STORMWATER MANAGEMENT PLAN

WHEELER RIDGE ESTATES
TENTATIVE MAP 5156

TIM STREET, BONITA
SAN DIEGO COUNTY, CALIFORNIA
TM 5156
ER 99-18-001

Engineer:

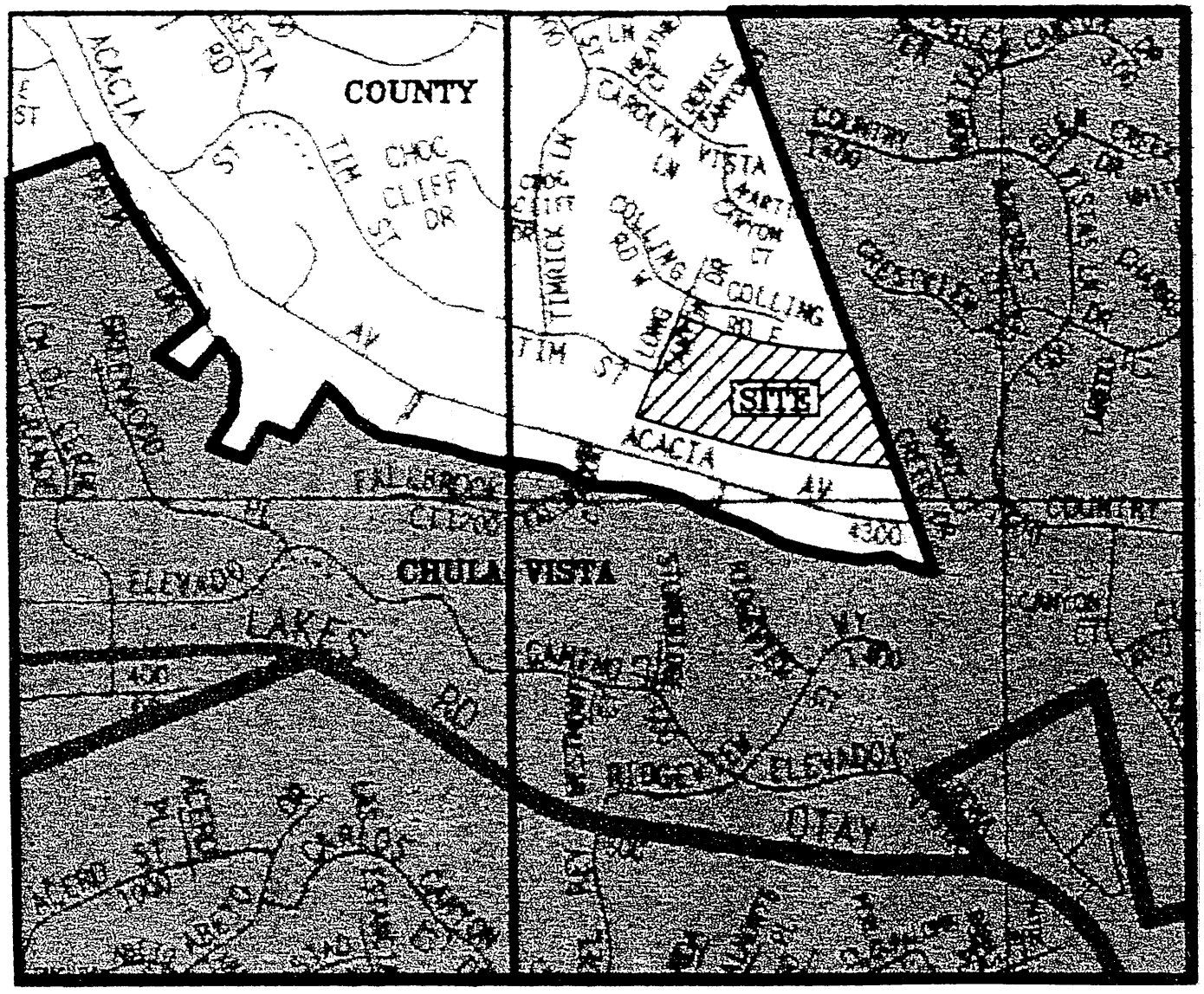
MASSON & ASSOCIATES, INC.
200 East Washington Avenue, Suite 200
Escondido, CA 92025
(760) 741-3570

Prepared by:

Dennis R. Furman
RCE 92391, exp. 12-31-03

Date Prepared: August 15, 2002
1st Revision: January 24, 2003
2nd Revision: April 15, 2003
3ed Revision: July 10, 2003
P.N. 98059

TABLE OF CONTENTS



VICINITY MAP

INTRODUCTION

The Stormwater Management Plan (SWMP) is required under the County of San Diego Watershed Protection, Stormwater Management, and Discharge Control Ordinance (section 67.817). The purpose of this SWMP is to address the water quality impacts from the proposed improvements on the Wheeler Ridge Estates (TM 5156) subdivision. Best Management Practices (BMPs) will be utilized to provide a long-term solution to water quality. This SWMP is also intended to ensure the effectiveness of the BMPs through proper maintenance that is based on long-term fiscal planning. The SWMP is subject to revisions as needed by the engineer.

1.0 PROJECT DESCRIPTION

The proposed project consists of a tentative subdivision map on 14 acres with 14 lots. The project is located at the eastern terminus of Tim Street within the community of Bonita, in the County of San Diego, California.

1.1 Topography and Land Use

The site is a south-facing hillside leveling at two previously graded pads on the property 's northwestern edge. Elevation on site range from 240 feet above sea level at its southern boundary to 360 above mean sea level at its northern boundary. The soil onsite consists of LsF, Linne clay loam with 30-50 percent slopes.

1.2 Hydrologic Unit Contribution

The project is within the La Nacion Hydrologic Subarea (9.12) of the Sweetwater Hydrologic Unit (9.00) as described by the Water Quality Control Plan for the San Diego Basin ("Basin Plan"), adopted by the California Regional Water Quality Control Board, San Diego Region, dated September 8, 1994 and amended May 5, 1998. The project area represents approximately 0.01% of the Sweetwater Hydrologic Unit. The receiving water of the project site is the Long Canyon Creek.

2.0 WATER QUALITY ENVIRONMENT

2.1 Beneficial Uses

The beneficial uses for the hydrologic unit are included in Tables 2.1 and 2.2. These tables have been extracted from the Water Quality Control Plan for the San Diego Basin.

Municipal and Domestic Supply (MUN) - Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Industrial Service Supply (IND) - Includes uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.

Contact Water Recreation (REC-1) - Includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, or use of natural hot springs.

Non-contact Water Recreation (REC-2) - Includes the uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Warm Freshwater Habitat (WARM) - Includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.

Wildlife Habitat (WILD) - Includes uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

2.1.1 Inland Surface Waters

Inland surface waters have the following beneficial uses as shown in Table 2.1.

Table 2.1 Beneficial Uses for Inland Surface Waters

Hydrologic Unit Number	Mun	Ind	Rec1	Rec2	Warm	Wild
909.12	+	x	o	x	x	x

2.1.2 Ground Waters

Ground waters have the following beneficial uses as shown in Table 2.2.

Table 2.2 Beneficial Uses for Ground Waters

Hydrologic Unit Number	Mun	Agr	Ind
909.12	x	x	x

x Existing Beneficial Use
0 Potential Beneficial Use
+ Excepted from Municipal

2.2 303(d) Status

According to the California 1998 303d list published by the San Diego Regional Water Quality Control Board, there are no impaired water bodies that are associated with this project.

3.0 CHARACTERIZATION OF PROJECT RUNOFF

3.1 Existing and Post-Construction Drainage

The existing site condition is a steep sloping hillside with flat areas left by a previous grading operation. A contributory offsite watershed to the north drains southward through the site and continues to Long Canyon Creek just south of Acacia Avenue. Historically this surface flow coming down from the hillside and migrating through the existing residential lots along the north side of Acacia Avenue has been a problem. Once in the street it flows toward two existing drop inlets at the intersection of Acacia Avenue and Fallbrook Court.
The proposed project will convey the site runoff plus contributory offsite drainage in the onsite street to a point just east of Lot ~~2~~ 5. Curb inlets at this point will intercept and convey the flow in an underground storm drain to the southeasterly corner of the project collecting additional storm water from the east and west via slope terrace drains. The underground storm drain will extended across the County of San Diego boundary into the City of Chula Vista, then south along this boundary to outlet into Long Canyon Creek.

The total quantity of storm water to be conveyed by the proposed project storm drain, to Long Canyon Creek, in the City of Chula Vista, is estimated to be 25.6 cfs from 15.32 acres. Street flows from existing residential development along Acacia Avenue to the existing drop inlets at Fallbrook Court will be lowered due to the reduction of drainage area conveyed to the drop inlets.

The proposed project will decrease the estimated 100-year peak flow to the existing storm drain in Fallbrook Court from 38.9 cfs to 17.3 cfs, a decrease of 21.6 cfs. The use of a Bio-filter at the outlet of the proposed easterly storm drain, in the City of Chula Vista, provides an effective storm water treatment that has a low maintenance requirement. The Bio-filter is designed to accommodate the 85th percentile flow of 4.7 cfs. Flows that exceed this amount will be directed by the by-pass box into a high flow by-pass pipe that outlets into Long Canyon Creek.

For a more detailed analysis of the site hydrology, refer to the Preliminary Hydrology and Hydraulics Study for Wheeler Estates TM 5156, prepared by Masson & Associates, Inc. dated April 9, 2003.

A summary of the post-construction water quality flows is included in Table 3.1

Table 3.1 Post-Construction Water Quality Flows

Outfall	Tributary Area (acres)	Q_{100} (cfs)	Q_{WQ} (cfs)
Basin 1	8.2	11.5	2.8
Basin 2	3. 9	7.0	1.3
Basin 3	.8	0.9	0.2
Basin 4	0.3	0.3	0.1
Basin 5	2.2	2.4	0.4
Basin 6	10.5	17.3	3.5

3.2 Post-Construction Expected Discharges

There are no sampling data available for the existing site condition. In addition, the project is not expected to generate significant amounts of non-visible pollutants. However, the following constituents are commonly found on similar developments and could affect water quality:

- Sediment discharge due to construction activities and post-construction areas left bare.
- Nutrients from fertilizers
- Trash and debris deposited in drain inlets.
- Hydrocarbons from paved areas.
- Pesticides from landscaping and home use.

3.3 Soil Characteristics

The project area consists of soil group C. The project will not have slopes steeper than 1.5:1. All slopes will include slope protection for construction and post-construction conditions.

4.0 MITIGATION MEASURES TO PROTECT WATER QUALITY

To address water quality for the project, BMPs will be implemented during construction and post-construction.

4.1 Construction BMPs

A detailed description of the construction BMPs will be developed during the Grading Plan and Improvement Plan Engineering phase. Since the project is in the preliminary development phase only a listing of potential types of temporary BMPs are available. This includes the following:

- 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
- Erosion Control Mats and Spray-on Applications
- 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
- Perm. Reveg. of all disturbed uncovered areas

Construction BMPs for this project will be selected, constructed, and maintained so as to comply with all applicable ordinances and guidance documents.

4.2 Post-Construction BMPs

Pollutants of concern as noted in Section 3 will be addressed through three types of BMPs. These types of BMPs are site design, source control and treatment control.

4.2.1 Site Design BMPs

The project is designed to minimize the use of impervious areas. Streets have been designed at minimal widths to minimize the impact of development on runoff and water quality.

The project is designed to minimize the potential for erosion. Slopes will be permanently stabilized with landscaping. Landscaping will consist of both native and non-native plants. Native or drought tolerant vegetation will be used where practicable. The goal is to achieve plant establishment expeditiously to reduce erosion. The irrigation system for these landscaped areas will be monitored to reduce over irrigation. Pad grading will divert runoff away from tops of slopes.

4.2.2 Source Control BMPs

Source control BMPs will consist of measures to prevent polluted runoff. This program will include an educational component directed at each homeowner. The homeowners will receive a set of brochures developed by the County's Environmental Health Department. These will include the following:

- Stormwater Runoff Pollution Fact Sheet
- Stormwater Runoff Pollution Prevention Tips for Homeowners
- Stormwater Pollution Prevention Yard Work (Landscaping, Gardening, Pest Control)
- Stormwater Pollution Prevention Pet Waste
- Stormwater BMP Swimming Pool and Spa Cleaning

In addition, storm drain inlets will be stenciled with a message warning citizens not to dump pollutants into the drains.

4.2.3 Treatment Control BMPs

The following treatment control BMPs will be implemented to address water quality:

4.2.3.1 Catch Basin Inserts

Catch basin inserts are devices consisting of a mesh basket or plastic basket with a perforated bottom that hangs just inside the opening of an inlet or catch basin. Different configurations are available to fit different inlet types. Stormwater passes through the basket while trash and debris fall into the basket. Various types of filter media are available that can be inserted in the basket to absorb oil & grease. The product recommended for this project is AbTech's Ultra Urban Filter® with Smart Sponge® Inside.

4.2.3.1.1 Appropriate Applications and Siting Constraints:

(This information is derived from the Los Angeles County SUSMP)

DESCRIPTION

A catch basin insert is any device that can be inserted into an existing catch basin design to provide some level of runoff contaminant removal. Currently, there are many different catch basin insert models available, with applications ranging from trash and debris removal to carbon adsorption of aliphatic and aromatic hydrocarbons and heavy metals removal. Costs vary widely, ranging from about $40 for a simple screen bag, to over $3,000 for more complex, custom-engineered units. The most frequent application for catch basin inserts is for reduction of sediment, oil, and grease levels in stormwater runoff. These catch basin inserts should also have an overflow outlet, through which water exceeding the treatment capacity can escape without flooding the adjacent area.

ADVANTAGES

1. Provides moderate removal of larger particles and debris as pretreatment.
2. Low installation costs.
3. Units can be installed in existing traditional stormwater infrastructure.
4. Ease of installation.
5. Requires no additional land area.

LIMITATIONS

1. Vulnerable to accumulated sediments being resuspended at low flow rates.
2. Severe clogging potential if exposed soil surfaces exist upstream.
3. Maintenance and inspection of catch basin inserts may be required before and after each rainfall event, excessive cleaning and maintenance.
4. Available head to meet design criteria.
5. Dissolved pollutants are not captured by filter media.
6. Limited pollutant removal capabilities.

DESIGN CRITERIA

1. Calculate the flow rate of stormwater to be mitigated by the catch basin insert using Principle 8: Design to Treatment Control BMP Standards in the County of San Diego Standard Urban Stormwater Mitigation Plan Guidance Manual.
2. Insert device selected should be Best Available Technology for removing constituents of concern for the particular site.

4.2.3.2 Bio-Filters

Bio-filtration swales are vegetated channels that receive directed flow and convey storm water. Bio-filtration strips, also known as vegetated buffer strips, are vegetated sections of land over which storm water flows as overland sheet flow. A schematic illustration of bio-filter is shown in Figure 4.1.

Pollutants are removed by filtration through the grass, sedimentation, adsorption to soil particles, and infiltration through the soil. Swales and strips are mainly effective at removing debris and solid particles, although some dissolved constituents are removed by adsorption onto the soil.

4.2.3.2.1 Appropriate Applications and Siting Constraints:

Swales and strips should be considered wherever site conditions and climate allow vegetation to be established and where flow velocities are not high enough to cause scour. Even where strips cannot be sited to accept directed sheet flow, vegetated areas provide treatment of rainfall and reduce the overall impervious surface.

Factors Affecting Preliminary Design:

Swales have two design goals: 1) maximize treatment, 2) provide adequate hydraulic function for flood routing, adequate drainage and scour prevention. Treatment is maximized by designing the flow of water through the swale to be as shallow and long as site constraints allow. No minimum dimensions are required for treatment purposes, as this could exclude swales from consideration at some sites.

To maximize treatment efficiency, strips should be designed to be as long (in the direction of flow) and as flat as the site will allow. No minimum lengths or maximum slopes are required for treatment purposes. The area to be used for the strip should be free of gullies or rills that can concentrate overland flow and cause erosion.

Vegetation mixes appropriate for various climates and locations should be approved by landscape staff. Table 4.1 summarizes preliminary design factors for bio-filtration.

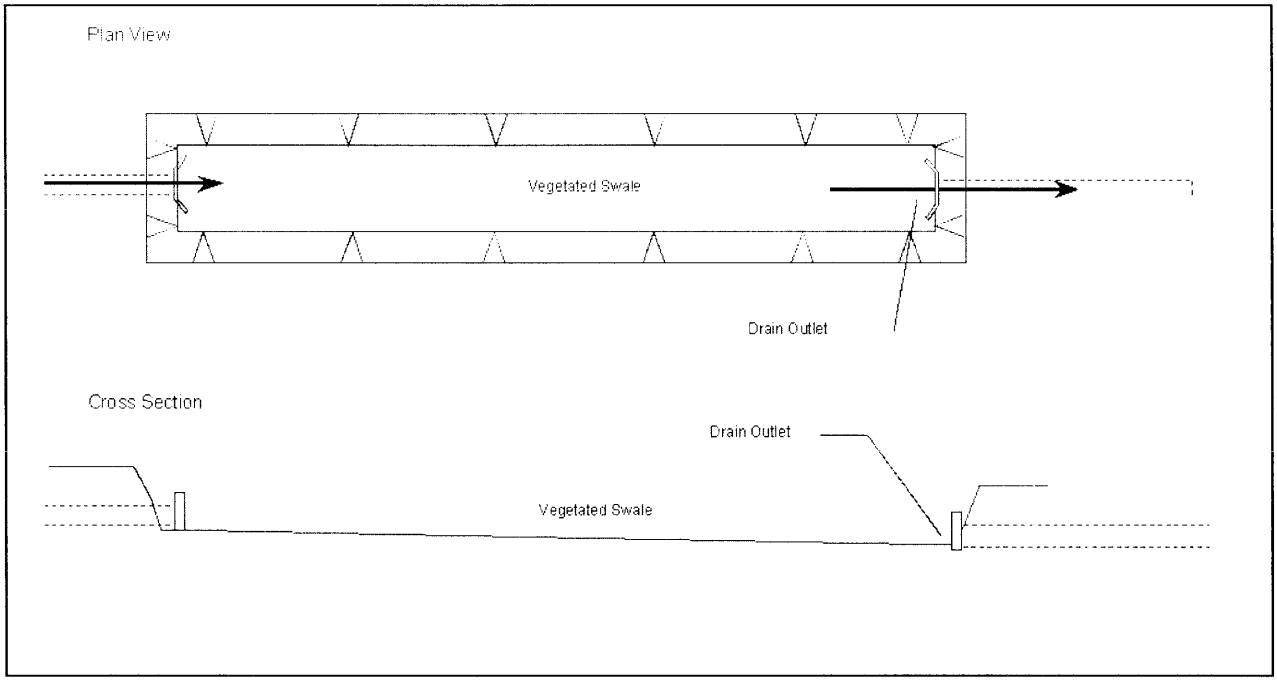


Figure 4.1
Example of Bio-filter Schematic

Table 4.1: 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 grass • 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) • 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

5.0 OPERATION AND MAINTENANCE PROGRAM

5.1 Bio-filters

The operational and maintenance needs of a Swale are:

- Vegetation management to maintain adequate hydraulic functioning and to limit habitat for disease-carrying animals.
- Animal and vector control.
- Periodic sediment removal to optimize performance.
- Trash, debris, grass trimmings, tree pruning, and leaf collection and removal to prevent obstruction of a Swale 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 Swale.

5.1.1 Inspection frequency

The facility will be inspected and inspection visits will be completely documented:

- Once a month at a minimum.
- 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.

5.1.2. Aesthetic and Functional Maintenance

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

5.1.2.1 Aesthetic Maintenance

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

- Grass Trimming. Trimming of grass will be done on the Swale, around fences, at the inlet and outlet structures.
- Weed Control. Weeds will be removed through mechanical means. Herbicide will not be used because these chemicals may impact the water quality monitoring.

5.1.2.2 Functional Maintenance

Functional maintenance has two components: preventative maintenance and corrective maintenance.

5.1.2.2.1 Preventive Maintenance

Preventive maintenance activities to be instituted at a Swale are:

- Grass Mowing. Vegetation seed mix within the Swale is 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 at a Swale, will be monitored once a month during the dry season, after every large storm (0.50 inch), and monthly during the wet season. Specifically, if sediment reaches a level at or near 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 (i.e., within ten working days) will be taken to restore the Swale to design performance standards. Actions will include using additional fill and 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. The swale will be regraded, if the flow gradient has changed, and then replanted with sod.

- 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.

5.1.2.2.2 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 a Swale. Corrective maintenance activities include:

- Removal of Debris and Sediment. Sediment, debris, and trash, which impede the hydraulic functioning of a Swale and prevent vegetative growth, will be removed and properly disposed. Temporary arrangements will be made for handling the sediments until a permanent arrangement is made. Vegetation will be re-established after sediment removal.
- Structural Repairs. Once deemed necessary, repairs to structural components of a Swale and its inlet and outlet structures will be done within 10 working days. 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 Swales will be repaired within 10 working days).
- Erosion Repair. Where a reseeding program has been ineffective, or where other factors have created erosive conditions (i.e., pedestrian traffic, concentrated flow, etc.), corrective steps will be taken to prevent loss of soil and any subsequent danger to the performance of a Swale. There are a number of corrective actions than can be taken. These include erosion control blankets, riprap, sodding, or reduced flow through the area. Designers or contractors will be consulted to address erosion problems if the solution is not evident.

5.2 Catch Basin Inserts

Catch basin inserts should be serviced as needed to remove sediment and debris. The sediment and debris can be quickly vacuumed out of the module with conventional maintenance equipment. Under normal operating conditions, the entire recyclable filter box should be replaced every 1-3 years.

5.2.1 Inspection Frequency

Catch basin inserts should be inspected and serviced once at least once at least four times a year.

5.2.2 Debris and Sediment Disposal

Disposal of sediment, debris, and trash will be contracted out in accordance with local, county, state, and federal waste control programs.

5.2.3 Hazardous Wastes

Suspected hazardous wastes will be analyzed to determine disposal options. Hazardous materials generated on site will be handled and disposed of according to local, state, and federal regulations. A solid or liquid waste is considered a hazardous waste if it exceeds the criteria listed in the California Code of Federal Regulations, Title 22, Article 11 (State of California, 1985).

6.0 FISCAL RESOURCES

The following sections are based on the County of San Diego's Stormwater Maintenance Plan (Draft #2) and Attachment 1.

6.1 Category Description

The BMP's proposed by this project fall into the Second Category, as defined by Attachment 1 to the Guidelines. The Second Category is described as follows:

> The County needs to assure ongoing maintenance. The nature of the proposed BMPs indicates that it is appropriate for property owners to be given primary responsibility for maintenance, on a perpetual basis (unless a stormwater utility is eventually formed). However, the County (in a "backup" role) needs to be able to step in and perform the maintenance if property owner fails, and needs to have security to provide funding for such backup maintenance. Security for "backup" maintenance after the interim period (5 years) would not be provided however primary owner maintenance responsibility would remain. If a stormwater utility or other permanent mechanism is put into place, it could assume either a primary or backup maintenance role.
>
> Typical BMPs:
> - Biofilters (Grass swale, Grass strip, Minor wetland vegetation swale)
> - Small Detention Basins (Extended/dry detention basin)
> - Infiltration BMP (basin, trench)
> - Single Storm Drain Inserts, Oil/Water separator, Catch basin insert & screens.

6.2 Mechanisms to Assure Maintenance

The following are all mechanisms that will be used to assure maintenance of the catch basin inserts.

1. Stormwater Ordinance Requirement: The County of San Diego Watershed Protection, Stormwater Management, and Discharge Control Ordinance (S.O.) requires this ongoing maintenance. In the event that the mechanisms below prove ineffective, or in addition to enforcing those mechanisms, civil action, criminal action or administrative citation could also be pursued for violations of the ordinance.

2. Public Nuisance Abatement: Under the S.O. failure to maintain a BMP would constitute a public nuisance, which may be abated under the Uniform Public Nuisance Abatement Procedure. This provides an enforcement mechanism additional to the above, and would allow costs of maintenance to be billed to the owner, a lien placed on the property, and the tax collection process to be used.

3. Notice to Purchasers. Section 67.819(e) of the SO requires developers to provide clear written notification to persons acquiring land upon which a BMP is located, or others assuming a BMP maintenance obligation, of the maintenance duty.

4. Subdivision Public Report: Tentative Map and Tentative Parcel Map approvals will be conditioned to require that, prior to approval of a Final or Parcel Map, the subdivider shall provide evidence to the Director of Public Works, that the subdivider has requested the California Department of Real Estate to include in the public report to be issued for the sales of lots within the subdivision, a notification regarding the maintenance requirement. (The requirement for this condition would not be applicable to subdivisions which are exempt from regulation under the Subdivided Lands Act, or for which no public report will be issued.)

5. BMP Maintenance Agreement with Easement and Covenant: An agreement will be entered into with the county, which will function three ways:

(a) It will commit the land to being used only for purposes of the BMP.
(b) It will include an agreement by the landowner to maintain the facilities in accordance with the SMP (this obligation would be passed on to future purchasers or successors of the landowner, as a covenant
(c) It will include an easement giving the County the right to enter onto the land (and any necessary adjacent land needed for access) to maintain the BMPs.

For offsite BMPs outside the jurisdiction of the County, the same maintenance agreement, with easement and covenant and agreements will be entered into with the agency that dose have jurisdiction, in this case the City of Chula Vista, unless such agency subordinates to the County.

6.3 Maintenance Costs

Maintenance of the bio-filtration swale is estimated to cost approximately $1,500 per year.

Maintenance of the catch basin inserts as recommended by the manufacturer is estimated to cost approximately $800/year for all inserts.

6.4 Funding

Developer would provide the County with SECURITY to back up the maintenance agreement, which would remain in place for an interim period of 5 years. The amount of the security would equal the estimated cost of 2 years of maintenance activities. The security can be a Cash Deposit, Letter of Credit or other form acceptable to the County.

7.0 SUMMARY/CONCLUSIONS

This SWMP has been prepared in accordance with the Watershed Protection, Stormwater Management, and Discharge Control Ordinance and the Stormwater Standards Manual. This SWMP has evaluated and addressed the potential pollutants associated with this project and their effects on water quality. A summary of the facts and findings associated with this project and the measures addressed by this SWMP is as follows:

- The beneficial uses for the receiving waters have been identified. None of these beneficial uses will be impaired or diminish due to the construction and operation of this project.
- The project will not significantly alter drainage patterns on the site. The discharge points will not be changed.
- Overall existing drainage patterns throughout the project and natural drainage basins will be effected and eliminate nuisance flows through adjacent property There will be an increase in peak runoff from the site. See Table 3.1 page 4.
- Open areas and slopes will be landscaped to reduce or eliminate sediment discharge.
- Bio-filters will be used to filter roadway runoff from the project.
- The proposed construction and post-construction BMPs address mitigation measures to protect water quality and protection of water quality objectives and beneficial uses to the maximum extent practicable.