Storm Water Management Plan
For Priority Projects
(Major SWMP)

The Major Stormwater Management Plan (Major SWMP) must be completed in its entirety and accompany applications to the County for a permit or approval associated with certain types of development projects. To determine whether your project is required to submit a Major or Minor SWMP, please reference the County's Stormwater Intake Form for Development Projects.

Project Name:	McNally Road TPM
Permit Number (Land Development Projects):	TPM 21004
Work Authorization Number (**CIP only**):	
Applicant:	Landmark Consulting
Applicant's Address:	9555 Genesee Ave, Suite 200 San Diego, Ca 92121
Plan Prepare By (*Leave blank if same as applicant*):	David Yeh
Date:	8-30-06
Revision Date (If applicable):	10-9-08

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 to be accompanied by a Storm Water Management Plan (SWMP) (section 67.806.b). 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 development project are required to prepare a Major SWMP.

Since the SWMP is a living document, revisions may be necessary during various stages of approval by the County. Please provide the approval information requested below.

Project Stages	Does the SWMP need revisions?		If YES, Provide Revision Date
	YES	NO	
2nd submittal	X		9-23-08
3rd submittal	X		10-9-08

Instructions for a Major SWMP can be downloaded at
http://www.sdcounty.ca.gov/dpw/watersheds/susmp/susmp.html

Completion of the following checklists and attachments will fulfill the requirements of a Major SWMP for the project listed above.

PROJECT DESCRIPTION

Please provide a brief description of the project in the following box. Please include:

Project Location:

The project is located on the northerly side of the intersection of Windy Mountain Lane and Jeffery Heights Road, North of Valley Center Road and west of Cole Grade Road. McNally Road runs through the center portion of the project.

Project Description :

The proposed development consists of the subdivision of the site into 4 parcels in addition to the remainder parcel for future single-family home construction. The minimum parcel size is 4 acres. The proposed home construction will be custom estate type structures. The developer will sell the lots separately and the grading and BMP implementation will be the responsibility of the future buyer of the lots. No home construction is proposed as part of this project.

Existing Conditions:

The project consists of approximately 87 acres of largely undisturbed open land with the existing McNally Road and an existing access road to an existing water tank site.

Physical Features (Topography) :

The project site is consisting of rolling hills with moderate to steep canyons.

Surrounding Land Use

The surrounding area of this project is consisting of rural and agricultural developments.

Proposed Project Land Use

Single-family development

Location of dry weather flows (year-round flows in streams, or creeks) within project limits, if applicable.

No dry weather flows evident on site.

PRIORITY DEVELOPMENT PROJECT DETERMINATION

Please check the box that best describes the project. Does the project meet one of the following criteria?

Table 1

PRIORITY DEVELOPMENT PROJECT	YES	NO
Redevelopment that creates or adds at least 5,000 net square feet of additional impervious surface area		X
Residential development of more than 10 units		X
Commercial developments with a land area for development of greater than 1 acre		X
Heavy industrial development with a land area for development of greater than 1 acre		X
Automotive repair shop(s)		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 (ESA): All development located within or directly adjacent to or discharging directly to an ESA (where discharges from the development or redevelopment will enter receiving waters within the ESA), 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. "Directly adjacent" means situated within 200 feet of the ESA. "Discharging directly to" means outflow from a drainage conveyance system that is composed entirely of flows from the subject development or redevelopment site, and not commingled with flows from adjacent lands.		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 (RGO) that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.		X

Limited Exclusion: Trenching and resurfacing work associated with utility projects are not considered Priority Development Projects. Parking lots, buildings and other structures associated with utility projects are subject to the WPO requirements if one or more of the criteria above are met.

If you answered **NO** to all the questions, then **STOP**. Please complete a Minor SWMP for your project. If you answered **YES** to any of the questions, please continue.

HYDROMODIFICATION DETERMINATION

The following questions provide a guide to collecting information relevant to hydromodification management issues.

Table 2

	QUESTIONS	YES	NO	Information
1.	Will the proposed project disturb 50 or more acres of land? (Including all phases of development)		X	If YES, continue to 2. If NO, go to 6.
2.	Would the project site discharge directly into channels that are concrete-lined or significantly hardened such as with rip-rap, sackcrete, etc, downstream to their outfall into bays or the ocean?		X	If NO, continue to 3. If YES, go to 6.
3.	Would the project site discharge directly into underground storm drains discharging directly to bays or the ocean?		X	If NO, continue to 4. If YES, go to 6.
4.	Would the project site discharge directly to a channel (lined or un-lined) and the combined impervious surfaces downstream from the project site to discharge at the ocean or bay are 70% or greater?		X	If NO, continue to 5. If YES, go to 6.
5.	Project is required to manage hydromodification impacts.		X	Hydromodification Management Required as described in Section 67.812 b(4) of the WPO.
6.	Project is not required to manage hydromodification impacts.	X		Hydromodification Exempt. Keep on file.

An exemption is potentially available for projects that are required (No. 5. in Table 2 above) to manage hydromodification impacts: The project proponent may conduct an independent geomorphic study to determine the project's full hydromodification impact. The study must incorporate sediment transport modeling across the range of geomorphically-significant flows and demonstrate to the County's satisfaction that the project flows and sediment reductions will not detrimentally affect the receiving water to qualify for the exemption.

STORMWATER QUALITY DETERMINATION

The following questions provide a guide to collecting information relevant to project stormwater quality issues. Please provide the following information in a printed report accompanying this form.

Table 3 WATERSHED

	QUESTIONS	COMPLETED	NA
1.	Describe the topography of the project area.	The project site is consisting of rolling hills with moderate to steep canyons.	
2.	Describe the local land use within the project area and adjacent areas.	The project site is currently vacant with an existing unpaved access road to an existing water tank located near the southwesterly corner of the site. The adjacent areas of the project site consists of natural undisturbed land and low-density residential developments.	
3.	Evaluate the presence of dry weather flow.	No dry weather flow evident.	
4.	Determine the receiving waters that may be affected by the project throughout all phases of development through completion (i.e., construction, long-term maintenance and operation).	North of Buena Vista Lagoon via San Luis Rey River	
5.	For the project limits, list the 303(d) impaired receiving water bodies and their constituents of concern.	Pacific Ocean shoreline, San Luis Rey River. Stressor: Bacteria Indicators.	
6.	Determine if there are any High Risk Areas (which is defined by the presence of municipal or domestic water supply reservoirs or groundwater percolation facilities) within the project limits.	Since the existing water tank is located on the high spot of the site, no runoff from the development will potentially come in contact with it.	
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.	The project area is located in climate Zone 10. The annual rainfall is 24”.	

9.	Determine the soil classification, permeability, erodibility, and depth to groundwater for Treatment BMP consideration.	Type 'D' soil, low permeability when soil is thoroughly wetted. Moderate to low erodibility. No groundwater was encountered.	
10.	Determine contaminated or hazardous soils within the project area.	None present	
11.	Determine if this project is within the environmentally sensitive areas as defined on the maps in Appendix A of the *County of San Diego Standard Urban Storm Water Mitigation Plan for Land Development and Public Improvement Projects.*	yes	
12.	Determine if this is an emergency project.	no	

Please check the watershed(s) for the project.

San Juan 901	Santa Margarita 902	**San Luis Rey 903**	Carlsbad 904
San Dieguito 905	Penasquitos 906	San Diego 907	Sweetwater 909
Otay 910	Tijuana 911	Whitewater 719	Clark 720
West Salton 721	Anza Borrego 722	Imperial 723	

Please provide the hydrologic sub-area and number(s)

Number	Name
903.12	Bonsall
903.22	Pauma

Please provide the beneficial uses for Inland Surface Waters and Ground Waters. Beneficial Uses can be obtained from the Water Quality Control Plan for the San Diego Basin, which is available at the Regional Board office or at http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/index.shtml

SURFACE WATERS	Hydrologic Unit Basin Number	MUN	AGR	IND	PROC	GWR	FRESH	POW	REC1	REC2	BIOL	WARM	COLD	WILD	RARE	SPWN
Inland Surface Waters	903.12 903.22	X	X	X				X	X			X	X	X		X
Ground Waters	903.12 903.22	X	X	X												

X Existing Beneficial Use 0 Potential Beneficial Use

POLLUTANTS OF CONCERN

Using Table 4, identify pollutants that are anticipated to be generated from the proposed priority project categories. Pollutants associated with any hazardous material sites that have been remediated or are not threatened by the proposed project are not considered a pollutant of concern.

Table 4. Anticipated and Potential Pollutants Generated by Land Use Type

	General Pollutant Categories								
PDP 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 1 acre or greater	P(1)	P(1)		P(2)	X	P(5)	X	P(3)	P(5)
Heavy industry /industrial development	X		X	X	X	X	X		
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)
Retail Gasoline Outlets			X	X	X	X	X		
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.

Note: If other monitoring data that is relevant to the project is available. Please include as Attachment C.

*** Even though the project does not propose any grading, building or roadway construction, BMPs are till selected as a general guideline for future homeowners who will be responsible for the construction of the individual pads and homes.**

CONSTRUCTION BMPs *

Please check the construction BMPs that may be implemented during construction of the project. The applicant will be responsible for the placement and maintenance of the BMPs incorporated into the final project design.

Silt Fence Desilting Basin Fiber Rolls **Gravel Bag Berm Street Sweeping and Vacuuming Sandbag Barrier**

Storm Drain Inlet Protection Material Delivery and Storage Stockpile Management Spill Prevention and

Control Solid Waste Management Concrete Waste Management Stabilized Construction Entrance/Exit

Water Conservation Practices Dewatering Operations Paving and Grinding

Operations

Vehicle and Equipment Maintenance

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.

EXCEPTIONAL THREAT TO WATER QUALITY DETERMINATION

Complete the checklist below to determine if a proposed project will pose an "exceptional threat to water quality," and therefore require Advanced Treatment Best Management Practices.

Table 5

No.	CRITERIA	YES	NO	INFORMATION
1.	Is all or part of the proposed project site within 200 feet of waters named on the Clean Water Act (CWA) Section 303(d) list of Water Quality Limited Segments as impaired for sedimentation and/or turbidity? Current 303d list may be obtained from the following site: http://www.swrcb.ca.gov/tmdl/docs/303dlists2006/approved/r9_06_303d_reqtmdls.pdf		x	If YES, continue to 2. If NO, go to 5.
2.	Will the project disturb more than 5 acres, including all phases of the development?	X		If YES, continue to 3. If NO, go to 5.
3.	Will the project disturb slopes that are steeper than 4:1 (horizontal: vertical) with at least 10 feet of relief, and that drain toward the 303(d) listed receiving water for sedimentation and/or turbidity?		x	If YES, continue to 4. If NO, go to 5.
4.	Will the project disturb soils with a predominance of USDA-NRCS Erosion factors k_f greater than or equal to 0.4?		x	If YES, continue to 6. If NO, go to 5.
5.	Project is not required to use Advanced Treatment BMPs.		x	Document for Project Files by referencing this checklist.

6.	Project poses an “exceptional threat to water quality” and is required to use Advanced Treatment BMPs.		x	Advanced Treatment BMPs must be consistent with WPO section 67.811(b)(20)(D) performance criteria

Exemption potentially available for projects that require advanced treatment:
Project proponent may perform a Revised Universal Soil Loss Equation, Version 2 (RUSLE 2), Modified Universal Soil Loss Equation (MUSLE), or similar analysis that shows to the County official’s satisfaction that advanced treatment is not required

Now that the need for treatment BMPs has been determined, other information is needed to complete the SWMP.

SITE DESIGN

To minimize stormwater impacts, site design measures must be addressed. The following checklist provides options for avoiding or reducing potential impacts during project planning. If YES is checked, it is assumed that the measure was used for this project.

Table 6 LOW IMPACT DEVELOPMENT (LID)

	OPTIONS		YES	NO	N/A
1.	Has the project been located and road improvements aligned to avoid or minimize 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.	Is the project designed to minimize impervious footprint?		X		
3.	Is the project conserving natural areas where feasible?		x		
4.	Where landscape is proposed, are rooftops, impervious sidewalks, walkways, trails and patios be drained into adjacent landscaping?		X		
5.	For roadway projects, are 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:				
	6.a.	Disturbing existing slopes only when necessary?	x		
	6.b.	Minimize cut and fill areas to reduce slope lengths?	x		
	6.c.	Incorporating retaining walls to reduce steepness of slopes or to shorten slopes?	x		
	6.d.	Providing benches or terraces on high cut and fill slopes to reduce concentration of flows?			x
	6.e.	Rounding and shaping slopes to reduce concentrated flow?	x		
	6.f.	Collecting concentrated flows in stabilized drains and channels?	x		

Each numbered item below is a LID requirement of the WPO. Please check the box(s) under each number that best describes the Low Impact Development BMP(s) selected for this project.

Table 7

1. Conserve natural Areas, Soils, and Vegetation-County LID Handbook 2.2.1
Preserve well draining soils (Type A or B)
x Preserve Significant Trees
Other. Description:
1. Not feasible. State Reason:
2. Minimize Disturbance to Natural Drainages-County LID Handbook 2.2.2
x Set-back development envelope from drainages
Restrict heavy construction equipment access to planned green/open space areas
Other. Description:
2. Not feasible. State Reason:
3. Minimize and Disconnect Impervious Surfaces (see 5) -County LID Handbook 2.2.3
x Clustered Lot Design
Items checked in 5?
Other. Description:
3. Not feasible. State Reason:
4. Minimize Soil Compaction-County LID Handbook 2.2.4
Restrict heavy construction equipment access to planned green/open space areas
X Re-till soils compacted by construction vehicles/equipment
Collect & re-use upper soil layers of development site containing organic materials
Other. Description:
4. Not feasible. State Reason:
5. Drain Runoff from Impervious Surfaces to Pervious Areas-County LID Handbook 2.2.5

LID Street & Road Design **NOT PART OF PROPOSED DEVELOPMENT.**	
	Curb-cuts to landscaping
	Rural Swales
	Concave Median
	Cul-de-sac Landscaping Design
	Other. Description:
LID Parking Lot Design **NOT PART OF PROPOSED DEVELOPMENT.**	
	Permeable Pavements
	Curb-cuts to landscaping
	Other. Description:
LID Driveway, Sidewalk, Bike-path Design	
	Permeable Pavements
X	Pitch pavements toward landscaping
	Other. Description:
LID Building Design	
	Cisterns & Rain Barrels
X	Downspout to swale
	Vegetated Roofs
	Other. Description:
LID Landscaping Design	
X	Soil Amendments
	Reuse of Native Soils
X	Smart Irrigation Systems
	Street Trees
	Other. Description:
5. Not feasible. State Reason:	

CHANNELS & DRAINAGES

Complete the following checklist to determine if the project includes work in channels.

No channel work proposed

Table 8 SOURCE CONTROL

No.	CRITERIA	YES	NO	N/A	COMMENTS
1.	Will the project include work in channels?				If YES go to 2 If NO go to 13.
2.	Will the project increase velocity or volume of downstream flow?				If YES go to 6.
3.	Will the project discharge to unlined channels?				If YES go to. 6.
4.	Will the project increase potential sediment load of downstream flow?				If YES go to 6.
5.	Will the project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?				If YES go to 8.
6.	Review channel lining materials and design for stream bank erosion.				Continue to 7.
7.	Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity.				Continue to 8.
8.	Include, where appropriate, energy dissipation devices at culverts.				Continue to 9.
9.	Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour.				Continue to 10.
10.	Include, if appropriate, detention facilities to reduce peak discharges.				Continue to 11.
11.	“Hardening“ natural downstream areas to prevent erosion is not an acceptable technique for protecting channel slopes, unless pre-development conditions are determined to be so erosive that hardening would be required even in the absence of the proposed development.				Continue to 12.
12.	Provide other design principles that are comparable and equally effective.				Continue to 13.
13.	End				

Please complete the following checklist for Source Control BMPs. If the BMP is not applicable for this project, then check N/A only at the main category.

Table 9

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 (such as: "NO DUMPING – DRAINS TO _San Vicente Creek_") 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 Outdoors 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.			
	2.c.	The storage area shall be paved and sufficiently impervious to contain leaks and spills.			
	2.d.	The storage area shall have a roof or awning to minimize direct precipitation within the secondary containment area.			
3.	**Design Trash Storage Areas to Reduce Pollution Introduction**				
	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.			
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.				
	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		
	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**				

BMP		YES	NO	N/A
	The design of private roadway drainage shall use at least one of the following			x

	5.a.	Rural swale system: street sheet flows to vegetated swale or gravel shoulder, curbs at street corners, culverts under driveways and street crossings.			
	5.b.	Urban curb/swale system: street slopes to curb, periodic swale inlets drain to vegetated swale/biofilter.			
	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.			
	5.d.	Other methods that are comparable and equally effective within the project.			
6.	**Residential Driveways & Guest Parking**				
	The design of driveways and private residential parking areas shall use one at least of the following features.				
	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.			
7.	**Dock Areas**				x
	Loading/unloading dock areas shall include the following.				
	7.a.	Cover loading dock areas, or design drainage to preclude urban run-on and runoff.			
	7.b.	Direct connections to storm drains from depressed loading docks (truck wells) are prohibited.			
	7.c.	Other features which are comparable and equally effective.			
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.			
	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.			
	8.c.	Other features which are comparable and equally effective.			
9.	**Vehicle Wash Areas**				x
	Priority projects that include areas for washing/steam cleaning of vehicles shall use the following.				
	9.a.	Self-contained; or covered with a roof or overhang.			
	9.b.	Equipped with a clarifier or other pretreatment facility.			
	9.c.	Properly connected to a sanitary sewer.			
	9.d.	Other features which are comparable and equally effective.			

	BMP	**YES**	**NO**	**N/A**
10.	**Outdoor Processing Areas**			x

	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.				
	10.a.	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.			
	10.b.	Grade or berm area to prevent run-on from surrounding areas.			
	10.c.	Installation of storm drains in areas of equipment repair is prohibited.			
	10.d.	Other features which are comparable or equally effective.			
11.	**Equipment Wash Areas**				x
	Outdoor equipment/accessory washing and steam cleaning activities shall be.				
	11.a.	Be self-contained; or covered with a roof or overhang.			
	11.b.	Be equipped with a clarifier, grease trap or other pretreatment facility, as appropriate			
	11.c.	Be properly connected to a sanitary sewer.			
	11.d.	Other features which are comparable or equally effective.			
12.	**Parking Areas**				x
	The following design concepts shall be considered, and incorporated and implemented where determined applicable and feasible by the County.				
	12.a.	Where landscaping is proposed in parking areas, incorporate landscape areas into the drainage design.			
	12.b.	Overflow parking (parking stalls provided in excess of the County's minimum parking requirements) may be constructed with permeable paving.			
	12.c.	Other design concepts that are comparable and equally effective.			
13.	**Fueling Area**				x
	Non-retail fuel dispensing areas shall contain the following.				
	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.			
	13.b.	Paved with Portland cement concrete (or equivalent smooth impervious surface). The use of asphalt concrete shall be prohibited.			
	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.			

BMP	**YES**	**NO**	**N/A**

	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.			

5. No private road proposed.
7. No dock area proposed
8. No maintenance bay proposed.
9. No vehicle washing operation proposed
10. No outdoor processing operation proposed
11. No equipment washing operation proposed
12. No parking area proposed
13. No fueling operation proposed

*** Even though the project does not propose any grading, building or roadway construction, BMPs are till selected as a general guideline for future homeowners who will be responsible for the construction of the individual pads and homes.**

Please list other project specific Source Control BMPs in the following box. Write **N/A** if there are none.

TREATMENT CONTROL *

To select a structural treatment BMP using Treatment Control BMP Selection Matrix (Table 10), 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 4). Any pollutants identified by Table 4, 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 10, which **maximizes pollutant removal** for the particular primary pollutant(s) of concern.

Priority development projects that are **not** anticipated to generate a pollutant for which the receiving water is CWA 303(d) impaired shall select a single or combination of stormwater BMPs from Table 10, which are effective for pollutant removal of the identified secondary pollutants of concern, consistent with the "maximum extent practicable" standard.

Table 10. Treatment Control BMP Selection Matrix

Pollutants of Concern	Bioretention Facilities (LID)*	Settling Basins (Dry Ponds)	Wet Ponds and Wetlands	Infiltration Facilities or Practices (LID)*	Media Filters	High-rate biofilters	High-rate media filters	Trash Racks & Hydro - dynamic Devices
Coarse Sediment and Trash	High	High	High	High	High	High	High	High
Pollutants that tend to associate with fine particles during treatment	High	High	High	High	High	Medium	Medium	Low
Pollutants that tend to be dissolved following treatment	Medium	Low	Medium	High	Low	Low	Low	Low

*Additional information is available in the County of San Diego LID Handbook.

NOTES ON POLLUTANTS OF CONCERN:

In Table 11, Pollutants of Concern are grouped as gross pollutants, pollutants that tend to associate with fine particles, and pollutants that remain dissolved.

Table 11

Pollutant	**Coarse Sediment and Trash**	**Pollutants that tend to associate with fine particles during treatment**	**Pollutants that tend to be dissolved following treatment**
Sediment	X	X	
Nutrients		X	X
Heavy Metals		X	
Organic Compounds		X	
Trash & Debris	X		
Oxygen Demanding		X	
Bacteria		X	

Oil & Grease		X	
Pesticides		X	

A Treatment BMP must address runoff from developed areas. Please provide the post-construction water quality treatment volume or flow values for the selected project Treatment BMP(s). Guidelines for design calculations are located in Chapter 5, Section 4.3, Principle 8 of the County SUSMP. Label outfalls on the BMP map. The Water Quality peak rate of discharge flow (Q_{WQ}) and the Water Quality storage volume (V_{WQ}) is dependent on the type of treatment BMP selected for the project.

Outfall	**Tributary Area (acres)**	**Q_{WQ} (cfs)**	**V_{WQ} (ft^3)**
Node 206	0.6	0.04	630
Node 208	1.7	0.1	1780
Node 302	1.9	0.1	1990
Node 402	3.4	0.2	3550

*** Even though the project does not propose any grading, building or roadway construction, BMPs are till selected as a general guideline for future homeowners who will be responsible for the construction of the individual pads and homes.**

WATER QUALITY CALCULATIONS:

Outfall	**Tributary Area (acres)**	**Runoff Coefficient**	**Rainfall Intensity (in/hr)**	**Q_{WQ} (cfs)**	**V_{WQ} (ft^3)**
Node 206	0.6	0.36	0.2	0.04	630
Node 208	1.7	0.36	0.2	0.1	1780
Node 302	1.9	0.36	0.2	0.1	1990
Node 402	3.4	0.36	0.2	0.2	3550

TYPICAL PAD TREATMENT BMP:

Each lot will be equipped with an oversized underground pipe to function as a retention tank. The tanks will store the excess runoff from the individual lots and allow the excess runoff to slowing infiltrate into the soil such that the hydrological footprint of the home pad grading will be the same as the pre-development conditions.

The typical home will have a 7800 square feet of impervious footprint including roof area, hardscape area and driveway area.

The prevailing storm events in San Diego county fall between the 0.2Q5 to Q10 storms. The 85th percentile rainfall is 0.8 in. The runoff coefficient of the impervious part of the lot is 0.87.

The prevailing runoff from the impervious area of the typical lot is:

0.87 x 0.8/12 x 0.18 Ac x 43560 = 455 cubic feet.

A 70’ 36” diameter CPP pipe will provide 495 cubic feet of storage space to retain the entire excess runoff from the impervious portion of the typical lot. Thus the home development will have a zero impervious footprint. The underground storage pipe will have adequate dead storage capacity to retain the excess runoff from as a result of the proposed impervious areas on each lot. Thus no hydromodification is anticipated to down stream watersheds.

A 4-foot wide, 4-foot deep and 80-foot long trench filled with native rocks will be constructed below the 36” CPP pipes, 2” diameter holes will be drilled into the bottom of the pipe at 1 foot intervals to allow the storm water stored in the pipe to slowly filter into the underlaying rock pit and then into the native soil. The on-site storm drain system will be connected to this over-size pipe, a overflow outlet will be installed near the top of the pipe such that the overflow runoff will discharge onto the existing natural terrain.

Please check the box(s) that best describes the Treatment BMP(s) selected for this project.

Biofilters
☐ Bioretention swale
☐ Vegetated filter strip
☐ Stormwater Planter Box (open-bottomed)
☐ Stormwater Flow-Through Planter (sealed bottom)
☐ Bioretention Area
☐ Vegetated Roofs/Modules/Walls
Detention Basins
☐ Extended/dry detention basin with grass/vegetated lining
☐ Extended/dry detention basin with impervious lining
Infiltration Basins
☐ Infiltration basin
☐ Infiltration trench
☐ Dry well
☐ Permeable Paving
☐ Gravel
☐ Permeable asphalt
☐ Pervious concrete
☐ Unit pavers, ungrouted, set on sand or gravel
☐ Subsurface reservoir bed
Wet Ponds or Wetlands
☐ Wet pond/basin (permanent pool)
☐ Constructed wetland
Filtration
☐ Media filtration
☐ Sand filtration
Hydrodynamic Separator Systems
☐ Swirl Concentrator
☐ Cyclone Separator
Trash Racks and Screens

Include Treatment Datasheet as Attachment E. The datasheet should include the following:	**COMPLETED**	**NO**
1. Description of how treatment BMP was designed. Provide a description for each type of treatment BMP.	x	
2. Engineering calculations for the BMP(s)	x	

Please describe why the selected treatment BMP(s) was selected for this project. For projects utilizing a low performing BMP, please provide a detailed explanation.

MAINTENANCE

Please check the box that best describes the maintenance mechanism(s) for this project. Guidelines for each category are located in Chapter 5, Section 5.2 of the County SUSMP.

CATEGORY	SELECTED	
	YES	NO
First	X	
Second		
Third		
Fourth		

Note:
1. Projects in Category 2 or 3 may choose to establish or be included in a Stormwater Maintenance Assessment District for the long-term maintenance of treatment BMPs.

ATTACHMENTS

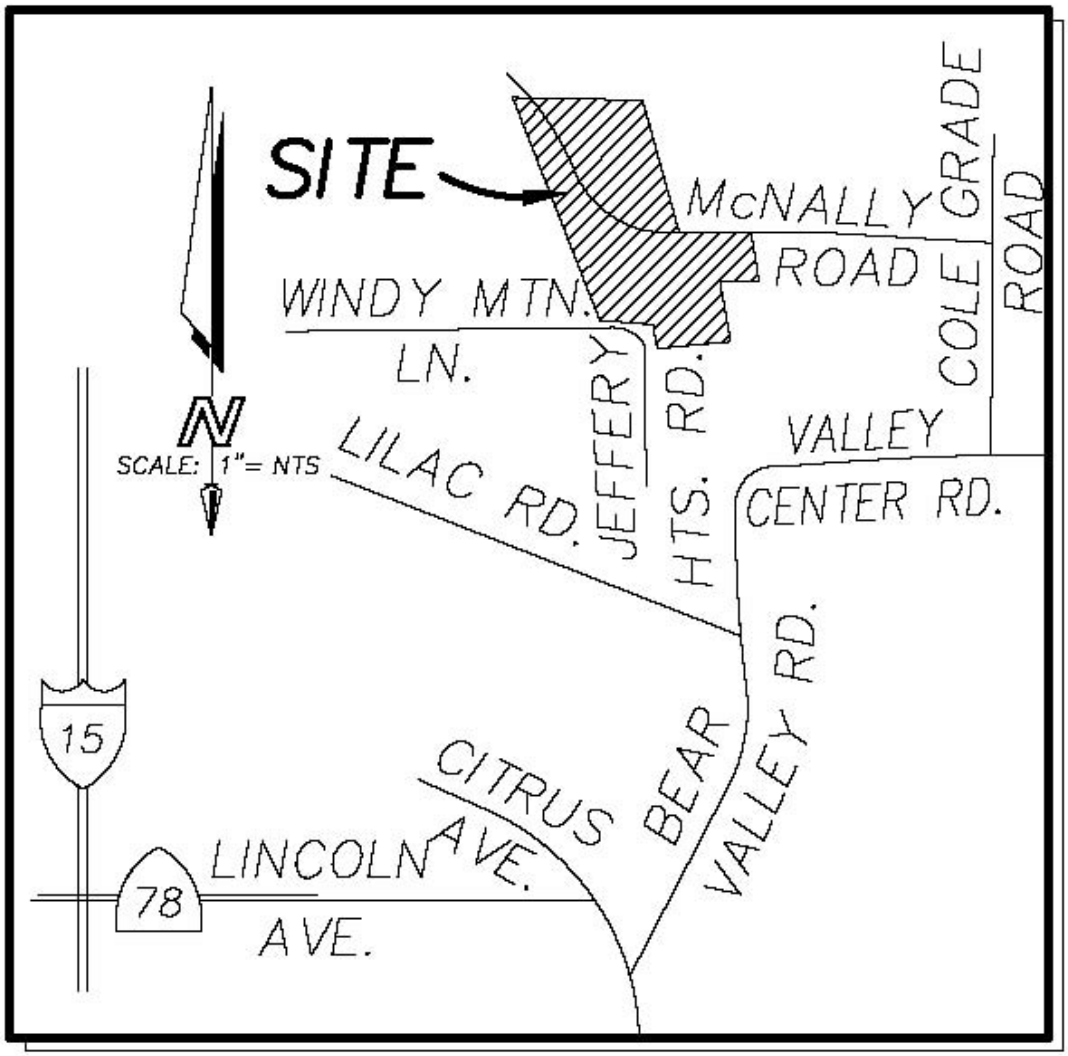
Please include the following attachments.

ATTACHMENT		COMPLETED	N/A
A	Project Location Map	x	
B	Site Map	x	
C	Relevant Monitoring Data	x	
D	LID and Treatment BMP Location Map	x	
E	Treatment BMP Datasheets	x	
F	Operation and Maintenance Program for Treatment BMPs	x	
G	Fiscal Resources	x	
H	Certification Sheet	x	
I	Addendum	x	

Note: Attachments A and B may be combined.

ATTACHMENT A

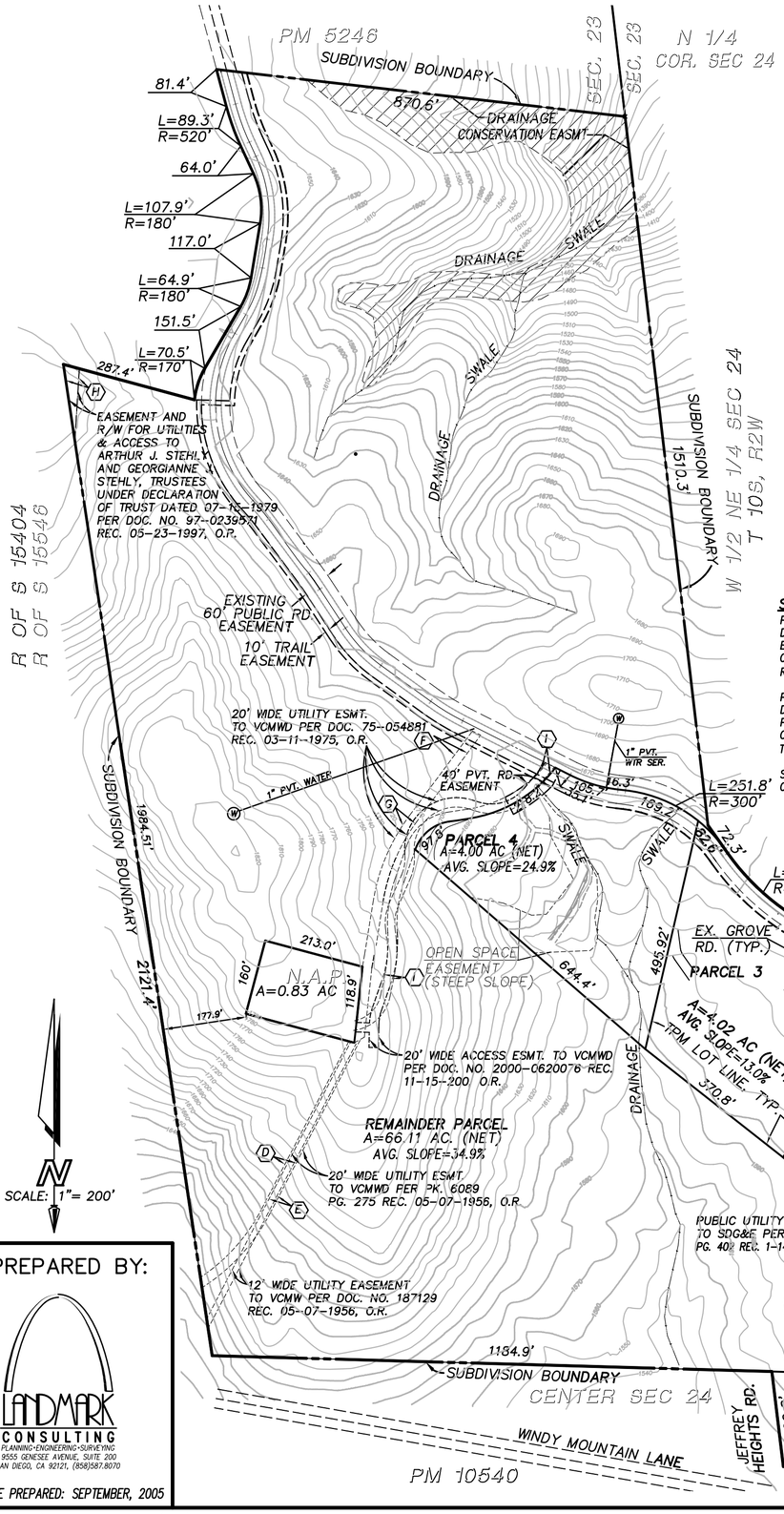
PROJECT LOCATION MAP



ATTACHMENT B

SITE MAP

COUNTY OF SAN DIEGO TENTATIVE PARCEL MAP NO. 21004



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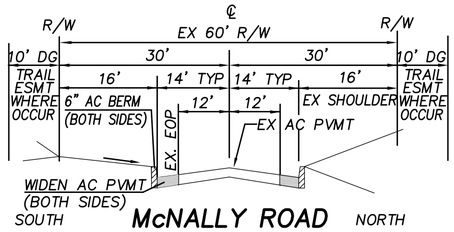


McNALLY ROAD TYPICAL SECTION

NOT TO SCALE

EASEMENTS

(A) INDICATES 20' WIDE PERMANENT RIGHT-OF WAY TO RAYMOND I. MORRIS AND MARY O. MORRIS PER BK. 790, PG. 153 REC. 6-10-1938, O.R.

(B) INDICATES PUBLIC UTILITY EASEMENT TO SAN DIEGO GAS AND ELECTRIC PER BK. 2316, PG. 402 REC. 1-14-1947, O.R.

(D) INDICATES 20' WIDE UTILITY EASEMENT TO VALLEY CENTER MUNICIPAL WATER DISTRICT PER BK. 6089, PG. 275 REC. 05-07-1956, O.R.

(E) INDICATES 12' WIDE UTILITY EASEMENT TO VALLEY CENTER MUNICIPAL WATER DISTRICT PER DOC. NO. 187129 REC. 05-07-1956, O.R.

(F) INDICATES 20' WIDE UTILITY EASEMENT TO VALLEY CENTER MUNICIPAL WATER DISTRICT PER DOC. NO. 75-054881 REC. 03-11-1975, O.R.

(G) INDICATES 20' WIDE ACCESS EASEMENT TO VALLEY CENTER MUNICIPAL WATER DISTRICT PER DOC. NO. 75-054881 REC. 03-11-1975, O.R.

(H) INDICATES EASEMENT AND RIGHT-OF-WAY FOR UTILITIES AND ACCESS TO ARTHUR J. STEHLY AND GEORGIANNE J. STEHLY, TRUSTEES UNDER DECLARATION OF TRUST DATED 07-15-1979 PER DOC. NO. 97-0239571 REC. 05-23-1997, O.R.

(I) INDICATES 20' WIDE ACCESS EASEMENT TO VALLEY CENTER MUNICIPAL WATER DISTRICT PER DOC. NO. 2000-0620076 REC. 11-15-2000, O.R.

SIGHT DISTANCE NOTE:

PHYSICALLY, THERE IS A MINIMUM ADEQUATE UNOBSTRUCTED SIGHT DISTANCE IN BOTH DIRECTIONS ALONG McNALLY ROAD FROM THE PRIVATE EASEMETN ROAD SERVING PARCEL 4, FOR THE PREVAILING OPERATING SPEED OF TRAFFIC ON McNALLY ROAD, PER SECTION 6.1.E OF THE COUNTY PUBLIC ROAD STANDARDS (APPROVED JULY 14, 1999).

PHYSICALLY, THERE IS A MINIMUM ADEQUATE UNOBSTRUCTED SIGHT DISTANCE IN BOTH DIRECTIONS ALONG McNALLY ROAD FROM DRIVEWAY OF PARCEL 1, 2, 3 AND THE REMAINDER PARCEL FOR THE PREVAILING OPERATING SPEED OF TRAFFIC ON McNALLY ROAD, PER SECTION 6.1.E OF THE COUNTY PUBLIC ROAD STANDARDS (APPROVED JULY 14, 1999).

SAID LINES OF SIGHT FALL WITHIN THE EXISTING RIGHT-OF-WAY AND A CLEAR SPACE EASEMENT IS NOT REQUIRED.

MARK A. BRENCICK, RCE 48153 DATE

LANDMARK CONSULTING
9555 GENESEE AVE., STE. 200
SAN DIEGO, CA. 92121
(858) 587-8070
FAX (858) 587-8750

SEPTIC CERTIFICATION:

* DATA AND RECOMMENDATION IN THE NAME OF FALLBROOK DEVELOPMENT CO. BY VINCENT GABY CEG#1755 & MALCOLM VINJE GE#863.

PARCEL NUMBER	LEACH LINE FOOTAGE	TRENCH DEPTH FOOTAGE	ROCK UNDER PIPE FOOTAGE	
1		EXISTING	DWELLINGS	(2 X 2 BDRMS)
2	460'	4'	2'	
3	420'	4'	2'	
4	575'	5'	3'	
REMAINDER	530'	4'	2'	

GARY ERBECK, DIRECTOR, DEPARTMENT OF ENVIRONMENTAL HEALTH

BY: _____ 6/20/08
NEIL SEARING DATE

LAND DIVISION STATEMENT

I HEREBY CERTIFY THAT I AM THE RECORD OWNER, AS SHOWN ON THE LATEST EQUALIZED COUNTY ASSESSMENT, OF THE PROPERTY SHOWN ON THE TENTATIVE PARCEL MAP. ALL OF MY CONTIGUOUS OWNERSHIP WITHIN AND BEYOND THE BOUNDARIES OF THE TENTATIVE PARCEL MAP IS SHOWN. THE BASIS OF CREATION OF THE LOTS IN MY OWNERSHIP (E.G. PARCEL MAP, FINAL MAP, CERTIFICATE OF COMPLIANCE, RECORDED DEED BEFORE 2-1-72) IS CONSIDERED CONTIGUOUS EVEN IF IT IS SEPARATED BY ROADS, STREETS, UTILITY EASEMENTS OR RAILROAD RIGHTS-OF-WAY. "FREEWAY" AS DEFINED IN SECTION 23.5 OF THE STREETS AND HIGHWAYS CODE, SHALL NOT BE CONSIDERED AS ROADS OR STREETS.

I FURTHER CERTIFY THAT I WILL NOT, BY THIS APPLICATION, CREATE, OR CAUSE TO BE CREATED, OR WILL NOT HAVE PARTICIPATED IN THE CREATION OF MORE THAN FOUR PARCELS ON CONTIGUOUS PROPERTY UNLESS SUCH CONTIGUOUS PARCELS WERE CREATED BY MAJOR SUBDIVISION. FOR PURPOSES OF THIS CERTIFICATION, THE TERM PARTICIPANT MEANS HAVING COOPERATED WITH OR ACTED IN A PLANNING, COORDINATING, OR DECISION-MAKING CAPACITY IN ANY FORMAL OR INFORMAL ASSOCIATION OR PARTNERSHIP FOR THE PURPOSE OF DIVIDING REAL PROPERTY.

I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT.

FALLBROOK DEVELOPMENT CO. DATE
3262 FRONT STREET
SAN DIEGO, CA 92103
TEL: 619-255-9767

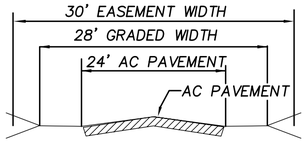
ENGINEER'S STATEMENT:

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

REGISTERED PROFESSIONAL ENGINEER
MARK A. BRENCICK
NO. 48153
EXP. 6/30/08
CIVIL
STATE OF CALIFORNIA

MARK A. BRENCICK, RCE 48153 DATE

LANDMARK CONSULTING
9555 GENESEE AVE., STE. 200
SAN DIEGO, CA. 92121
(858) 587-8070
FAX (858) 587-8750



PVT. EASEMENT ROAD TYPICAL SECTION

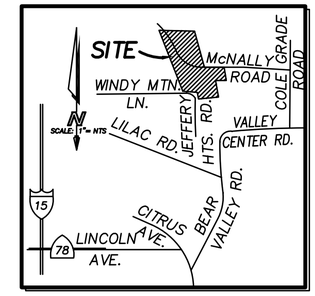
NOT TO SCALE

ALL PARCELS SHALL HAVE A LAYOUT OF THE SEWAGE DISPOSAL SYSTEM, PROPOSED STRUCTURES, CUTS AND FILLS APPROVED BY THE SAN DIEGO DEPARTMENT OF ENVIRONMENTAL HEALTH PRIOR TO THE APPROVAL OF THE BUILDING PERMIT AND/OR ISSUANCE OF A SEPTIC TANK PERMIT. AN ADDITIONAL EXPANSION AREA OF 100% OF THE INITIAL TILE AREA SHALL BE PROVIDED BY GRAVITY FLOW FOR THE POTENTIAL EXPANSION IN THE EVENT OF FAILURE.

THIS CERTIFICATION DOES NOT IMPLY ALL CONDITIONS PURSUANT TO THE RESOURCE PROTECTION ORDINANCE AND THE GROUNDWATER ORDINANCE HAVE BEEN MET. THE DEPARTMENT OF PLANNING AND LAND USE SHOULD BE CONSULTED REGARDING THE APPLICATION OF THESE ORDINANCES RELATIVE TO THIS PROJECT. ANY RESULTANT CHANGES TO THE SEPTIC SYSTEM DESIGN(S) MUST BE REEVALUATED BY THE DEPARTMENT OF ENVIRONMENTAL HEALTH.

EACH PARCEL IS APPROVED FOR A STANDARD SEPTIC TANK CONNECTED TO _*_ FEET OF TILE DRAIN FIELD TO SERVE A FIVE-BEDROOM DWELLING: PROVIDED THE ORIGINAL SOIL IS NOT DISTURBED IN ANY WAY, SUCH AS CUTTING, FILLING OR RIPPING. THIS DOES NOT CONSTITUTE APPROVAL FOR COMMERCIAL ESTABLISHMENTS.

USE OF SEPTIC SYSTEMS FOR ALL LOTS HAS BEEN CERTIFIED BY COUNTY OF SAN DIEGO DEH ON 6-20-08 ACCORDING TO DOC. VPM224.



VICINITY MAP

LEGEND:
SUBDIVISION BOUNDARY
PROPOSED LOT LINE
FUTURE MPP LOT LINES

NOTES:

1. COMPLETE TAX ASSESSOR'R PARCEL NUMBER IS: 128-271-10, 11, 17, 18, 31, 32 AND 128-460-03
2. LEGAL DESCRIPTION: A PORTION OF SEC 24 T 10 S, R2W, S.B.M. IN THE COUNTY OF SAN DIEGO
3. GENERAL PLAN: 18
4. REGIONAL CATEGORY: EDA
5. COMMUNITY PLAN AREA: VALLEY CENTER
6. EXISTING ZONING:

ZONE		EXISTING* & PROPOSED	EXISTING & PROPOSED**
USE REGULATIONS		A70	A70
NEIGHBORHOOD REGULATIONS		L	L
DEVELOPMENT REGULATIONS	DENSITY	0.25	.5
	LOT SIZE	4 AC	2
	BUILDING TYPE	C	C
	MAX. FLOOR AREA	–	–
	FLOOR AREA RATIO	–	–
	HEIGHT	G	G
	LOT COVERAGE	–	–
	SETBACK	C	C
	OPEN SPACE	–	–
SPECIAL AREA REGULATIONS		–	–
GENERAL PLAN DESIGNATION		17/18	17/18
REGIONAL CATEGORY		EDA	EDA
COMMUNITY PLAN		VALLEY CENTER	VALLEY CENTER

* APN's: 128-271-10, 11, 17, 18, 31, 32
** APN: 128-460-03 ONLY
*** PROPOSED ZONING IS SAME AS EXISTING

7. LOCATION AND STATUS OF EXISTING LEGAL ACCESS TO THE SUBJECT PROPERTY FROM A PUBLICLY MAINTAINED ROADWAY – McNALLY ROAD
8. WATER DISTRICT: VCMWD
9. SEWER DISTRICT: N/A (SEPTIC SYSTEMS)
10. FIRE DISTRICT: VALLEY CENTER FIRE PROTECTION DISTRICT
11. SCHOOL DISTRICT: VALLEY CENTER/PAUMA UNIFIED
12. TOPOGRAPHY INDEX: 410-1755
13. SOURCE OF TOPOGRAPHY: COUNTY OF SAN DIEGO
14. SOLAR ACCESS: ALL PARCELS WITHIN THIS SUBDIVISION HAVE A MAXIMUM OF 100 SQ. FT. OF SOLAR ACCESS FOR EACH FUTURE DWELLING ALLOWED BY THIS SUBDIVISION AS REQUIRED BY SECTION 81.401(m) OF THE SUBDIVISION ORDINANCE.
15. TOTAL ACREAGE: 87.25 ACRES GROSS, 87.07 ACRES NET
16. TOTAL NUMBERS OF PROPOSED PARCELS: 5
17. TAX RATE AREA: 94075

PREPARED BY:

LANDMARK CONSULTING
PLANNING-ENGINEERING-SURVEYING
9555 GENESEE AVENUE, SUITE 200
SAN DIEGO, CA 92121, (858)587.8070

DATE PREPARED: SEPTEMBER, 2005

0 100 200 400 600 800
SCALE: 1" = 200'

TENTATIVE PARCEL MAP
McNally Road
County of San Diego California

NO.	REVISIONS	DATE	BY
1	SUBMITTAL	5/2/05	LMCO
2	CORRECTIONS	9/9/05	LMCO
3	CORRECTIONS	3/14/06	LMCO
4	CORRECTIONS	4/24/07	LMCO
5	CORRECTIONS	2/14/08	LMCO
6	CORRECTIONS	10/09/08	LMCO

SHEET 1 OF 1

F:\55-3\55-3.dwg 12/11/2008 2:46:29 PM PST

ATTACHMENT C

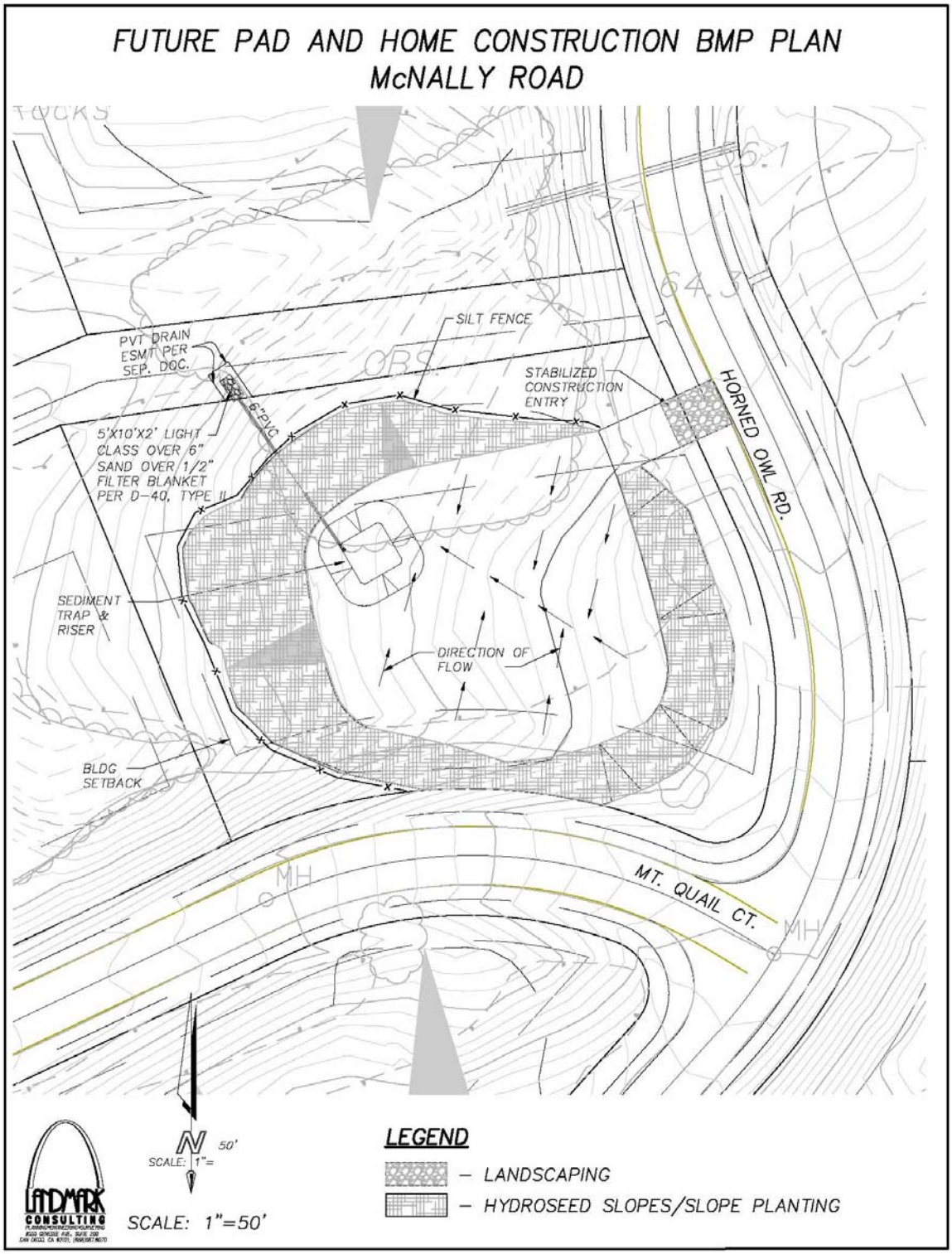
RELEVANT MONITORING DATA

(NOTE: PROVIDE RELEVANT WATER QUALITY MONITORING DATA IF AVAILABLE.)

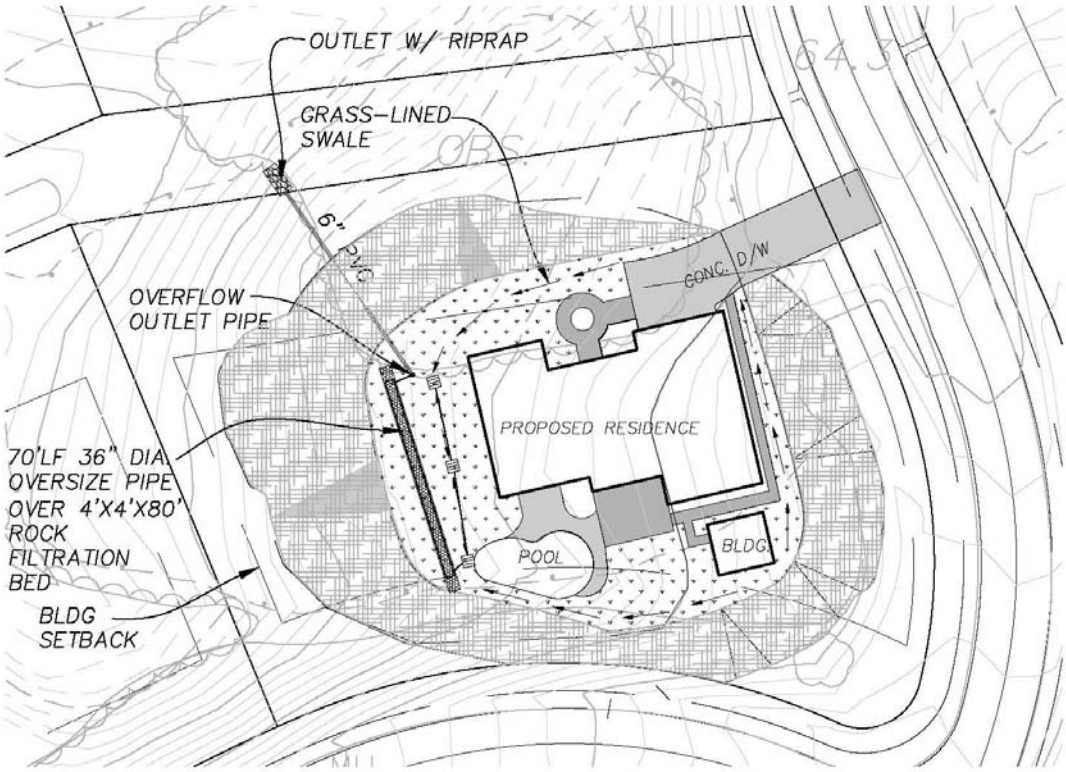
N/A

ATTACHMENT D

LID AND TREATMENT BMP LOCATION MAP


FUTURE PAD AND HOME CONSTRUCTION BMP PLAN
McNALLY ROAD
SILT FENCE
PVT DRAIN ESMT PER SEP. DOC.
6"PVC
STABILIZED CONSTRUCTION ENTRY
HORNED OWL RD.
5'X10'X2' LIGHT CLASS OVER 6" SAND OVER 1/2" FILTER BLANKET PER D-40, TYPE II
SEDIMENT TRAP & RISER
DIRECTION OF FLOW
BLDG SETBACK
MT. QUAIL CT.
MH
N
SCALE: 1"= 50'
LANDMARK CONSULTING
SCALE: 1"=50'
LEGEND
– LANDSCAPING
– HYDROSEED SLOPES/SLOPE PLANTING

FUTURE TYPICAL PERMANENT BMP & LID SITE PLAN
McNALLY ROAD



N

SCALE: 1"= 50'

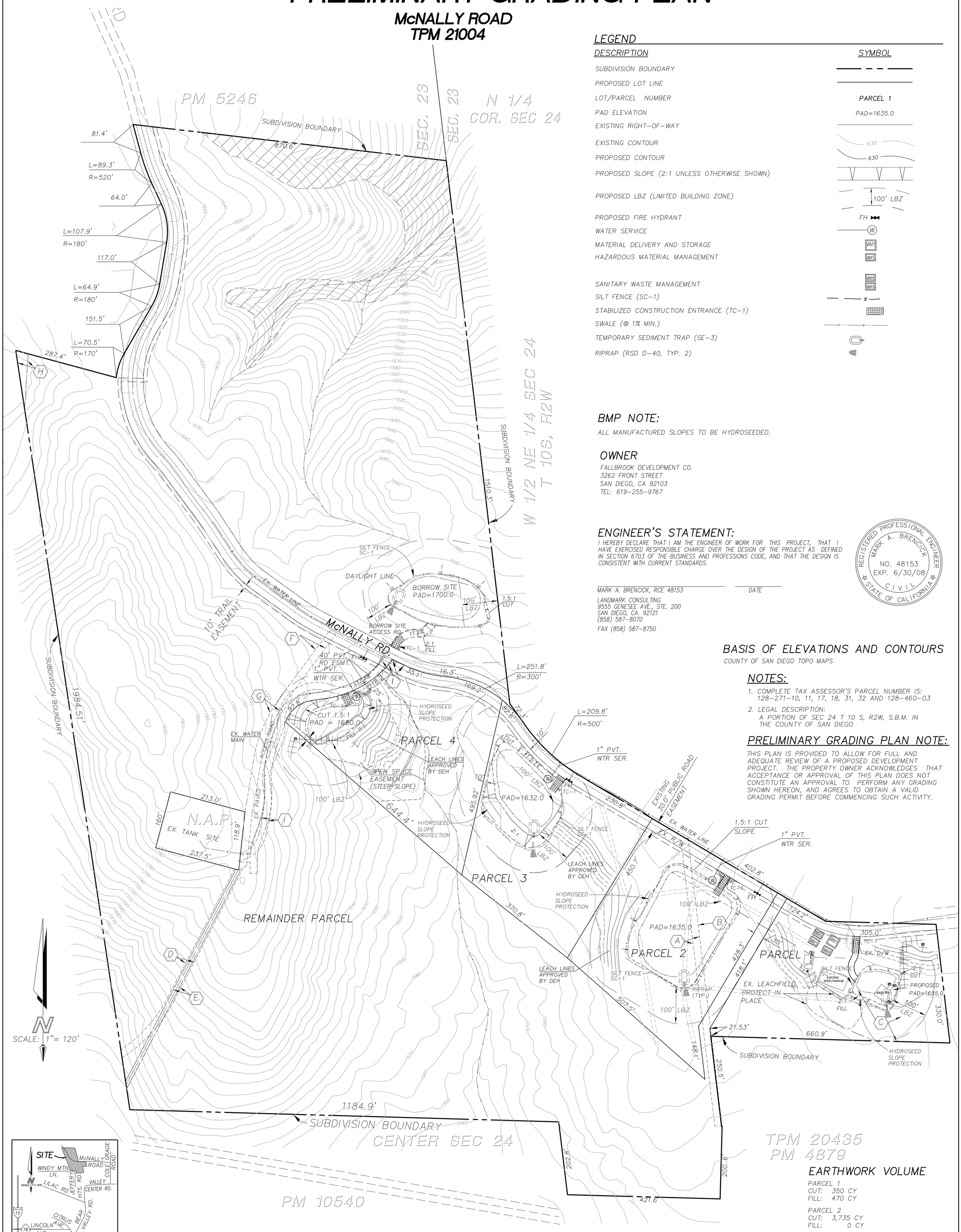
SCALE: 1"=50'

LEGEND

- LANDSCAPING
- SLOPE PLANTING
- HARDSCAPE

PRELIMINARY GRADING PLAN

McNALLY ROAD
TPM 21004



LEGEND

DESCRIPTION	SYMBOL
SUBDIVISION BOUNDARY	
PROPOSED LOT LINE	
LOT/PARCEL NUMBER	PARCEL 1
PAD ELEVATION	PAD=1635.0
EXISTING RIGHT-OF-WAY	
EXISTING CONTOUR	630
PROPOSED CONTOUR	630
PROPOSED SLOPE (2:1 UNLESS OTHERWISE SHOWN)	
PROPOSED LBZ (LIMITED BUILDING ZONE)	100' LBZ
PROPOSED FIRE HYDRANT	FH
WATER SERVICE	W
MATERIAL DELIVERY AND STORAGE	WM1
HAZARDOUS MATERIAL MANAGEMENT	WM5
SANITARY WASTE MANAGEMENT	WM8 WM9
SILT FENCE (SC-1)	X
STABILIZED CONSTRUCTION ENTRANCE (TC-1)	
SWALE (@ 1% MIN.)	
TEMPORARY SEDIMENT TRAP (SE-3)	
RIPRAP (RSD D-40, TYP. 2)	

BMP NOTE:

ALL MANUFACTURED SLOPES TO BE HYDROSEEDED.

OWNER

FALLBROOK DEVELOPMENT CO.
3262 FRONT STREET
SAN DIEGO, CA 92103
TEL: 619-255-9767

ENGINEER'S STATEMENT:

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

REGISTERED PROFESSIONAL ENGINEER
MARK A. BRENCICK
NO. 48153
EXP. 6/30/08
CIVIL
STATE OF CALIFORNIA

MARK A. BRENCICK, RCE 48153 DATE

LANDMARK CONSULTING
9555 GENESEE AVE., STE. 200
SAN DIEGO, CA. 92121
(858) 587-8070
FAX (858) 587-8750

BASIS OF ELEVATIONS AND CONTOURS

COUNTY OF SAN DIEGO TOPO MAPS

NOTES:

1. COMPLETE TAX ASSESSOR'S PARCEL NUMBER IS: 128-271-10, 11, 17, 18, 31, 32 AND 128-460-03
2. LEGAL DESCRIPTION: A PORTION OF SEC 24 T 10 S, R2W, S.B.M. IN THE COUNTY OF SAN DIEGO

PRELIMINARY GRADING PLAN NOTE:

THIS PLAN IS PROVIDED TO ALLOW FOR FULL AND ADEQUATE REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HEREON, AND AGREES TO OBTAIN A VALID GRADING PERMIT BEFORE COMMENCING SUCH ACTIVITY.

EARTHWORK VOLUME

PARCEL 1
CUT: 350 CY
FILL: 470 CY

PARCEL 2
CUT: 3,735 CY
FILL: 0 CY

PARCEL 3
CUT: 1,700 CY
FILL: 11,760 CY

PARCEL 4
CUT: 2,885 CY
FILL: 3,675 CY

REMAINING PARCEL – BORROW SITE
CUT: 7,235 CY
FILL: 0 CY

TOTAL
CUT: 15,905 CY
FILL: 15,905 CY
IMPORT/EXPORT: 0 CY

USE OF SEPTIC SYSTEMS FOR ALL LOTS HAS BEEN CERTIFIED BY COUNTY OF SAN DIEGO DHE ON 11-16-05 ACCORDING TO DOC. VPM224/LMAP73

EASEMENTS

(A) INDICATES 20' WIDE RIGHT-OF WAY TO RAYMOND I. MORRIS AND MARY O. MORRIS PER BK. 790, PG. 153 REC. 6-10-1938, O.R. (TO BE VACATED)
(B) INDICATES PUBLIC UTILITY EASEMENT TO SAN DIEGO GAS AND ELECTRIC PER BK. 2316, PG. 402 REC. 1-14-1947, O.R. (TO BE VACATED)
(C) INDICATES PUBLIC UTILITY EASEMENT TO SAN DIEGO GAS AND ELECTRIC PER BK. 2320, PG. 223 REC. 1-14-1947, O.R.
(D) INDICATES 20' WIDE UTILITY EASEMENT TO VALLEY CENTER MUNICIPAL WATER DISTRICT PER BK. 6089, PG. 275 REC. 05-07-1956, O.R.
(E) INDICATES 12' WIDE UTILITY EASEMENT TO VALLEY CENTER MUNICIPAL WATER DISTRICT PER DOC. NO. 187129 REC. 05-07-1956, O.R.
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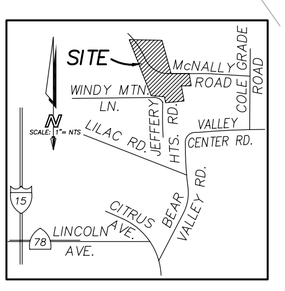
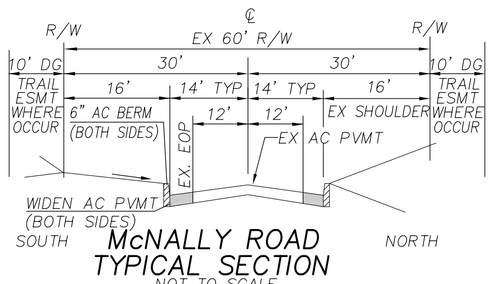
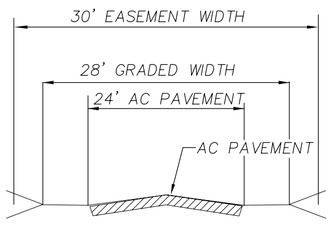


VICINITY MAP

LANDMARK CONSULTING
PLANNING•ENGINEERING•SURVEYING
9555 GENESEE AVENUE, STE. 200
SAN DIEGO, CA 92121, 858.587.8070



McNALLY ROAD TYPICAL SECTION
NOT TO SCALE



PVT. EASEMENT ROAD TYPICAL SECTION
NOT TO SCALE

0 120 240 360 480 600
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ATTACHMENT E

TREATMENT BMP DATASHEET

*(**NOTE:** POSSIBLE SOURCE FOR DATASHEETS CAN BE FOUND AT WWW.CABMPHANDBOOKS.COM. INCLUDE ENGINEERING CALCULATIONS FOR SIZING THE TREATMENT BMP.)*

Vegetated Swale TC-30

Design Considerations

- Tributary Area
- Area Required
- Slope
- Water Availability

Description

Vegetated swales are open, shallow channels with vegetation covering the side slopes and bottom that collect and slowly convey runoff flow to downstream discharge points. They are designed to treat runoff through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infiltration into the underlying soils. Swales can be natural or manmade. They trap particulate pollutants (suspended solids and trace metals), promote infiltration, and reduce the flow velocity of stormwater runoff. Vegetated swales can serve as part of a stormwater drainage system and can replace curbs, gutters and storm sewer systems.

Targeted Constituents

☑	Sediment	▲
☑	Nutrients	●
☑	Trash	●
☑	Metals	▲
☑	Bacteria	●
☑	Oil and Grease	▲
☑	Organics	▲

Legend *(Removal Effectiveness)*

● Low ■ High

▲ Medium

California Experience

Caltrans constructed and monitored six vegetated swales in southern California. These swales were generally effective in reducing the volume and mass of pollutants in runoff. Even in the areas where the annual rainfall was only about 10 inches/yr, the vegetation did not require additional irrigation. One factor that strongly affected performance was the presence of large numbers of gophers at most of the sites. The gophers created earthen mounds, destroyed vegetation, and generally reduced the effectiveness of the controls for TSS reduction.

Advantages

- If properly designed, vegetated, and operated, swales can serve as an aesthetic, potentially inexpensive urban development or roadway drainage conveyance measure with significant collateral water quality benefits.

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- Roadside ditches should be regarded as significant potential swale/buffer strip sites and should be utilized for this purpose whenever possible.

Limitations

- Can be difficult to avoid channelization.
- May not be appropriate for industrial sites or locations where spills may occur
- Grassed swales cannot treat a very large drainage area. Large areas may be divided and treated using multiple swales.
- A thick vegetative cover is needed for these practices to function properly.
- They are impractical in areas with steep topography.
- They are not effective and may even erode when flow velocities are high, if the grass cover is not properly maintained.
- In some places, their use is restricted by law: many local municipalities require curb and gutter systems in residential areas.
- Swales are mores susceptible to failure if not properly maintained than other treatment BMPs.

Design and Sizing Guidelines

- Flow rate based design determined by local requirements or sized so that 85% of the annual runoff volume is discharged at less than the design rainfall intensity.
- Swale should be designed so that the water level does not exceed 2/3rds the height of the grass or 4 inches, which ever is less, at the design treatment rate.
- Longitudinal slopes should not exceed 2.5%
- Trapezoidal channels are normally recommended but other configurations, such as parabolic, can also provide substantial water quality improvement and may be easier to mow than designs with sharp breaks in slope.
- Swales constructed in cut are preferred, or in fill areas that are far enough from an adjacent slope to minimize the potential for gopher damage. Do not use side slopes constructed of fill, which are prone to structural damage by gophers and other burrowing animals.
- A diverse selection of low growing, plants that thrive under the specific site, climatic, and watering conditions should be specified. Vegetation whose growing season corresponds to the wet season are preferred. Drought tolerant vegetation should be considered especially for swales that are not part of a regularly irrigated landscaped area.
- The width of the swale should be determined using Manning's Equation using a value of 0.25 for Manning's n.

Construction/Inspection Considerations

- Include directions in the specifications for use of appropriate fertilizer and soil amendments based on soil properties determined through testing and compared to the needs of the vegetation requirements.
- Install swales at the time of the year when there is a reasonable chance of successful establishment without irrigation; however, it is recognized that rainfall in a given year may not be sufficient and temporary irrigation may be used.
- If sod tiles must be used, they should be placed so that there are no gaps between the tiles; stagger the ends of the tiles to prevent the formation of channels along the swale or strip.
- Use a roller on the sod to ensure that no air pockets form between the sod and the soil.
- Where seeds are used, erosion controls will be necessary to protect seeds for at least 75 days after the first rainfall of the season.

Performance

The literature suggests that vegetated swales represent a practical and potentially effective technique for controlling urban runoff quality. While limited quantitative performance data exists for vegetated swales, it is known that check dams, slight slopes, permeable soils, dense grass cover, increased contact time, and small storm events all contribute to successful pollutant removal by the swale system. Factors decreasing the effectiveness of swales include compacted soils, short runoff contact time, large storm events, frozen ground, short grass heights, steep slopes, and high runoff velocities and discharge rates.

Conventional vegetated swale designs have achieved mixed results in removing particulate pollutants. A study performed by the Nationwide Urban Runoff Program (NURP) monitored three grass swales in the Washington, D.C., area and found no significant improvement in urban runoff quality for the pollutants analyzed. However, the weak performance of these swales was attributed to the high flow velocities in the swales, soil compaction, steep slopes, and short grass height.

Another project in Durham, NC, monitored the performance of a carefully designed artificial swale that received runoff from a commercial parking lot. The project tracked 11 storms and concluded that particulate concentrations of heavy metals (Cu, Pb, Zn, and Cd) were reduced by approximately 50 percent. However, the swale proved largely ineffective for removing soluble nutrients.

The effectiveness of vegetated swales can be enhanced by adding check dams at approximately 17 meter (50 foot) increments along their length (See Figure 1). These dams maximize the retention time within the swale, decrease flow velocities, and promote particulate settling. Finally, the incorporation of vegetated filter strips parallel to the top of the channel banks can help to treat sheet flows entering the swale.

Only 9 studies have been conducted on all grassed channels designed for water quality (Table 1). The data suggest relatively high removal rates for some pollutants, but negative removals for some bacteria, and fair performance for phosphorus.

Table 1 Grassed swale pollutant removal efficiency data							
Removal Efficiencies (% Removal)							
Study	TSS	TP	TN	NO_3	Metals	Bacteria	Type
Caltrans 2002	77	8	67	66	83-90	-33	dry swales
Goldberg 1993	67.8	4.5	-	31.4	42–62	-100	grassed channel
Seattle Metro and Washington Department of Ecology 1992	60	45	-	-25	2–16	-25	grassed channel
Seattle Metro and Washington Department of Ecology, 1992	83	29	-	-25	46–73	-25	grassed channel
Wang et al., 1981	80	-	-	-	70–80	-	dry swale
Dorman et al., 1989	98	18	-	45	37–81	-	dry swale
Harper, 1988	87	83	84	80	88–90	-	dry swale
Kercher et al., 1983	99	99	99	99	99	-	dry swale
Harper, 1988.	81	17	40	52	37–69	-	wet swale
Koon, 1995	67	39	-	9	-35 to 6	-	wet swale

While it is difficult to distinguish between different designs based on the small amount of available data, grassed channels generally have poorer removal rates than wet and dry swales, although some swales appear to export soluble phosphorus (Harper, 1988; Koon, 1995). It is not clear why swales export bacteria. One explanation is that bacteria thrive in the warm swale soils.

Siting Criteria

The suitability of a swale at a site will depend on land use, size of the area serviced, soil type, slope, imperviousness of the contributing watershed, and dimensions and slope of the swale system (Schueler et al., 1992). In general, swales can be used to serve areas of less than 10 acres, with slopes no greater than 5 %. Use of natural topographic lows is encouraged and natural drainage courses should be regarded as significant local resources to be kept in use (Young et al., 1996).

Selection Criteria (NCTCOG, 1993)

- Comparable performance to wet basins
- Limited to treating a few acres
- Availability of water during dry periods to maintain vegetation
- Sufficient available land area

Research in the Austin area indicates that vegetated controls are effective at removing pollutants even when dormant. Therefore, irrigation is not required to maintain growth during dry periods, but may be necessary only to prevent the vegetation from dying.

The topography of the site should permit the design of a channel with appropriate slope and cross-sectional area. Site topography may also dictate a need for additional structural controls. Recommendations for longitudinal slopes range between 2 and 6 percent. Flatter slopes can be used, if sufficient to provide adequate conveyance. Steep slopes increase flow velocity, decrease detention time, and may require energy dissipating and grade check. Steep slopes also can be managed using a series of check dams to terrace the swale and reduce the slope to within acceptable limits. The use of check dams with swales also promotes infiltration.

Additional Design Guidelines

Most of the design guidelines adopted for swale design specify a minimum hydraulic residence time of 9 minutes. This criterion is based on the results of a single study conducted in Seattle, Washington (Seattle Metro and Washington Department of Ecology, 1992), and is not well supported. Analysis of the data collected in that study indicates that pollutant removal at a residence time of 5 minutes was not significantly different, although there is more variability in that data. Therefore, additional research in the design criteria for swales is needed. Substantial pollutant removal has also been observed for vegetated controls designed solely for conveyance (Barrett et al, 1998); consequently, some flexibility in the design is warranted.

Many design guidelines recommend that grass be frequently mowed to maintain dense coverage near the ground surface. Recent research (Colwell et al., 2000) has shown mowing frequency or grass height has little or no effect on pollutant removal.

Summary of Design Recommendations

1) The swale should have a length that provides a minimum hydraulic residence time of at least 10 minutes. The maximum bottom width should not exceed 10 feet unless a dividing berm is provided. The depth of flow should not exceed 2/3rds the height of the grass at the peak of the water quality design storm intensity. The channel slope should not exceed 2.5%.

2) A design grass height of 6 inches is recommended.

3) Regardless of the recommended detention time, the swale should be not less than 100 feet in length.

4) The width of the swale should be determined using Manning's Equation, at the peak of the design storm, using a Manning's n of 0.25.

5) The swale can be sized as both a treatment facility for the design storm and as a conveyance system to pass the peak hydraulic flows of the 100-year storm if it is located "on-line." The side slopes should be no steeper than 3:1 (H:V).

6) Roadside ditches should be regarded as significant potential swale/buffer strip sites and should be utilized for this purpose whenever possible. If flow is to be introduced through curb cuts, place pavement slightly above the elevation of the vegetated areas. Curb cuts should be at least 12 inches wide to prevent clogging.

7) Swales must be vegetated in order to provide adequate treatment of runoff. It is important to maximize water contact with vegetation and the soil surface. For general purposes, select fine, close-growing, water-resistant grasses. If possible, divert runoff (other than necessary irrigation) during the period of vegetation

establishment. Where runoff diversion is not possible, cover graded and seeded areas with suitable erosion control materials.

Maintenance

The useful life of a vegetated swale system is directly proportional to its maintenance frequency. If properly designed and regularly maintained, vegetated swales can last indefinitely. The maintenance objectives for vegetated swale systems include keeping up the hydraulic and removal efficiency of the channel and maintaining a dense, healthy grass cover.

Maintenance activities should include periodic mowing (with grass never cut shorter than the design flow depth), weed control, watering during drought conditions, reseeding of bare areas, and clearing of debris and blockages. Cuttings should be removed from the channel and disposed in a local composting facility. Accumulated sediment should also be removed manually to avoid concentrated flows in the swale. The application of fertilizers and pesticides should be minimal.

Another aspect of a good maintenance plan is repairing damaged areas within a channel. For example, if the channel develops ruts or holes, it should be repaired utilizing a suitable soil that is properly tamped and seeded. The grass cover should be thick; if it is not, reseed as necessary. Any standing water removed during the maintenance operation must be disposed to a sanitary sewer at an approved discharge location. Residuals (e.g., silt, grass cuttings) must be disposed in accordance with local or State requirements. Maintenance of grassed swales mostly involves maintenance of the grass or wetland plant cover. Typical maintenance activities are summarized below:

- Inspect swales at least twice annually for erosion, damage to vegetation, and sediment and debris accumulation preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the swale is ready for winter. However, additional inspection after periods of heavy runoff is desirable. The swale should be checked for debris and litter, and areas of sediment accumulation.
- Grass height and mowing frequency may not have a large impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.
- Trash tends to accumulate in swale areas, particularly along highways. The need for litter removal is determined through periodic inspection, but litter should always be removed prior to mowing.
- Sediment accumulating near culverts and in channels should be removed when it builds up to 75 mm (3 in.) at any spot, or covers vegetation.
- Regularly inspect swales for pools of standing water. Swales can become a nuisance due to mosquito breeding in standing water if obstructions develop (e.g. debris accumulation, invasive vegetation) and/or if proper drainage slopes are not implemented and maintained.

Cost

Construction Cost

Little data is available to estimate the difference in cost between various swale designs. One study (SWRPC, 1991) estimated the construction cost of grassed channels at approximately $0.25 per ft^2. This price does not include design costs or contingencies. Brown and Schueler (1997) estimate these costs at approximately 32 percent of construction costs for most stormwater management practices. For swales, however, these costs would probably be significantly higher since the construction costs are so low compared with other practices. A more realistic estimate would be a total cost of approximately $0.50 per ft^2, which compares favorably with other stormwater management practices.

Table 2 Swale Cost Estimate (SEWRPC, 1991)

Component	Unit	Extent	Unit Cost			Total Cost		
			Low	Moderate	High	Low	Moderate	High
Mobilization / Demobilization-Light	Swale	1	$107	$274	$441	$107	$274	$441
Site Preparation								
Clearing[b]	Acre	0.5	$2,200	$3,800	$5,400	$1,100	$1,900	$2,700
Grubbing[c]	Acre	0.25	$3,800	$5,200	$6,600	$950	$1,300	$1,650
General								
Excavation[d]	Yd^3	372	$2.10	$3.70	$5.30	$781	$1,376	$1,972
Level and Till[e]	Yd^2	1,210	$0.20	$0.35	$0.50	$242	$424	$605
Sites Development								
Salvaged Topsoil Seed, and Mulch[f]	Yd^2	1,210	$0.40	$1.00	$1.60	$484	$1,210	$1,936
Sod[g]	Yd^2	1,210	$1.20	$2.40	$3.60	$1,452	$2,904	$4,356
Subtotal	--	–	--	–	--	$5,116	$9,388	$13,660
Contingencies	Swale	1	25%	25%	25%	$1,279	$2,347	$3,415
Total	--	–	--	–	--	$6,395	$11,735	$17,075

Source: (SEWRPC, 1991)

Note: Mobilization/demobilization refers to the organization and planning involved in establishing a vegetative swale.

[a] Swale has a bottom width of 1.0 foot, a top width of 10 feet with 1:3 side slopes, and a 1,000-foot length.

[b] Area cleared = (top width + 10 feet) x swale length.

[c] Area grubbed = (top width x swale length).

[d] Volume excavated = (0.67 x top width x swale depth) x swale length (parabolic cross-section).

[e] Area tilled = $\left(\text{top width} + \frac{8(\text{swale depth}^2)}{3(\text{top width})}\right) \times \text{swale length}$ (parabolic cross-section).

[f] Area seeded = area cleared x 0.5.

[g] Area sodded = area cleared x 0.5.

Table 3 Estimated Maintenance Costs (SEWRPC, 1991)

Component	Unit Cost	Swale Size (Depth and Top Width)		Comment
		1.5 Foot Depth, One-Foot Bottom Width, 10-Foot Top Width	3-Foot Depth, 3-Foot Bottom Width, 21-Foot Top Width	
Lawn Mowing	$0.85 / 1,000 ft^2 / mowing	$0.14 / linear foot	$0.21 / linear foot	Lawn maintenance area=(top width + 10 feet) x length. Mow eight times per year
General Lawn Care	$9.00 / 1,000 ft^2 / year	$0.18 / linear foot	$0.28 / linear foot	Lawn maintenance area = (top width + 10 feet) x length
Swale Debris and Litter Removal	$0.10 / linear foot / year	$0.10 / linear foot	$0.10 / linear foot	--
Grass Reseeding with Mulch and Fertilizer	$0.30 / yd^2	$0.01 / linear foot	$0.01 / linear foot	Area revegetated equals 1% of lawn maintenance area per year
Program Administration and Swale Inspection	$0.15 / linear foot / year, plus $25 / inspection	$0.15 / linear foot	$0.15 / linear foot	Inspect four times per year
Total	--	**$0.58 / linear foot**	**$ 0.75 / linear foot**	--

Maintenance Cost

Caltrans (2002) estimated the expected annual maintenance cost for a swale with a tributary area of approximately 2 ha at approximately $2,700. Since almost all maintenance consists of mowing, the cost is fundamentally a function of the mowing frequency. Unit costs developed by SEWRPC are shown in Table 3. In many cases vegetated channels would be used to convey runoff and would require periodic mowing as well, so there may be little additional cost for the water quality component. Since essentially all the activities are related to vegetation management, no special training is required for maintenance personnel.

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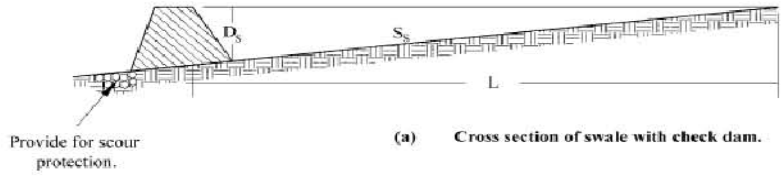
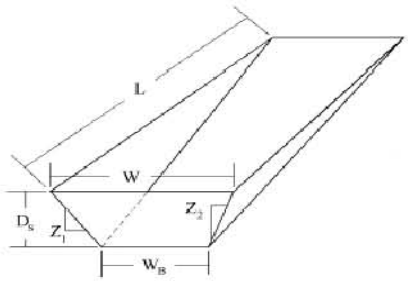


(a) Cross section of swale with check dam.

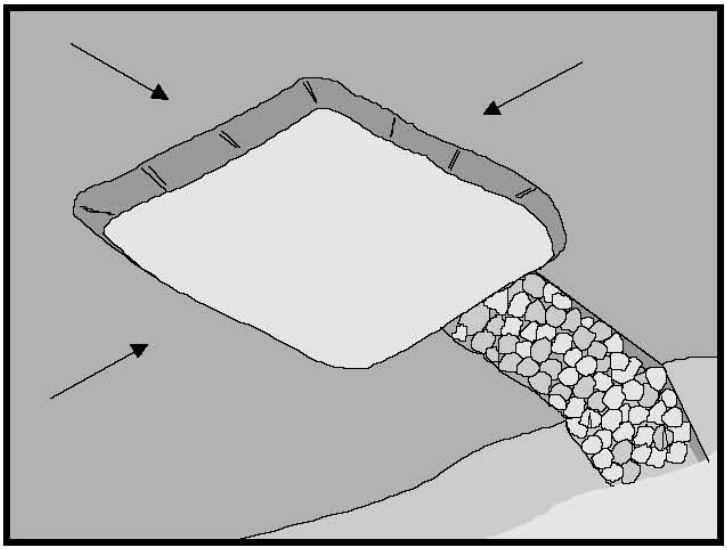


(b) Dimensional view of swale impoundment area.

Notation:

L = Length of swale impoundment area per check dam (ft)
D_S = Depth of check dam (ft)
S_S = Bottom slpe of swale (ft/ft)
W = Top width of check dam (ft)
W_B = Bottom width of check dam (ft)
$Z_{1\&2}$ = Ratio of horizontal to vertical change in swale side slope (ft/ft)

Sediment Trap SE-3



Objectives

EC	Erosion Control	
SE	Sediment Control	☑
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-2 Sediment Basin (for larger areas)

Description and Purpose

A sediment trap is a containment area where sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out or before the runoff is discharged. Sediment traps are formed by excavating or constructing an earthen embankment across a waterway or low drainage area.

Suitable Applications

Sediment traps should be considered for use:

- At the perimeter of the site at locations where sediment-laden runoff is discharged offsite.
- At multiple locations within the project site where sediment control is needed.
- Around or upslope from storm drain inlet protection measures.
- Sediment traps may be used on construction projects where the drainage area is less than 5 acres. Traps would be placed where sediment-laden stormwater may enter a storm drain or watercourse. SE-2, Sediment Basins, must be used for drainage areas greater than 5 acres.
- As a supplemental control, sediment traps provide additional protection for a water body or for reducing sediment before it enters a drainage system.

Limitations

- Requires large surface areas to permit infiltration and settling of sediment.
- Not appropriate for drainage areas greater than 5 acres.
- Only removes large and medium sized particles and requires upstream erosion control.
- Attractive and dangerous to children, requiring protective fencing.
- Conducive to vector production.
- Should not be located in live streams.

Implementation

Design

A sediment trap is a small temporary ponding area, usually with a gravel outlet, formed by excavation or by construction of an earthen embankment. Its purpose is to collect and store sediment from sites cleared or graded during construction. It is intended for use on small drainage areas with no unusual drainage features and projected for a quick build-out time. It should help in removing coarse sediment from runoff. The trap is a temporary measure with a design life of approximately six months to one year and is to be maintained until the site area is permanently protected against erosion by vegetation and/or structures.

Sediment traps should be used only for small drainage areas. If the contributing drainage area is greater than 5 acres, refer to SE-2, Sediment Basins, or subdivide the catchment area into smaller drainage basins.

Sediment usually must be removed from the trap after each rainfall event. The SWPPP should detail how this sediment is to be disposed of, such as in fill areas onsite, or removal to an approved offsite dump. Sediment traps used as perimeter controls should be installed before any land disturbance takes place in the drainage area.

Sediment traps are usually small enough that a failure of the structure would not result in a loss of life, damage to home or buildings, or interruption in the use of public roads or utilities. However, sediment traps are attractive to children and can be dangerous. The following recommendations should be implemented to reduce risks:

- Install continuous fencing around the sediment trap or pond. Consult local ordinances regarding requirements for maintaining health and safety.
- Restrict basin side slopes to 3:1 or flatter.

Sediment trap size depends on the type of soil, size of the drainage area, and desired sediment removal efficiency (see SE-2, Sediment Basin). As a rule of thumb, the larger the basin volume the greater the sediment removal efficiency. Sizing criteria are typically established under the local grading ordinance or equivalent. The runoff volume from a 2-year storm is a common design criteria for a sediment trap. The sizing criteria below assume that this runoff volume is 0.042 acre-ft/acre (0.5 in. of runoff). While the climatic, topographic, and soil type extremes make it difficult to establish a statewide standard, the following criteria should trap moderate to high amounts of sediment in most areas of California:

- Locate sediment traps as near as practical to areas producing the sediment.
- Trap should be situated according to the following criteria: (1) by excavating a suitable area or where a low embankment can be constructed across a swale, (2) where failure would not cause loss of life or property damage, and (3) to provide access for maintenance, including sediment removal and sediment stockpiling in a protected area.
- Trap should be sized to accommodate a settling zone and sediment storage zone with recommended minimum volumes of 67 yd^3/acre and 33 yd^3/acre of contributing drainage area, respectively, based on 0.5 in. of runoff volume over a 24-hour period. In many cases, the size of an individual trap is limited by available space. Multiple traps or additional volume may be required to accommodate specific rainfall, soil, and site conditions.
- Traps with an impounding levee greater than 4.5 ft tall, measured from the lowest point to the impounding area to the highest point of the levee, and traps capable of impounding more than 35,000 ft^3, should be designed by a Registered Civil Engineer. The design should include maintenance requirements, including sediment and vegetation removal, to ensure continuous function of the trap outlet and bypass structures.
- The outlet pipe or open spillway must be designed to convey anticipated peak flows.
- Use rock or vegetation to protect the trap outlets against erosion.
- Fencing should be provided to prevent unauthorized entry.

Installation

Sediment traps can be constructed by excavating a depression in the ground or creating an impoundment with a small embankment. Sediment traps should be installed outside the area being graded and should be built prior to the start of the grading activities or removal of vegetation. To minimize the area disturbed by them, sediment traps should be installed in natural depressions or in small swales or drainage ways. The following steps must be followed during installation:

- The area under the embankment must be cleared, grubbed, and stripped of any vegetation and root mat. The pool area should be cleared.
- The fill material for the embankment must be free of roots or other woody vegetation as well as oversized stones, rocks, organic material, or other objectionable material. The embankment may be compacted by traversing with equipment while it is being constructed.
- All cut-and-fill slopes should be 3:1 or flatter.
- When a riser is used, all pipe joints must be watertight.
- When a riser is used, at least the top two-thirds of the riser should be perforated with 0.5 in. diameter holes spaced 8 in. vertically and 10 to 12 in. horizontally. See SE-2, Sediment Basin.
- When an earth or stone outlet is used, the outlet crest elevation should be at least 1 ft below the top of the embankment.

- When crushed stone outlet is used, the crushed stone used in the outlet should meet AASHTO M43, size No. 2 or 24, or its equivalent such as MSHA No. 2. Gravel meeting the above gradation may be used if crushed stone is not available.

Costs

Average annual cost per installation and maintenance (18 month useful life) is $0.73 per ft^3 ($1,300 per drainage acre). Maintenance costs are approximately 20% of installation costs.

Inspection and Maintenance

- 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 outlet area for erosion and stabilize if required.
- Inspect trap banks for seepage and structural soundness, repair as needed.
- Inspect outlet structure and spillway for any damage or obstructions. Repair damage and remove obstructions as needed.
- Inspect fencing for damage and repair as needed.
- Inspect the sediment trap for area of standing water during every visit. Corrective measures should be taken if the BMP does not dewater completely in 72 hours or less to prevent vector production.
- 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 trap capacity. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed of at an appropriate location.
- Remove vegetation from the sediment trap when first detected to prevent pools of standing water and subsequent vector production.
- BMPs that require dewatering shall be continuously attended while dewatering takes place. Dewatering BMPs shall be implemented at all times during dewatering activities.

References

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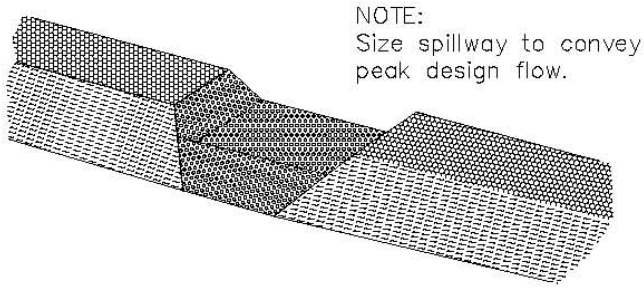
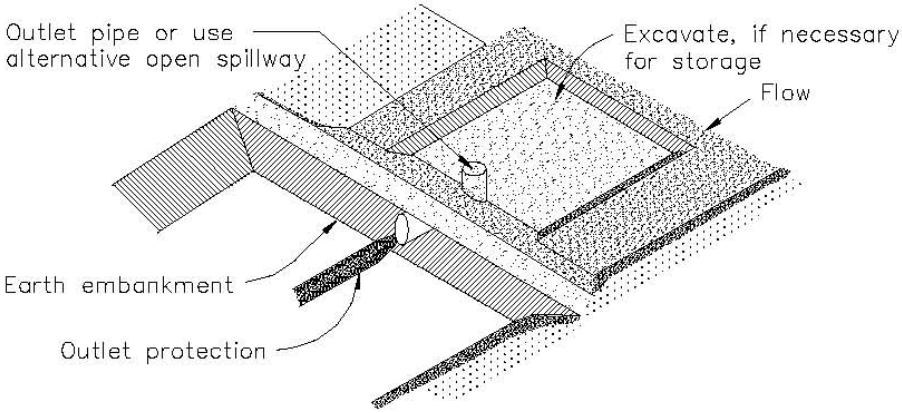
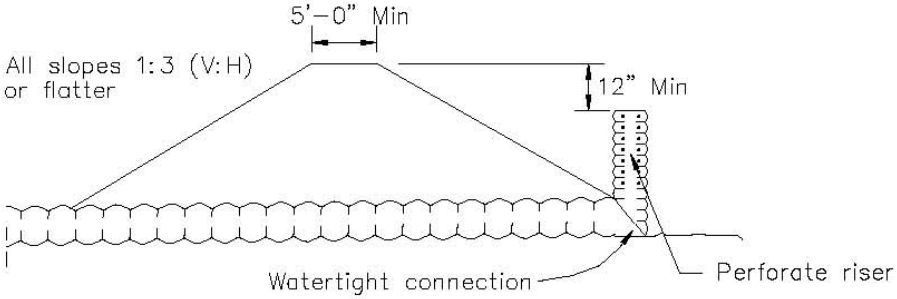


TYPICAL OPEN SPILLWAY





EMBANKMENT SECTION THRU RISER

TYPICAL SEDIMENT TRAP
NOT TO SCALE

ATTACHMENT F

OPERATION AND MAINTENANCE PROGRAM FOR TREATMENT BMPS

BMP CATEGORY	**MAINTENANCE ACTIVITIES**	MAINTENANCE FREQUENCY	ANNUAL COST
BIO-FILTER/ GRASS-LINED BIOSWALE	- CUT VEGETATION IN NATURAL CHANNEL TO MAX. 6" HEIGHT - RESEED/VEGETATE BARE SPOTS AS NECESSARY - REMOVE SEDIMENT FROM CHANNEL AS NECESSARY - BACKFILL BURROW HOLES AS NECESSARY	ONCE / MONTH PER LOT	**$1,200**
	TOTAL	**PER LOT**	**$ 1,200**

ATTACHMENT G

FISCAL RESOURCES

The developer, Fallbrook Development Co., will be responsible for the maintenance of the post-development, permanent BMPs on each lot until the lots are sold to subsequent homeowners. The individual homeowners will be responsible for the continuing maintenance of the post-development, permanent BMPs.

ATTACHMENT H

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.

Date: 10-9-08