STORMWATER MANAGEMENT PLAN FOR GREGORY CANYON LANDFILL

Prepared for

Gregory Canyon Landfill, Ltd.
249 South Highway 101, #377
Solana Beach, CA 92075

URS Project No. 27654025.00020

December 14, 2007
Last Revised September 22, 2008

URS

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Attachments

amsl	above mean sea level
BMP	Best Management Practice
GCLF	Gregory Canyon Landfill
I-15	Interstate 15
LID	Low Impact Development
LLC	Limited Liability Company
MS4	Municipal Separate Storm Sewer Systems
RWQCB	Regional Water Quality Control Board
SDG&E	San Diego Gas and Electric
SWMP	Stormwater Management Plan
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
URS	URS Corporation
WPO	County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance

SECTION 1 BACKGROUND

Table 1
Project Information

Project Name:	Gregory Canyon Landfill
Applicant::	Gregory Canyon Landfill, Ltd. 249 South Highway 101, #377 Solana Beach, CA 92075
Plan Prepared By:	URS Corporation
Date:	November 16, 2007
Revision Date:	September 22, 2008

Table 2
SWMP Revisions

Project Review Stage	Does the SWMP need revisions?		If YES, Provide Revision Date
	YES	NO	
Resource Agency Permitting	X		
Final Engineering Design	X		

1.1 REGIONAL REQUIREMENTS

The County of San Diego Watershed Protection, Storm Water Management, and Discharge Control Ordinance (WPO) (Ordinance No. 9424) requires all applications for a permit or approval associated with a Land Disturbance Activity must be accompanied by a Storm Water Management Plan (SWMP) (Section 67.804.f). The purpose of the SWMP is to describe how the project will minimize the short and long-term impacts on receiving water quality. Projects that meet the criteria for a priority project are required to prepare a major SWMP.

The current standard County SWMP template was modified herein to incorporate the requirements listed in the California Regional Water Quality Control Board, San Diego Region, Order Number R9-2007-0001, NPDES No. CAS0108758, Waste Discharge Requirements for Discharges of Urban Runoff From the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, the San Diego Unified Port District, and the San Diego County Regional Airport Authority. This permit will be referenced as the 2007 Municipal Permit.

Note that the project is located outside of the urban and environmentally sensitive areas as defined on the maps in Appendix B of the County of San Diego Standard Urban Storm Water Mitigation Plan for Land Development and Public Improvement Projects and is not directly tributary to a Municipal Separate Storm Sewer System (MS4), and therefore would not technically be subject to the requirements of the new Municipal Permit. However, a number of the Low Impact Development (LID), Best Management Practices (BMPs), Treatment Control BMPs, and Hydromodification requirements presented in the

Municipal Permit will be incorporated into the project to minimize the potential for stormwater quality degradation and hydromodification impacts to the San Luis Rey River.

1.2 PROJECT DESCRIPTION

The Gregory Canyon Landfill (GCLF) is located in north central part of San Diego County near the community of Pala. The GCLF is north of the community of Valley Center, east of Fallbrook and Interstate 15 (I-15) and west of the community of Pala and the Pala Indian Reservation. It lies approximately 25 miles east of the Pacific Ocean, about three miles east of I-15, and about five miles south of the northern County boundary.

The GCLF property includes approximately 1,770 acres of which approximately 308 acres will be used for overall landfill activities (e.g., stockpile areas, ancillary facilities, access road, refuse disposal) of which 183 acres will be used for refuse disposal. The proposed site will be permitted as a Class III landfill. The proposed project area will also include two designated soil stockpile/borrow areas. Borrow /Stockpile Area A will be located west of the proposed landfill footprint adjacent to the western property boundary, and Borrow/Stockpile Area B will be located immediately southwest and adjacent to the proposed landfill footprint. Other project components include ancillary facilities area, access road and bridge from State Route 76 crossing San Luis Rey River, internal haul road, and installation of environmental monitoring and control systems.

GCLF drainage facilities will consist of two desilting basins and surface drainage features including bench drains and pipe downdrains for landfill area drainage, and perimeter surface drains for collection and conveyance of runoff originating outside of the landfill footprint. Additionally, the landfill design will incorporate post-construction site design, source control, and treatment control stormwater quality BMPs.

1.2.1 Drainage Design Features

To reduce the potential long-term impacts of the landfill and associated facilities on surface water quality, a number of drainage features would be incorporated into the project to direct runoff away from the landfill working face and borrow/stockpile areas, to minimize erosion and resulting sediment and to provide desiltation prior to runoff discharge into the San Luis Rey River that could result from stormwater runoff.

With regard to the landfill footprint, the primary function of the proposed drainage facilities is to divert and convey stormwater flows in a controlled manner in order to minimize erosion and inhibit the potential infiltration of surface water run-on into the refuse disposal areas. On-site drainage features are designed to control stormwater that falls on the landfill and the surrounding support facilities. A berm around the landfill deck perimeter would intercept stormwater flows and direct water into the downdrains, which would convey the flows to the buried drainage pipes located around the perimeter of the refuse footprint. The buried drainage pipes would be sloped to maintain positive flow and discharge to the desilting basins. These basins would act to reduce the amount of silt ultimately discharged from the landfill site. Stormwater from the surrounding facilities would sheet flow directly into the perimeter drainage channels, which would convey flows around the desilting basins and would discharge in a combined

outfall with discharges from the desilting basins. Energy dissipators would reduce discharge velocities to predevelopment conditions.

The downdrains would be laid perpendicular to slope contours and located atop, and anchored into, the final landfill surface. They would extend up the completed side slopes of the landfill as the filling progresses. The downdrains would also have inlets at each bench to accommodate flows along the inside edge of the benches resulting from stormwater from the landfill side slopes.

SECTION 2 PRIORITY PROJECT DETERMINATION

2.1 PRIORITY PROJECT TABLE

Based upon evaluation and completion of Table 3 below, the project would be considered a priority project. Detailed priority project definitions are included in the 2007 Municipal Permit.

Table 3
Priority Project Determination

PRIORITY PROJECT	YES	NO
Redevelopment within the County Urban Area that creates, adds, or replaces at least 5,000 net square feet of additional impervious surface area on an already developed site that falls into one of the categories below.		X
Housing subdivisions of 10 or more dwelling units.		X
Commercial developments greater than 1 acre.	X	
Developments of heavy industry greater than one acre.		X
Automotive repair shops.		X
Restaurants, where the land area for development is greater than 5,000 square feet.		X
Hillside development, in an area with known erosive soil conditions, where there will be grading on any natural slope that is twenty-five percent or greater, if the development creates 5,000 square feet or more of impervious surface.	X	
Environmentally Sensitive Areas: All development and redevelopment located within or directly adjacent to or discharging directly to an environmentally sensitive area (where discharges from the development or redevelopment will enter receiving waters within the environmentally sensitive area), which either creates 2,500 square feet of impervious surface on a proposed project site or increases the area of imperviousness of a proposed project site to 10% or more of its naturally occurring condition.		X
Parking Lots 5,000 square feet or more or with 15 parking spaces or more and potentially exposed to urban runoff.	X	
Streets, roads, highways, and freeways which would create a new paved surface that is 5,000 square feet or greater.	X	
Retail Gasoline Outlets 5,000 square feet or larger or with a projected Average Daily Traffic of 100 or more vehicles.		X

2.2 SITE DESCRIPTION

Table 4 provides the suggested site description components to be discussed in this section. Following the section is description of the applicable components. The order of the discussion proceeds in a slightly different order than that presented in Table 4 to provide continuity of the discussion.

Table 4
Site Description Components

	SITE DESCRIPTION COMPONENT	COMPLETED	NA
1.	Describe the topography of the project area.	X	
2.	Describe the local land use within the project area and adjacent areas.	X	
3.	Evaluate the presence of dry weather flow.	X	
4.	Determine the receiving waters that may be affected by the project throughout the project life cycle (i.e., construction, maintenance and operation).	X	
5.	For the project limits, list the 303(d) impaired receiving water bodies and their constituents of concern.	X	
6.	Determine if there are any High Risk Areas (municipal or domestic water supply reservoirs or groundwater percolation facilities) within the project limits.	X	
7.	Determine the Regional Board special requirements, including TMDLs, effluent limits, etc.		X
8.	Determine the general climate of the project area. Identify annual rainfall and rainfall intensity curves.	X	
9.	If considering Treatment BMPs, determine the soil classification, permeability, erodibility, and depth to groundwater.	X	
10.	Determine contaminated or hazardous soils within the project area.	X	

2.2.1 Topography

Approximately 75 percent of the project site consists of steeply sloping, rocky land which is naturally vegetated and undeveloped. From a geologic perspective, the project is located within the Penisular Range. Regional topography in the Peninsular Range is characterized by considerable relief with relatively moderate to steep slopes. East of Gregory Canyon, Gregory Mountain rises steeply to a maximum elevation of 1,844 feet above mean sea level (amsl). The western ridge rises to a maximum elevation of 940 feet amsl. The thalweg (*i.e.,* the flow line) of the canyon itself drops in elevation from 920 feet amsl at the head of the canyon on the south to 320 feet amsl on its northern terminus into the San Luis Rey River. Elevations on the Gregory Canyon site range from approximately 300 feet above mean sea level (amsl) at the mouth of the canyon in the San Luis Rey River drainage to 1,200 feet amsl at the head of the canyon at the south. Much of the canyon is steep, rugged terrain containing numerous boulder outcrops on the eastern side with only a few isolated boulders on the western canyon wall. The canyon flattens somewhat at the mouth where it meets the alluvial deposits of the San Luis Rey River drainage. The overall slope of the canyon is approximately 12% from top to bottom along the thalweg. The Gregory Canyon watershed drains approximately 458 acres or approximately one tenth of one percent of the San Luis Rey River basin area. Gregory Canyon flows northward to the San Luis Rey River.

2.2.2 General Climate

The median annual rainfall based upon 30 years of rainfall data analysis by URS Corporation (URS) for the Fallbrook rain gauge (located approximately 10 miles northwest of the project) is 14.1 inches. The

rainy season is from October to April with most significant rain events occurring between December and March. Summers are typically dry with only infrequent thunderstorms.

2.2.3 Soils and Groundwater

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. The existing slopes on the lower area of Gregory Canyon are about 5:1 (horizontal-to-vertical ratio), become 2:1 to the east, and are 1:1 and steeper on the upper part of the eastern slope. The western flank of the canyon is defined by a rounded ridgeline, with rather uniform slopes at inclinations of 2:1 to 3:1.

2.2.4 Local Land Use

Land uses in this part of the County are primarily rural, including agriculture, large lot residential, scattered small communities, and occasional large-scale commercial/industrial uses (primarily mining). Existing and past 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.

2.2.5 Dry Weather Flows

Flows in Gregory Canyon are considered ephemeral (*i.e.*, it flows briefly in direct response to heavy precipitation in the vicinity). Surface flow in the canyon occurs during moderate to large storm events (in excess of the 5-year storm event). However, surface flows from Gregory Canyon will not reach the San Luis Rey River due to rapid infiltration within the San Luis Rey River 500-year floodplain terrace. Typically, the San Luis Rey River is at zero to low flow during the summer months and has variable flows during the winter rainy season.

2.2.6 Receiving Waters and 303(d) Status

The San Luis Rey River is the receiving water from the GCLF. The San Luis Rey River is listed for 303(d) Total Dissolved Solids (TDS) (total of 19 miles) and Chloride (lower 13 miles) impairment downstream of the project area.

2.2.7 High Risk Areas

There are no municipal or domestic water supply reservoirs located within or downstream of the project. An existing underground water aqueduct and SDG&E power lines run along the west and east portions of the project, but these utilities will be relocated or protected as necessary to prevent potential service interruption due to stormwater related issues during landfill operation.

2.2.8 Regional Board Special Requirements

Total Maximum Daily Loads (TMDLs) and effluent limits have not been established for the San Luis Rey River or the project. Regional Board special requirements will be determined during the permitting phase of the project and incorporated into this SWMP if applicable and appropriate to stormwater issues.

2.3 TREATMENT CONTROL BMP REQUIREMENTS

The checklist below outlines the requirements to determine if Treatment Control Best Management Practices (BMPs) are required for the project based upon current County of San Diego SUSMP requirements. Based upon completion of Table 5, GCLF is not technically required to implement treatment control BMPs because it is not located in the County urban area or tributary to an MS4. However, the project is proposing to use LID techniques and treatment control BMPs to minimize the potential for stormwater quality degradation and hydromodification impacts to the San Luis Rey River.

Table 5
Treatment Control BMP Determination

NO.	CRITERIA	YES	NO	INSTRUCTION
1.	Is this an emergency project?		X	If YES, go to 6. If NO, continue to 2.
2.	Have TMDLs been established for surface waters within the project limit?		X	If YES, go to 5. If NO, continue to 3.
3.	Will the project directly discharge to a 303(d) impaired receiving water body?	X		If YES, go to 5. If NO, continue to 4.
4.	Is this project within the urban and environmentally sensitive areas as defined on the maps in Appendix B of the County of San Diego Standard Urban Storm Water Mitigation Plan for Land Development and Public Improvement Projects?		X	If YES, continue to 5. If NO, go to 6.
5.	Consider approved Treatment BMPs for the project.	X		If YES, go to 7.
6.	Project is not required to consider Treatment BMPs.			Document for Project Files by referencing this checklist.
7.	End			

SECTION 3 WATERSHED

The project is located in the following watershed.

☐ San Juan	☐ Santa Margarita	☒ San Luis Rey	☐ Carlsbad
☐ San Dieguito	☐ Penasquitos	☐ San Diego	☐ Pueblo San Diego
☐ Sweetwater	☐ Otay	☐ Tijuana	

Hydrologic sub-area number(s) and name(s): 903.21, San Luis Rey River Hydrologic Unit, Monserate Hydrologic Area, Pala Hydrologic SubArea.

3.1 BENEFICIAL USES

The beneficial uses for Inland Surface Waters and Ground Waters for the San Luis Rey River are provided in Table 6, and were obtained from the San Diego RWQCB Basin Plan. These beneficial uses apply for both San Luis Rey River and Gregory Canyon (tributary).

Table 6
Beneficial Uses for Inland Surface Waters and Ground Waters

	Hydrologic Unit Basin Number	MUN	AGR	IND	PROC	GWR	FRESH	POW	REC1	REC2	BIOL	WARM	COLD	WILD	RARE	SPWN
Inland Surface Waters																
San Luis Rey between Couser Canyon and Gomez Creek	903.21	X	X	X					X	X		X	X	X		
Groundwater																
Pala HSA	903.21	X	X	X												

X = Existing Beneficial Use

MUN – Municipal and Domestic Supply; AGR - Agricultural Supply; IND – Industrial Services Supply; PROC – Industrial Process Supply; GWR - Ground Water Recharge; FRESH - Freshwater Replenishment; POW - Hydropower Generation; REC1– Contact Recreation; REC2 – Non-Contact Recreation; BIOL - Preservation of Biological Habitats of Special Significance; WARM – Warm Freshwater Habitat:; COLD - Cold Freshwater Habitat; WILD – Wildlife Habitat; RARE - Rare, Threatened, or Endangered Species; SPWN - Spawning, Reproduction, or Early Development.

SECTION 4 POLLUTANTS OF CONCERN

Using Table 7, pollutants that are anticipated to be generated from the proposed priority project categories were identified. Based upon the variety of activities associated with GCLF, all of the pollutants shown in Table 7 could be potential pollutants depending on the location within the project footprint and operational activity.

Table 7
Anticipated and Potential Pollutants Generated by Land Use Type

	General Pollutant Categories								
Priority Project Categories	**Sediments**	**Nutrients**	**Heavy Metals**	**Organic Compounds**	**Trash & Debris**	**Oxygen Demanding Substances**	**Oil & Grease**	**Bacteria & Viruses**	**Pesticides**
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development >100,000 ft^2	P(1)	P(1)		P(2)	X	P(5)	X	P(3)	P(5)
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	
Hillside Development >5,000 ft^2	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X		

X = anticipated

P = potential

(1) A potential pollutant if landscaping exists on-site.

(2) A potential pollutant if the project includes uncovered parking areas.

(3) A potential pollutant if land use involves food or animal waste products.

(4) Including petroleum hydrocarbons.

(5) Including solvents.

SECTION 5 CONSTRUCTION BMPS

The proposed construction BMPs that may be used are listed below.

- ☒ Silt Fence
- ☒ Fiber Rolls
- ☒ Street Sweeping and Vacuuming
- ☒ Storm Drain Inlet Protection
- ☒ Stockpile Management
- ☒ Solid Waste Management
- ☒ Stabilized Construction Entrance/Exit
- ☒ Dewatering Operations
- ☒ Vehicle and Equipment Maintenance
- ☒ Desilting Basin
- ☒ Gravel Bag Berm
- ☒ Sandbag Barrier
- ☒ Material Delivery and Storage
- ☒ Spill Prevention and Control
- ☒ Concrete Waste Management
- ☒ Water Conservation Practices
- ☒ Paving and Grinding Operations
- ☒ Any minor slopes created incidental to construction and not subject to a major or minor grading permit shall be protected by covering with plastic or tarp prior to a rain event, and shall have vegetative cover reestablished within 180 days of completion of the slope and prior to final building approval.

SECTION 6 SITE DESIGN AND LOW IMPACT DEVELOPMENT BMPS

To minimize stormwater impacts, site design measures must be addressed. Site design measures overlap low impact development techniques. The 2007 Municipal Permit requires that all Priority Development Projects incorporate the following LID BMPs listed below where applicable and feasible:

- Conserve natural areas, including existing trees, other vegetation, and soils
- Construct streets, sidewalks, or parking lot aisles to the minimum widths necessary, provided that public safety and a walkable environment for pedestrians are not compromised
- Minimize the impervious footprint of the project
- Minimize soil compaction where feasible
- Minimize disturbances to natural drainages (*e.g.*, natural swales, topographic depressions, etc.)

The following checklist provides options for avoiding or reducing potential impacts during project planning. If YES is checked, then that the measure will be used for this project. If NO is checked, a brief explanation is provided as to why the option was not selected.

Table 8
Site Design Options

		OPTIONS	YES	NO	N/A
1.		Was the project relocated or realigned to avoid/reduce impacts to receiving waters or to increase the preservation of critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions?	X		
2.		Was the project designed to minimize impervious footprint?	X		
3.		Was the project designed to conserve natural areas where feasible?	X		
4.		Where landscape is proposed, can rooftops, impervious sidewalks, walkways, trails and patios be drained into adjacent landscaping?	X		
5.		For roadway projects, can structures and bridges be designed or located to reduce work in live streams and minimize construction impacts?	X		
6.		Can any of the following methods be utilized to minimize erosion from slopes:			
	6a.	Disturbing existing slopes only when necessary?	X		
	6b.	Minimize cut and fill areas to reduce slope lengths?		X	
	6c.	Incorporating retaining walls to reduce steepness of slopes or to shorten slopes?		X	
	6d.	Providing benches or terraces on high cut and fill slopes to reduce concentration of flows?	X		
	6e.	Rounding and shaping slopes to reduce concentrated flow?	X		
	6f.	Collecting concentrated flows in stabilized drains and channels?	X		

Notes:
6b. Cut and fill areas are minimized to the extent practicable, but slope lengths are based upon geotechnical recommendations for maximum cut and fill slope angles.
6c. Retaining walls are provided in one case to avoid an existing wetland area near the facility operations pad and entrance to the landfill. Additional retaining walls will be provided where necessary, but retaining walls are not used systematically to reduce slope steepness or length.

If the project includes work in channels, then complete the following checklist. Information shall be obtained from the project drainage report.

Table 9
Channel Modification Criteria Evaluation

NO.	CRITERIA	YES	NO	N/A	COMMENTS
1.	Will the project increase velocity or volume of downstream flow?		X		If YES go to 5. *Project treatment control BMPs will reduce flowrate, volume, and velocity to pre-development conditions.*
2.	Will the project discharge to unlined channels?	X			If YES go to 5.
3.	Will the project increase potential sediment load of downstream flow?		X		If YES go to 5. *Project desilting basins will provide sediment load reductions.*
4.	Will the project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect upstream and/or downstream channel stability?		X		If YES go to 7. *Project will cross San Luis Rey River but will not affect upstream and/or downstream channel stability.*
5.	Review channel lining materials and design for stream bank erosion.	X			Continue to 6.
6.	Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity.	X			Continue to 7.
7.	Include, where appropriate, energy dissipation devices at culverts.	X			Continue to 8. *Energy dissipation will be provided at culvert and pipe outlets.*
8.	Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour.	X			Continue to 9.
9.	Include, if appropriate, detention facilities to reduce peak discharges.	X			*Desilting Basins and infiltration areas will be incorporated into project design.*
10.	"Hardening" natural downstream areas to prevent erosion is not an acceptable technique for protecting channel slopes, unless predevelopment conditions are determined to be so erosive that hardening would be required even in the absence of the proposed Development.			X	Continue to 11.
11.	Provide other design principles that are comparable and equally effective.	X			Continue to 12.
12.	End				

SECTION 7 SOURCE CONTROL BMPS

The following table provides a listing of the source control BMPs identified for the project. Note that some source control BMPs such as biofilter strips and swales are considered Low Impact Development (LID) techniques.

Table 10
Source Control BMP Identification

BMP			YES	NO	N/A
1.	Provide Storm Drain System Stenciling and Signage				
	1.a.	All storm drain inlets and catch basins within the project area shall have a stencil or tile placed with prohibitive language and/or graphical icons to discourage illegal dumping.	X		
	1.b.	Signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, must be posted at public access points along channels and creeks within the project area.	X		
2.	Design Outdoor Material Storage Areas to Reduce Pollution Introduction				
	2.a.	This is a detached single-family residential project. Therefore, personal storage areas are exempt from this requirement.			X
	2.b.	Hazardous materials with the potential to contaminate urban runoff shall either be: (1) placed in an enclosure such as, but not limited to, a cabinet, shed, or similar structure that prevents contact with runoff or spillage to the storm water conveyance system; or (2) protected by secondary containment structures such as berms, dikes, or curbs.	X		
	2.c.	The storage area shall be paved and sufficiently impervious to contain leaks and spills.	X		
	2.d.	The storage area shall have a roof or awning to minimize direct precipitation within the secondary containment area.	X		
3.	Design Trash Storage Areas to Reduce Pollution Introduction (Applies to Site Facility Area - Not Landfill)				
	3.a.	Paved with an impervious surface, designed not to allow run-on from adjoining areas, screened or walled to prevent off-site transport of trash; or,	X		
	3.b.	Provide attached lids on all trash containers that exclude rain, or roof or awning to minimize direct precipitation.	X		
4.	Use Efficient Irrigation Systems & Landscape Design				
	The following methods to reduce excessive irrigation runoff shall be considered, and incorporated and implemented where determined applicable and feasible. Note: All irrigation will be by truck.				
	4.a.	Employing rain shutoff devices to prevent irrigation after precipitation.			X
	4.b.	Designing irrigation systems to each landscape area's specific water requirements.			X

Table 10. Source Control BMP Identification (Continued)

BMP			YES	NO	N/A
	4.c.	Using flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.			X
	4.d.	Employing other comparable, equally effective, methods to reduce irrigation water runoff.	X		
5.	Private Roads				
	The design of private roadway drainage shall use at least one of the following:				
	5.a.	Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings.	X		
	5.b.	Urban curb/swale system: street slopes to curb, periodic swale inlets drain to vegetated swale/biofilter.		X	
	5.c.	Dual drainage system: First flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder, high flows connect directly to storm water conveyance system.		X	
	5.d.	Other methods that are comparable and equally effective within the project.	X		
6.	Residential Driveways & Guest Parking				X
	The design of driveways and private residential parking areas shall use one at least of the following features.				X
	6.a.	Design driveways with shared access, flared (single lane at street) or wheelstrips (paving only under tires); or, drain into landscaping prior to discharging to the storm water conveyance system.			X
	6.b.	Uncovered temporary or guest parking on private residential lots may be: paved with a permeable surface; or, designed to drain into landscaping prior to discharging to the storm water conveyance system.			X
	6.c.	Other features which are comparable and equally effective.			X
7.	Dock Areas				X
	Loading/unloading dock areas shall include the following.				X
	7.a.	Cover loading dock areas, or design drainage to preclude urban run-on and runoff.			X
	7.b.	Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.			X
	7.c.	Other features which are comparable and equally effective.			X
8.	Maintenance Bays				X
	Maintenance bays shall include the following.				
	8.a.	Repair/maintenance bays shall be indoors; or, designed to preclude urban run-on and runoff. Note: The maintenance building within the Site Facility Area will be enclosed.	X		

Table 10. Source Control BMP Identification (Continued)

BMP			YES	NO	N/A
	8.b.	Design a repair/maintenance bay drainage system to capture all wash water, leaks and spills. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.	X		
	8.c.	Other features which are comparable and equally effective.			X
9.	Vehicle Wash Areas				X
	Priority projects that include areas for washing/steam cleaning of vehicles shall use the following.				X
	9.a.	Self-contained; or covered with a roof or overhang.			X
	9.b.	Equipped with a clarifier or other pretreatment facility.			X
	9.c.	Properly connected to a sanitary sewer.			X
	9.d.	Other features which are comparable and equally effective.			X
10.	Outdoor Processing Areas				
	Outdoor process equipment operations, such as rock grinding or crushing, painting or coating, grinding or sanding, degreasing or parts cleaning, waste piles, and wastewater and solid waste treatment and disposal, and other operations determined to be a potential threat to water quality by the County shall adhere to the following requirements. Note: The working face of the landfill will not be covered.				
	10a.	Cover or enclose areas that would be the most significant source of pollutants; or, slope the area toward a dead-end sump; or, discharge to the sanitary sewer system following appropriate treatment in accordance with conditions established by the applicable sewer agency.			X
	10b.	Grade or berm area to prevent run-on from surrounding areas.	X		
	10.c.	Installation of storm drains in areas of equipment repair is prohibited.			X
	10.d.	Other features which are comparable or equally effective.	X		
11.	Equipment Wash Areas				
	Outdoor equipment/accessory washing and steam cleaning activities shall:				X
	11.a.	Be self-contained; or covered with a roof or overhang.			X
	11.b.	Be equipped with a clarifier, grease trap or other pretreatment facility, as appropriate			X
	11.c.	Be properly connected to a sanitary sewer.			X
	11.d.	Other features which are comparable or equally effective.			X
12.	Parking Areas				
	The following design concepts shall be considered, and incorporated and implemented where determined applicable and feasible by the County.				

Table 10. Source Control BMP Identification (Continued)

BMP			YES	NO	N/A
	12.a.	Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design.			X
	12.b.	Overflow parking (parking stalls provided in excess of the County's minimum parking requirements) may be constructed with permeable paving.			X
	12.c.	Other design concepts that are comparable and equally effective.	X		
13.	Fueling Area				
	Non-retail fuel dispensing areas shall contain the following. Note: The site facilities area will include a diesel storage tank within a concrete enclosure.				
	13.a.	Overhanging roof structure or canopy. The cover's minimum dimensions must be equal to or greater than the area within the grade break. The cover must not drain onto the fuel dispensing area and the downspouts must be routed to prevent drainage across the fueling area. The fueling area shall drain to the project's treatment control BMP(s) prior to discharging to the storm water conveyance system.	X		
	13.b.	Paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete shall be prohibited.	X		
	13.c.	Have an appropriate slope to prevent ponding, and must be separated from the rest of the site by a grade break that prevents run-on of urban runoff.	X		
	13.d.	At a minimum, the concrete fuel dispensing area must extend 6.5 feet (2.0 meters) from the corner of each fuel dispenser, or the length at which the hose and nozzle assembly may be operated plus 1 foot (0.3 meter), whichever is less.	X		

SECTION 8 TREATMENT CONTROL BMPS

To select structural treatment BMPs the following BMP Selection Matrix (Table 11) was used. Each priority project shall compare the list of pollutants for which the downstream receiving waters are impaired (if any), with the pollutants anticipated to be generated by the project (as identified in Table 7). Any pollutants identified in Table 7, which are also causing a Clean Water Act section 303(d) impairment of the receiving waters of the project, shall be considered primary pollutants of concern. Priority projects that are anticipated to generate a primary pollutant of concern shall select a single or combination of stormwater BMPs from Table 11, which maximizes pollutant removal for the particular primary pollutant(s) of concern. Priority projects that are not anticipated to generate a pollutant for which the receiving water is Clean Water Act Section 303(d) impaired shall select a single or combination of stormwater BMPs from Table 11, which are effective for pollutant removal of the identified secondary pollutants of concern, consistent with the "maximum extent practicable" standard.

Table 11
Treatment Control BMP Selection Matrix

Pollutant of Concern	Treatment Control BMP Categories (1)						
	Biofilters	Detention Basins	Infiltration Basins(2)	Wet Ponds or Wetlands	Drainage Inserts	Filtration	Hydrodynamic Separator Systems(3)
Sediment	M	H	H	H	L	H	M
Nutrients	L	M	M	M	L	M	L
Heavy Metals	M	M	M	H	L	H	L
Organic Compounds	U	U	U	U	L	M	L
Trash & Debris	L	H	U	U	M	H	M
Oxygen Demanding Substances	L	M	M	M	L	M	L
Bacteria	U	U	H	U	L	M	L
Oil & Grease	M	M	U	U	L	H	L
Pesticides	U	U	U	U	L	U	L

(1) Copermittees are encouraged to periodically assess the performance characteristics of many of these BMPs to update this table.
(2) Including trenches and porous pavement.
(3) Also known as hydrodynamic devices and baffle boxes.
L: Low removal efficiency
M: Medium removal efficiency
H: High removal efficiency
U: Unknown removal efficiency
Sources: Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (1993), National Stormwater Best Management Practices Database (2001), and Guide for BMP Selection in Urban Developed Areas (2001).

8.1 RUNOFF CALCULATIONS

A Treatment BMP must address runoff from developed areas. Provided in Table 12 are the pre- and post-construction runoff flowrates and volumes for the project. Outfalls are labeled on the BMP map. Note that both the Rational Method and the Unit Hydrograph Method were used to calculate flowrates from the site. The Rational Method was applied only for the 100-year storm event and flowrates for lower storm events were determined based upon the ratio of rainfall intensity values assuming the same time of concentration and runoff coefficient. The Unit Hydrograph Method was used to simulate naturally occurring conditions within the canyon and calibrated based upon observed runoff events within Gregory Canyon. Calculations are provided in Attachment E.

Although the Rational Method runoff calculations indicate no increased flows within this area, the Unit Hydrograph Method hydrology calculations indicate the potential for increased flowrate and volume due to the proposed change in runoff patterns. Runoff from the steep upper portions of the canyon will be diverted away from the center of the canyon in perimeter drainage channels and will, therefore, not have the opportunity to infiltrate within the flatter portions of the canyon.

Table 12a
Project Runoff Values

Unit Hydrograph Method Analysis (HEC-1) - Runoff Comparison

		Existing					Proposed					
Storm Frequency	6-hour Storm Rainfall (inches)	Outfall 1 (cfs)	Outfall 2 (cfs)	Outfall 3 (cfs)	Outfall 4 (cfs)	Outfall 5 (cfs)	Outfall 1 (cfs)	Outfall 2 (cfs)	Outfall 3 (cfs)	Combined Outfall 1 - 3 (cfs)	Outfall 4 (cfs)	Outfall 5 (cfs)
2	1.5	**0**	0	0	0	0	1	1	2	**2**	*	*
5	2	**0**	0	0	0	0	5	3	6	**8**	*	*
10	2.4	**6**	0	0	0	0	11	3	8	**16**	*	*
25	2.8	**14**	0	0	0	0	21	9	9	**29**	*	*
50	3.1	**61**	0	0	0	0	94	55	11	**140**	*	*
100	3.4	**94**	0	0	0	0	119	71	12	**179**	*	*

* These Outfalls were not analyzed using the Unit Hydrograph Method due to their small size and short time of concentration.

Rational Method Analysis (HEC-1) - Runoff Comparison

		Existing					Proposed					
Storm Frequency	6-hour Storm Rainfall (inches)	Outfall 1 (cfs)	Outfall 2 (cfs)	Outfall 3 (cfs)	Outfall 4 (cfs)	Outfall 5 (cfs)	Outfall 1 (cfs)	Outfall 2 (cfs)	Outfall 3 (cfs)	Combined Outfalls 1 -3 (cfs)	Outfall 4 (cfs)	Outfall 5 (cfs)
Water Quality	0.2	**32.1**	0	0	0	0	16.3	15.8	1.3	**33.3**	0.22	0.17
2	1.5	**284**	0	0	0	0	181	131	16	**223**	1.6	1.3
5	2	**379**	0	0	0	0	242	175	21	**297**	2.2	1.7
10	2.4	**530**	0	0	0	0	290	210	25	**357**	2.6	2.1
25	2.8	**545**	0	0	0	0	338	245	30	**416**	3.1	2.4
50	3.1	**587**	0	0	0	0	375	271	33	**461**	3.4	2.7
100	3.4	**693**	0	0	0	0	411	297	36	**505**	3.7	2.9

Table 12b
Project Hydrograph Volumes

Unit Hydrograph Method Analysis (HEC-1) - Volume Comparison

		Existing					Proposed					
Storm Frequency	6-hour Storm Rainfall (inches)	Outfall 1 (ac-ft)	Outfall 2 (ac-ft)	Outfall 3 (ac-ft)	Outfall 4 (ac-ft)	Outfall 5 (ac-ft)	Outfall 1 (ac-ft)	Outfall 2 (ac-ft)	Outfall 3 (ac-ft)	Combined Hydrograph Outfall 1 - 3 (ac-ft)	Outfall 4 (ac-ft)	Outfall 5 (ac-ft)
2	1.5	**0**	0	0	0	0	0.13	0	0.36	**0.49**	*	*
5	2	**0**	0	0	0	0	1.2	0.5	0.57	**2.3**	*	*
10	2.4	**0.8**	0	0	0	0	2.5	1.2	0.76	**4.5**	*	*
25	2.8	**2.3**	0	0	0	0	4.3	2.1	0.95	**7.3**	*	*
50	3.1	**14.2**	0	0	0	0	11.4	6.5	1.09	**19.0**	*	*
100	3.4	**18.8**	0	0	0	0	14.1	8.4	1.23	**23.7**	*	*

* These Outfalls were not analyzed using the Unit Hydrograph Method due to their small size and short time of concentration.

Rational Method Analysis - Volume Comparison

		Existing					Proposed					
Storm Frequency	6-hour Storm Rainfall (inches)	Outfall 1 (ac-ft)	Outfall 2 (ac-ft)	Outfall 3 (ac-ft)	Outfall 4 (ac-ft)	Outfall 5 (ac-ft)	Outfall 1 (ac-ft)	Outfall 2 (ac-ft)	Outfall 3 (ac-ft)	Combined Hydrograph Outfall 1 - 3 (ac-ft)	Outfall 4 (ac-ft)	Outfall 5 (ac-ft)
Water Quality	0.85	**11.4**	0	0	0	0	5.8	5.6	0.4	**11.8**	0.08	0.06
2	1.5	**20.1**	0	0	0	0	10.2	9.9	0.8	**20.8**	0.14	0.11
5	2	**26.7**	0	0	0	0	13.6	13.1	1.1	**27.8**	0.18	0.14
10	2.4	**32.1**	0	0	0	0	16.3	15.8	1.3	**33.3**	0.22	0.17
25	2.8	**37.4**	0	0	0	0	19.0	18.4	1.5	**38.9**	0.25	0.20
50	3.1	**41.4**	0	0	0	0	21.1	20.4	1.6	**43.1**	0.28	0.22
100	3.4	**45.4**	0	0	0	0	23.1	22.3	1.8	**47.2**	0.31	0.24

8.2 PROJECT TREATMENT BMPS

Following are the minimum Treatment BMP(s) that are currently proposed for this project.

Biofilters

☒ Vegetated swale (two minimum on facilities area and one downstream of facilities area at Outfall 3)

☐ Vegetated strips (two vegetated strips may be used in lieu of the two vegetated swales on the site facilities area depending on final engineering grading plan constraints)

☐ Wetland vegetation swale

☐ Bioretention

Detention Basins

☐ Extended/dry detention basin with grass lining

☐ Extended/dry detention basin with impervious lining

Infiltration Basins

☒ Infiltration basin (flow spreading and infiltration into natural areas downstream of Outfalls 1, 2, 4 and 5)

☐ Infiltration trench

☐ Porous asphalt

☐ Porous concrete

☐ Porous modular concrete block

Wet Ponds or Wetlands

☐ Wet pond/basin (permanent pool)

☐ Constructed wetland

Drainage Inserts (See note below)

☒ Oil/Water separator (a minimum of one oil-water separator that will collect runoff from the landfill entry area and discharge separated water to the bio-filters and media filtration device at Outfall 3)

☐ Catch basin insert

☐ Storm drain inserts

☒ Catch basin screens *(two pre-infiltration filters are proposed for Outfall 5 along the access road at the low point west of the bridge. This is the only type of filter screening device available due to grade*

conditions. There is less than a foot of elevation difference between the roadway and the infiltration areas.)

Filtration

☒ Media filtration *(one media filter is proposed for the access road south of the bridge on the east side of the road that will treat both sides of the road and a minimum of one media filtration device is proposed for the site facility area downstream of the bio-filtration devices.)*

☐ Sand filtration

Hydrodynamic Separator Systems

☐ Swirl Concentrator

☐ Cyclone Separator

☐ Baffle Separator

☐ Gross Solids Removal Device

☐ Linear Radial Device

Note: Catch basin inserts and storm drain inserts are excluded from use on County maintained right-of-way and easements.

Treatment BMP Datasheets and design calculations are provided in Attachment E of this SWMP. Attachment E includes the following:

1. Description of how each treatment BMP was designed.
2. Engineering calculations for the BMP(s).
3. BMP Datasheets.

8.3 BMP SELECTION DESCRIPTION

Provided below is a description of post-construction BMPs selected for this project for each outfall. The BMP locations and conceptual drawings are provided in Attachment E. The main goal of the BMP selection was to prevent hyromodification impacts to the San Luis Rey River and to provide stormwater quality treatment using LID BMPs.

- 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.

- Outfall 3 - 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 ancillary 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 ancillary 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 ancillary facilities area. In addition, the hazardous waste storage facility, which is located in the ancillary facilities area, would be enclosed with secondary containment. Treatment control BMPs will consist of: a minimum of one oil-water separator that will collect runoff from the landfill entry area and discharge separated water to the bio-filters or media filtration device; 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.

- 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 curbside structural pre-infiltration filter devices (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.

SECTION 9 MAINTENANCE

Table 13 provides the County maintenance mechanisms/categories. The selected BMPs for this project constitute Second or Third Category Maintenance Mechanism. The long-term fiscal resources for the selected maintenance mechanism(s) will be Gregory Canyon Landfill, Ltd.

Table 13
Maintenance Category

	(Private Responsibility)		(Public Responsibility)	
	First Category	**Second Category**	**Third Category**	**Fourth Category**
Importance of Maintenance	Minimal concern; inherent in BMP or property stewardship	Need to make sure private owners maintain, and provide County ability to step in & perform maintenance	Warrants Flood Control Dist. (FCD) assuming responsibility, with funding related to project	Broader public responsibility for maintenance and funding (beyond project)
Typical BMPs	Biofilter (Grass swale, grass strip, vegetated buffer); Infiltration basin/trench	[First cat. Plus:] Minor wetland swale; Small detention basin; Single storm drain insert/Oil-water separator/Catch basin insert&screen	[Second cat. Plus:] Wetland swale or bioretention; Detention basin (extended/dry) Wet ponds & wetlands; Multiple storm drain inserts; Filtration systems	[Third cat. Plus:] Retrofit public storm drain inserts, etc. Master plan facility that serves area larger than project
Mechanisms	1. Stormwater Ordinance requirement with code enforcement. 2. Nuisance abatement with costs charged back to property owner. 3. Condition in ongoing permit such as a Major Use Permit (if project has MUP). 4. Notice to new purchasers. 5. Subdivision public report "white papers" to include notice of maintenance responsibility.		1. Dedication to FCD. 2. Formation of benefit area. 3. FCD maintenance documentation.	1. Dedication to FCD or County. 2. FCD/County maintenance documentation.
		6. Recorded easement agreement w/ covenant binding on successors.		
Funding Source(s)	None necessary	Security (Cash deposit, Letter of Credit, or other acceptable to County) for interim period. Agreement for security to contain provisions for release or refund, if not used.	**Start-up interim:** Developer fee covering 24 months of costs **Permanent:** FCD Assessment per FCD Act Sec 105-17.5	Varies: gas tax for BMP in road ROW, Transnet for CIP projects, Special funding or General funding for others.

SECTION 10 HYDROMODIFICATION EVALUATION

The 2007 Municipal Permit requires implementation of hydromodification assessments for priority projects greater than 50 acres. Gregory Canyon Landfill will likely be subject to these requirements when they take effect in 2008. Following are two sections from the 2007 Municipal Permit relating to the hydromodification requirements.

D.1.d (10) Downstream Erosion

"As part of its local SUSMP, each Copermittee shall develop and apply criteria to Priority Development Projects so that runoff discharge rates, durations, and velocities from Priority Development Projects are controlled to maintain or reduce downstream erosion conditions and protect stream habitat."

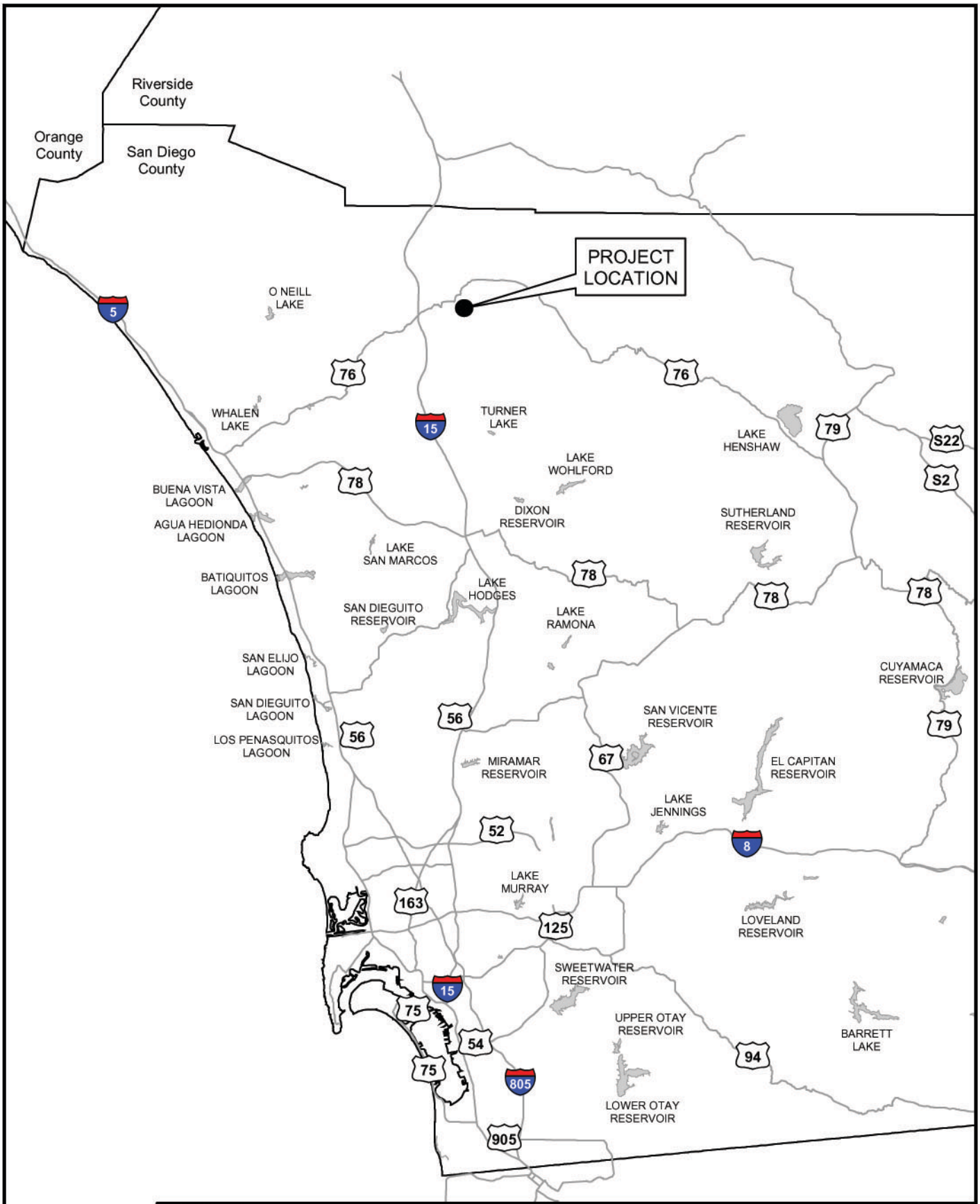
D.1.g (1) (c) Require Priority Development Projects to implement hydrologic control measures so that Priority Development Projects' post-project runoff flow rates and durations (1) do not exceed pre-project runoff flow rates and durations for the range of runoff flows identified under section D.1.g.(1)(b), where the increased flow rates and durations will result in increased potential for erosion or other significant adverse impacts to beneficial uses, attributable to changes in the flow rates and durations, and (2) do not result in channel conditions which do not meet the channel standard developed under section D.1.g.(1)(a) for channel segments downstream of Priority Development Project discharge points."

In response to the requirements of the 2007 Municipal Permit, the County of San Diego will prepare a Hydromodification Management Plan (HMP) for review and approval by the RWQCB. In the meantime, the County is preparing Interim Hydromodification requirements for use until the HMP is approved.

This project will evaluate potential hydromodification impacts by analyzing pre- and post- project flowrates and hydrograph volumes. Typically hydromodification impacts are evaluated for flowrates and hydrograph volumes less than the 10-year storm event, and are generally evaluated for 2 to 5-year storm events (or a percentage of those storm event flows). Conservatively, potential hydromodification impacts from the project were evaluated using a full range of flowrates and volumes from the 2- to 100-year storm event. The flowrates and volumes are provided in Tables 12a and 12b and in Attachment E.

The goal of the selected project treatment BMPs was to mimic the existing canyon flows and volumes tributary to the San Luis Rey River to provide both water quality treatment benefits and to minimize the potential for hydromodification impacts. This will be accomplished by construction of bio-swales and infiltration areas. Infiltration areas will be sized to infiltrate the required water quality volume.

The 2007 URS report "Evaluation of Hydrogeomorphology and Potential Beneficial Uses at Gregory Canyon," provides additional information on Gregory Canyon hydrology and effects to beneficial uses.



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: 1
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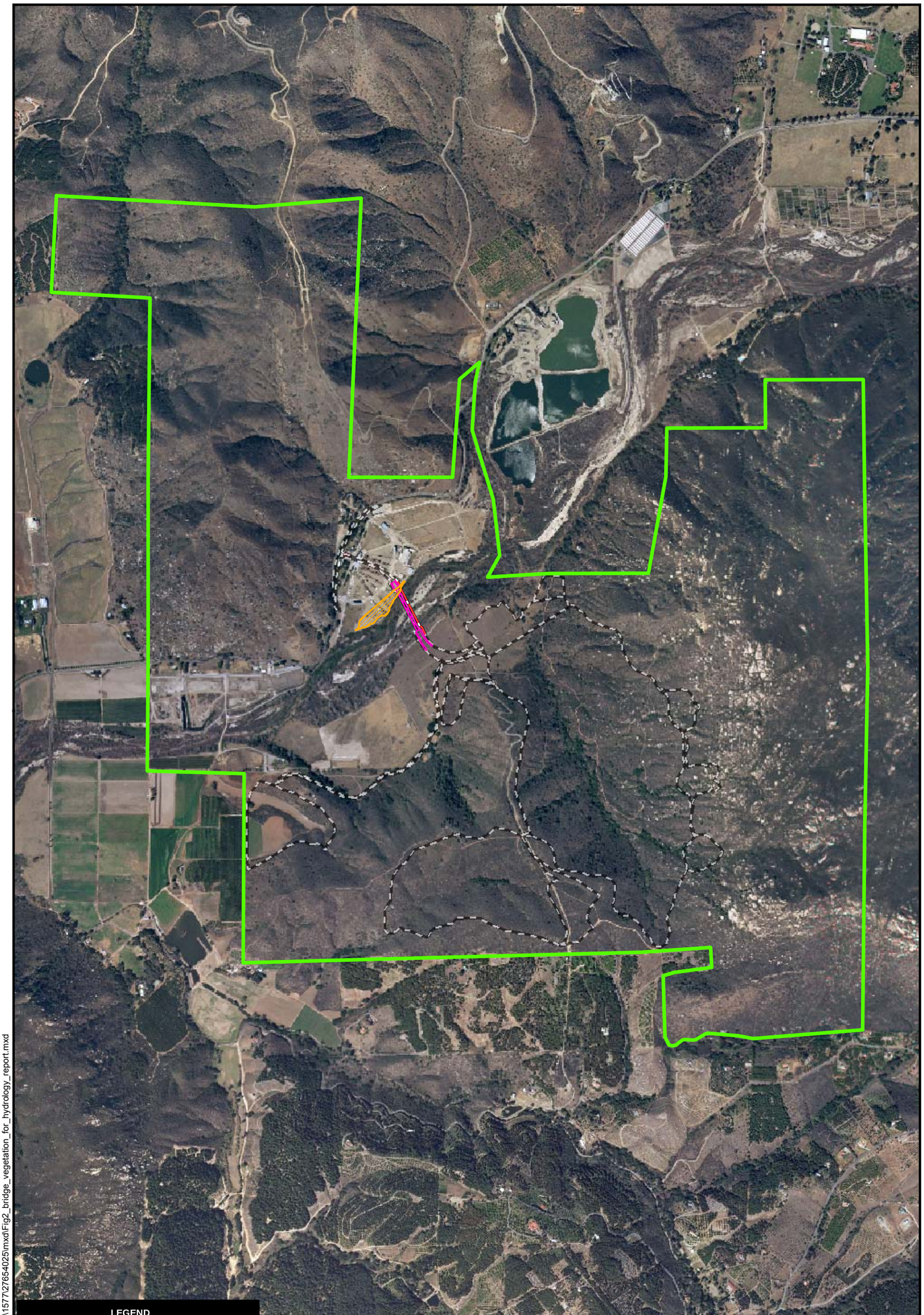

LEGEND

- 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).

625 0 625 1250 Feet

SCALE: 1" = 1,250' (1:15,000)

PROJECT OVERVIEW
GREGORY CANYON, LTD. LLC SITE

URS

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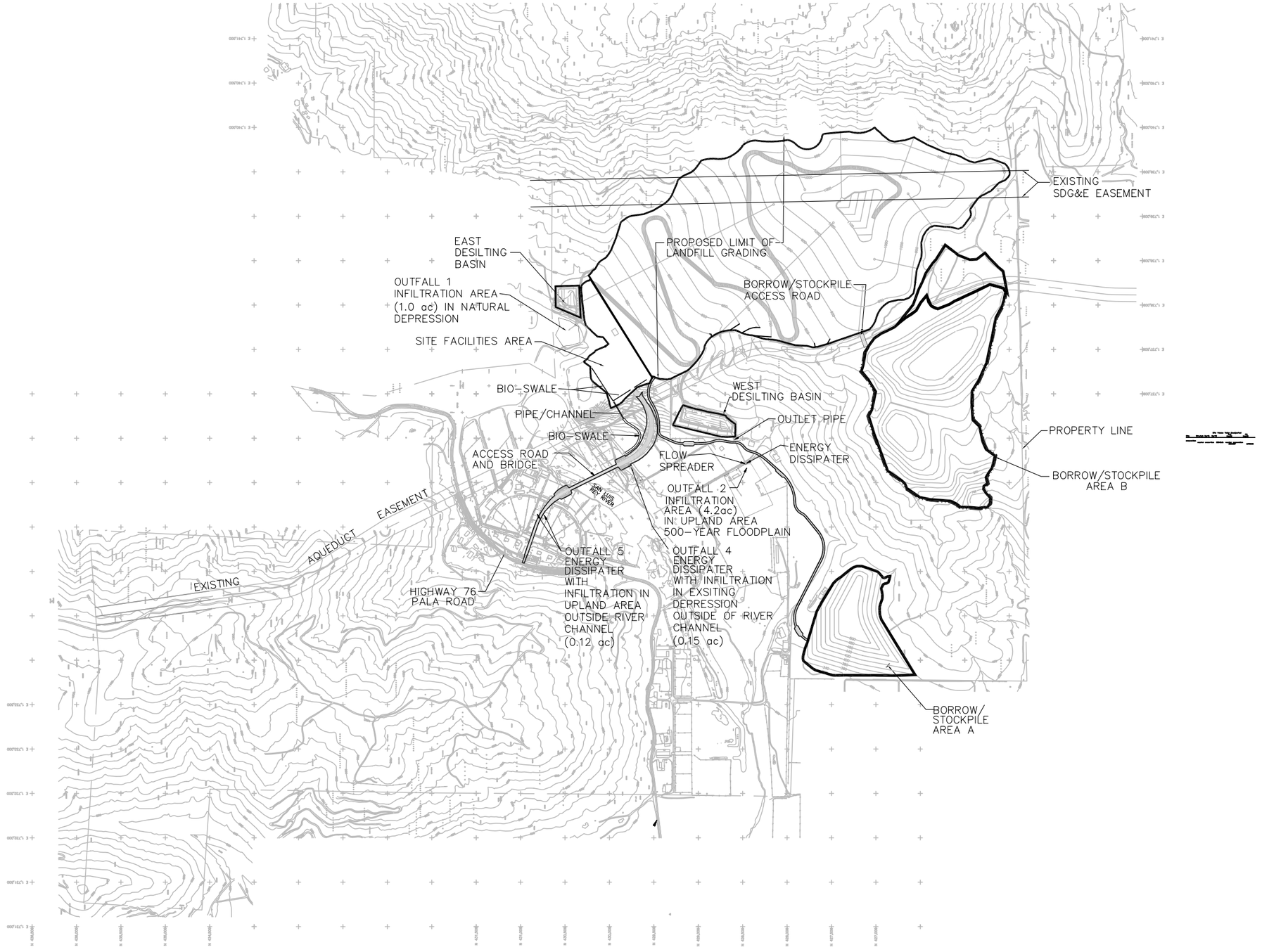
Note: No Relevant Surface Water Quality Monitoring Data is Currently Available



STORMWATER OUTFALL AND BMP LOCATIONS OVERLAIN ON TOPO GREGORY CANYON, LTD. LLC SITE

URS

600 0 600 1200 Feet

SCALE: 1"= 1200'

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PM: WPM	PROJ. NO: 27654025.00020	

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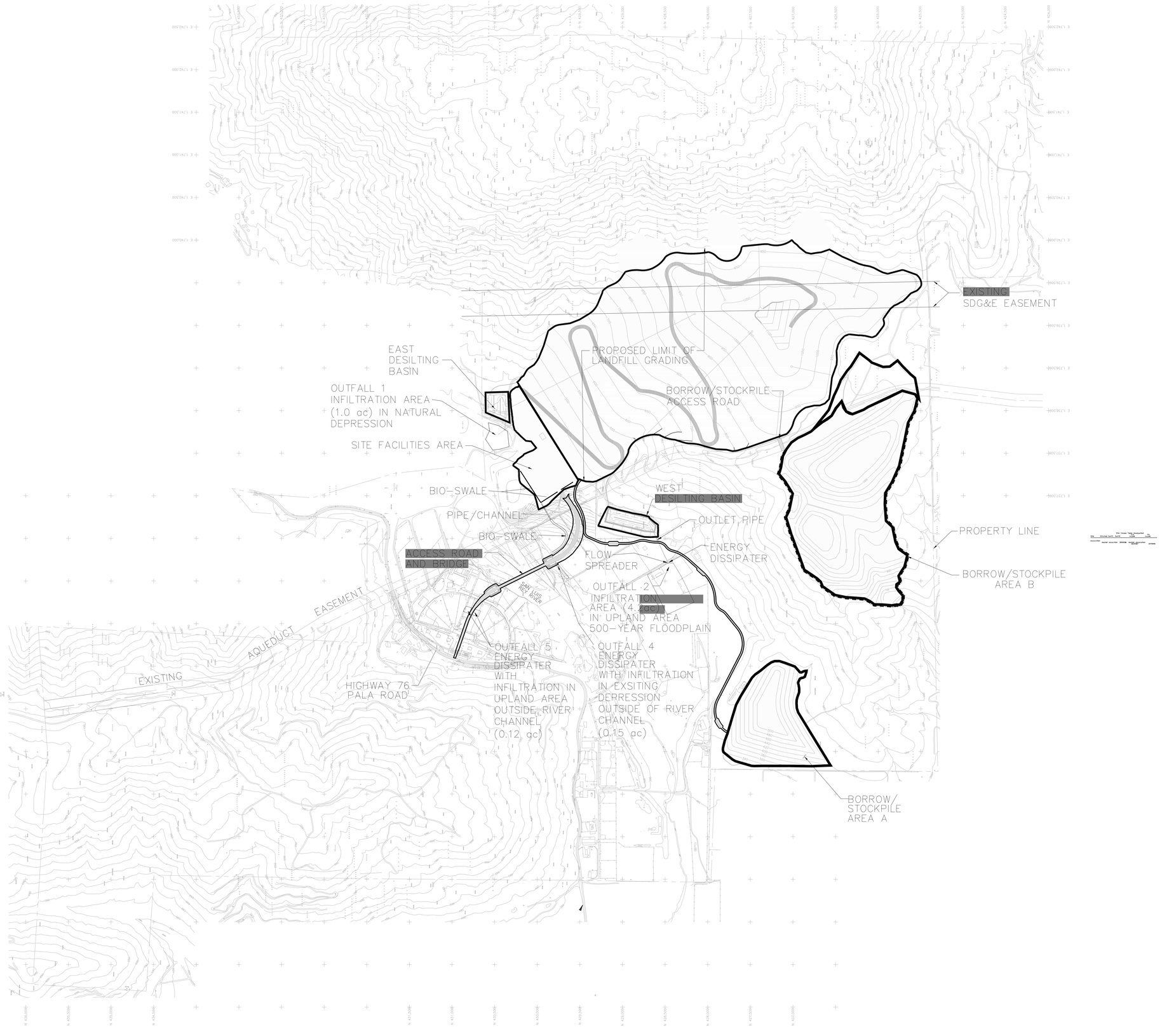

STORMWATER OUTFALL AND BMP LOCATIONS
OVERLAIN ON TOPO
GREGORY CANYON, LTD./I LLC

URS

200 0 200 400 Feet
SCALE: 1"= 400'

CHECKED BY: MM	DATE: 12-12-07	PLATE
PM: WPM	PROJ. NO: 27654025.00020	1

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Table E-1. Summary of Bio-filtration Design Factors (Strips And Swales)

Description	Applications/Siting	Preliminary Design Factors
Swales are vegetated channels that receive and convey storm water. Strips are vegetated buffer strips over which storm water flows as sheet flow. Treatment Mechanisms: Filtration through the vegetation Sedimentation Adsorption to soil particles Infiltration Pollutants removed: Debris and solid particles Some dissolved constituents	Site conditions and climate allow vegetation to be established Flow velocities not high enough to cause scour	Swales sized as a conveyance system (per County flood routing and scour procedures) Swale water depth as shallow as the site will permit Strips sized as long (in direction of flow) and flat as the site allows Strips should be free of gullies or rills No minimum dimensions or slope restrictions for treatment purposes Vegetation mix appropriate for climates and location

Table E-2. Summary of Infiltration Area Siting and Design Criteria

Description	Applications/Siting	Preliminary Design Factors
Depressions designed to hold runoff and infiltrate into the soil without discharge Treatment Mechanism: Infiltration Pollutants removed: All constituents	> 10 ft to seasonally high water table (or 4 ft if justified by adequate groundwater observations for a minimum of 1 year) Soil infiltration rate of 1.3 cm/hr (0.5 in/hr) Clay content < 30%, and < 40% clay and silt combined Sufficient horizontal hydraulic capacity Infiltrated water is unlikely to affect the stability of downgradient structures, slopes, or embankments Runoff quality has standards for infiltration to local groundwater If pretreatment is required, only approved BMPs should be considered Consult with RWQCB, water agencies, vector control authorities, and local utilities	Maintenance access (road around basin and ramp to basin invert) Optional upstream diversion channel or pipe, or downstream overflow structure Flood control spillway Scour protection on inflow and spillway Size to capture the water quality volume Infiltrate water quality volume within 48 to 72 hours Use ½ the measured infiltration rate to size the basin > 10 feet downgradient and 100 ft upgradient from structural foundations > 100 ft from drinking water wells Emergency/maintenance gravity drain

Runoff Calculations

Unit Hydrograph Method Analysis (HEC-1) - Runoff Comparison

		Existing					Proposed					
Storm Frequency	6-hour Storm Rainfall (inches)	Outfall 1 (cfs)	Outfall 2 (cfs)	Outfall 3 (cfs)	Outfall 4 (cfs)	Outfall 5 (cfs)	Outfall 1 (cfs)	Outfall 2 (cfs)	Outfall 3 (cfs)	Combined Hydrograph Outfall 1 - 3 (cfs)	Outfall 4 (cfs)	Outfall 5 (cfs)
2	1.5	**0**	0	0	0	0	1	1	2	**2**	*	*
5	2	**0**	0	0	0	0	5	3	6	**8**	*	*
10	2.4	**6**	0	0	0	0	11	3	8	**16**	*	*
25	2.8	**14**	0	0	0	0	21	9	9	**29**	*	*
50	3.1	**61**	0	0	0	0	94	55	11	**140**	*	*
100	3.4	**94**	0	0	0	0	119	71	12	**179**	*	*

* These Outfalls were not analayzed using the Unit Hydrograph Method due to their small size and short time of concentration.

Rational Method Analysis (HEC-1) - Runoff Comparison

		Existing					Proposed					
Storm Frequency	6-hour Storm Rainfall (inches)	Outfall 1 (cfs)	Outfall 2 (cfs)	Outfall 3 (cfs)	Outfall 4 (cfs)	Outfall 5 (cfs)	Outfall 1 (cfs)	Outfall 2 (cfs)	Outfall 3 (cfs)	Combined Outfalls 1 -3 (cfs)	Outfall 4 (cfs)	Outfall 5 (cfs)
Water Quality	0.2	**32.1**	0	0	0	0	16.3	15.8	1.3	**33.3**	0.22	0.17
2	1.5	**284**	0	0	0	0	181	131	16	**223**	1.6	1.3
5	2	**379**	0	0	0	0	242	175	21	**297**	2.2	1.7
10	2.4	**530**	0	0	0	0	290	210	25	**357**	2.6	2.1
25	2.8	**545**	0	0	0	0	338	245	30	**416**	3.1	2.4
50	3.1	**587**	0	0	0	0	375	271	33	**461**	3.4	2.7
100	3.4	**693**	0	0	0	0	411	297	36	**505**	3.7	2.9

Volume Calculations

Unit Hydrograph Method Analysis (HEC-1) - Volume Comparison

		Existing					Proposed					
Storm Frequency	6-hour Storm Rainfall (inches)	Outfall 1 (ac-ft)	Outfall 2 (ac-ft)	Outfall 3 (ac-ft)	Outfall 4 (ac-ft)	Outfall 5 (ac-ft)	Outfall 1 (ac-ft)	Outfall 2 (ac-ft)	Outfall 3 (ac-ft)	Combined Hydrograph Outfall 1 - 3 (ac-ft)	Outfall 4 (ac-ft)	Outfall 5 (ac-ft)
2	1.5	**0**	0	0	0	0	0.13	0	0.36	**0.49**	*	*
5	2	**0**	0	0	0	0	1.2	0.5	0.57	**2.3**	*	*
10	2.4	**0.8**	0	0	0	0	2.5	1.2	0.76	**4.5**	*	*
25	2.8	**2.3**	0	0	0	0	4.3	2.1	0.95	**7.3**	*	*
50	3.1	**14.2**	0	0	0	0	11.4	6.5	1.09	**19.0**	*	*
100	3.4	**18.8**	0	0	0	0	14.1	8.4	1.23	**23.7**	*	*

* These Outfalls were not analayzed using the Unit Hydrograph Method due to their small size and short time of concentration.

Rational Method Analysis - Volume Comparison

		Existing					Proposed					
Storm Frequency	6-hour Storm Rainfall (inches)	Outfall 1 (ac-ft)	Outfall 2 (ac-ft)	Outfall 3 (ac-ft)	Outfall 4 (ac-ft)	Outfall 5 (ac-ft)	Outfall 1 (ac-ft)	Outfall 2 (ac-ft)	Outfall 3 (ac-ft)	Combined Hydrograph Outfall 1 - 3 (ac-ft)	Outfall 4 (ac-ft)	Outfall 5 (ac-ft)
Water Quality	0.85	**11.4**	0	0	0	0	1.8	3.0	0.4	**5.3**	0.08	0.06
2	1.5	**20.1**	0	0	0	0	10.2	9.9	0.8	**20.8**	0.14	0.11
5	2	**26.7**	0	0	0	0	13.6	13.1	1.1	**27.8**	0.18	0.14
10	2.4	**32.1**	0	0	0	0	16.3	15.8	1.3	**33.3**	0.22	0.17
25	2.8	**37.4**	0	0	0	0	19.0	18.4	1.5	**38.9**	0.25	0.20
50	3.1	**41.4**	0	0	0	0	21.1	20.4	1.6	**43.1**	0.28	0.22
100	3.4	**45.4**	0	0	0	0	23.1	22.3	1.8	**47.2**	0.31	0.24

* Water Quality Volume for Outfalls 1 and 2 is calculated for landfill area only (not natural hillsides).

Required Infiltration Volumes

Surface Area assuming Maximum 2 foot ponding depth

Outfall 1 Required Infiltration Volume (ac-ft)	Outfall 2 Required Infiltration Volume (ac-ft)	Outfall 3 Required Infiltration Volume (ac-ft)	Outfall 4 Required Infiltration Volume (ac-ft)	Outfall 5 Required Infiltration Volume (ac-ft)	Outfall 1 Required Infiltration Volume (cf)	Outfall 2 Required Infiltration Volume (cf)	Outfall 3 Required Infiltration Volume (cf)	Outfall 4 Required Infiltration Volume (cf)	Outfall 5 Required Infiltration Volume (cf)	Outfall 1 Required Surface Area (sf)	Outfall 2 Required Surface Area (sf)	Outfall 3 Required Surface Area (sf)	Outfall 4 Required Surface Area (sf)	Outfall 5 Required Surface Area (sf)
0.00	3.00	0.40	0.08	0.06	0	130680	17424	3371	2638	0	65340	8712	1685	1319
0.13	0.00	0.36	0.14	0.11	5663	0	15551	5949	4655	2831	0	7775	2974	2328
1.20	0.50	0.57	0.18	0.14	52272	21780	24927	7932	6207	26136	10890	12464	3966	3104
1.70	1.20	0.76	0.22	0.17	74052	52272	32931	9518	7449	37026	26136	16466	4759	3724
2.00	2.10	0.95	0.25	0.20	87120	91476	41164	11104	8690	43560	45738	20582	5552	4345
0.00	6.50	1.09	0.28	0.22	0	283140	47568	12294	9621	0	141570	23784	6147	4811
0.00	8.40	1.23	0.31	0.24	0	365904	53742	13484	10552	0	182952	26871	6742	5276

Infiltration: 72-hour drawdown maximum

Infiltration Rate (in/hr)	Maximum Depth (ft)
0.5	3
1	6
2	12
3	18
6	36

Infiltration: 48-hour drawdown maximum

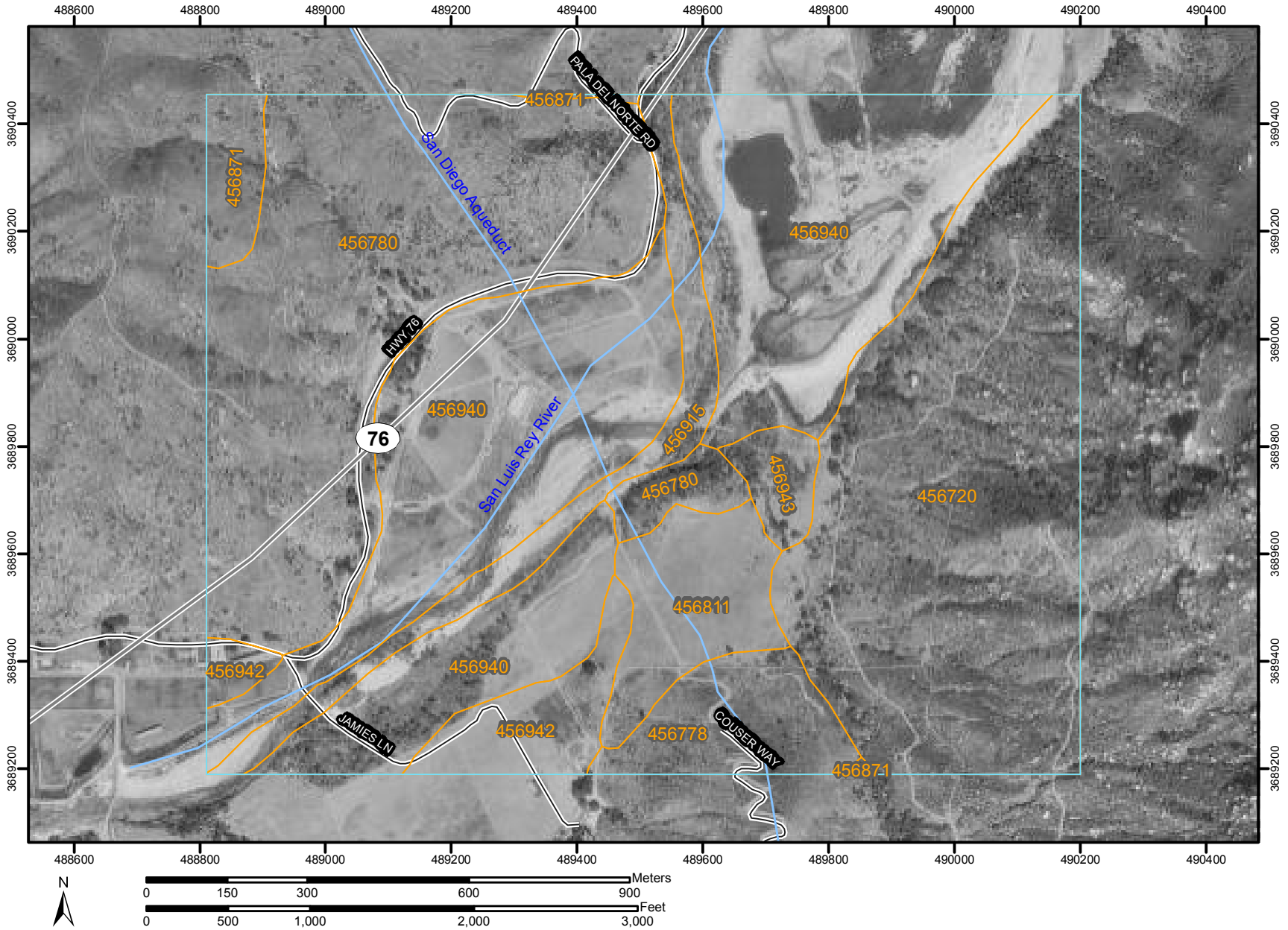
Infiltration Rate (in/hr)	Maximum Depth (ft)
0.5	2
1	4
2	8
3	12
6	24

Soils Information

Outfall	Soil Type	Infiltration Rate (in/hr)	Depth to water table	Water Capacity (inches)	Drainage class
1	VaB	2 - 6	> 80"	11.9	Well Drained
2	VaA	2 - 6	> 80"	14.1	Well Drained
3	FaD2	0.2 - 0.6	> 80"	13.2	Well Drained
4	TuB	6 - 20	> 80"	6.7	Somewhat excessively drained
5	TuB	6 - 20	> 80"	6.7	Somewhat excessively drained

VaB = Visalia Sandy Loam, 2-5% slopes
VaA = Visalia Sandy Loam, 0-2% slopes
FaD2 = Fallbrook sandy loam, 9-15% slopes
TuB = Tujunga sand, 0-5% slopes

Source: NRCS Web Soil Survey 2.0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488800
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489200
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3689800
3689600
3689400
3689200
456871
456780
456940
456915
456943
456720
456811
456942
456778
PALA DEL NORTE RD
San Diego Aqueduct
HWY 76
76
San Luis Rey River
JAMIES LN
COUSER WAY
N
Meters
0
150
300
600
900
Feet
0
500
1,000
2,000
3,000

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features

Municipalities
- Cities
- Urban Areas

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails

Roads
- Interstate Highways
- US Routes
- State Highways
- Local Roads
- Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 11N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 5, Jan 4, 2007

Date(s) aerial images were photographed: 10/2/1995

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
456720	Acid igneous rock land	123.4	24.2%
456778	Cieneba coarse sandy loam, 30 to 65 percent slopes, ero ded	19.4	3.8%
456780	Cieneba very rocky coarse sandy loam, 30 to 75 percent slopes	125.3	24.6%
456811	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	21.8	4.3%
456871	Las Posas stony fine sandy loam, 30 to 65 percent slope s	8.6	1.7%
456915	Riverwash	20.7	4.1%
456940	Tujunga sand, 0 to 5 percent slopes	165.5	32.5%
456942	Visalia sandy loam, 0 to 2 percent slopes	17.7	3.5%
456943	Visalia sandy loam, 2 to 5 percent slopes	6.6	1.3%
Totals for Area of Interest (AOI)		509.1	100.0%

GREGORY CANYON - SITE FACILITIES AREA BIOSWALE SIZING CALCULATION

Bio-Swale Calculation Summary Table

	Design Flow (cfs)	Water Quality Flow (cfs)	Channel Slope (ft/ft)	Channel Length (ft)	Side Slopes (V:H)	Bottom Width (ft)	Design Q Velocity (fps)	Design Q Depth (ft)	WQF Velocity (fps)	WQF Depth (ft)	HRT (minutes)	HRT/(DxV)
1	20	0.65	0.01	300	1 to 4	2	2.4	1.2	0.34	0.5	15	86.51
2	20	0.65	0.010	200	1 to 4	2	2.4	1.2	0.34	0.5	10	57.67

NOTES:

1. Bioswales designed per the following criteria (Caltrans criteria)

At Water Quality Flow (WQF):

- Manning's n=0.20 to 0.24
- Maximum flow depth of 6 inches (0.5 feet)
- Velocity less than 1 feet per second (fps)
- Hydraulic Residence Time (HRT) > 5 minutes
- Bottom width minimum 2 feet

At Design Flow (Q100)

- Manning's n=0.05
- Maximum flow depth less than 2 feet
- Velocity less than 4 fps

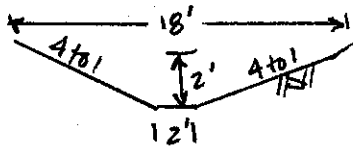
Site-Facility-Bio-swale - Qwqf

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.200	
Channel Slope	0.01000	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	0.65	ft³/s



Results

Normal Depth	0.48	ft
Flow Area	1.89	ft²
Wetted Perimeter	5.96	ft
Top Width	5.84	ft
Critical Depth	0.14	ft
Critical Slope	1.22878	ft/ft
Velocity	0.34	ft/s
Velocity Head	0.00	ft
Specific Energy	0.48	ft
Froude Number	0.11	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.48	ft
Critical Depth	0.14	ft
Channel Slope	0.01000	ft/ft
Critical Slope	1.22878	ft/ft

Site-Facility-Bio-swale - Q100

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.050	
Channel Slope	0.01000	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	20.00	ft^3/s

Results

Normal Depth	1.23	ft
Flow Area	8.53	ft^2
Wetted Perimeter	12.15	ft
Top Width	11.85	ft
Critical Depth	0.88	ft
Critical Slope	0.04631	ft/ft
Velocity	2.35	ft/s
Velocity Head	0.09	ft
Specific Energy	1.32	ft
Froude Number	0.49	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.23	ft
Critical Depth	0.88	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.04631	ft/ft

GRAPHIC SCALE
200 100 0 200 400
(IN FEET)

N

HIGH POINT
TRANSITION CHANNEL (TYP)
TRAPEZOIDAL CHANNEL
DOWNDRAIN
TOP DECK INLET (TYP)
BENCH INLET (TYP)
EARTHEN BERM
DOWNDRAIN (TYP)
TRAPEZOIDAL CHANNEL
PROPERTY LINE
PROPERTY LINE
TRAPEZOIDAL CHANNEL
BURRIED PERIMETER DRAINAGE PIPE
DESILTING BASIN
DOWNDRAIN
OUTLET PIPE RISER
ENERGY DISSIPATOR
STORM WATER DISCHARGE AND MONITORING POINT
AQUEDUCT EASEMENT
BURRIED PERIMETER DRAINAGE PIPE
TRAPEZOIDAL CHANNEL
DESILTING BASIN
STORM WATER DISCHARGE AND MONITORING POINT
STORM WATER DISCHARGE POINT
ENERGY DISSIPATOR
OUTLET PIPE RISER

LEGEND
- PROPERTY LINE
- PERIMETER TRAP CHANNEL
- APPROXIMATE LIMIT OF WASTE
- TRANSITION CHANNEL
- BENCH INLET
- EXISTING CONTOUR
- FINAL CONTOUR
- DECK INLET
- ACCESS/HAUL ROAD
- BURIED PERIMETER DRAIN PIPE

PRELIMINARY

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.: 34057DB.DWG
CHECKED BY :	DATE :	DRAWING 7
APPROVED BY :	DATE :	

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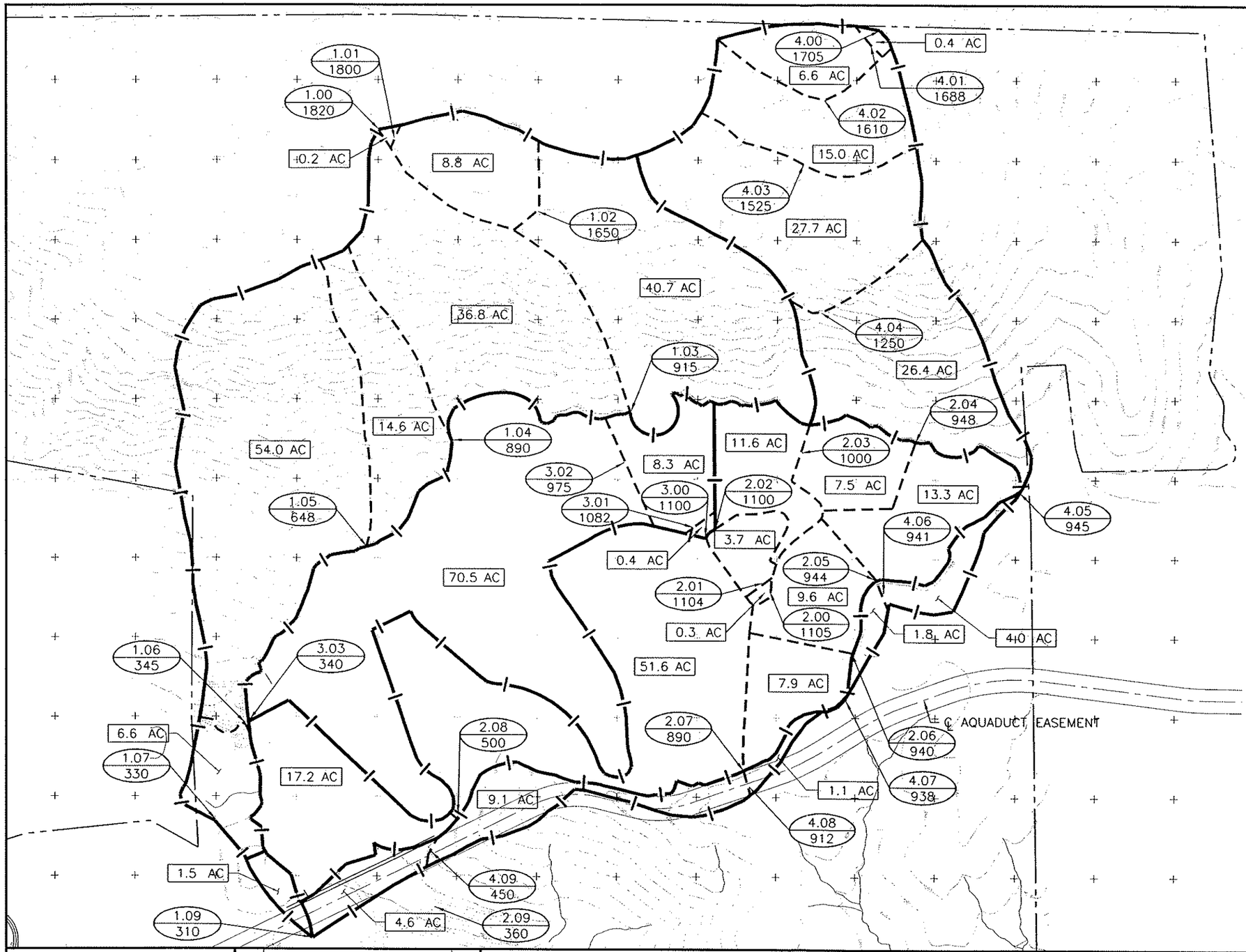

GRAPHIC SCALE

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	98.64	
1.03-1.04	36.80	66.36	86.50	155.99	
1.04-1.05	14.60	25.50	101.10	176.51	
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	132.08	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.: 2418508.DWG	
CHECKED BY :	DATE :	DRAWING 24	
APPROVED BY :	DATE :		

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BIO-FILTERS AND INFILTRATION AREAS

The operational and maintenance needs of the bio-filter and infiltration areas are:

- Vegetation management to maintain adequate hydraulic functioning and to limit habitat for disease-carrying animals.
- Animal and vector control.
- Sediment removal to optimize performance.
- Trash, debris, vegetation trimmings, tree pruning, and leaf collection and removal to prevent obstruction of a bio-filter and monitoring equipment.
- Removal of standing water, which may contribute to the development of aquatic plant communities or mosquito breeding areas.
- Erosion and structural maintenance to prevent the loss of soil and maintain the performance of the BMP.

Inspection Frequency

The BMPs will be inspected:

- After every large storm (after every storm monitored or those storms with more than 0.50 inch of precipitation.)
- On a weekly basis during extended periods of wet weather.

Aesthetic and Functional Maintenance

- Aesthetic maintenance is important for public acceptance of stormwater facilities.
- Functional maintenance is important for performance and safety reasons.

Both forms of maintenance will be combined into an overall Stormwater Management System Maintenance.

Aesthetic Maintenance

The following activities will be included in the aesthetic maintenance program:

- Weed Control. Weeds within the bio-filters will be removed through mechanical means. Herbicide will not be used because these chemicals may impact the water quality monitoring.

Functional Maintenance

Functional maintenance has two components:

Preventive maintenance

Corrective maintenance

Preventive Maintenance

Preventive maintenance activities to be instituted at a bio-filter are:

- Vegetation seed mix within the bio-filters will be designed to be kept short to maintain adequate hydraulic functioning and to limit the development of faunal habitats.
- Trash and Debris. During each inspection and maintenance visit to the site, debris and trash removal will be conducted to reduce the potential for inlet and outlet structures and other components from becoming clogged and inoperable during storm events.
- Sediment Removal. Sediment accumulation, as part of the operation and maintenance program, will be monitored during the dry season, after every large storm (0.50 inch). Specifically, if sediment reaches a level at or near bio-filter plant height, or could interfere with flow or operation, the sediment will be removed. If accumulation of debris or sediment is determined to be the cause of decline in design performance, prompt action will be taken to restore the bio-filter/infiltration area to design performance standards. Actions will include using additional vegetation and/or removing accumulated sediment to correct channeling or ponding. Characterization and appropriate disposal of sediment will comply with applicable local, county, state, or federal requirements.
- Removal of Standing Water. Standing water must be removed if it contributes to the development of aquatic plant communities or mosquito breeding areas.
- Fertilization and Irrigation. The vegetation seed mix has been designed so that fertilization and irrigation is not necessary. Fertilizers and irrigation will not be used to maintain the vegetation.
- Elimination of Mosquito Breeding Habitats. The most effective mosquito control program is one that eliminates potential breeding habitats.

Corrective Maintenance

Corrective maintenance is required on an emergency or non-routine basis to correct problems and to restore the intended operation and safe function of the BMP. Corrective maintenance activities include:

- Removal of Debris and Sediment. Sediment, debris, and trash, which impede the hydraulic functioning of the BMP, will be removed and properly disposed.
- Structural Repairs. Qualified individuals (i.e., the designers or contractors) will conduct repairs where structural damage has occurred.
- Embankment and Slope Repairs. Once deemed necessary, damage to the embankments and slopes of the BMP will be repaired.
- Erosion Repair. Where factors have created erosive conditions (i.e., concentrated flow, etc.), corrective steps will be taken to prevent loss of soil and any subsequent danger to the performance of the BMP. There are a number of corrective actions than can be taken. These include erosion control blankets, riprap, or reduced flow through the area. Designers or contractors will be consulted to address erosion problems if the solution is not evident.
- Fence Repair. Where applicable, repair of fences will be done within 30 days to maintain the security of the site.
- Elimination of Animal Burrows. Animal burrows within the bio-filters will be filled and steps taken to remove the animals if burrowing problems continue to occur (filling and compacting). If the problem persists, vector control specialists will be consulted regarding removal steps. This consulting is necessary as the threat of rabies in some areas may necessitate the animals being destroyed rather than relocated. If the BMP performance is affected, abatement will begin.

- General Facility Maintenance. In addition to the above elements of corrective maintenance, general corrective maintenance will address the overall facility and its associated components. If corrective maintenance is being done to one component, other components will be inspected to see if maintenance is needed.

Debris and Sediment Disposal

Waste generated at bio-filters/infiltration areas is ultimately the responsibility of Gregory Canyon Landfill, Ltd. Disposal of sediment, debris, and trash will comply with applicable local, county, state, and federal waste control programs.

Hazardous Waste

Suspected hazardous wastes will be analyzed to determine disposal options. Hazardous wastes generated onsite will be handled and disposed of according to applicable local, state, and federal regulations. A solid or liquid waste is considered a hazardous waste if it exceeds the criteria listed in the CCR, Title 22, Article 11.

CERTIFICATION SHEET

This Stormwater Management Plan has been prepared under the direction of the following Registered Civil Engineer. The Registered Civil Engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

_____

MATTHEW C. MOORE
December 11, 2007
REGISTERED CIVIL ENGINEER
No. C 56780
Exp. 06-30-09