/2011

S A M P L E N O T I F I C A T I O N L E T T E R

Date

Contact Person
County of San Diego, Department of Environmental Health Services
1255 Imperial Avenue
San Diego, California 92101

RE: GREGORY CANYON LANDFILL (GCLF)
NOTIFICATION OF HAZARDOUS WASTE OR PCB WASTE FOUND AS PART OF THE HAZARDOUS WASTE EXCLUSION PROGRAM (HWEP)

==

Dear ____________________:

In compliance with Title 27 of the California Code of Regulations (27 CCR), Section 20870(a)(4), this letter is notify you that hazardous waste or PCB waste was found as part of the HWEP at GCLF. Enclosed is the inspection sheet and other pertinent information.

If you have any questions or require additional information, please advise.

Very truly yours,

Representative/Position
Gregory Canyon Limited

c: Director of the California Department of Toxic Substances Control (DTSC)
San Diego Regional Water Quality Control Board (RWQCB)

APPENDIX F-1

HANDLING AND GENERAL PROCEDURES FOR USE OF GEOSYNTHETIC BLANKETS

HANDLING AND GENERAL PROCEDURES FOR USE OF GEOSYNTHETIC BLANKETS

Handling Procedures

The area for the geosynthetic blanket application is the active face. During daily landfill operations, the size of the working face will be maintained at a slightly smaller area than the panel dimensions. The working face will be 5 to 10 feet smaller in each dimension than the panel total area. After the last load of refuse has been placed, landfill compaction equipment will make extra passes over the refuse to leave as smooth a surface as possible. Laborers will carefully walk around the edge of the refuse face to remove any protruding objects which might snag on the cover material. Larger objects will be moved by landfill equipment. After compacting the surface, the blankets will be placed over the exposed refuse surface by either unfolding, rolling or pulling.

Landfill equipment and employees will place the blankets. The blankets will be anchored along the edges and across the center of the working face. The blankets will be removed before placing additional waste. The number of panels used each day will depend on the size and location of the refuse active face, and size of the panels. In those areas where refuse will not be placed within 180 days, a minimum of 12 inches of soil (intermediate cover) will be placed as required under 27CCR, Section 20700. Tears in the blanket will be repaired as recommended by the manufacturer. The design and operation of the GCLF will provide for the diversion of surface water away from areas of active filling, thus minimizing potential contact between the ADC and surface water.

General Procedures

The following items provide general information related to the operational activities associated with the geosynthetic blanket:

- Daily inspections of the material will be required to assure that it is still useful. If the geosynthetic blanket shows extreme wear or is torn beyond repair, it will be disposed and a new stock of material used.
- Employees will be reminded about working near exposed refuse. Protective clothing and footwear will be required for employees assigned to placing and removing the blanket.

- If the blanket material cannot be effectively placed due to wind and/or rain, then soil will be used for daily cover.
- Where appropriate, repairs to minor tears in the material will be made in accordance with the manufacturer's or supplier's recommendations.
- Where multiple panels are used, the same application/removal scheme will still apply. There will be at least 3 feet of overlap between panels or as recommended by the manufacturer and the panels shall be held-in-place.
- As allowed under 27 CCR, Section 20690(b)(1), the geosynthetic blanket products will be removed from the waste and the waste will be covered with new waste or approved cover materials within 24 hours of product placement, unless the product is intended to be non-reusable, or has been approved by the EA for continuous use beyond 24 hours. .
- Use of the geosynthetic blankets may be restricted during periods of heavy precipitation. The blanket will be allowed to dry before moving to avoid the potential for tearing.
- Records of performance related to special occurrences will be noted by the operator and include unusual performance of the blankets during windy and rainy conditions.
- Periodic updates will be noted as to any problems or suggestions in using the woven geosynthetic blankets. Recommended changes to operational procedures will be submitted to the EA.

APPENDIX F-2

CONTINGENCY PLAN

GREGORY CANYON LANDFILL
CONTINGENCY PLAN

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GREGORY CANYON LANDFILL
CONTINGENCY PLAN

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LIST OF APPENDICES

SECTION 1.0

INTRODUCTION

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1.0 INTRODUCTION

This Contingency Plan (Plan) was prepared at the request of the San Diego Regional Water Quality Control Board (RWQCB) in accordance with the California Code of Regulations, Title 27 (27 CCR), Section 21760 (b)(2). The Plan was developed to provide procedures to be followed in the event of a failure in waste handling facilities or containment systems including notification of any such failure, or any detection of waste or leachate in the monitoring facilities to the RWQCB, local government and downgradient waste users.

The procedures outlined in this Plan are intended to minimize hazards to human health and the environment resulting from the unplanned release of leachate or waste. The Plan provides a description of all environmental control or waste containment facilities as described in Section 1.0 and agency notification procedures are outlined in Section 3.0. Additionally, Section 2.0 of this Plan describes corrective action procedures to stop and contain the migration of pollutants from the site.

1.1 SITE DESCRIPTION

The Gregory Canyon Landfill (GCLF) is located on property currently owned by Gregory Landfill Limited, who will also be named as the operator of record on all permits and approvals. The GCLF is situated on approximately 1,770 acres of which 308 acres will be used for landfill related activities including a 183-acre refuse disposal area footprint. The 308 acres also includes 13 acres for the power pole pads and 87 acres designated for soil stockpile and borrow areas. The remaining 25 acres will be utilized for the main access roads and bridge, desilting basins, stockpile/borrow area, haul roads, and the ancillary facilities. Access to GCLF is gained via SR-76, a two-lane highway, which is located in an easement that bisects the site property in an east/west orientation.

1.2 ENVIRONMENTAL CONTROL/WASTE CONTAINMENT FACILITIES

A description of the GCLF's landfill gas condensate system, the leachate collection and removal system (LCRS), and the waste containment system (i.e., subdrain and composite liner systems). The proposed composite liner system design, which is a component of the overall waste containment system, exceeds the prescriptive standard design criteria specified in 40 CFR, 258.40.

1.2.1 WASTE CONTAINMENT SYSTEM

Any release from under the liner system will be detected through the subdrain system discussed below. In the event of a release detected in the subdrain of downgradient monitoring wells, 27 CCR regulations for evaluation monitoring and corrective action will be complied with at the GCLF. The Plan is for a physical breakdown of the aboveground conveyance and/or storage facilities.

Subdrain System

The proposed subdrain system for the GCLF will be placed beneath the composite liner and will consist of a one-foot thick gravel blanket and gravel filled trenches with slotted collector pipes in the bottom areas. The floor subdrain system is a redundant system in which the permeable gravel pack and the pipe can both convey over a million gallons of water per day. A geotextile layer separates the gravel layer from the low-permeability soil layer on the landfill floor. This geotextile layer prevents the floor subdrain from clogging.

The proposed design does include a bottom subdrain system. As a contingency, in the event that localized groundwater seeps are encountered in the canyon and/or the proposed cut slopes, the water will be managed. Seeps encountered above the active development areas will be directed into the perimeter surface water control system (i.e., perimeter channels).

The seeps will also be measured for flow volume to determine the exact design of the subdrain collector. Once liner construction reaches the observed seep elevation, the subdrain system will be installed. The subdrain feature utilized will be a chimney drain. Based on seep flows, the chimney drain will be constructed consisting of either a geonet or trench-type collector. A geonet strip collector will be constructed and used for lower flow seeps and placed from the seep to the next lower bench into a section of slotted pipe surrounded with gravel and wrapped in geotextile. The slotted pipe will transition to solid pipe gravity flowing to the bottom subdrain system. Higher flow seeps may warrant a trench collector type chimney drain. A trench will be cut into the side slope from the next lower bench up to the seep. The trench will be filled with gravel and wrapped with geotextile. A perforated pipe can also be added for additional flow capacity. The trench size will be dictated by flow rates. The trench collector will connect at the bench and eventually to the bottom subdrain system similar to the geonet collector.

The subdrain system discharge will be monitored for contamination in accordance with the WDR parameters. Any contaminated water will be treated at the landfill by the on-site RO system, other groundwater treatment as discussed in the JTD, or transported to an appropriate off-site disposal facility.

Composite Liner System

The composite liner system proposed for the GCLF exceeds the prescriptive design standards required by 40 CFR 258.40. A liner demonstration in support of the proposed design was prepared and is included as Appendix H of the JTD. The liner system design for the GCLF consists of the following components:

- **Bottom Liner System Design.** The bottom area liner section will include (from top to bottom): a minimum 24-inch thick protective soil cover layer, a 12-ounce geotextile, a 12-inch thick LCRS gravel layer, a 16-ounce geotextile, an 80-mil HDPE geomembrane (textured on both sides), a geosynthetic clay liner (GCL), a 60-mil HDPE geomembrane (textured on both sides), a 16-ounce geotextile, a 9-inch minimum thickness gravel or equivalent drainage layer, a 16-ounce geotextile, a 60-mil HDPE geomembrane (textured on both sides), and a 24-inch thick layer of low-hydraulic-conductivity material ($<1\times10^{-7}$ cm/sec) placed over the subdrain system with a 12-ounce geotextile between the low-permeability layer and the bottom subdrain gravel.

- **Slope Liner System Design.** The slope liner system design (e.g., sections with gradients greater than 5:1), will include (from top to bottom): a protective soil cover layer (minimum of 24-inches thick), a 16-ounce geotextile liner, an 80-mil HDPE geomembrane (single-sided textured, textured side down), a GCL, a 60-mil HDPE geomembrane (textured both sides) and a 24-inch thick layer of low-hydraulic-conductivity material ($<1\times10^{-7}$ cm/sec) placed over the subdrain system.

1.2.2 LEACHATE COLLECTION AND REMOVAL SYSTEM

The composite liner will be overlain by a LCRS designed and constructed to meet or exceed minimum state and federal regulations. The quantity of leachate expected to be generated within the lined portion of the landfill was estimated by modeling the water balance in the landfill site. The LCRS is designed to collect and remove a minimum of twice the anticipated maximum daily volume of leachate generated from within the refuse prism, as well as maintain less than a 30-cm (12-inch) depth of leachate over the composite liner system. In fact, based on the leachate generation analysis the peak daily head on the liner will be 0.25 inches.

In the bottom area, the LCRS will consist of a continuous gravel blanket and an integrated dendritic drainage pipe collection network made up of lateral collectors and a mainline pipe. For slope areas (i.e., those areas within 5:1 gradients or steeper), the LCRS will consist of a pipe-and-gravel collection system constructed on the interior benches. This bench collection system will be connected to the bottom area LCRS pipe network. The LCRS laterals and bench collection piping will discharge into a mainline placed down the center of the refuse area.

The LCRS was designed and will be operated to function without clogging through the scheduled closure of the unit and during the post closure maintenance period in accordance with 27 CCR, Section 20340(d). Clean-outs were incorporated into the LCRS design and are available to flush debris from the LCRS pipes. The clean-outs will be utilized to annually test the LCRS flow capability. Specified volumes of clean water will be pumped into each cleanout prior to waste placement. Flow rate and volume will be recorded. This same method will be repeated each year to determine system performance. A comparison of the most recent test results against results from previous years will be conducted. In the bottom area, the LCRS design will consist of a continuous gravel blanket and an integrated dendritic drainage pipe network. The LCRS pipes will be placed in V-shaped gravel trenches which will intercept the leachate flow. The pipes are designed to handle many times the anticipated leachate flow. In the unlikely event that localized clogging occurs, the surrounding gravel pack allows the leachate to flow around the restricted area. To minimize the potential for clogging, 85% of the gravel will be larger than the diameter of the perforations in the pipe. In addition, the bottom area LCRS gravel pack will be overlain by geotextile fabric to prevent fines in the operations layer soil material from clogging of gravel.

The side slope LCRS will consist of collectors (also known as a "burrito" type collectors) placed at each interior bench. These collectors are perforated pipe surrounded by gravel and then wrapped with geotextile filter fabric. The benches are sloped to drain any leachate which makes its way through the operations or protective layer back to the toe of the bench/upper slope interface. A strip of tri-planar geonet will also be placed over the remaining flat area of the bench to direct liquid flow for added redundancy. Geonet is designed and manufactured with landfill-specific conditions in mind including flow rate factors of safety. Geonet will accommodate heavy loading up to a pressure of 25,000 psf. This equals 240 feet of trash placed at an average density of 1,500 lbs/cy. Geonet is also designed to resist biofouling.

The inward gradient of the interior cut slope benches is more than adequate to direct flows into the "burrito" collector.

Any leachate that comes into contact with the slopes will flow along the operations layer/refuse-interface to the benches, then either through protective layer and into the bench collectors or continue all the way down to the bottom areas and into the LCRS.

The entire LCRS system is designed to drain by gravity flow to a solid outfall pipe located at the northwest corner of the refuse prism. The outfall pipe is connected to two 10,000-gallon leachate collection storage tanks located in the southwest corner of the ancillary facilities area. The leachate storage tanks will be routinely monitored by the operator in accordance with the site specific WDRs. If liquid is detected during routine monitoring, a grab sample will be taken and analyzed in accordance with the WDRs. Leachate collected in the storage tanks will be transported off-site for treatment and disposal. There are facilities located in San Diego and Los Angeles counties that can dispose of any leachate that is collected.

1.2.3 LANDFILL GAS CONTROL AND RECOVERY SYSTEM

The landfill gas control system will consist of a series of gas collection wells interconnected by above-ground laterals (pipes) and a main header pipe connected to the flare station. The system will be brought on-line with a blower designed to create a vacuum pulling landfill gas to the flare for destruction. The flare station will be located along the northern portion of the landfill, adjacent to the operations support facilities.

The gas migration monitoring system at GCLF will consist of monitoring probes spaced at approximately 1,000-foot centers around the entire refuse prism to detect potential gas migration prior to reaching the property boundary. The probes will be installed along the property boundary to the south and in consideration of the site topography along the northeast and west of the refuse footprint.

In addition, a landfill gas condensate collection system will be constructed to gravity drain condensate to sumps located at header low-points around the landfill. The collected condensate will be removed from the sumps manually or will be pumped automatically to a central holding tank. The condensate will then be transported off-site

1.3 DESIGNATED RESPONSE TEAM RESPONSIBILITIES

This section discusses the responsibilities of the response team designated to implement the procedures outlined in this Plan. The Emergency Coordinator (EC) or his designated alternate has ultimate responsibility for implementation of the Plan in the event of a leak, spill or release of solid waste. The EC has been designated as the primary responder and coordinator to implement the Plan.

1.3.1 EMERGENCY COORDINATOR

The primary responsibility of the EC is to oversee the management of all emergency response procedures implemented at GCLF. The EC shall be thoroughly familiar with all aspects of the site, the location of the facility records, and the overall site layout.

It is the ultimate responsibility of the EC to take all reasonable measures to ensure that the leak, spill or release of solid waste is contained. Appropriate monitoring must be initiated. Additionally, future action shall be taken to prevent a recurrence of a similar event.

The EC will be at the facility during routine hours of operation; the EC or the alternate will be available at all times to handle emergency situations. If the facility is closed or the EC is not at the site, the EC or alternate will be on call via pager or phone to assure that they can be contacted immediately in the event of an emergency.

1.3.2 WASTE HANDLING FACILITIES SPILL/RELEASE COORDINATION

The EC will implement the Plan and determine the initial level of resources needed to handle the situation. The EC shall have the authority to commit all resources needed to carry out the Plan. The EC shall gather information concerning the leak or spill of leachate including the following: character, source, approximate quantity, location and extent of leak or spill. Concurrently, the EC will assess the potential hazards to human health, the environment, and property caused by the leak, spill or waste release including agents used to control the leak, spill or release.

The EC will notify the Site Manager of the leak, spill or waste release and contact the RWQCB and the EA to report the incident. The EC will provide status updates to the Site Manager. Requests for outside resources necessary to mitigate the leak or spill will also be made by the EC.

The EC shall determine when the affected portion(s) of the waste containment facilities may resume operation. The EC will ensure that post clean-up activities are completed and all equipment utilized will be decontaminated, if necessary.

1.3.3 SUPPORT STAFF

The Site Manager will supervise the mobilization of any heavy equipment and operators necessary during on-site incidents. The EC and Site Manager have the authority to terminate the participation in any emergency response activity that may lead to conditions immediately dangerous to the health and safety of site personnel. The Site Manager will coordinate directly with the EC during implementation of this Plan and provide support staff to the EC during implementation of this Plan.

It should be noted that site emergency response concerns are the responsibility of all site personnel. Specific responsibilities are assigned to the site personnel by the Site Manager as directed by the EC. Therefore, by implementing the Plan, the EC will be the individual who makes the decisions and gives directions. This will reduce confusion, improve safety, organize and coordinate actions and should facilitate effective management of the incident.

1.4 DISTRIBUTION OF THE PLAN

A current copy of the Plan will be maintained at the facility for training and reference. Copies of the Plan will also be distributed to the following: the RWQCB and the EA. In addition, a copy of the Plan will also be maintained at the GCLF site office. Section 3.0 includes a list of the agencies referenced in the Plan including the appropriate contact person and phone numbers.

1.5 AMENDMENT OF THE PLAN

The Plan will be periodically reviewed and amended if any of the following occurs: a release occurs for which the Plan did not provide an appropriate response; the facility changes in design; or other circumstances change the procedures in this Plan (e.g., the designated response personnel change, and/or applicable regulations are revised or newly implemented).

1.6 SITE CONTROL

The site control measures shall be implemented at the discretion of the EC to provide adequate protection for all site personnel, to limit access to the affected area by unauthorized personnel, and to minimize potential waste migration into clean areas. Access to the affected facility may be controlled by the EC or his designee.

1.6.1 SITE SECURITY

Entry into the GCLF during business hours will be controlled by site personnel at the entrance facilities, which is the single point of public access to the site. Unauthorized access to the site will be controlled by perimeter fencing and/or topographical constraints. Lockable gates will be installed on the access road on the north side of the bridge and at the ancillary facilities area. Visitors to the site will be required to check-in at the administrative office. Additional fencing will surround specific on-site facilities. The borrow/stockpile areas will not be fenced.

SECTION 2.0

CORRECTIVE ACTION PLAN

2.0 CORRECTIVE ACTION PLAN

2.1 INTRODUCTION

As required by 27 CCR, Section 21760 (b)(2), corrective actions resulting from a leak, spill, or release of waste are included in this Plan. The following sections describe the recommended corrective actions which should be taken to mitigate the effects of a leak or spill. However, it should be noted that the corrective actions discussed in this section are not the only actions which could be implemented by the GCLF.

2.2 INSPECTION PROCEDURES

Once a leak, spill or release of waste has been identified, the EC will implement a more thorough inspection of the affected area. The EC or designated site employee will conduct this inspection and record his observations on the Leak/Spill/Waste Release Event Form (Form 2-A). The designated site personnel shall inspect for damage to the waste containment facilities. The inspection will include the identification of damage through the observance of liquids/waste released from the storage tanks, the treatment plant, the exposed conveyance lines, and/or exposed waste.

The EC will determine the permanent corrective actions to retrofit these facilities to fully operational status. The corrective actions suggested in this section will be implemented until permanent repairs are completed. Any damage found during the inspection will be noted on Form 2-A and the appropriate corrective action will be implemented. Corrective action activities will be monitored and recorded on the Corrective Actions Tracking Form (Form 2-B). These forms are included in Appendix A of this Plan. Site personnel can refer to the Corrective Actions Tracking Form during repairs for information on the progress. These forms will also be submitted to the RWQCB and the EA upon request.

2.2.1 INSPECTION SAFETY PROCEDURES

The safety of those personnel conducting the inspection is of the utmost importance. At a minimum, the following general safety procedures should be adhered to while conducting the inspection:

- The site inspection shall be conducted utilizing the "Buddy System", if possible. If more than one inspection team is dispatched by the EC, each team will consist of at least one site employee familiar with this Plan.
- Inspection team members will be outfitted with the following safety equipment: hard hat, rubber safety boots, safety vest, safety goggles, gloves, flash lights (if inspection is conducted during hours of darkness), and at least one two-way communication radio per team.

2.3 CORRECTIVE ACTION PROCEDURES

This section describes possible damage which may occur causing a leak or spill and the recommended corrective actions which should be taken. The corrective actions discussed in this section are not the only activities which could be implemented by the EC to mitigate the leak, spill or release of waste.

The following corrective action procedures will be implemented proceeding the initial observance and a detailed inspection of a leak or spill (as necessary):

If an aboveground liquid storage tank rupture occurs, the EC or alternate will be notified of the source and location of rupture. In the event of a rupture, the steps outlined below shall be taken:

- Isolate the tank and remove it from service immediately.
- Verify the integrity of the secondary containment. Place sandbags or construct soil berms to repair or reinforce the containment, if necessary.
- Use a backhoe or similar earthmoving equipment to contain leaks from the secondary containment by trenching or building berms to redirect the flow of the spill.
- Use a backhoe or other equipment to secure leaks by trenching or building berms to redirect the flow of the spill.

- Ensure that the remaining storage tanks can accept liquid flow from the damaged tanks, well and other facilities by inspection of the tanks. If some tanks have not been damaged, divert liquid flow to those tanks.
- In the event that the other tanks cannot accept the liquid flow, stop the corresponding liquid pump(s) or valves on the gravity drain lines until the emergency situation is corrected. If required, vacuum trucks will be summoned to the site.
- The contents of the affected storage tank will be pumped in a safe manner and transferred to other storage tanks with available capacity using a portable pump or vacuum truck. This includes liquids accumulated by secondary containment berms.
- Care must be taken at all times to prevent accidents such as slips, falls and electrical shock.
- Soils contaminated from contact with leachate shall be transported to the top deck and reconsolidated.
- Emergency repairs shall be performed as soon as the EC deems the area workable. All emergency repairs will be conducted in a safe manner.

If a liquid conveyance line rupture occurs, the EC or alternate will be notified and apprised of the incident and its location, and shall coordinate the appropriate site personnel to respond. These procedures relate to all leachate conveyance lines from the toe of the refuse cells, those lines connecting the storage tanks and those lines utilized at the treatment plant. In the event of a rupture of liquid conveyance pipes, the steps outlined below shall be taken:

- To prevent further leakage, shut off all valves that control flow.
- Shut off pumps; contain liquid on-site using sandbags and earthen dikes.
- Pump standing liquid into a water truck or vacuum truck(s), as necessary.
- If the ruptured line conveys liquid from an aboveground storage tank, transfer of the liquid via a water truck will be utilized to pump directly from one holding tank to another which has sufficient holding capacity. If necessary, arrangements will be made to have vacuum trucks from outside transporters on-site as soon as possible to assist in transferring liquids to previously inspected and approved holding tanks.
- Soils contaminated from contact with liquids shall be transported to the top deck and reconsolidated.

In the event of a spill or leak on-site during transfer and transport operations, the steps outlined below shall be taken:

- Notify the EC.
- To prevent further spills, shut off valves that control flow.
- Use a backhoe or other equipment to secure leaks by trenching or building berms to redirect the flow of the spill.
- Pump any standing liquid into a water truck.

In the event of any spill or leak on-site, the steps outlined below shall be taken:

- In the event that leachate flows offsite due to rupture of a holding tank or conveyance pipeline, or a spill during transfer and transport operations, implement the above-mentioned corrective actions, as necessary, and notify the local agencies including the RWQCB, the EA, and State Department of Toxic Substances Control (DTSC). An estimate of the volume of liquids migrating offsite will be made, including the location of the flow.
- After the leak or spill has been mitigated, perform a thorough investigation of all leachate tank and pipe conditions.

In the event of a release of solid waste due to surface water control system failure or other catastrophic event such as an earthquake, the following steps shall be taken:

- In the event that waste has been transported away from the refuse footprint, it will be hand picked or scraped-up using heavy equipment. The collected waste will be transported back to the working face for disposal.
- To prevent further spread/transport of waste, cover dirt will be placed over the exposed areas and compacted in accordance with procedures outlined in the Joint Technical Document (JTD).
- For larger areas or major sloughing, the placement of soil will be constructed to form a berm downgradient to prevent further transport. The affected areas would then be inspected by a geologist for further hazards and the best approach to covering the exposed areas will be determined.

SECTION 3.0

NOTIFICATION AND REPORTING PROCEDURES

3.0 NOTIFICATION AND REPORTING PROCEDURES

3.1 NOTIFICATION AND REPORTING PROCEDURES

The EC has the ultimate responsibility for all notification and reporting activities implemented as a result of a leak, spill or waste release beyond the refuse footprint. Primary responsibility for these duties include the gathering of information regarding the condition of the site facilities and personnel from the inspection. These activities may be delegated to the Site Manager as directed by the EC.

The EC will analyze this information to determine the best course of action in implementing the Plan. Additionally, the EC will notify those emergency response agencies and other entities necessary to bring the site back to normal operations and eliminate any hazard to site personnel or the public's health and safety.

The following agencies will be notified by the Site Engineer, as necessary, immediately proceeding the event or within 24 hours:

County of San Diego
Department of Environmental Health, Local Enforcement Agency
5500 Overland Avenue, Suite 110
San Diego, Ca. 92123
Telephone No.: (858) 694-2888

California Regional Water Control Board
San Diego Region 9, Land Discharge Unit
9174 Sky Park Court, Suite 100
San Diego, Ca. 92123
Telephone No.: (858) 467-2952

California Department of Resources Recycling and Recovery
Permitting and Enforcement Division
801 "K" Street
Sacramento, Ca. 95814
Telephone No.: (916) 322-4027

State of California Environmental Protection Agency
Department of Toxic Substances Control
Sacramento Office
Telephone No.: (916) 323-3600 (Duty Officers – Emergency Response)
Telephone No. After 5:00 p.m.: (800) 852-7550
(Notification should be made for any type of toxic spill.)

Other agencies may be notified, as necessary, depending on the extent and nature of the leak or spill at the site.

It is the responsibility of the Inspection Teams to accurately report their observations to the EC and to complete Forms 2-A and 2-B for agency reporting purposes. Once the inspection results are analyzed, the EC can determine the appropriate corrective actions.

3.2 REPORTING INFORMATION

The EC will compile all of the information related to the incident into one report package. This information will be maintained on-site and forwarded within 7 days following the incident to the EA, RWQCB and CIWMB for their review and records. In addition to the information on the inspection forms (Forms 2-A and 2-B), the EC will also record and include the following information into the report:

- Name, address, and telephone number of owner or operator.
- Name, address, and telephone number of facility.
- Date and time of the incident.
- Name and quantity of material(s) involved.
- Extent of injuries.
- Persons injured.
- General comments or observations.
- Assessment of actual or potential public health or environmental hazards, if applicable.
- Estimated quantity and disposition of recovered waste materials resulting from the incident.
- Any off-site migration of leachate.

- Actual or potential off-site public health or environment hazards assessment.
- Corrective actions implemented to mitigate the leak or spill.

APPENDIX A

FORMS

FORM 2-A

LEAK, SPILL OR WASTE RELEASE EVENT FORM

Date of Incident ______________
Time of Incident ______________
Location of Observation ______________
Observation Made by: ______________

INSPECTION INFORMATION

Date of Inspection ______________
Time of Inspection ______________
Person(s) Conducting Inspection ______________
____
____

Conveyance Treatment and Storage Facilities	Damage Evident Yes	Damage Evident No
- Reverse Osmosis Treatment Plant	____	____
- Conveyance Lines	____	____
- Aboveground Storage Tanks	____	____
- Pumps	____	____

Was there any damage to the conveyance treatment and storage/gas condensate facilities?

Yes ____ No ____

Complete the Following:

Location of Leak, Spill or Waste Release: ______________
____

Damage to Site Facilities: Yes ____ No ____

FORM 2-A

LEAK, SPILL OR WASTE RELEASE EVENT FORM
(Continued)

Description of Damage: ____

____

____

____

Offsite Migration of Leachate/Condensate/Waste Water Yes ____ No ____

Description of Migration (location, quantity, extent): ____________________

____

____

FORM 2-B

CORRECTIVE ACTIONS TRACKING FORM

Date of Leak, Spill or Waste Release Event ______________
Time of Leak, Spill or Waste Release Event ______________
Date of Inspection ______________
Time of Inspection ______________

AREA OR FACILITY TO BE REPAIRED: ______________

LOCATION: ______________

____

CORRECTIVE ACTIONS IMPLEMENTED:

____

____

____

____

____

____

____

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____

____

Date damage was repaired: ______________
Time damage was repaired: ______________
Damage repaired by: ______________