STEVENS · CRESTO ENGINEERING, INC.

WATER QUALITY TECHNICAL REPORT

FOR:

STORM WATER RUNOFF

FROM:

ROSELLE STREET

CITY OF SAN DIEGO, CA

Prepared For:
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San Diego, CA 92109

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SCE Project No.: 14017.01
Date: 01/16/08
Revised: 06/03/15
PTS: 150566

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LIST OF EXHIBITS

SECTION 1

DESCRIPTION

1.1 Introduction

This Water Quality Technical Report (**WQTR**) has been prepared to address permanent storm water Best Management Practices (BMPs) that will be considered and incorporated in the project which will mitigate, to the Maximum Extent Practicable (MEP), pollutants in urban runoff due to the development of the **Roselle Street (Roselle)** project.

This **WQTR** fulfills the requirements of this project to comply with the City of San Diego's Storm Water Standards; permanent and construction storm water BMP requirements, including the Model SUSMP, for new development projects in the County of San Diego; and Cities within.

The requirement to implement storm water BMPs for development projects is based on Section 402(p) of the Federal Clean Water Act. The Clean Water Act Amendments of 1987 established a framework for regulating storm water discharges from municipal, industrial, and construction activities under the National Pollution Discharging Elimination System (**NPDES**) program. Under the Clean Water Act, municipalities throughout the nation are issued a Municipal NPDES Permit. The primary goal of the municipal Permit is to stop polluted discharges, to the Maximum Extent Practicable (MEP), from entering the storm water conveyance system and local receiving and coastal waters.

In California, the State Water Resources Control Board (SWRCB), through the nine Regional Boards, administers the NPDES storm water municipal permitting program. Based on the San Diego Municipal Permit issued by the San Diego Regional Board, the City of San Diego is required to develop and implement construction and permanent storm water BMPs addressing pollution from new development projects. The current permit, R9-2013-0001, will not be applicable to new development until each co-permittee prepares, and gets approval of, an updated BMP Design Manual. Until that time, the prior permit, R9-2007-0001, will remain in effect. R9-2007-0001 was issued by the San Diego Regional Water Quality Control Board (RWQCB) on January 24, 2007 to the City, the County of San Diego, the Port of San Diego, and 18 other regional Co-permittees.

Mitigation of impacts from runoff due to urban development assures containment of contaminants prior to release to the Municipal Storm Drain System within the City of San Diego; thus assuring the highest, practicable, water quality for storm water discharge; to the MEP. Mitigating pollution within urban stormwater runoff is a multi-faceted effort utilizing Low Impact Development (LID) site design, source control, and structural treatment. This report will identify the scope of the development, receiving water bodies, pollutants of concern, LID site design, source control, and treatment control methods utilized. Finally, this report will describe maintenance responsibility for permanent Best Management Practices. Technical specifications are provided within Section 8.

1.2 Project Description

Roselle is a 7.04 acre undeveloped property located at the eastern end of Roselle Street, south of Sorrento Valley Road. Approximately one third of the property, the southern portion, is steep hillside that slopes from south to north. Carroll Canyon Creek runs along the base of the hillside from the eastern property boundary to the middle of the property, and then turns north and

exits through the northwestern property boundary. All storm water runoff generated by the project is tributary to the creek. The creek discharges into the Pacific Ocean approximately 2 miles downstream. This report accompanies the Site Development Permit, Coastal Development Permit, and Neighborhood Development Permit submittal for Roselle.

Legal description for the project is: Lot "B" and the Southeasterly 65 feet of Lot "A" of Acre Lot 33 of the Town of Sorrento, in the City of San Diego, County of San Diego, State of California, according to Map thereof No. 362 and No. 483, filed in the Office of the County Recorder of San Diego County, September 30, 1887, and February 9, 1888, respectively.

From the 1950s to the 1970s, the project site was used as a summer day camp. Structures on-site at that time included multiple buildings and a swimming pool. The swimming pool has since been backfilled and the buildings have been demolished. Since the 1970s, and up until a few years ago, the property sat vacant and unused. From early 2005 to late 2006, the property was leased out for use as a storage yard. During that time, unauthorized fill was placed in the northwestern corner of the project. As a result, a Notice of Violation was issued for the property on December 7, 2006. Currently, no structures exist on-site or are proposed for the project.

The Roselle Street property has been identified as a site of significant archaeological interest and is part of a larger archaeological site known as Ystagua. This site is believed to have been a village used by Native Americans approximately 240 years ago. Archaeological excavations on neighboring properties have uncovered large numbers of artifacts, including ceramic vessel fragments, arrowheads, stone tools, ornaments made from shells, and human remains. In 1999, a water line repair uncovered many artifacts on the subject property similar to those found on the neighboring properties.

The Site Map for this **WQTR** graphically depicts the project and contains pertinent data for ground cover and stormwater control devices (Exhibit 'A' and 'B' at the end of this Section).

The proposed use of the project property will potentially increase pollutants generated on-site. Anticipated potential pollutants will include sediments, heavy metals, trash and debris, oil and grease. The proposed project will implement Low Impact Development (LID) strategies, combined with the use of Source Control and Structural Treatment Control BMPs, in order to mitigate potential pollutants in storm water runoff to the MEP, prior to discharge to Carroll Canyon Creek.

Completing APPENDIX A "Storm Water Requirements Applicability Checklist", as required by the "San Diego Municipal Code, Land Development Manual, Storm Water Standards", has identified **Roselle** to be a *Priority Project* with a *High Construction Priority*. Resultantly, this **WQTR** will identify the pollutants of concern anticipated to be generated by the project, and will detail the BMPs that have been selected to mitigate those pollutants within stormwater runoff.

1.3 Hydromodification Criteria Exemption

The current municipal storm water permit, R9-2007-0001, required the co-permittees to develop and implement a hydromodification management plan for new development projects. The Final Hydromodification Management Plan (HMP) was approved by the RWQCB on July 14, 2010, and went into effect on January 14, 2011. The hydromodification criteria applies to all Priority Development Projects regardless of size unless qualifying for an exemption allowed within the approved HMP.

Per the City of San Diego Storm Water Standards, Section 4.5.1 - HMP Applicability Requirements, dated January 20, 2012, "For redevelopment projects, flow controls would only be required if the redevelopment project increases impervious area or peak flow rates as compared to pre-project conditions." The proposed project will not increase impervious surface at the site and, per the project drainage study, will not increase peak flows generated by the site. As a result, the project is exempt from hydromodification mitigation; see the project drainage study for peak flow calculations, and Figure 4-1 from the City of San Diego Stormwater Standards, on the next page, for the exemption node path.

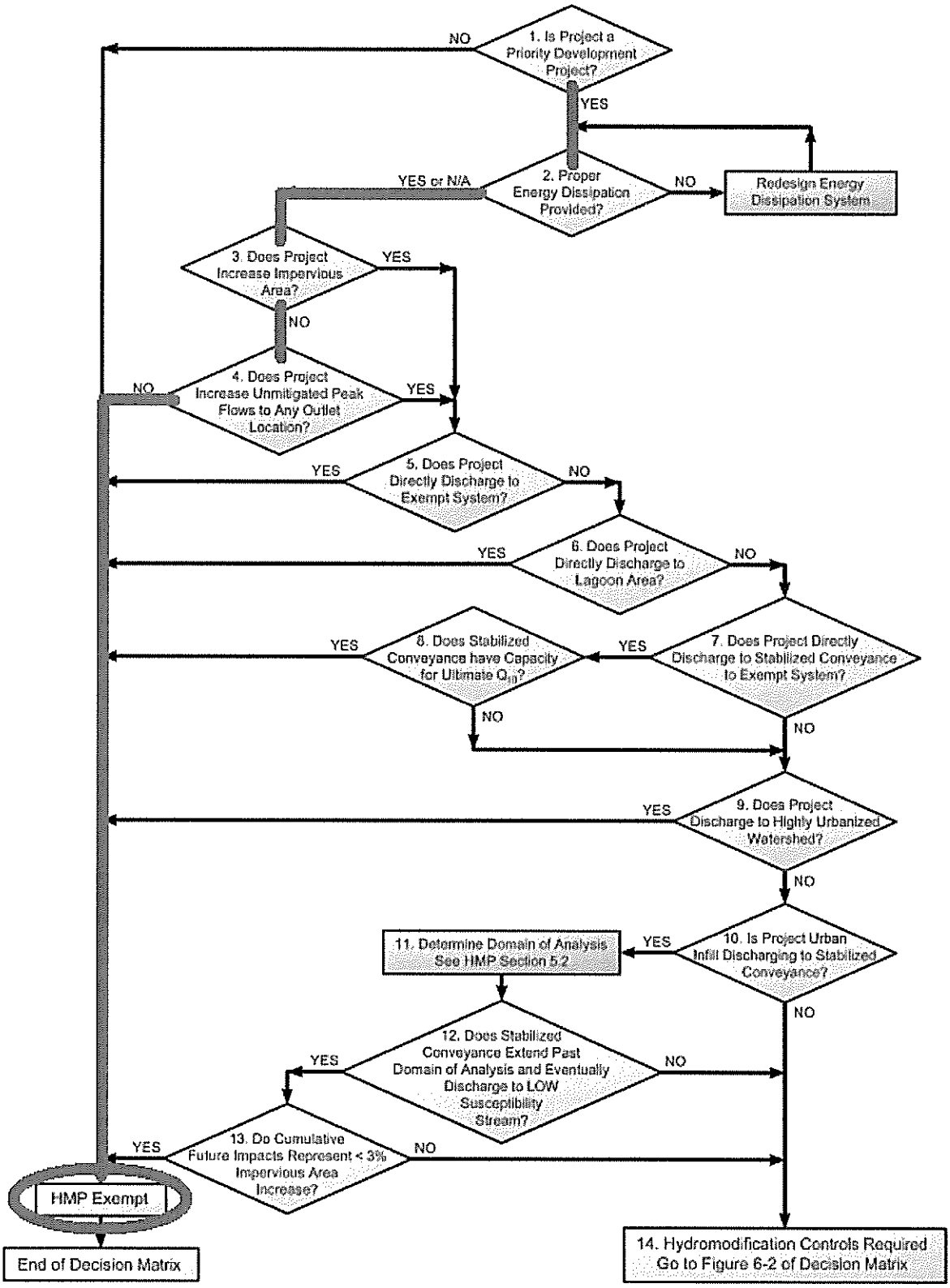


Figure 4-1. HMP Applicability Determination

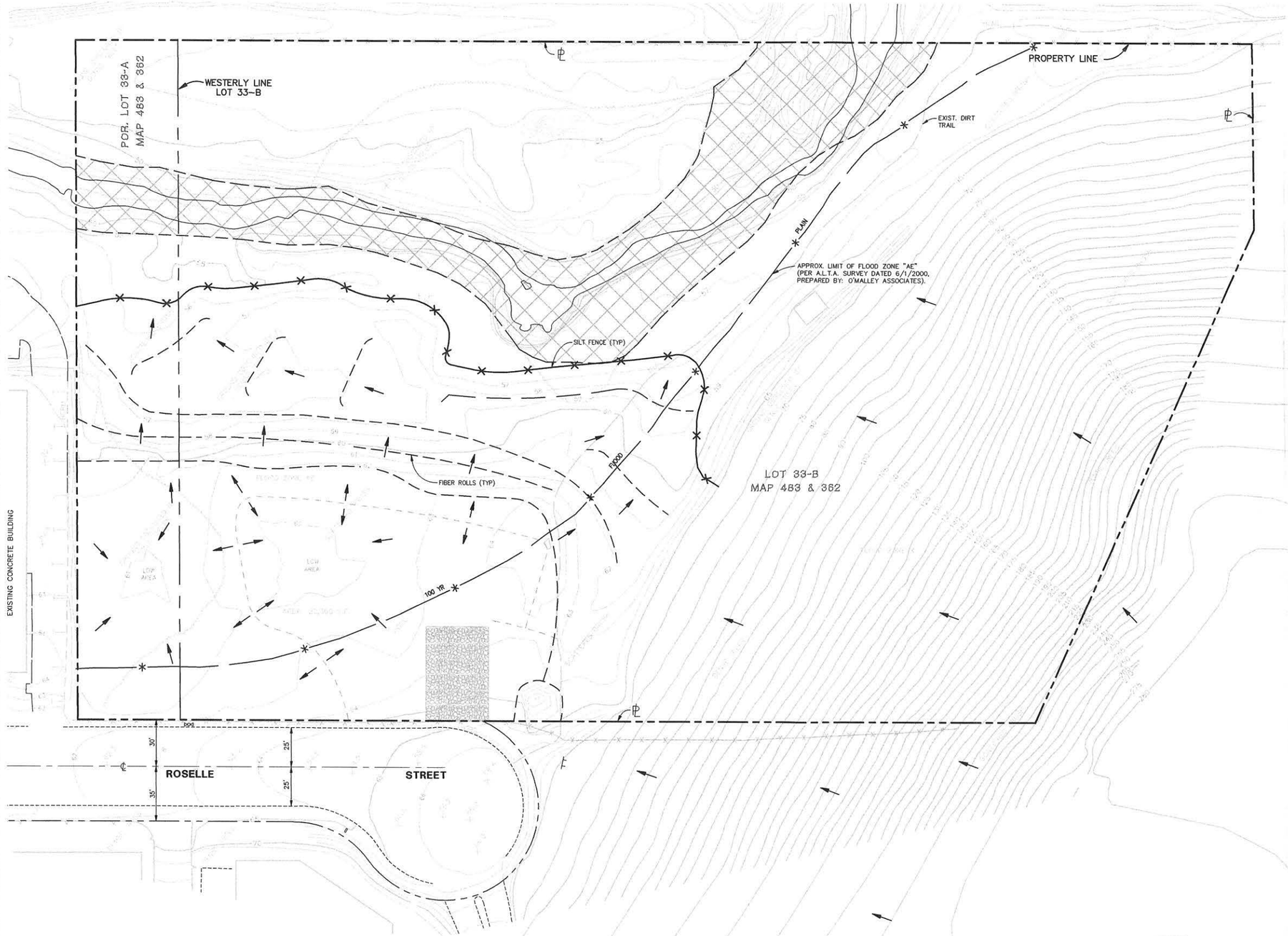
1.4 Implementation of Low Impact Development (LID) to Mitigate Potential Pollutant Discharge

Parking lots and storage yards, such as **Roselle**, generate specific type(s) of contaminants which have the potential of polluting stormwater runoff. Additionally, site use practices also have the potential of polluting storm water runoff and need to be mitigated. To devise a strategy to assure containment of contaminants prior to release to the Municipal Storm Drain System, it is necessary to identify the pollutants of concern expected to be generated by the project. Once those pollutants are determined, a specific treatment strategy can be developed. Section 4 of this report details potential pollutant generation at the proposed project.

The most effective strategy for mitigating pollutants in urban stormwater runoff is to reduce or eliminate the pollutants contacting project stormwater. Low Impact Development (LID) is an approach to Site Design that attempts to create a post-development hydrologic condition that is the same as the pre-development condition. LID design strategies focus on minimizing impervious surfaces and maximizing the use of bio-filtration at the project site. A development designed using LID principles can significantly reduce the amount of pollutants entering Municipal Storm Drain System compared to similar developments that rely solely on structural treatment control BMPs. The proposed **Roselle** project will employ LID site design principals in conjunction with non-structural "Source Control" BMPs to minimize the need for structural treatment at the project site.

Source Control BMPs are methods of preventing and reducing non-point pollution by eliminating the opportunity for pollutants on the land surface to enter surface runoff. Non-structural (Good House Keeping) BMPs are to be implemented to the MEP. However, as one hundred percent of pollutants cannot be removed by site design and source control, (non-structural means), it becomes necessary to employ structural treatment control BMPs. Structural treatment control BMPs are permanent facilities that serve as a last treatment point for removal of contaminants in storm water, and maintain discharge rates at pre-development levels, prior to discharge to the Municipal Storm Drain System. Section 5 details the LID site design, source control, and structural treatment control BMPs proposed for use at the **Roselle** project.

EXHIBIT "A"
WATER QUALITY TECHNICAL REPORT
EXISTING CONDITION



LEGEND

EXISTING GROUND CONTOURS
360 INDEX
359 INTERMEDIATE

PROPERTY LINE

RUNOFF FLOW DIRECTION

100 YR FLOOD PLAIN

FIBER ROLL/STRAW WATTLES

SILT FENCE

STABILIZED CONSTRUCTION ENTRANCE

NOTE: 25-FOOT INTERVAL CONTOURS OUTSIDE THE PROJECT BOUNDARY WERE PROVIDED BY THE COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS GEOGRAPHIC INFORMATION SERVICES.

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REVISIONS

△	△
△	△
△	△
△	△
△	△

ROSELLE STREET
SAN DIEGO, CALIFORNIA

EXHIBIT "A"
SITE MAP EXISTING CONDITION

DATE:	12/11/07
SCE NO.	07004.01
SHEET	A

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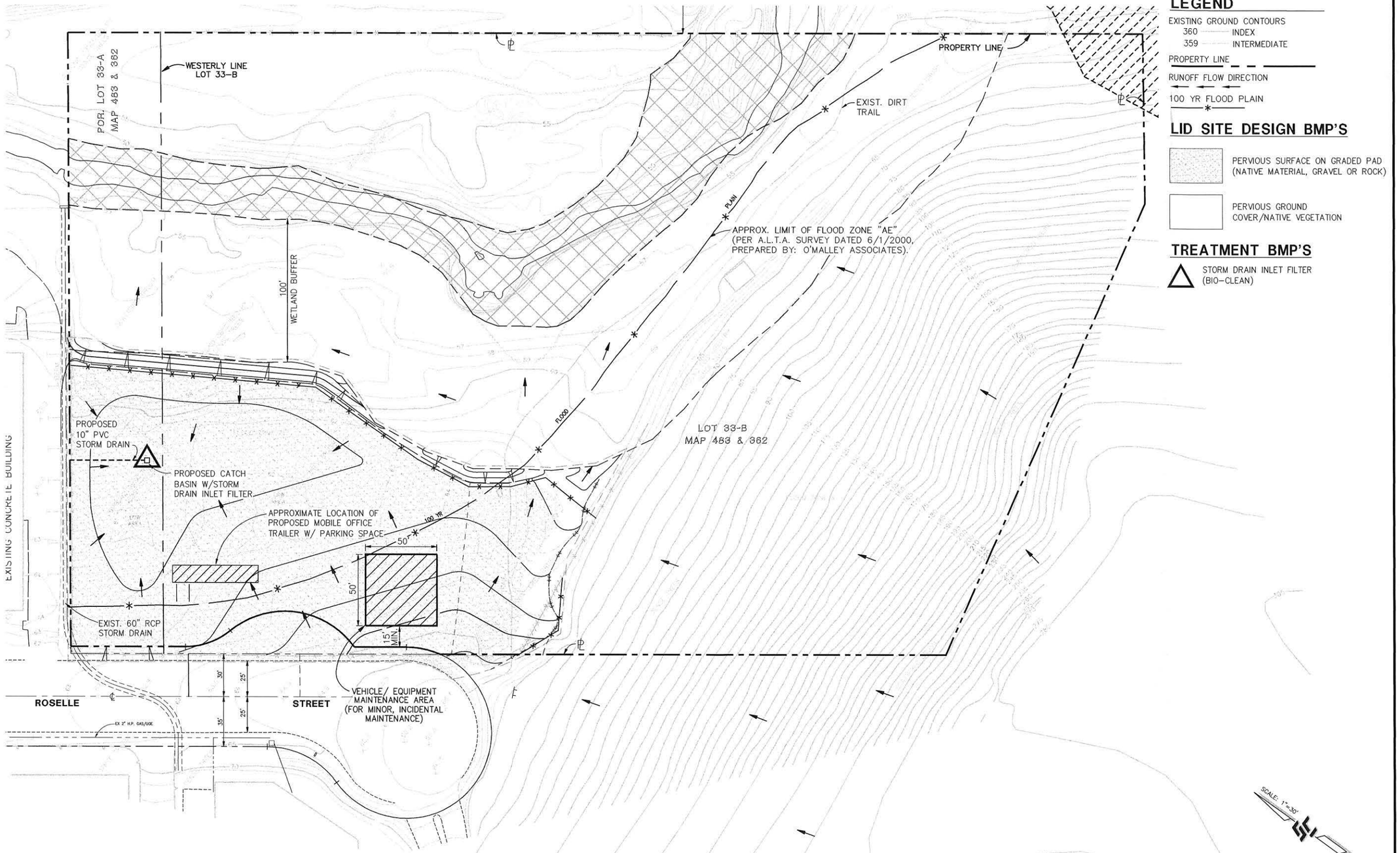
EXHIBIT "B"
WATER QUALITY TECHNICAL REPORT
PROPOSED CONDITION



LEGEND

EXISTING GROUND CONTOURS
360 ——— INDEX
359 ——— INTERMEDIATE

PROPERTY LINE

RUNOFF FLOW DIRECTION

100 YR FLOOD PLAIN

LID SITE DESIGN BMP'S

PERVIOUS SURFACE ON GRADED PAD (NATIVE MATERIAL, GRAVEL OR ROCK)

PERVIOUS GROUND COVER/NATIVE VEGETATION

TREATMENT BMP'S

STORM DRAIN INLET FILTER (BIO-CLEAN)

0 15 30 60 90
SCALE: 1" = 30'

NOTE: 25-FOOT INTERVAL CONTOURS OUTSIDE THE PROJECT BOUNDARY WERE PROVIDED BY THE COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS GEOGRAPHIC INFORMATION SERVICES.

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SAN DIEGO, CALIFORNIA

EXHIBIT "B"
SITE MAP PROPOSED CONDITION

DATE: 06/03/15
SCE NO. 14017.01
SHEET B

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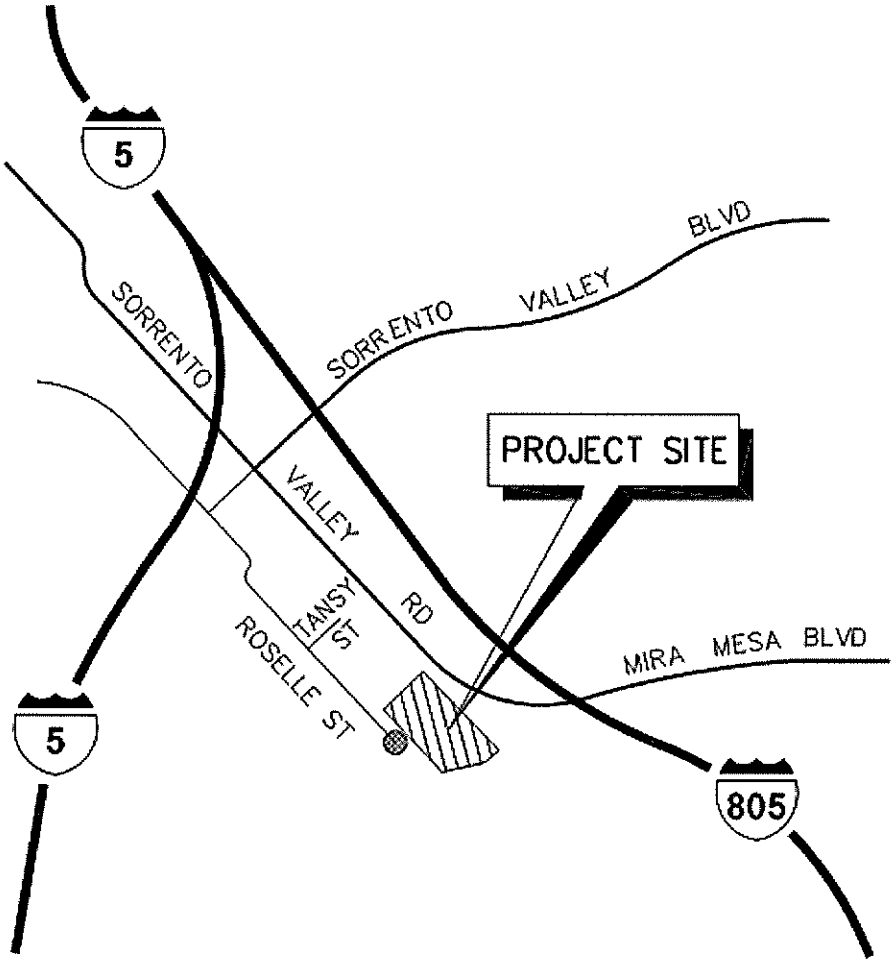
SECTION 2

VICINITY MAP

(No Scale)



VICINITY MAP

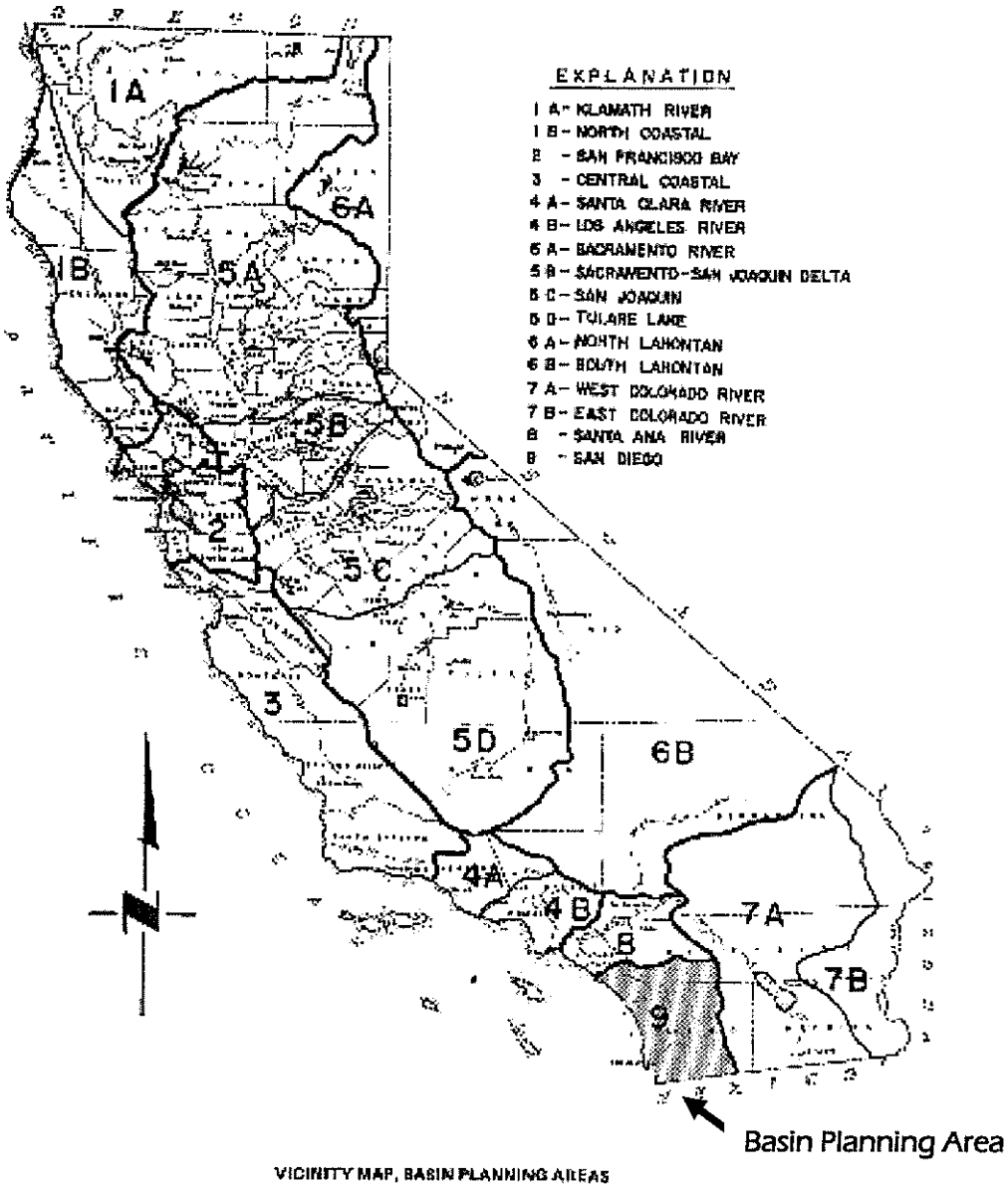
NO SCALE

SECTION 3

HYDROLOGIC REGIME

3.1 Basin Planning Area

San Diego County is located within California Regional Water Quality Control Board (CRWQCB), Basin Planning Area 9 and is shown in Figure 3.1.A. Within Basin Planning Area 9 are sub-areas, known as Hydrologic Units, and are identified in the format of Unit 9XX.X.



VICINITY MAP, BASIN PLANNING AREAS

Figure 3.1.A
California Regional Water Quality Control Board: Basin Planning Areas

3.2 Hydrologic Unit Contribution (Watershed)

Roselle is contained within the Penasquitos Watershed, Hydrologic Unit 906. Specifically, the project is a portion of Hydrologic Area, "Miramar Reservoir" (906.10) and is tributary to Carroll Canyon Creek. Carroll Canyon Creek confluences with Los Penasquitos Creek, and Los Penasquitos Creek discharges into Los Penasquitos Lagoon. Los Penasquitos Lagoon outlets into the Pacific Ocean, approximately 2 miles northwest of the project. Figure 3.2.A depicts the project site and its location within the Penasquitos Watershed.

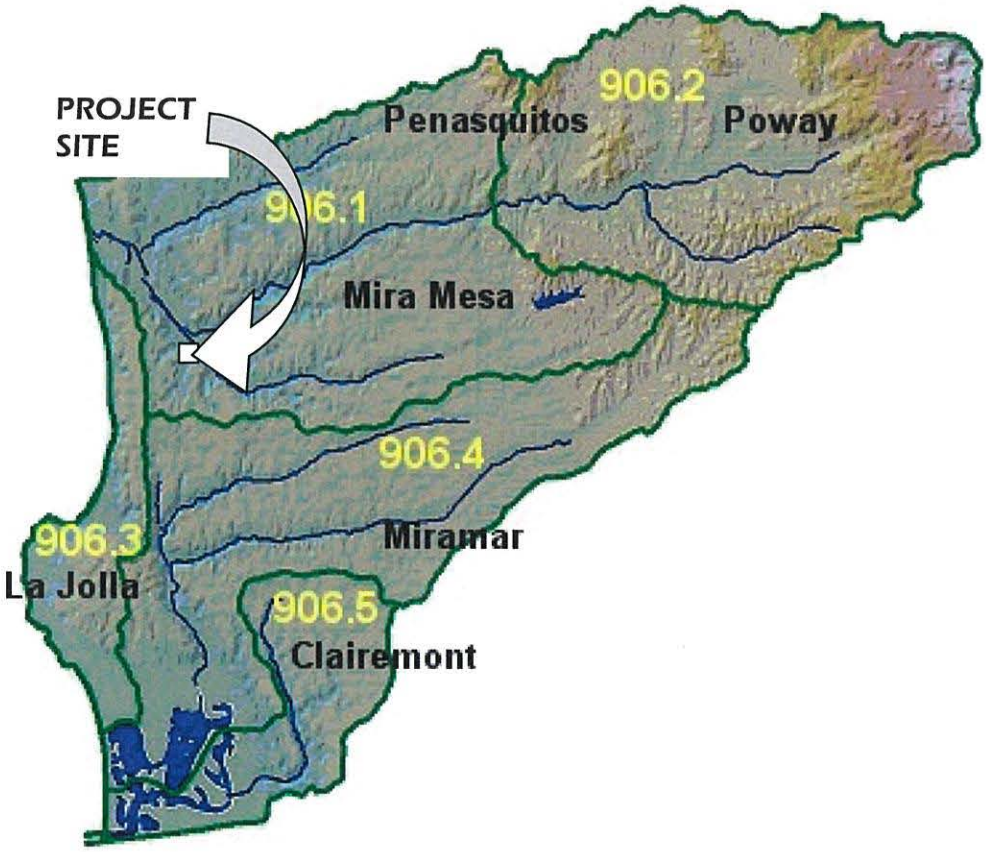


Figure 3.2.A
Penasquitos Watershed, Hydrologic Unit 906
Source: Project Clean Water

3.3 303(d) Status

Section 303(d) of Federal Clean Water Act requires states to identify waterbodies that do not meet water quality standards and are not supporting their beneficial uses (impaired waterbodies). In addition to identifying the impaired waterbodies, the list also identifies the pollutant or stressor causing impairment and establishes a schedule for developing a control plan to address the impairment. The control plan is called a Total Maximum Daily Load (TMDL).

According to the California 2010 303(d) list published by the San Diego Regional Water Quality Control Board, approved November 12, 2010, Los Penasquitos Creek and Los Penasquitos Lagoon are listed as impaired water bodies. Constituents of concern are enterococcus, fecal coliform, selenium, total dissolved solids, total nitrogen as N, toxicity, and sedimentation. Figure 3.3.A contains an excerpt from the 303(d) list indicating impairments for the water body to which the project is tributary.

Pollutants anticipated to be generated by the proposed project include sediments, heavy metals, trash and debris, and oil and grease (see Section 4 for further details). Those pollutants that are anticipated to be generated by the project and are also identified as impairments within downstream water bodies are the primary pollutants of concern at the project site. The primary pollutants of concern at **Roselle** are sediments and heavy metals (total dissolved solids). Pollutants anticipated to be generated by the project but are not identified as impairments within downstream water bodies are the secondary pollutants of concern at **Roselle** which are bacteria and nutrients.

Total Maximum Daily Loads (TMDLs) for Los Penasquitos Creek and Los Penasquitos Lagoon, for all pollutants of concern except toxicity, are anticipated to be completed by 2019, while TMDL for Toxicity in Los Penasquitos Creek is anticipated to be completed by 2021. The TMDL serves as the means to attain and maintain water quality standards for the impaired water body. A treatment train will be implemented at the project site to remove pollutants from storm water runoff prior to discharging into the Municipal Storm Drain System. The treatment train will place specific emphasis on the removal of sediments and heavy metals.

2010 CALIFORNIA 303(d) LIST OF WATER QUALITY LIMITED SEGMENTS

REGION	WATER BODY NAME	WATER TYPE	WATERSHED CALWATER 7 USGS HUC	* POLLUTANT / POTENTIAL SOURCES *Relevant/Notes*	ESTIMATED AREA ASSESSED	FIRST YEAR LISTED	TMDL REQUIREMENT STATUS**	DATE**
9	Los Penasquitos Creek	River & Stream	90610000 / 18070304	* Enterococcus · Source Unknown	12 Miles	2010	5A	2019
				* Fecal Coliform · Source Unknown	12 Miles	2010	5A	2019
				* Selenium · Source Unknown	12 Miles	2010	5A	2019
				* Total Dissolved Solids · Source Unknown	12 Miles	2006	5A	2019
				* Total Nitrogen as N · Source Unknown	12 Miles	2010	5A	2019
				* Toxicity · Unknown Nonpoint Source · Unknown Point Source Urban Runoff/Storm Sewers	12 Miles	2010	5A	2021
9	Los Penasquitos Lagr	Estuary	90610000 / 18070304	* Sedimentation/Siltation · Nonpoint Source · Point Source	469 Acres	1992	5A	2019

Figure 3.3.A
Excerpts From: 303(D), Water Body to which the Project is Tributary
Source: California 2010 303(d) List (Approved November 12, 2010)

3.4 Beneficial Uses

This section summarizes the beneficial uses for surface and ground waters to which stormwater runoff associated with the **Roselle** project will be conveyed. Beneficial uses are defined as the uses of water necessary for the survival or well being of man, plants and wildlife and form the cornerstone of water quality protection under the Basin Plan. Once beneficial uses are designated, appropriate water quality objectives can be established and programs that maintain or enhance water quality can be implemented to ensure the protection of beneficial uses. These

uses of water serve to promote the tangible and intangible economic, social and environmental goals of mankind.

The beneficial uses for the hydrologic Unit 906 are summarized in Figure 3.4.A.

Benefical Uses	Inland Surface Water	Coastal Water	Reservoirs and Lakes	Ground Water
Municipal and Domestic Supply			X	X
Agricultural Supply	X			X
Industrial Service Supply	X	X	X	X
Navigation		X		
Contact Water Recreation	X	X	X	
Non-Contact Water Recreation	X	X	X	
Commercial and Sport Fishing		X		
Biological Habitats of Special Signif.		X		
Warm Freshwater Habitat	X		X	
Cold Freshwater Habitat	X		X	
Estuarine Habitat		X		
Wildlife Habitat	X	X	X	
Rare, Threatened, or End.	X	X		
Marine Habitat		X		
Migration of Aquatic Organisms		X		
Aquaculture		X		
Shellfish Harvesting		X		
Spawning, Reprod. and/ or Early Develop.		X		
Hydropower Generation			X	

Figure 3.4.A
Beneficial Water Uses within the Penasquitos Watershed
Source: Project Clean Water

3.5 Fluvial Geomorphology

Geomorphology is the study of the Earth's landscapes and landforms, the processes by which the landforms originated, their age, and the nature of the materials underlying them. Fluvial geomorphology is the study of landforms and processes associated with rivers. Runoff leaving the project site should not have any adverse effect on the existing geomorphology down stream since the project will not increase post-development peak runoff rates. Hydrologic and hydraulic calculations for the proposed development are presented in the Preliminary Drainage Study for Roselle Street, dated 01/16/08. The report analyzes runoff flow rates during a 50-year design storm, using the criteria detailed in the City of San Diego's Drainage Design Manual, dated April 1984. Since the project will not increase post-development peak runoff rates, downstream streams, creeks, and channels will see no significant change in fluvial geomorphology due to the development (see Section 2 for more detail of existing and proposed land uses).

BACKGROUND:

An understanding of river- and stream-channel response to both natural and human factors is necessary for addressing several important issues including the protection of property and structures; bridge-site selection, design, and maintenance; protection and rehabilitation of riparian and aquatic habitat; channel capacity; ground-water levels; general aesthetics; and recreation. The channel bank erosion that accompanies natural channel migration across a flood plain represents a constant threat to property and structures located in or near the channel. Human disturbances such as dams, channelization, in-channel sand and gravel extraction, and urbanization introduce additional instability to which rivers and streams adjust by such processes as channel-bed degradation (erosion), channel-bed aggradation (deposition of material), and (or) channel widening. These adjustments, which represent the channel's attempt to establish a new approximate equilibrium pose additional threats to property, structures, and habitat located in or near the affected channels.

Channel adjustments are a concern for several reasons. A significant lowering of the channel bed poses an immediate threat to bridge pier foundations as well as buried pipelines and cables. In addition, significant bed lowering increases bank height and bank instability that may trigger channel widening. Channel aggradation raises the bed elevation, reduces channel capacity, and increases the likelihood of flooding. Any channel changes that occur on the main-stem rivers and streams also may migrate upstream on the tributaries where additional property, structures, and habitat may be at risk. Finally, any long-term channel adjustment processes also may instigate or worsen local scour problems.

SECTION 4

POLLUTANTS AND CONDITIONS OF CONCERN

4.1 Pollutants

Post-development pollutants are derived from automobile use and tenant/occupant waste, and can contribute to storm water discharge contamination if not managed, maintained, and controlled. General Pollutant Categories and a summary of anticipated pollutants are illustrated in Figure 4.2.A.

4.2 Land Use Pollutants

A. **AUTOMOBILE** – Vehicular use on the proposed site, consisting of the use of the property as a storage yard, contributes pollutants to ground surfaces exposed to rainwater. This type of use generates heavy metals, petroleum residue (oil & grease), trash and debris.

Table 4-1. Anticipated and Potential Pollutants Generated by Land Use Type.

General Project Categories	General Pollutant Categories								
	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Housing Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development	P(1)	P(1)	X	P(2)	X	P(5)	X	P(3)	P(5)
Industrial Development	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	P(1)
Steep Hillside Developments	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X	X	P(1)
Retail Gasoline Outlets (RGO)			X	X	X	X	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.

Figure 4.2.A.
City of San Diego, Storm Water Standards, Table 4-1

SECTION 5

ESTABLISHMENT OF PERMANENT STORMWATER BMPs

5.1 Low Impact Development (LID) Site Design BMPs

Low Impact Development (LID) Site Design BMPs are any project design feature that reduces the creation or severity of potential pollutant sources or reduces the alteration of the project site's natural flow regime. The goal of LID is to create a post-development hydrologic condition that is the same, or improved over the existing condition.

LID Site Design BMPs to be implemented by **Roselle** as a means to reduce pollution of storm water runoff as a result of the proposed development are:

Priority Development Project Requirements

1. Optimize the Site Layout:
   a) Utilize topography to optimize the site layout and reduce the need for grading. Development envelopes should be focused in the upper elevations of a site to promote sheet flow and natural surface drainage to BMPs or Integrated Management Practices (IMPs) located at lower elevations of the site. **The proposed Roselle project will minimize impacts to the project site by limiting the extents of disturbance and conserving a natural buffer zone between the project site and Carroll Canyon Creek.**
   b) Where possible, conform the site layout along natural landforms, avoid excessive grading and disturbance of vegetation and soils, and replicate the site's natural drainage patterns. Set development sufficiently away from creeks, wetlands, and riparian habitats. **Sensitive native plant species have been identified on each side of the creek and will be protected to the MEP. Additionally, the project will conserve a natural buffer zone between the project site and Carroll Canyon Creek.**
   c) Hillside areas should be considered more sensitive to development practices than flatter areas. **Grading will be limited to the flatter portions of the project.**
   d) Identify soils with high infiltration capacity and, if possible, locate storm water treatment facilities in these locations. Concentrate development on portions of the site with less permeable soils. **Grading will be limited to areas already impacted by the undocumented fill. Additionally, no infiltration BMPs are proposed due to the archaeological sensitivity of the site. Pollutants that infiltrate through the DG surface will be spread out and are not anticipated to migrate to a depth that would significantly impact the native soils or archaeological resources.**
   e) Areas of the site where the erosive potential of the soil is high should be considered more sensitive to development and areas that should be left undisturbed. Areas devoid of vegetation, including previously graded areas and agricultural fields, and areas of non-native vegetation where receiving waters are not present are typically suitable for development. Conversely, areas of occupied habitat of sensitive species and wetlands areas are typically unsuitable for development. **Due to the archaeologically and biologically sensitive nature of the site, the project will minimize impacts to the property.**

f) Preserve significant trees, especially native trees and shrubs, and identify locations for planting additional native or drought tolerant and large shrubs. **Existing trees and other vegetation on the project site will be protected in place to the MEP. A large portion of the site will remain covered in native, drought tolerant plants.**

II. Minimize Impervious Footprint:
   a) Increase building density (number of stories above or below ground) through design of compact and taller structures. **Not applicable; Roselle will be a DG rough graded pad used for storage.**
   b) Construct walkways, trails, patios, overflow parking lots, alleys and other low-traffic areas with permeable surfaces. Such permeable surfaces could include pervious concrete, porous asphalt, unit pavers, etc. **The proposed graded pad will be covered in a pervious surface such as native material, rock, or gravel.**
   c) Construct streets, sidewalks and parking lot aisles to the minimum widths necessary, provided that public safety and a walkable environment for pedestrians are not compromised. **Not applicable to the proposed development.**
   d) Promote the implementation of shared driveways where possible. **Not applicable to the proposed development.**
   e) Design of smaller parking lots with fewer stalls, smaller stalls, more efficient lanes. **Not applicable to the proposed development.**
   f) Design of indoor or underground parking. **Not applicable to the proposed development.**
   g) Minimize the use of impervious surfaces in the landscape design. **Roselle proposes no significant new impervious surfaces.**

III. Disperse Runoff to Adjacent Landscaping and IMPs:
   a) Drain rooftops into adjacent landscaping areas. **Not applicable; no buildings are proposed. Runoff from the proposed mobile trailer will drain to the pervious DG pad.**
   b) Drain impervious parking lots, sidewalks, walkways, trails, and patios into adjacent landscaping areas. **Not applicable; no impervious surfaces are proposed.**
   c) Reduce or eliminate curb and gutters from roadway sections, thus allowing roadway runoff to drain to adjacent pervious areas. **Not applicable; no roads are proposed.**
   d) Detain and retain runoff through the site. On flatter sites, landscaped areas and IMPs can be interspersed among the buildings and pavement areas. On hillside sites, drainage from upper areas may be collected in conventional catch basins and conveyed to landscaped areas and IMPs in lower areas of the site. **No retention and detention will be utilized since project proposes no impervious surfaces.**
   e) Use depressed landscaping areas (Self-Retaining Areas), vegetated buffers, and bioretention areas as amenities and focal points within the site and landscaping design. **Not applicable; project proposes the construction of a rough graded pad. No self-retaining areas or bioretention planters are proposed.**

IV. Design and Implementation of Pervious Surfaces:

a) Consider the implementation of permeable pavements into the site design. Identify locations where permeable pavements, such as turf block, unit pavers, pervious concrete, or pervious asphalt could be substituted for impervious concrete or asphalt paving. The Operations and Maintenance Plan of the site must ensure that permeable pavements will not be sealed in the future. **The Roselle project proposes the use of native material, rock, or gravel as an alternative to impervious paving.**

b) Potential benefits of vegetated or green roofs include lower heating and cooling costs and better sound insulation, in addition to air quality and water quality benefits. For SUSMP compliance purposes, runoff from vegetated roofs requires no further treatment or detention. For more information on vegetated roofs, see www.greenroofs.org. **Not applicable to the proposed development; no permanent buildings are proposed.**

V. Construction Considerations:

a) Minimize soil compaction for landscaped areas of the project site designated for storm water treatment. **Due to the sensitive archaeological nature of the site no landscaped areas are used for treatment.**

b) Implement soil amendments. Landscape topsoil improvements play a significant role in maintaining plant and lawn health. Such soil amendments also improve the soil's capacity to retain moisture, which will reduce runoff from the water quality design storm and improve water quality. **Amendments will be used in proposed landscape planter.**

c) Additional information regarding construction considerations is located in the City of San Diego's LID Design Manual. **Manual is utilized as applicable.**

VI. Additional Considerations:

a) Stabilize the site. Vegetate disturbed soils and slopes with drought tolerant vegetation and stabilize permanent channel crossings. **Drought tolerant plants will be utilized within proposed landscaping.**

b) Convey runoff safely away from the tops of slopes (to prevent slope instability caused by infiltrated runoff. **Runoff will be directed away from slopes.**

c) Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, or channels that discharge to unlined channels in accordance with applicable specifications to reduce the potential for erosion and minimize impacts to receiving waters. **Riprap energy dissipater will be utilized at the outlet of the proposed storm drain where it discharges into Carroll Canyon Creek.**

d) To make the most efficient use of the site and to maximize aesthetic value, integrate IMPs with site landscaping. Many local zoning codes may require landscape setbacks or buffers, or may specify that a minimum portion of the site be landscaped. It may be possible to locate some or all of the site's treatment and flow-control facilities within this same area, or within utility easements or other non-buildable areas. **Not applicable to the proposed development.**

e) Planter boxes and bioretention areas must be level or nearly level all the way around. Bioretention areas configured as swales may be gently sloped in the linear direction, but opposite sides must be at the same elevation. **Not applicable; Roselle proposes no planter boxes or bioretention areas.**

f) For effective, low-maintenance operation, locate facilities so that drainage into and out of the device is by gravity flow. Pumped systems are feasible, but are expensive, require more maintenance, are prone to untimely failure, and can cause mosquito control problems. Most IMPs require 3 feet or more of head. **Not applicable to the proposed development.**

g) If property is being subdivided now or in the future, the facility should be in a common, accessible area. In particular, avoid locating facilities on private residential lots. Even if the facility will serve only one site owner or operator, make sure the facility is located for ready access by inspectors from the City of San Diego and the County of San Diego's vector control department. **Not applicable to the proposed development.**

h) The facility must be accessible to equipment needed for maintenance. Access requirements for maintenance will vary with the type of facility selected. Planter boxes and bioretention areas will typically need access for the same types of equipment used for landscape maintenance. **Not applicable to the proposed development.**

Buffer Measures

A natural buffer zone between the project site and Carroll Canyon Creek will be conserved.

Exhibit "B", at the end of Section 1, illustrates the LID site design features incorporated throughout the project.

5.2 Non-Structural Source Control BMPs

"Source Control BMPs" are land use or site planning practices, or structures that aim to prevent urban runoff pollution by reducing the potential contamination at the source of pollution.

Non-Structural (good housekeeping) BMPs to be implemented by **Roselle** as a means to reduce pollution of storm water runoff as a result of the proposed development are:

Priority Development Project Requirements

I. Maintenance Bays: No maintenance bays are proposed at the **Roselle** project.

II. Vehicle and Equipment Wash Areas: No vehicle and equipment wash areas are proposed at the **Roselle** project.

III. Outdoor Processing Areas: No outdoor processing areas are proposed at the **Roselle** project.

IV. Retail and Non-retail Fueling Areas: No fueling areas are proposed at the **Roselle** project.

V. Steep Hillside Landscaping: The proposed project will not significantly impact steep hillside.

VI. Efficient Irrigation Systems and Landscape Design: No permanent irrigation systems are proposed at the project.

VII. Trash Storage Areas: No trash storage areas are proposed at the project.

VIII. Outdoor Material Storage: Materials with the potential to contaminate urban runoff shall be:

- Placed in an enclosure such as a cabinet, shed, or other structure that prevents contact with rainfall or runoff and prevents spillage to the storm water conveyance system, and
- Protected by secondary containment structures such as berms, dikes, or curbs when the material storage area includes hazardous materials. The storage area shall be paved and sufficiently impervious to contain leaks and spills and be covered by a roof or awning to minimize direct precipitation within the secondary containment area.

IX. Loading Docks: No loading docks are proposed at the **Roselle** project.

X. Integrated Pest Management Principles: Pesticides will be utilized as a last resort at the project site. When deemed necessary, pesticides will be selected and applied in a manner that minimizes risk to human health, the environment, beneficial and non-target organisms. Pest-resistant and well adapted plant varieties will be used in order to minimize the need for pesticides.

XI. Storm Drain Signage:

- Concrete stamping, or approved equivalent method, shall be provided for all storm water conveyance system inlets and catch basins within the project area (not including landscape/pedestrian area drains).
- Language associated with the stamping (e.g., "NO DUMPING – I LIVE DOWNSTREAM") must be to the satisfactory of the City Engineer. Stamping may also be required in Spanish.
- Post signs and prohibitive language (with graphical icons) which prohibit illegal dumping at trailheads, parks, building entrances and public access points along channels and creeks within the project area. **No public access points proposed; site use is anticipated to be a private storage facility.**

XII. Fire Sprinkler System Discharge: No fire sprinkler system is proposed at **Roselle**.

XIII. Manage Air Conditioning Condensate: No air conditioning units are proposed at **Roselle**.

XIV. Use Non-Toxic Roofing Materials Where Feasible: No roofing materials will be used at **Roselle**.

XV. Other Source Control Requirements:

- All disturbed areas not covered in hardscape or buildings will be re-vegetated in conformance with project Landscaping Plans.
- Provide for pet waste collection dispensers where applicable. **Not Applicable at Roselle.**

- Restrict the use of galvanized and copper roofing materials.

XVI. Vehicle/Equipment Maintenance Area:
An area 50ft x 50ft in size will be designated for use as a vehicle and equipment maintenance area (see Exhibit "B" for location). All vehicle and equipment maintenance shall be performed per the California Stormwater BMP Handbook fact sheet NS-10, attached at the end of this section for reference.

All vehicles or equipment used at the site or stored at the site must be kept in a proper state of tune and any leaks must be promptly repaired. Should a vehicle or piece of equipment require service, use of an off-site repair facility is preferred. If use of an off-site facility is not feasible, limited maintenance may be performed at the project site. Minor routine maintenance activities, such as small parts changes and tire repairs, are permitted provided measures to prevent leakage or contamination are taken. Major vehicular maintenance and repairs, such as pulling engines, transmissions, power trains, suspension work, or body work are not permitted. No fluids or materials shall penetrate the site or leak into streets, gutters, storm drains, or into the adjacent environmentally sensitive lands.

During any maintenance activity, precautions must be taken to prevent spills and to ensure containment should any spills occur. Drip pans, plastic sheeting, and/or adsorbent pads shall be used during any vehicle and equipment maintenance work that involves fluids. Ample supplies of spill cleanup materials are to be kept onsite and readily available. If a spill does occur, the following methods shall be used for clean-up:

- Small spills are to be wiped up using dry rags. Used rags are to be disposed of properly.

- Medium spills (those too large to wipe up) are to be contained as soon as possible. Liquids are soaked up using a dry absorbent material such as cat litter. The used absorbent is then swept up and disposed of properly.

- Large spills are to be contained as soon as possible. If the spill is not "double contained" and has the potential to flow into drainage inlets on the project, then the inlets should be temporarily plugged. If the spilled material is hazardous, then contact the Fire Department for a Hazardous Material Response Team.

Waste oil, grease, gas, antifreeze, hydraulic fluid and any other residues from the servicing or cleaning of vehicles or equipment must be disposed of at authorized collection centers. Waste fluid containers are to be kept in leak proof condition.

5.3 Project Infiltration

The proposed project will mitigate pollutants in stormwater runoff to the MEP prior to discharge to the Municipal Storm Drain System. Per the San Diego Municipal Code - Land Development Manual, Storm Water Standards, Table 4-3 - Structural BMP Treatment Control Selection Matrix,

of the most widely used storm water BMPs, infiltration BMPs offer the highest removal efficiencies for the widest range of stormwater pollutants. The graded pad at the project will be covered in a pervious surface such as native material, rock, or gravel so as to maximize the infiltration potential of the project site. The use of infiltration is limited, however, by the characteristics of the soil found at the project site. Based on the Hydrologic Soils Group Map found in Appendix A of the San Diego County Hydrology Manual, dated June 2003, the site appears to be dominated by Type D clay soils. As a result of the type D soils, in combination with the sensitive archaeological resources at the site, infiltration BMPs will not be relied upon for treatment.

5.4 Structural Treatment Control BMPs

"Treatment Control BMPs" are any engineered systems designed and constructed to remove pollutants from urban runoff.

As stated in Section 3.3, potential pollutants anticipated to be generated at **Roselle** are sediments, heavy metals, trash and debris, and oil and grease. The primary pollutants of concern at the project are sediments and heavy metals. As discussed in Sections 5.1 and 5.2, the proposed project will utilize LID Site Design and Source Control BMPs to reduce the quantity of pollutants generated. Not all pollutants can be eliminated however, so treatment control BMPs will need to be used to remove pollutants from storm water runoff.

Per Section 5.3, although the infiltration potential of the project site will be maximized, infiltration will not be relied upon for treatment. It is anticipated that clay soils at the project will limit the effectiveness of infiltration for use as a BMP. As a result, structural treatment methods will be needed. Table 4-3 – Structural BMP Treatment Control Selection Matrix, in the San Diego Municipal Code - Land Development Manual, Storm Water Standards, lists the most widely used treatment control BMPs, and their respective removal efficiencies. A catch basin insert was chosen for use at the site after taking into account several important factors. The most critical factor considered is impact into the native ground; the BMP should require as minimal of an impact as possible into the sensitive archaeological resources at the project site. Most structural treatment devices (vortex separators, wet vaults, etc.) require large structures separate from the inlet structure, which would potentially result in excessive impacts into the archaeological resources. Also, those devices maintain a pool of standing water within them, and given the close proximity of the site to Carroll Canyon Creek, would likely have vector problems. Another important factor considered is the pollutant loading anticipated at the device. Given that the proposed pad will be used primarily for storage, with relatively few vehicles entering and leaving the site on a regular basis, the amount of pollutants generated by the site should be very minimal. Taking into consideration all of these factors, and given the results of the studies discussed below, it has been determined that a catch basin insert with hydrocarbon boom is the most appropriate BMP for use at the project site.

I. CATCH BASIN INLET FILTER (BIO-CLEAN) -

Storm drain inserts are a cost effective solution for treating storm water runoff prior to release to the public storm drain system. Although Table 4-3 – Structural BMP Treatment Control Selection Matrix, in the City of San Diego Storm Water Standards Manual, indicates that storm drain inserts provide low levels of pollutant removal for all pollutants except trash, current Best Available Technology (BAT) in catch basin inserts, utilizing Suntree Technologies' (Bio-Clean) "Grate Inlet Skimmer Box" with "Bio-Sorb"

hydrocarbon adsorbing booms, have been shown to be effective in removing a wide range of pollutants. A study prepared by Creech Engineers, Inc. titled, "Pollutant Removal Testing for a Suntree Technologies Grate Inlet Skimmer Box", dated November 2001, found that the Grate Inlet Skimmer Box has a removal efficiency of 79.3% for grass clippings, and 73.3% for sediment. Plant clippings and leaves are likely to be the most common oxygen demanding substance, and source of nutrients and pesticides, found at the project. An additional study, prepared by the City of El Monte, dated November 2002, found Bio-Clean filters to be effective in removing heavy metals and oil & grease. The study was a real-world analysis of a storm drain inlet fitted with a Bio-Clean filter. The study analyzed a sample of storm water runoff at the storm drain inlet prior to the installation of the filter, and then analyzed effluent water samples after one week, three weeks, and five weeks of having the Bio-Clean filter installed. Heavy metals and oil & grease concentrations were reduced by up to 95% by the Bio-Clean filter. Another study, prepared by the University of Hawaii, titled, "The Efficiency of Storm Drain Filters in Removing Pollutants from Urban Road Runoff", dated March 2004, analyzed the effectiveness of four of the most popular storm drain inserts, including the Bio-Clean Grate Inlet Skimmer Box, and found the Bio-Clean filter to be the most promising for wide spread use in Honolulu. They came to this conclusion after performing a multi-year, three phase study of the inserts, and taking into account several factors, including cost and ease of maintenance. The Creech Engineers, Inc. and City of El Monte studies, and an excerpt from the University of Hawaii study, are included at the end of this section.

Storm Drain inserts treat "first flush" (Qff) minor storms and allow bypass of the filter for large storm events. Additionally, inlet filters remove hydrocarbons, oil, and petroleum products and assist in further removal of heavy metals which may escape non-structural good housekeeping practices, thus removing pollutants from public roadway runoff prior to release into the Municipal Storm Drain to the MEP.

- Design Criteria:

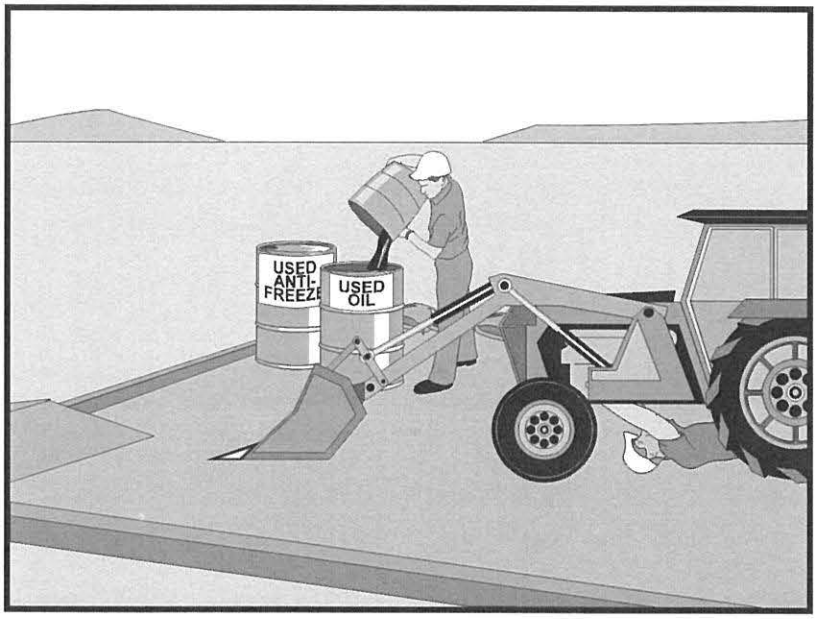
  a) One catch basin insert will be utilized at the project. The area tributary to the filter is approximately 1.18 acres. The filter will contain a "Bio-Sorb Oil Absorbing Polymer Boom". Manufacturer's Specifications for the catch basin insert shows a filtration capacity of 6.3 cfs for the fine mesh screen on a 24" x 24" insert.

  b) Based upon County of San Diego, Storm Water Standards, flow based BMPs are required to treat runoff from a storm with an intensity of 0.2 in/hr. Therefore, the water quality treatment flow rate for the proposed pad is approximately 0.12 cfs (Qff= 0.50(0.2in/hr)(1.18) = 0.12 cfs).

  c) Given that the treatment capacity of the catch basin insert is approximately 6.3 cfs, and the required water quality treatment flow rate is approximately 0.12 cfs, the proposed storm drain insert is capable of treating project runoff from the proposed pad with excess capacity.

Manufacturer's Specifications are provided in Section 8

Vehicle & Equipment Maintenance NS-10



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	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

None

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Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8,

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Vehicle and Equipment Cleaning, and NS-9, Vehicle and Equipment Fueling.

Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runon and runoff, and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.

- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

Safer Alternative Products

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an "environmentally friendly" label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

Recycling and Disposal

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like,-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Costs

All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

SECTION 6

MAINTENANCE CONDITIONS

6.1 Permanent Treatment BMP Maintenance Mechanisms

Permanent storm water requirements will be incorporated into the project design and shown on plans. The project owner will enter into a permanent BMP maintenance agreement with the City of San Diego obliging the Owner to maintain, repair and replace storm water BMPs as necessary into perpetuity. A security may be collected, at the discretion of the City of San Diego, in order to ensure proper maintenance of the BMPs. This agreement will be transferred to any future owners of the property.

"The permittee or designee shall incorporate any construction best management practices (BMPs) necessary to comply with Chapter 14, Article 2, Division 1 (Grading Regulations) of the Land Development Code, into the construction plans and/or specifications, satisfactory to the City Engineer, prior to the issuance of any construction permits."

6.2 Permanent Treatment BMP Maintenance Program

The Owner is ultimately responsible for BMP maintenance, repair, and replacement as necessary into perpetuity.

A. CATCH BASIN INSERT

I. SCHEDULE: Bio-Clean Inspection quarterly, weekly during extended periods of wet weather, and after every significant rainfall event (greater than 0.75 inches reported for the local community). Annual replacement of hydrocarbon adsorbent boom.

II. MAINTENANCE: removal of debris and replacement of hydrocarbon adsorbent boom, if necessary

III. ESTIMATED ANNUAL COST : To be determined

NOTE: The Maintenance schedule recommended by the manufacturer varies dependant on the site as well as the maturation of the site. As a result the manufacture will be contacted and recommendations adopted. Contact: BIO CLEAN ENVIRONMENTAL SERVICES, Incorporated at 760-433-7640

SECTION 7

SUMMARY/CONCLUSIONS

This **WQTR** fulfills **Roselle's** requirement to comply with the City of San Diego's Storm Water Standard's permanent and construction storm water BMP requirements, to the Maximum Extent Practicable, including the Model SUSMP, for new development projects in the City of San Diego.

A summary of the facts and findings associated with this project and the measures addressed by this **Roselle** is as follows:

- The beneficial uses for the receiving waters have been identified. None of these beneficial uses will be impaired or diminished further due to the construction and operation of this project.
- **Roselle** will not significantly alter drainage patterns on the site.
- Slopes will be landscaped to reduce or eliminate sediment generation.
- The proposed post-construction BMPs address mitigation measures to protect water quality and protection of water quality objectives and beneficial uses to the maximum extent practicable.

This **WQTR** 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 the following design, recommendations, conclusions, and decisions are based. The selection, sizing, and design of stormwater treatment and other control measures in this report meet the requirements of Regional Water Quality Control Board Order R9-2007-0001 and subsequent amendments.

MARK E. STEVENS
R.C.E. 35502

6/22/15
DATE

SECTION 8

STRUCTURAL BMP DATA

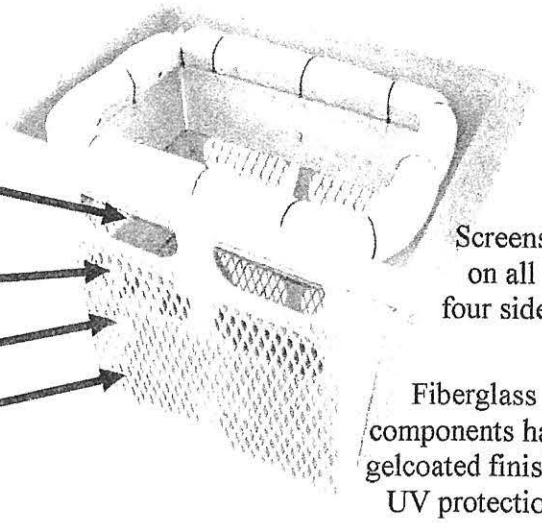
1. Bio-Clean Catch Basin Insert

Multi-Stage Filtation

Screens of Different Sieve Sizes Optimize Filtration And Water Flow

Grate Inlet Skimmer Box Special Features

- Bypass Opening
- Stainless Steel Screen
- Coarse Sieve Size Screen
- Medium Sieve Size Screen
- Fine Sieve Size Screen
  (Fine sieve size screen also on bottom)

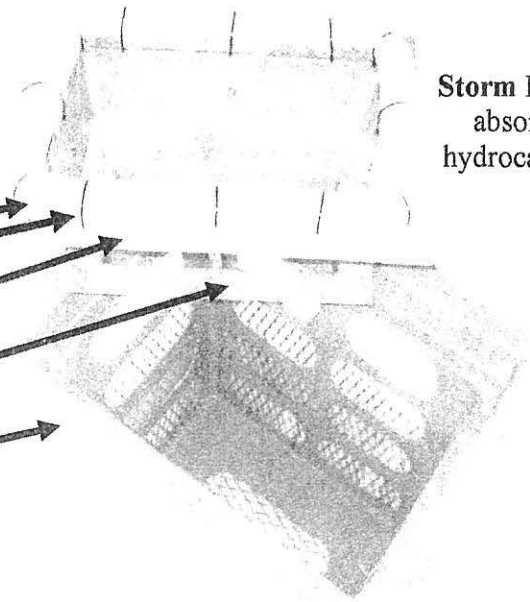


Screens on all four sides

Fiberglass components have gelcoated finish + UV protection

Interior Components are Easily Removed to Allow Easy Access to Lower Filtration Chamber

- Storm Boom
- Zip Tie
- Skimmer Tray
- Deflection Shield
- Flange is Reinforced with Knitted 1808±45° biaxial fiberglass



Storm Boom absorbs hydrocarbon

Built Strong To Last!

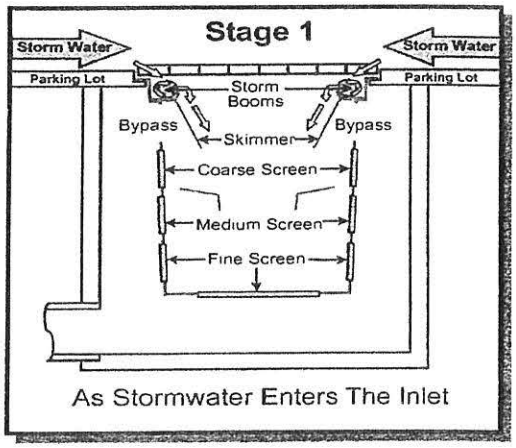
BIO CLEAN
ENVIRONMENTAL SERVICES, INC.™

Manufactured by Suntree Technologies

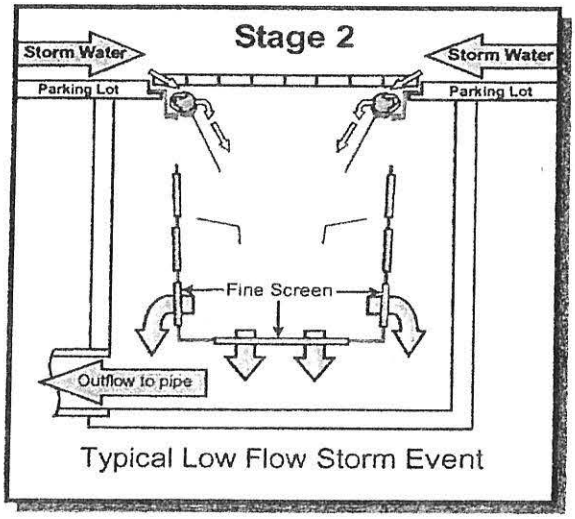
Grate Inlet Skimmer Box—Functional Description

Multi-Stage Filtration Utilizes Screens Of Different Sieve Sizes Optimize Filtration And Water Flow

Stage 1: As Stormwater enters the inlet through the grate it comes in contact with and passes through a ***Storm Boom*** located around the top perimeter of the ***Grate Inlet Skimmer Box.*** After making contact with the ***Strom Boom,*** the stromwater flows down into the lower filtration chamber which is equipped with 3 different sieve size filtration screens and bypass openings.



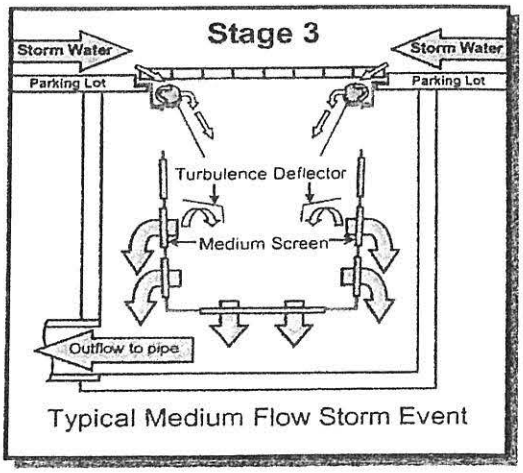
As Stormwater Enters The Inlet



Typical Low Flow Storm Event

Stage 2: Throughout the entire storm event, stormwater continues to come in contact with the ***Storm Boom*** and then flow into the lower filtration chamber, adjacent to the fine sieve size screens. The fines sieve size screens are sized to be able to capture sediments such as sand, clay, phosphates, etc. A sand filter quickly forms across the bottom which has the potential to capture the finest of particles.

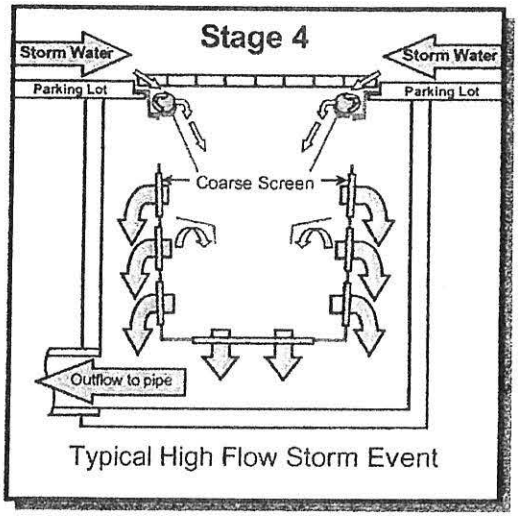
Stage 3: As the storm event increases in intensity the water level in the ***Grate Inlet Skimmer Box*** rises to a level adjacent to the medium sieve size screens and the *turbulence deflector.* The medium screen provides additional flow with less chance of obstruction than the fine screen. The *turbulence deflector* dramatically reduces the turbulence in the lower filtration chamber, which allows sediment to continue to settle, without re-suspending sediment that has previously been captured



Typical Medium Flow Storm Event

BIO CLEAN
ENVIRONMENTAL SERVICES, INC.™

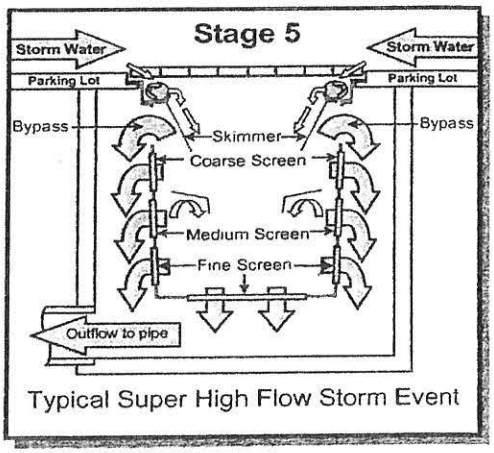
Stage 4: As the storm event increases in intensity to that of high flow storm event, the water level in the ***Grate Inlet Skimmer Box*** rises to a level adjacent to the coarse sieve size screen above *turbulence deflector.*



Typical High Flow Storm Event

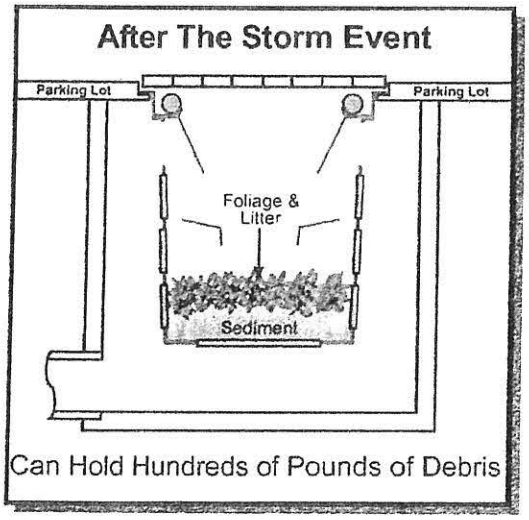
The coarse screen provides additional filtered flow with less chance for obstruction than either the medium or fine screen. The coarse screen is sized to capture floatables like foliage and litter. At this stage water is flowing through all the different sieve size screens, the *turbulence deflector* continues to dramatically reduce the turbulence in the lower filtration chamber, and sediments continues to settle and collect towards the bottom.

Stage 5: If the storm event creates an extremely high flow rate into the inlet which exceeds the flow through all screens, the water flow can bypass filtration screens through skimmer protected bypass opening near the top of the ***Grate Inlet Skimmer Box.*** As water flows through the bypass openings, it also continues to flow through all the other screens. Storm events that produce such high flow rates are rare and typically don't last very long.



Typical Super High Flow Storm Event

Drains Dry After Every Storm Event



Can Hold Hundreds of Pounds of Debris

After The Storm Event: The stormwater drains completely out of the ***Grate Inlet Skimmer Box*** after the storm event. The debris collected in the unit is stored in a dry state which helps to contain the nutrient pollutant load, prevents mosquitoes from breeding in the unit. After each storm event more debris is collected, which can ultimately weigh many hundreds of pounds.

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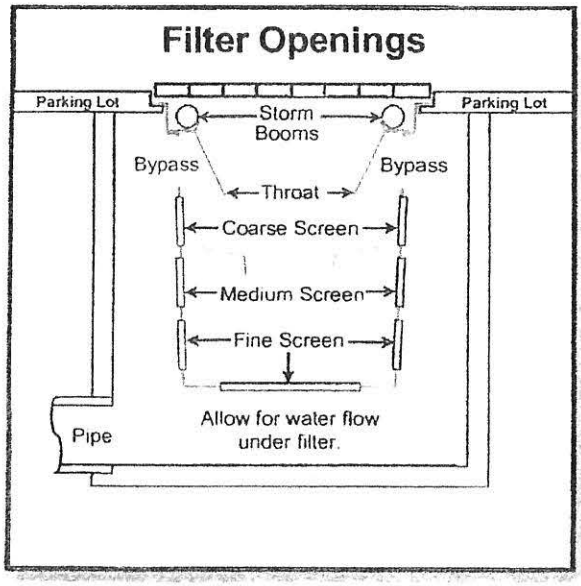
ENVIRONMENTAL SERVICES, INC.™

Grate Inlet Skimmer Box - Sizing and Flow Rates



The **maximum flow rate of a** *Grate Inlet Skimmer Box* is determined by the amount of flow that can pass through the throat, the exception is found only in very large units.

To determine the **minimum flow rate** of a **Grate Inlet Skimmer Box**, consider only the potential flow through the throat and bypass. If the potential flow through the throat is less than the potential flow through the by-pass, then the throat determines the minimum flow. If the potential water flow through the bypass is less than that of the throat, then the bypass determines the minimum flow. **Filtered Flow** represents the potential flow rate through all screens, and does not include the potential flow through the bypass. Water bypass happens only when the flow rate through the grate exceeds the flow all the screens.

Flow Rate Table For 8 different Models

	Dimensions of the flange around the top of the Grate Inlet Skimmer Box			Flow Rate (cubic feet per second)		
Model Number	Width (inches)	Length (inches)	Depth (inches)	Throat	Filtered Flow	Bypass Flow
GISB-I-24-24-25	24	24	25	4.4	14.9	6.7
GISB-A-24-37-25	24	37	25	10.2	21.1	8.7
GISB-C-28-37-25	28	37	25	12.2	19.4	7.4
GISB-J-24-41-25	24	41	25	12	24.6	10
GISB-NK-32-32-25	32	32	25	12.5	19.1	10.3
GISB-36-36-25	36	36	25	18.8	23.4	13.4
GISB-D-36-48-18	36	48	18	33.2	26.3	13.3
GISB-G-52-58-18	52	58	18	89.3	40.1	25

- The yellow blocks represent the minimum flow rates.
- Filtered flow is based on unobstructed screens.

Custom Sizes No Problem

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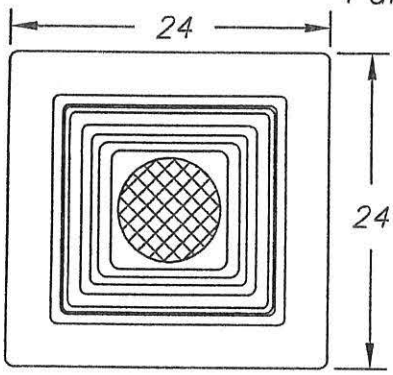
Part # GISB-24-24-24

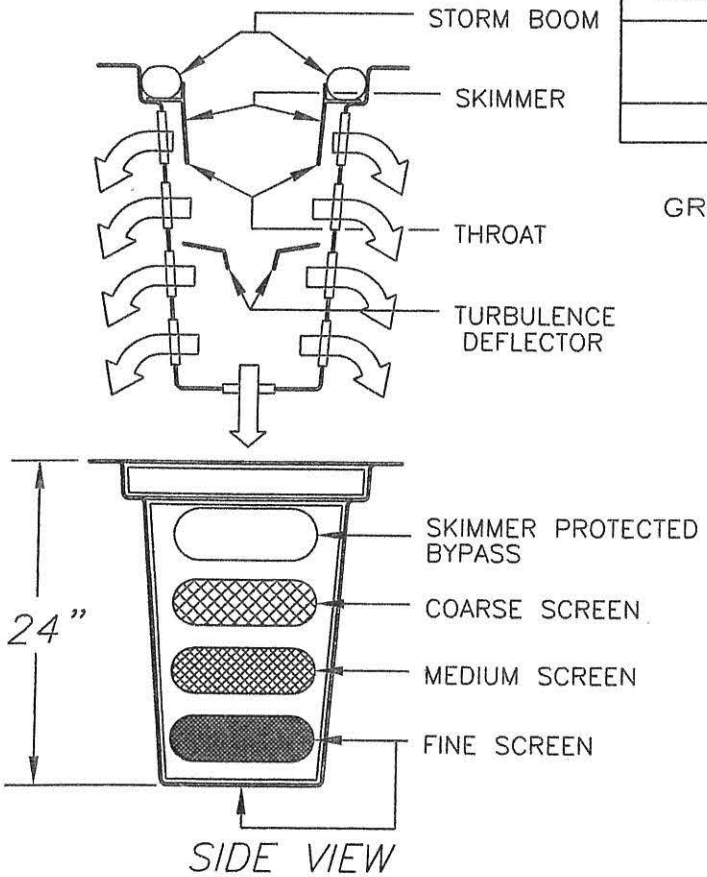


TOP VIEW

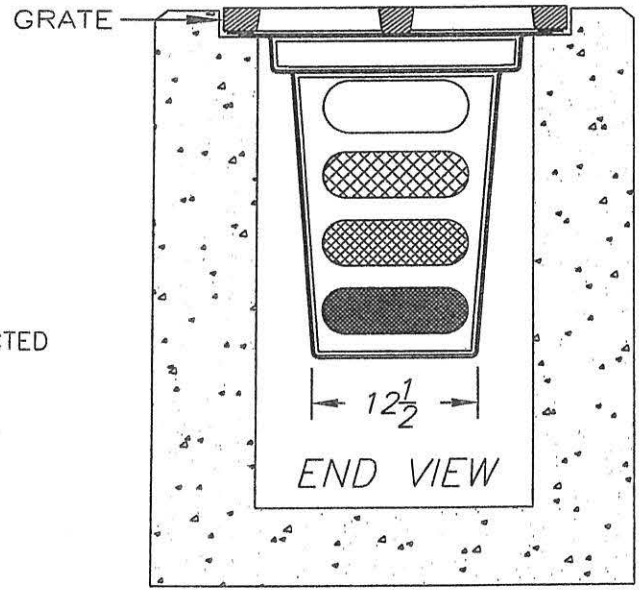
Flow Specifications

Description of filter opening	Percent Open (Based on Screen Dimensions)	Total Square Inches per Unit	Square Inches of Total Unobstructed Openings	Flow Rate (Cubic Feet per Second)
Skimmer protected By-Pass	100%	162.3	162.3	6.7 cfs
Coarse Screen 3/4" x 1-3/4" stainless steel flattened expanded	62%	143.5	89.0	4.3cfs
Medium Screen 10x10 mesh stainless steel	56%	143.5	80.4	4.3cfs
Fine screen 14 x 18 mesh stainless steel	68%	156.1	106.1	6.3cfs
THROAT FLOW RATE Total: 4.4 cfs			TREATED FLOW RATE Total: 14.9cfs	
FLOW RATES BASED ON UNOBSTRUCTED OPENINGS				

FLOW SCHEMATIC



SIDE VIEW



END VIEW

CONCRETE STRUCTURE

BOX MANUFACTURED FROM MARINE GRADE FIBERGLASS & GEL COATED FOR UV PROTECTION

REMOVE GRATE
INSERT GISB
REINSTALL GRATE

5 YEAR MANUFACTURERS WARRANTY

PATENTED

ALL FILTER SCREENS ARE STAINLESS STEEL

EXCLUSIVE CALIFORNIA DISTRIBUTOR:
BIO CLEAN ENVIRONMENTAL SERVICE
P.O. BOX 869, OCEANSIDE, CA. 92049
TEL. 760-433-7640 FAX: 760-433-3176
Email: info@biocleanenvironmental.net

SUNTREE QUALITY PRODUCTS ARE BUILT FOR EASY CLEANING AND ARE DESIGNED TO BE PERMANENT INFRASTRUCTURE AND SHOULD LAST FOR DECADES.

SUNTREE TECHNOLOGIES
798 CLEARLAKE RD. SUITE #2
COCOA FL. 32922
TEL. 321-637-7552 FAX 321-637-7554

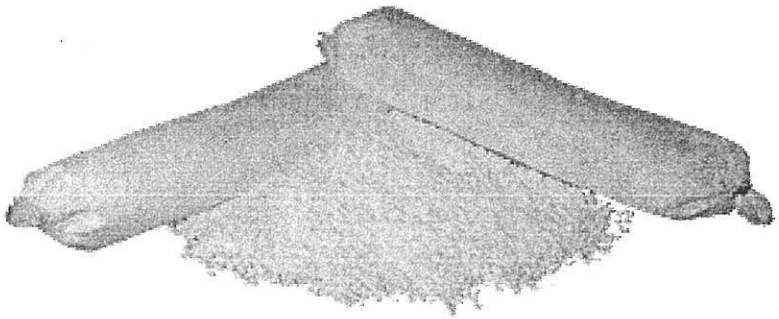
GRATE INLET SKIMMER BOX
GISB-24-24-24

DATE: 05/20/04 | SCALE: SF = 15

DRAFTER: N.R.B. | UNITS = INCHES

PROJECT:	
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:
REVISIONS:	DATE:

Bio-Sorb



Oil Absorbing Polymers

Our Bio-Sorb oil absorbing polymers are uniquely formulated to clean up...

- Spills
- Chemical Spills
- Fuel Oil Spills
- Diesel Oil Spills

Control and absorb oil and hydrocarbons on any surface – including water

- Control oil spills and slicks in harbor and dock areas
- Control oil contamination in municipal run-off
- Remove oil contamination from plant process water
- Clean-up fuel spills on highways
- Absorb hydrocarbon vapors and fumes

	TIME (seconds)	% Uptake	C
0	0.00	0.0000	
1	30.0	104.00	
2	60.0	107.00	
3	120	128.00	
4	180	155.00	
5	240	164.00	
6	300	188.00	

How Are Bio-Sorb Oil Absorbing Polymers Unique?

Bio-Sorb oil absorbing polymers function by first attracting hydrocarbons to the surface of the polymer to adsorb the liquid, followed immediately by internally absorbing the media into its structure. Bio-Sorb oil absorbing polymers will not absorb water, which lends the material a unique usefulness for separating and collecting hydrocarbons from water mixtures. Most notably, the polymer can commonly absorb from 20% to 200% or more of its own weight of chemical or petroleum derived liquids. Furthermore, because of the unique absorption characteristic of the material, Bio-Sorb becomes dry to the touch shortly after sorption.

For What Applications May Biosorb Oil Absorbing Polymers be Useful?

Potential applications for Bio-Sorb hydrocarbon absorbing materials are numerous as a result of their unique nature. One can imagine applications for commercial, industrial, defense and ecological markets.

- Stormwater Filters
- Concentrate Carrier Material for Liquid Additives
- Removing Oil or Chemicals from Contaminated Water Streams or Water/Soil Slurries
- Industrial Work Area Collection Mats
- Spill Containment and Collection
- Odor Barrier/Collector for Flavor Oils and Fragrances
- Collection of Volatile Organic Compounds (VOC's)
- Many Others

BIO CLEAN
ENVIRONMENTAL SERVICES, INC.

P.O. BOX 869
OCEANSIDE, CA
www.biocleanenviornmental.net
PHONE: 760.433.7640
FAX: 760.433.3176

Grate Inlet Skimmer Box - Removal Efficiencies

Numeric Reductions (mg/L)

	Total Suspended Solids mg/L			Total Phosphorus mg/L			Total Nitrogen mg/L		
Location	Inlet	Outlet	Removal Efficiency	Inlet	Outlet	Removal Efficiency	Inlet	Outlet	Removal Efficiency
Site Evaluation - Reedy Creek			74%			67%	24.3	10.4	57%
Creech Engineering Report			73%			79%			79%
Witman's Pond	978	329	66%	16.6	0.452	98%	48.08	9.86	79%
UC Irvine			53%						

	Zinc mg/L			Lead mg/L			Copper mg/L		
Location	Inlet	Outlet	Removal Efficiency	Inlet	Outlet	Removal Efficiency	Inlet	Outlet	Removal Efficiency
UC Irvine			11%			99%			
Longo Toyota	13.7	0.73	95%	1.5	0.2	87%	1.9	0.1	95%

	Ammonia, Salicylate mg/L			Fecal Coliform CFU/100 mL			Cadmium		
Location	Inlet	Outlet	Removal Efficiency	Inlet	Outlet	Removal Efficiency	Inlet	Outlet	Removal Efficiency
Site Evaluation - Reedy Creek	0.38	0.23	39%						
UC Irvine						33%			94%

	Hydrocarbons mg/L			COD (mg/L)		
Location	Inlet	Outlet	Removal Efficiency	Inlet	Outlet	Removal Efficiency
Site Evaluation - Reedy Creek			54%	2670	1490	44%
Witman's Pond	110	50	55%			
UC Irvine			90%			
Longo Toyota	199	10.43	95%			

Reedy Creek - Site Evaluation of a Grate Inlet Skimmer Box for Debris, Sediment, and Oil & Grease Removal - 1999 - Independent Test
Creech Engineering Report - Pollutant Removal Testing for a Grate Inlet Skimmer Box - 2001
Witman's Pond - Restoration Project - Massachusetts Dept of Environmental Management - 1998 - Independent Test
UC Irvine - Optimization of Stormwater Filtration at the Urban/Watershed Interface - Dept of Environmental Health - 2005 - Independent Test
Longo Toyota - Field Test - City of El Monte - 2002 - Independent Test

POLLUTANT REMOVAL TESTING FOR A SUNTREE TECHNOLOGIES GRATE INLET SKIMMER BOX

Prepared for

Suntree Technologies, Inc.

November 2001

CEI Project #21121.00

Prepared By:

11-13-01

CREECH ENGINEERS, INC.
CIVILIZATION ENGINEERED

4450 W. Eau Gallie Blvd., Ste. 232
Melbourne, FL 32934
(321) 255-5434

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Pollutant Removal Testing for a Suntree Technologies Grate Inlet Skimmer Box

by
Creech Engineers, Inc.

November 2001

With special thanks to Joanie Regan of the Cocoa Beach Stormwater Utility

Background:

Over the last several years, a number of BMPs have been developed to provide stormwater treatment by trapping pollutants and debris in inlets. Inlet trap BMPs are quasi source controls, being inexpensive, requiring no roadway construction or utility relocation, and keeping pollutants out of the water bodies, rather than trying to remove the pollutants from the water once it is contaminated. Suntree Technologies, of Cape Canaveral, Florida commissioned Creech Engineers, Inc. and Universal Engineering to perform testing on a Grate Inlet Skimmer Box (GISB) to determine its pollutant removal effectiveness for sediment and grass clippings. The testing was performed on September 26, 2001. Attached are photographs from the test and the accompanying report by Universal Engineering Sciences.

The GISB is designed to trap sediment, grass, leaves, organic debris, floating trash, and hydrocarbons as they enter a grated inlet, thereby preventing these pollutants from entering the stormdrain system where they would cause detrimental impacts on downstream waterbodies. The GISB is a 3/16" thick fiberglass device custom made to fit most types of grated inlets. The overflow capacity of the GISB is designed to be greater than the curb grate capacity, thereby insuring that there will be no loss of hydraulic capacity due to the device being inside the inlet. The bottom of the GISB is designed to be above any pipes entering or leaving the inlet so that flow through the inlet is not blocked.

Water flowing through the grate first encounters a hydrocarbon absorbing cellulose. This boom also serves to trap large debris between the boom and the body of the GISB. At the bottom of the trap are a series of stainless steel filter screens covering 3.5 inch wide cutouts in the fiberglass body. These screens trap debris while allowing water to pass through the bottom of the body and out to the storm drain system. The screens in the floor and first vertical row of the GISB are fine mesh. The second vertical row of screens are medium mesh and the highest row are coarse mesh. On the outside of the cutouts the screens are backed by stainless diamond plate to provide support to the screens since heavy loads of debris build up in the box. If the flow rate through the inlet exceeds the capacity of the filter screens there is another row of overflow holes cut out with no screens. These overflow holes allow water to pass through the GISB even if it becomes full of debris. The level of the holes is above the bottom of the top tray, enabling the tray to act as a skimmer to prevent floating trash from escaping through the overflow holes.

About halfway down the box is a diffuser plate to minimize resuspension of trapped sediment.

Inlet traps such as these are generally designed to capture hydrocarbons, sediment, and floating debris. There is generally a large build up of grass, leaves, and yard debris in the GISBs; which represent a source of nutrients, which do not enter the waterbodies. Royal and England, 1999, determined that leaves and grass leach most of their nutrients into the water within 24-72 hours after being submerged in water. GISBs are designed to keep captured debris in a dry state, off the bottom of the inlet, thus preventing phosphates and nitrates from leaching into the stormdrain system, where much more expensive BMPs would be required to remove the dissolved nutrients.

Methodology:

A test was designed to simulate a rainfall event and measure the ability of a GISB to remove sediment and grass leaves from a typical grated inlet at 600 South Brevard Ave., Cocoa Beach, Florida. Joanie Regan of the Cocoa Beach Stormwater Utility provided this location for the test, as well as a water truck to flush the curbs. Universal Engineering Sciences performed the testing, measurements, and sediment sampling. Creech Engineering, Inc. observed the testing.

The City has installed a number of these devices and Joanie indicated this location was typical of a normal installation. The grate, curb, and gutter around and upstream of the inlet were brushed and washed clean. A new, clean GISB was placed inside the inlet. A water truck with a pump discharged reuse water into the gutter upstream of the inlet at a rate of 500 gpm (1.1 cfs). Dry, green St. Augustine grass clippings from a yard that had been recently fertilized were slowly fed into the gutter and flushed into the inlet. It was observed that the cast iron grate trapped a significant amount of grass around the edges of the grate. The grate was removed for all tests to enable all of the grass and sediment to enter the box. After all of a measured sample of grass had been washed into the inlet, the grass was removed from the inlet, dried, and weighed. Samples of grass before and after the test were sent to PC&B Laboratories in Oviedo, Florida. Laboratory analysis was performed to determine the Total Phosphorus and TKN content of the grass.

Next, a sediment sample was washed through the GISB using the same methodology. Universal Engineering ran a sieve size analysis, using ASTM D 422 procedures, before and after the test. The sediment was classified as a poorly graded gravely sand. The sediment was removed from the GISB, dried, and weighed.

Results:

During both of the tests, all water leaving the GISB passed through the filter screens. The water levels in the box only rose a few inches, with no water passing through the overflow holes or coarse screens, even though the bottom screens were completely covered with grass or sediment. There was a small amount of grass and sediment that passed between the box and the concrete walls of the inlet because of the uneven edges of

the inlet. This situation is fairly common in most inlets due to loose tolerances in construction techniques.

In the grass test, 6.58 lbs. of grass were washed into the inlet and 5.22 lbs. were captured, resulting in 1.36 lbs. of grass passing through the GISB. This represents a removal efficiency of 79.3%. The pretest grass sample had a Total Phosphorus content of 950 mg/kg and a TKN content of 510 mg/kg. The grass sample removed from the GISB had a Total Phosphorus content of 2,270 mg/kg and TKN content of 905 mg/kg.

The sediment test was a little more complex. The initial results showed that of the 57.87 lbs. of sediment introduced to the GISB, 42.41 lbs. were captured, giving a total mass removal efficiency of 73.3%. Universal Engineering indicates that the Pretest sample had 10.7 % gravel, 88.0% sand, and 1.4% clay. The Post test sample had 25.9% gravel, 14.7% sand, and 1.7% clay. Gravel is considered to be particles No.4 and larger. Silt and clay is defined as particles passing the No. 200 sieve.

Table 1
Sediment Sieve Analysis

Sieve Size	3/8"	No. 4	No. 10	No. 40	No. 60	No. 100	No. 200
PreTest % Passing	94.3	89.3	81.8	64.8	50.3	25.5	1.4
Post Test % Passing	88.8	74.1	62.6	44.2	31.8	14.7	1.7
Difference	5.5	15.2	19.2	20.6	18.5	10.8	-0.3

Conclusions:

At the flow rate tested, the GISB removed 79.3% of the grass clippings washed into it. The ability of the GISB to remove grass during large flows when water passes through the bypass holes was not tested. In Florida, 90% of the storms are low rainfall events of 1" or less, resulting in low flows similar to the test conditions. This makes the GISB a very effective BMP for Low flow events. It is unknown how effectively the GISB works in large storm events.

By keeping grass and other trapped organic debris in a dry state, the nutrients in the debris do not leach out and become dissolved nitrates and phosphates. The GISB is a very effective BMP for preventing nutrients from organic debris from entering waterbodies. The significant increase in nutrient concentration after the test is probably attributed to the use of wastewater reuse water during the test. The grass matted several inches thick in the bottom of the box. This thick layer could have acted as a filter to remove nutrients from the water source.

At the flow rate of 1.1 cfs, the GISB had a sediment removal efficiency of 73.3%. As would be expected, most of the trapped sediment was gravel and sand, with little fine material collected. The GISB has sediment removal capabilities rivaling those found in many structural BMPs, at a fraction of the cost, and without disruptive construction.

Environmental Laboratories, Inc.

10926 Rush St., Suite A-168 • South El Monte, CA 91733 • Tel: (626) 575-5137 • Fax: (626) 575-7467

02 DEC 2 AM 10:08

Client: CITY OF EL MONTE
PUBLIC WORKS/ENGINEERING DEPARTMENT
11333 Valley Boulevard
El Monte, CA 91731-3293

Report based on Analyses Results.

The city of El Monte provided ABN Environmental Laboratories, Inc. with four runoff samples which were collected from Longo Toyota. Only one sample was collected before filtration and three samples were collected after filtration. Three samples (after filtration) were collected on three separate dates. All four samples were tested for metals, oil & grease, and MBAS (soap)

Based on the analyses results, the following can be deduced:

The filtration is efficient in retaining the tested metals as well as oil & grease. However, filtration is unable to retain MBAS (soap) as indicated by the test results. This report is prepared based on limited runoff samples.

Respectfully submitted,

Fredrick Bet-Pera, Ph. D.
Laboratory Director

Jacob (Hacop) Nercessian
Technical Director

LAB TEST RESULTS-RUNOFF WATER SAMPLES
COLLECTED AT LONGO TOYOTA
BETWEEN 09/23/02 AND 11/07/02
(BIO CLEAN FILTERS)
TESTING BY **ABN ENV. LABS.**, SOUTH EL MONTE, CA

No.	POLLUTANT	DETECTION LIMIT	TEST 1 NO FILTER	TEST 2 AFTER 1 WEEK W/FILTER	TEST 3 AFTER 3 WEEKS W/FILTER	TEST 4 AFTER 5 WEEKS W/FILTER
		mg/l	mg/l	mg/l	mg/l	mg/l
1	OIL & GREASE	2.70	199.00	< 2.7	20.00	8.60
2	SOAP	17.00	102.00	165.00	151.00	106.00
3	CHROMIUM	0.05	0.47	< 0.05	< 0.05	< 0.05
4	LEAD	0.10	1.50	0.40	< 0.10	< 0.10
5	COPPER	0.05	1.90	0.13	0.06	0.11
6	IRON	0.05	216.00	3.70	1.93	1.25
7	ALUMINUM	0.20	103.00	1.99	1.20	0.80
8	ZINC	0.10	13.70	1.10	0.34	0.76
9	NICKEL	0.10	0.70	0.30	< 0.10	0.15

The Efficiency of Storm Drain Filters in Removing Pollutants from Urban Road Runoff

Phase 3 and Final Report

March 2004

Prepared for:
The City and County of Honolulu
Department of Environmental Services
650 South King Street 3rd Floor
Honolulu, Hawaii 96813

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Honolulu, Hawaii 96822

In consultation with
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615 Piikoi Street, #1605
Honolulu, Hawaii 96814

Overall Summary and Performance Evaluation Matrix

As part of the overall study, four neighborhoods with different land use within urban Honolulu were evaluated with respect to the conditions of streets and roadways with emphasis on material that might enter the storm drain system during storm and/or "nuisance" runoff. The quantity and quality of RDS, the abundance of oil and grease on the pavement and of gross litter near and adjoining storm drain inlets/catch basins were determined through a series of surveys. Conditions on land adjoining the surveyed storm drain inlets as well as traffic density were also examined. Not surprisingly, it was found that the quality of RDS deteriorates from neighborhoods that are comprised primarily of single-family homes with yards (e.g., upper Manoa) through high-density multi-family areas (e.g., Makiki) to commercial/light industrial (e.g., Kakaako). On average RDS from Kakaako displayed the highest heavy metal concentrations. The abundance of RDS, however, does not seem to depend on land use, as RDS was found to be abundant near almost all the storm drain inlets examined throughout the four neighborhoods. This finding is consistent with observations by the C&CH Roads Division who, according to DES staff, state that street sweepers always come back full, regardless of how long it has been between episodes of street sweeping. Clearly street sweeping is a beneficial practice, as it removes RDS that is most readily transported into the storm drain system and can contribute to heavy metal pollution in sediments of receiving waters. Street sweeping also targets other materials such as vegetative debris that can also contribute to degraded water quality (i.e., high BOD) in receiving waters, not to mention potentially clog the storm drain system.

Vegetative debris was generally found to be more abundant in residential neighborhoods than in commercial/light industrial areas. Certain streets, however, are particularly prone to the accumulation of vegetative debris, largely as a function of the abundance of trees lining the particular city streets.

Abundances of gross litter and rubbish vary considerably within any given neighborhood. There does not seem to be a strong correlation between land use and the abundance of gross rubbish, although greater amounts of rubbish are often observed in the immediate proximity of small businesses, particularly fast-food establishments, "mini-marts" or convenience stores.

This study also researched the commercially available DII devices that can readily be retrofitted into existing catch basins. Many systems exist, although many challenges exist

including but not limited to costs (both initial and maintenance), the need for modifications to the catch basin, and size constraints, which limit the pool of devices that are potentially suitable for large-scale implementation. A variety of large systems that require specific construction were also identified but not deemed appropriate for this study. Four DII systems were subsequently selected from those deemed potentially suitable for large-scale retrofit installations and their performance was evaluated through short- and long-term field studies.

The performance of the four DII systems that were field-tested varied considerably. Each system has characteristics that provide advantages in terms of target pollutants. Each system also exhibits considerable differences in terms of initial costs of the DII installation as well as maintenance/servicing costs. The latter typically depend on replacement costs of filter media (e.g., Kristar, Bioclean, and Hydrocompliance systems) or entire devices (e.g., Abtech system) as well as the cost of manpower required for maintenance/servicing. Because there are about 21,000 catch basins within Honolulu, the overall efficiency of any given system in pollutant removal may not necessarily be the most important evaluation criterion. Additionally, of the 21,000 catch basins in Honolulu, possibly 30-50% are Type B catch basins. The Type B catch basins pose different challenges to DII installation as well as maintenance. Only the Bioclean and Kristar systems appear to be readily suitable for use in Type B catch basins.

Examination of total RDS and PAH removal data shows that the Hydrocompliance and Kristar systems performed best in the long term experiments; the Abtech and Bioclean systems, however, performed best for oil and grease. With respect to gross litter (rubbish), the size of the baskets or compartments of the DII largely dictates their efficacy. Therefore, the Bioclean and Kristar DII systems appeared better than either the Abtech or Hydrocompliance systems in this category. Finally, when including cost factors, the Bioclean and the Kristar DII systems appear to perform best in the long-term evaluations.

All the above factors must be considered before any final decision as to what system to utilize for BMP implementation can be made. With hopes of facilitating such a decision, a matrix was constructed to evaluate each system with the tested DII assigned a ranking in various categories. Ranking were then normalized to a value of 10. Because of the importance of fiscal constraints in any potential large-scale BMP implementation, the categories for initial cost and filter media (or device) replacement costs were scaled to 20. Similarly, because of personnel/costs constraints, the "service requirements" category was assigned a maximum score

of 25 points. The maximum possible score for each DII system using the above matrix evaluation was 185 points. The matrix, which is somewhat subjective with respect to the importance placed on the various parameters, is provided below. Scores for the Bioclean (142) and Kristar (127.5) systems are relatively similar but substantially higher than those for the Abtech (110.5) and Hydrocompliance (91.5) systems.

Performance matrix for field tested DII systems				
Parameter	**AbTech**	**Hydrocompliance**	**KriStar**	**Bioclean**
Initial device cost (10 ft drain inlet)	10	5	15	20
Initial installation requirements	10	2.5	7.5	5
Flow capacity	5	10	2.5	7.5
Turbidity during short term test	5	10	7.5	2.5
Short term RDS retention	10	5	7.5	2.5
Short term organics retention	10	2.5	7.5	5
Long term RDS retention	2.5	10	7.5	5
Long term PAH retention (mg)	5	10	7.5	5
Long term O/G retained (mg)	10	5	2.5	7.5
Long term overall rubbish retention	5	5	10	10
Suitability for Vector Control	5	2.5	7.5	10
Unit durability	7.5	2.5	7.5	10
Media replacement Costs	5	10	15	20
Suitability for Type B basin	2.5	2.5	7.5	10
Servicing Requirements	18	9	15	22
TOTAL SCORE	**110.5**	**91.5**	**127.5**	**142**
Performance of DII is ranked from one to four, with increasing scores assigned to increasing performance of the device. Ranks for each category are scaled to 10 except initial costs and media replacement costs which are scaled to 20. Servicing requirements are based on a score of 25 as determined in Appendix A. Maximum total possible score is 185.				

SECTION 9

CITY OF SAN DIEGO LDR STORM WATER STANDARD CHECKLISTS

City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

THE CITY OF SAN DIEGO

Storm Water Requirements Applicability Checklist

FORM
DS-560
JANUARY 2011

Project Address: 10325 Roselle Street	Project Number *(for City Use Only)*:

SECTION 1. Permanent Storm Water BMP Requirements:

Additional information for determining the requirements is found in the Storm Water Standards Manual.

Part A: Determine if Exempt from Permanent Storm Water BMP Requirements.

Projects that are considered maintenance, or are otherwise not categorized as "development projects" or "redevelopment projects" according to the Storm Water Standards manual are not required to install permanent storm water BMPs. **If "Yes" is checked for any line in Part A, proceed to Part C and check the box labeled "Exempt Project." If "No" is checked for all of the lines, continue to Part B.**

1.	The project is not a Development Project as defined in the Storm Water Standards Manual: for example habitat restoration projects, and construction inside an existing building.	☐ Yes ☑ No
2.	The project is only the construction of underground or overhead linear utilities.	☐ Yes ☑ No
3.	The project qualifies as routine maintenance (replaces or renews existing surface materials because of failed or deteriorating condition). This includes roof replacement, pavement spot repairs and resurfacing treatments such as asphalt overlay or slurry seal, and replacement of damaged pavement.	☐ Yes ☑ No
4.	The project only installs sidewalks, bike lanes, or pedestrian ramps on an existing road, and does not change sheet flow condition to a concentrated flow condition.	☐ Yes ☑ No

Part B: Determine if Subject to Priority Development Project Requirements.

Projects that match one of the definitions below are subject to additional requirements including preparation of a Water Quality Technical Report.

If "Yes" is checked for any line in Part B, proceed to Part C and check the box labeled "Priority Development Project." If "No" is checked for all of the lines, continue to Part C and check the box labeled "Standard Development Project."

1.	**Residential development of 10 or more units.**	☐ Yes ☑ No
2.	**Commercial development and similar non-residential development greater than one acre.** Hospitals; laboratories and other medical facilities; educational institutions; recreational facilities; municipal facilities; commercial nurseries; multi-apartment buildings; car wash facilities; mini-malls and other business complexes; shopping malls; hotels; office buildings; public warehouses; automotive dealerships; and other light industrial facilities.	☐ Yes ☑ No
3.	**Heavy industrial development greater than one acre.** Manufacturing plants, food processing plants, metal working facilities, printing plants, and fleet storage areas.	☐ Yes ☑ No
4.	**Automotive repair shop.** Facilities categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.	☐ Yes ☑ No
5.	**Restaurant.** Facilities that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC code 5812), and where the land area for development is greater than 5,000 square feet.	☐ Yes ☑ No
6.	**Hillside development greater than 5,000 square feet.** Development that creates 5,000 square feet of impervious surface and is located in an area with known erosive soil conditions and where the development will grade on any natural slope that is twenty-five percent or greater.	☐ Yes ☑ No
7.	**Water Quality Sensitive Area.** Development located within, directly adjacent to, or discharging directly to a Water Quality Sensitive Area (as depicted in Appendix C) in which the project 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" is defined as being situated within 200 feet of the Water Quality Sensitive Area. "Discharging directly to" is defined as 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.	☑ Yes ☐ No
8.	**Parking lot with a minimum area of 5,000 square feet or a minimum of 15 parking spaces** and potential exposure to urban runoff (unless it meets the exclusion for parking lot reconfiguration on line 11).	☑ Yes ☐ No

9.	**Street, road, highway, or freeway.** New paved surface in excess of 5,000 square feet used for the transportation of automobiles, trucks, motorcycles, and other vehicles (unless it meets the exclusion for road reconfiguration on line 11).	☐ Yes ☑ No
10.	**Retail Gasoline Outlet (RGO)** that is: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.	☐ Yes ☑ No
11.	**Significant Redevelopment**; project installs and/or replaces 5,000 square feet or more of impervious surface and the existing site meets at least one of the categories above. The project is not considered Significant Redevelopment if reconfiguring an existing road or parking lot without a change to the footprint of an existing developed road or parking lot. The existing footprint is defined as the outside curb or the outside edge of pavement when there is no curb.	☐ Yes ☑ No
12.	**Other Pollutant Generating Project.** Any other project not covered in the categories above, that disturbs one acre or more and is not excluded by the criteria below.	☐ Yes ☑ No

Projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces or if they sheet flow to surrounding pervious surfaces.

Part C: Select the appropriate category based on the outcome of Parts A & B.

1.	If "Yes" is checked for any line in Part A, then check this box. Continue to Section 2.	☐ Exempt Project
2.	If "No" is checked for all lines in Part A, and Part B, then check this box. Continue to Section 2.	☐ Standard Development Project
3.	If "No" is checked for all lines in Part A, and "Yes" is checked for at least one of the lines in Part B, then check this box. Continue to Section 2. See the Storm Water Standards Manual for guidance on determining if Hydromodification Management Plan requirements apply.	☑ Priority Development Project

SECTION 2. Construction Storm Water BMP Requirements:
For all projects, complete Part D. If "Yes" is checked for any line in Part D, then continue to Part E.

Part D: Determine Construction Phase Storm Water Requirements.

1.	Is the project subject to California's statewide General NPDES Permit for Storm Water Discharges Associated with Construction Activities? (See State Water Resources Control Board Order No. 2009-0009-DWQ for rules on enrollment)	☑ Yes ☐ No
2.	Does the project propose grading or soil disturbance?	☑ Yes ☐ No
3.	Would storm water or urban runoff have the potential to contact any portion of the construction area, including washing and staging areas?	☑ Yes ☐ No
4.	Would the project use any construction materials that could negatively affect water quality if discharged from the site (such as, paints, solvents, concrete, and stucco)?	☑ Yes ☐ No
5.	Check this box if "Yes" is checked for line 1. Continue to Part E.	☑ SWPPP Required
6.	Check this box if "No" is checked for line 1, and "Yes is checked for any line 2-4. Continue to Part E.	☐ WPCP Required
7.	Check this box if "No" is checked for all lines 1-4. Part E does not apply.	☐ No Document Required

Part E: Determine Construction Site Priority

This prioritization must be completed with this form, noted on the plans, and included in the SWPPP or WPCP. The City reserves the right to adjust the priority of the projects both before and during construction. [Note: The construction priority does NOT change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by City staff.]

☑ 1. **High Priority**
- a) Projects where the site is 50 acres or more and grading will occur during the wet season
- b) Projects 1 acre or more and tributary to an impaired water body for sediment (e.g., Peñasquitos watershed)
- c) Projects 1 acre or more within or directly adjacent to or discharging directly to a coastal lagoon or other receiving water within a Water Quality Sensitive Area.
- d) Projects subject to phased grading or advanced treatment requirements.

☐ **2 Medium Priority**. Projects 1 acre or more but not subject to a high priority designation.

☐ **3 Low Priority.** Projects requiring a Water Pollution Control Plan but not subject to a medium or high priority designation.

Name of Owner or Agent *(Please Print)*: Chris Loughridge/CLL-Roselle, LLC	Title: Owner & Manager
Signature:	Date:

SECTION 10

REFERENCES

This **WQTR** incorporates, by reference, the appropriate elements of the following documents and plans required by local, State or Federal agencies. In addition, this document incorporates other environmental reports, permits, construction permits that are specifically prepared for this project or reference this project.

1. Current Edition of the San Diego Municipal Code, Land Development Manual, Storm Water Standards

2. Countywide Model SUSMP for San Diego County, Port of San Diego, and Cities in San Diego County; San Diego Co-Permittees dated March 25, 2011.

3. United States Environmental Protection Agency (EPA), Preliminary Data Summary of Urban Storm Water Best Management Practice (EPA-821-R-99-012).

4. San Diego Regional Water Quality Control Board, Order R9-2007-0001, Municipal Storm Water Permit for San Diego County and Cities

5. Current Edition of Standard Specifications for Public Works Construction and Local and City Supplements

6. Current Edition Uniform Building Code and State Amendments

7. Current Edition City of San Diego Standard Drawings

8. City of San Diego Drainage Manual, Current Edition (1984)

9. Statewide General Construction Activity Storm Water Permit (WQ Order No. 99-08 DWQ)

10. County of San Diego Hazardous Waste Requirements