# APPENDIX D

## DRAINAGE AND PRELIMINARY WATER QUALITY MANAGEMENT PLAN

# County of Orange/Santa Ana Region Priority Project Preliminary Water Quality Management Plan (pWQMP)

**Project Name:**

**1300 Bristol St.**

**Newport Beach, CA 92660**

**Prepared for:**

**KCN MANAGEMENT, LLC**

**5000 Birch St. East Tower, Suite 600**

**Newport Beach, CA 92660**

**(949)267-1507**

**Prepared by:**

**Tait & Associates, INC**

**801 N. Parkcenter Drive**

**Santa Ana, CA 92705**

**(714)560-8643**

**Prepared: September 24, 2021**

| Project Owner's Certification | | | |
|---|---|---|---|
| Planning Application No. (If applicable) | PA2021-XXX | Grading Permit No. | |
| Tract/Parcel Map and Lot(s) No. | | Building Permit No. | |
| Address of Project Site and APN (If no address, specify Tract/Parcel Map and Lot Numbers) | | | 427-342-01 |

This Water Quality Management Plan (WQMP) has been prepared for The Picerne Group by Tait & Associates, Inc. The WQMP is intended to comply with the requirements of the County of Orange NPDES Stormwater Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan , including the ongoing operation and maintenance of all best management practices (BMPs), and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the current Orange County Drainage Area Management Plan (DAMP) and the intent of the non-point source NPDES Permit for Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

| **Owner:** | | | |
|---|---|---|---|
| Title | Patrick Coyle / Senior Vice President | | |
| Company | The Picerne Group, LLC | | |
| Address | 5000 Birch, Suite 600, Newport Beach, CA 92660 | | |
| Email | pcoyle@picernegroup.com | | |
| Telephone # | (949) 267-1553 | | |
| I understand my responsibility to implement the provisions of this WQMP including the ongoing operation and maintenance of the best management practices (BMPs) described herein. | | | |
| Owner Signature | | Date | |

| **Preparer (Engineer):** | | | |
|---|---|---|---|
| Title | David Sloan, PE / Director of Engineering | PE Registration # | C82595 |
| Company | Tait & Associates, Inc. | | |
| Address | 801 N. Parkcenter Dr., Santa Ana, CA 92705 | | |
| Email | dsloan@tait.com | | |
| Telephone # | (714) 560-8643 | | |

I hereby certify that this Water Quality Management Plan is in compliance with, and meets the requirements set forth in, Order No. R8-2009-0030/NPDES No. CAS618030, of the Santa Ana Regional Water Quality Control Board.

| Preparer Signature | | Date | |
|---|---|---|---|
| Place Stamp Here | | | |

# Contents

**Page No.**



## Attachments

# Section I Permit(s) and Water Quality Conditions of Approval or Issuance

Provide discretionary or grading/building permit information and water quality conditions of approval, or permit issuance, applied to the project. If conditions are unknown, please request applicable conditions from staff. *Refer to Section 2.1 in the Technical Guidance Document (TGD) available on the OC Planning website (ocplanning.net).*

| **Project Infomation** | | | |
|---|---|---|---|
| Permit/Application No. (If applicable) | N/A | Grading or Building Permit No. (If applicable) | N/A |
| Address of Project Site (or Tract Map and Lot Number if no address) and APN | APN: 427-342-01 | | |
| | | | |
| **Water Quality Conditions of Approval or Issuance** | | | |
| Water Quality Conditions of Approval or Issuance applied to this project. (Please list verbatim.) | N/A for Preliminary WQMP. | | |
| | | | |
| **Conceptual WQMP** | | | |
| Was a Conceptual Water Quality Management Plan previously approved for this project? | N/A | | |
| | | | |

| Watershed-Based Plan Conditions | |
|---|---|
| Provide applicable conditions from watershed - based plans including WIHMPs and TMDLS. | WIHMP:<br>Not Applicable<br><br>303(d) Listed Impairments for San Diego Creek and Newport Bay:<br>Selenium, Toxaphene, Fecal Coliform, Metals, Copper, Sediment Toxicity, Chlordane, DDT, PCB's (Polychlorinated Biphenyls), Indicator Bacteria, Nutrients, Pesticides, Sedimentation/Siltation<br><br>TMDL's for San Diego Creek and Newport Bay:<br>Bacteria Indicators/Pathogens, Nutrients, Pesticides, Sedimentation/Siltation |

# Section II Project Description

## II.1 Project Description

Provide a detailed project description including:

- Project areas;
- Land uses;
- Land cover;
- Design elements;
- A general description not broken down by drainage management areas (DMAs).

Include attributes relevant to determining applicable source controls. *Refer to Section 2.2 in the Technical Guidance Document (TGD) for information that must be included in the project description.*

| **Description of Proposed Project** | | | | |
|---|---|---|---|---|
| Development Category (From Model WQMP, Table 7.11-2; or -3): | Category 8: Significant Redevelopment Project | | | |
| Project Area ($ft^2$): 84,270 (1.93 AC) | Number of Dwelling Units: | | SIC Code: 59 (Residential) | |
| Project Area | Pervious | | Impervious | |
| | Area (acres or sq ft) | Percentage | Area (acres or sq ft) | Percentage |
| Pre-Project Conditions | 0.38 | 20% | 1.55 | 80% |
| Post-Project Conditions | 0.34 | 18% | 1.59 | 82% |
| Drainage Patterns/Connections | | | | |

| | |
|---|---|
| Narrative Project Description:<br><br>(Use as much space as necessary.) | The proposed development is in the City of Newport Beach, Orange County, California. In general, the property is bordered by an existing parking lot to the North and East, Bristol Street to the South and Spruce Street to the West. The project is comprised of a 6-story podium apartment building with two levels of subterranean parking. Project leasing offices are accessed directly from the corner of Bristol and Spruce. A fire-lane is provided around the site for emergency access uses.<br><br>**Existing (Pre-Developed) Hydrologic Conditions:**<br><br>The property is currently an office parking consisting of a 2-story office complex with surface parking. Soil classification is largely comprised of 'D' type soils. The site currently drains in 2 directions, with approximately 70% of the drainage running towards Spruce Street and 30% towards Bristol Street. The site is considered relatively flat at 1% to 2% to provide sheet flow within the existing parking lots. The parking lot drainage is collected by a series of concrete swales which are collected by storm drain lines. From the southerly driveway entrance the flows collected by the valley gutter are conveyed to the northerly driveway and discharged to Spruce Street. Once the flows enter the existing curb and gutter along Spruce Street, they are conveyed to the North and eventually discharge into a storm drain system located in Quail Street.<br><br>**Developed (Post-Developed) Hydrologic Conditions:**<br><br>The project will maintain the existing drainage pattern of the site, drainage areas south of the high point will drain to Bristol Street and drainage areas northerly of the high point will drain to Spruce Street. Approximately 0.34 ac of the 1.93 ac site will be landscaped or have a pervious surface. The impervious surface includes walkway areas in the podium area, roads and parking areas that allow for vehicular traffic, which are anticipated to be paved with asphalt. Although the impervious percentage is slightly increased, the increase in runoff volume does not exceed the allowable 5%, therefore no hydrologic conditions of concern (HCOC) are anticipated. |

## II.2 Potential Stormwater Pollutants

Determine and list expected stormwater pollutants based on land uses and site activities. *Refer to Section 2.2.2 and Table 2.1 in the Technical Guidance Document (TGD) for guidance.*

| **Pollutants of Concern** | | | |
|---|---|---|---|
| Pollutant | Check One for each: E=Expected to be of concern N=Not Expected to be of concern | | Additional Information and Comments |
| Suspended-Solid/ Sediment | E ☒ | N ☐ | Attached Residential, Retail, Parking, and Street project components |
| Nutrients | E ☒ | N ☐ | Attached Residential, Retail, Parking, and Street project components |
| Heavy Metals | E ☒ | N ☐ | Attached Residential, Retail, Parking, and Street project components |
| Pathogens (Bacteria/Virus) | E ☒ | N ☐ | Attached Residential, Retail, Parking, and Street project components |
| Pesticides | E ☒ | N ☐ | Attached Residential, Retail, Parking, and Street project components |
| Oil and Grease | E ☒ | N ☐ | Attached Residential, Retail, Parking, and Street project components |
| Toxic Organic Compounds | E ☒ | N ☐ | Attached Residential, Retail, Parking, and Street project components |
| Trash and Debris | E ☒ | N ☐ | Attached Residential, Retail, Parking, and Street project components |

## II.3 Hydrologic Conditions of Concern

Determine if streams located downstream from the project area are potentially susceptible to hydromodification impacts. *Refer to Section 2.2.3.1 in the Technical Guidance Document (TGD) for North Orange County or Section 2.2.3.2 for South Orange County.*

☒ No – Show map

☐ Yes – Describe applicable hydrologic conditions of concern below. *Refer to Section 2.2.3 in the Technical Guidance Document (TGD).*

While streams located downstream of the project site are potentially susceptible to hydromodification impacts, there are no 'Hydrologic Conditions of Concern' (HCOC). Although the impervious percentage is slightly increased, the increase in runoff volume does not exceed the allowable 5%, therefore no hydrologic conditions of concern (HCOC) are anticipated.

Approximately 970 cu-ft of runoff volume is produced by a 2-year, 24-hour storm event under the post developed condition. The same frequency and duration storm produces approximately 951 cu-ft in the pre-developed condition. This represents a slight increase in the runoff volume and is less than the allowable 5% increase. A summary of runoff volumes is provided in the following table. Hydrology calculations for the 2-year, 24-hour storm event are included in the Appendix of this report. Hydrology maps can be found in the Attachment D of this report.

Additionally, due to roof runoff starting at the building roof 6 stories above ground, the time of concentration will be reduced as a result of the project.

**HCOC CALCULATIONS**

**Proposed**

| *Drainage Area* | *Area* | *Area* | *Rainfall Depth* | *Pervious Area* | *Impervious Area* | *Impervious Area* | *Impervious Ratio* | *C* | *V* |
|---|---|---|---|---|---|---|---|---|---|
| | (square feet) | (acres) | (ft) | (sf) | (sf) | (acres) | | (0.75*imp+0.15) | (cf) |
| A | 19,743 | 0.45 | 0.18 | 5000 | 0.11 | 0.34 | 0.75 | 0.71 | 210 |
| B | 39,858 | 0.92 | 0.18 | 4100 | 0.09 | 0.82 | 0.90 | 0.82 | 492 |
| C | 24,670 | 0.57 | 0.18 | 5780 | 0.13 | 0.43 | 0.77 | 0.72 | 268 |
| Total | 84271 | 1.93 | | 14880 | 0 | 1.59 | 0.82 | | 970 |

**Existing**

| *Drainage Area* | *Area* | *Area* | *Rainfall Depth* | *Pervious Area* | *Impervious Area* | *Impervious Area* | *Impervious Ratio* | *C* | *V* |
|---|---|---|---|---|---|---|---|---|---|
| | (square feet) | (acres) | (ft) | (sf) | (sf) | (acres) | | (0.75*imp+0.15) | (cf) |
| A | 17235 | 0.40 | 0.18 | 5251 | 11984 | 0.28 | 0.70 | 0.67 | 174 |
| B | 67037 | 1.54 | 0.18 | 11300 | 55737 | 1.28 | 0.83 | 0.77 | 778 |
| Total | 84272 | 1.93 | | 16551 | 67721 | 1.55 | 0.80 | Total | 951 |

1.97% Increase

## II.4 Post Development Drainage Characteristics

Describe post development drainage characteristics. *Refer to Section 2.2.4 in the Technical Guidance Document (TGD).*

The proposed storm drain system will largely maintain the same drainage pattern(s), and connectivity that exists today. Currently there is two storm drain discharge location. Refer to the Existing & Proposed Hydrology Exhibit attached with this report.

1. Drainage Area "A" collects a portion of the parking lot, landscape, and building roof runoff which is discharged to grade at the proposed Biotreatment Planter #1. The biotreatment planter treats the water then discharges to a proposed pump which discharges stormwater to the curb and gutter along Spruce Street. Once the Design Capture Volumes are achieved, the peak flows from Drainage Area A are discharged to the curb and gutter along Bristol Street via proposed parkway drain.
2. Drainage Area "B" collects landscape and most of the building roof runoff which is discharged to grade at the proposed Biotreatment Planter #2. The biotreatment planter treats the water then discharges to a proposed pump which discharges stormwater to the curb and gutter along Spruce Street. Once the Design Capture Volumes are achieved, the peak flows from Drainage Area B are discharged to the curb and gutter along Spruce Street via proposed parkway drain.
3. Drainage Area "C" collects landscape and drainage from the proposed drive aisle which is discharged via storm drain pipe to the proposed Modular Wetlands Unit. The Modular Wetlands Unit treats the water then discharges to a proposed pump which discharges stormwater to the curb and gutter along Spruce Street. Once the Design Capture Volumes are achieved, the peak flows from Drainage Area C are discharged to the curb and gutter along Spruce Street via proposed parkway drain.

## II.5 Property Ownership/Management

Describe property ownership/management. *Refer to Section 2.2.5 in the Technical Guidance Document (TGD).*

The property will be privately owned and maintained. This includes all street and storm drain improvements as well as all applicable site design, source control, and treatment control BMP's.

# Section III Site Description

## III.1 Physical Setting

Fill out table with relevant information. *Refer to Section 2.3.1 in the Technical Guidance Document (TGD).*

| | |
|---|---|
| Name of Planned Community/Planning Area (if applicable) | |
| Location/Address | 1300 Bristol St. |
| | Newport Beach, CA 92660 |
| General Plan Land Use Designation | Mixed Use: Residential/Commerical |
| Zoning | PC 11 |
| Acreage of Project Site | 1.93 AC |
| Predominant Soil Type | D |

## III.2 Site Characteristics

Fill out table with relevant information and include information regarding BMP sizing, suitability, and feasibility, as applicable. *Refer to Section 2.3.2 in the Technical Guidance Document (TGD).*

| Site Characteristics | |
|---|---|
| Precipitation Zone | Between 0.7-inches and 0.75-inches (24-hour, 85th percentile rainfall) from Figure XVI-1 (Rainfall Zones) from the Orange County Technical Guidance Document. |
| Topography | The site is relatively flat. |

| | |
|---|---|
| Drainage Patterns/Connections | The existing condition contains 2 points of connection. The proposed condition will follow the same drainage pattern and maintain the same points of connection. |
| Soil Type, Geology, and Infiltration Properties | According to the soils maps provided in Attachment C, the hydrologic soils group is D. |
| Hydrogeologic (Groundwater) Conditions | To be provided with final WQMP. |
| Geotechnical Conditions (relevant to infiltration) | To be provided with final WQMP. |
| Off-Site Drainage | N/A |
| Utility and Infrastructure Information | Existing utilities are not anticipated to constrain site design in regards to implementing BMP strategies. |

## III.3 Watershed Description

Fill out table with relevant information and include information regarding BMP sizing, suitability, and feasibility, as applicable. *Refer to Section 2.3.3 in the Technical Guidance Document (TGD).*

| | |
|---|---|
| Receiving Waters | San Diego Creek (Reach 1)<br>Newport Bay (Lower)<br>Newport Bay (Upper)<br>Pacific Ocean |
| 303(d) Listed Impairments | **San Diego Creek (Reach 1)** - Selenium, Toxaphene, Fecal Coliform, Sedimentation/Siltation, Nutrients, Pesticides, Metal/Metalloids, Pathogens, Sediment<br>**Newport Bay (Upper)** - Metals, Copper, Sediment Toxicity, Chlordane, DDT (Dichlorodiphenyl Trichloroethane), PCB's (Polychlorinated Biphenyls), Indicator Bacteria, Nutrients, Pesticides, Sedimentation/Siltation, Other Organics<br>**Newport Bay (Lower)** - Copper, Sediment Toxicity, Chlordane, DDT, PCB's, Indicator Bacteria, Nutrients, Pesticides, Other Organics |

| | |
|---|---|
| Applicable TMDLs | **San Diego Creek (Reach 1)** - Indicator Bacteria, Nutrients, Pesticides, Sedimentation/Siltation<br>**Newport Bay (Upper)** - Indicator Bacteria, Nutrients, Pesticides, Sedimentation/Siltation<br>**Newport Bay (Lower)** - Nutrients, Pesticides |
| Pollutants of Concern for the Project | Primary Pollutants of Concern:<br>Suspended-Solid / Sediment, Nutrients, Heavy Metals, Pathogens (Bacteria/Virus), Pesticides, and Toxic Organic Compounds<br>Other Pollutants of Concern: Oil and Grease, Trash and Debris |
| Environmentally Sensitive and Special Biological Significant Areas | San Diego Creek (Reach 1)<br>Newport Bay (Upper)<br>Newport Bay (Lower) |

# Section IV Best Management Practices (BMPs)

## IV. 1 Project Performance Criteria

Describe project performance criteria. Several steps must be followed in order to determine what performance criteria will apply to a project. These steps include:

- If the project has an approved WIHMP or equivalent, then any watershed specific criteria must be used and the project can evaluate participation in the approved regional or sub-regional opportunities. (Please ask your assigned planner or plan checker regarding whether your project is part of an approved WIHMP or equivalent.)
- Determine applicable hydromodification control performance criteria. *Refer to Section 7.II-2.4.2.2 of the Model WQMP.*
- Determine applicable LID performance criteria. *Refer to Section 7.II-2.4.3 of the Model WQMP.*
- Determine applicable treatment control BMP performance criteria. *Refer to Section 7.II-*3.2.2 *of the Model WQMP.*
- Calculate the LID design storm capture volume for the project. *Refer to Section 7.II-2.4.3 of the Model WQMP.*

| | | |
|---|---|---|
| (NOC Permit Area only) Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implementing LID on regional or sub-regional basis? | YES ☐ | NO ☒ |
| If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities. | | |

| Project Performance Criteria | |
|---|---|
| If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP) | This project does not have HCOCs due to the fact that the existing site has already been fully developed, the proposed condition does not modify the proposed drainage patterns and the proposed redevelopment will not significantly exceed the volumes and time of concentration of the storm water runoff for the pre-development condition for a two-year frequency storm event (a difference of five percent or less is considered insignificant). Reference Attachment B for calculations. |
| List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP) | Per Section 7.II-2.4.3 of the WQMP,<br>"Priority Projects must infiltrate, harvest and use, evapotranspire, or biotreat/biofilter, the 85th percentile, 24-hour storm event (Design Capture Volume)." "A properly designed biotreatment system may only be considered if infiltration, harvest and use, and evapotranspiration (ET) cannot be feasibly implemented for the full design capture volume. In this case, infiltration, harvest and use, and ET practices must be implemented to the greatest extent feasible and biotreatment may be provided for the remaining design capture volume."<br>The required DCV will be treated via proposed biotreatment basins. The biotreatment planters will remove stormwater pollutants through physical and biological processes. Pollutants removed from stormwater include particulate organic matter, phosphorus, suspended solids, nitrogen, metals, TKN, and bacteria. Refer to the info sheet in Attachment D. |
| List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP) | Per Section 7.II-2.4.3 of the WQMP,<br>"If it is not feasible to meet LID performance criteria through retention and/or biotreatment provided on-site or at a sub-regional/regional scale, then treatment control BMPs shall be provided on-site or offsite prior to discharge to waters of the US. Sizing of treatment control BMP(s) shall be based on either the unmet volume after claiming applicable water quality credits, if appropriate (See Section 7.II-3.1 Water Quality Credits) and as calculated in TGD Appendix VI. If treatment control BMPs can treat all of the remaining unmet volume and have a medium to high effectiveness for reducing the primary POCs, the project is considered to be in compliance; a waiver application and participation in an alternative program is not required.<br>If the cost of providing treatment control BMPs greatly outweighs the pollution control benefits they would provide, a waiver of treatment control and LID requirements can be requested and alternative compliance approaches must be used to fulfill the remaining unmet volume (See Section 7.II-3.3)."<br>Treatment control BMP's will not be utilized for this project. |

| | |
|---|---|
| Calculate LID design storm capture volume for Project. | LID DCV calculations are provided in Attachment B. |

## IV.2. Site Design and Drainage

Describe site design and drainage including

- A narrative of site design practices utilized or rationale for not using practices;
- A narrative of how site is designed to allow BMPs to be incorporated to the MEP
- A table of DMA characteristics and list of LID BMPs proposed in each DMA.
- Reference to the WQMP "BMP Exhibit."
- Calculation of Design Capture Volume (DCV) for each drainage area.
- A listing of GIS coordinates for LID and Treatment Control BMPs.

*Refer to Section 2.4.2 in the Technical Guidance Document (TGD).*

BMP utilization in Site Design to Maximum Extent Practicable (MEP):

Since infiltration and harvest and reuse are no feasible, the next hierarchy will utilize the biofiltration and bioretention strategy for treating the design capture volume. Due to geotechnical concerns related to clayey layers of soil, infiltration strategies were not proposed. Areas shall incorporate a bioretention planter and Modular Wetlands Unit. The biotreatment basins with underdrains will be lined with an impermeable membrane to ensure infiltration does not occur in these areas.

Streets, Landscape, Sidewalks, & Building Roof

Per the reasons stated above, infiltration and/ or Harvest and use methods are not considered for these areas of the project site. The streets area lack either adequate space or are infeasible to implement these LID BMP strategies. The proposed bio treatment strategy consists of using a biotreatment planter sized for the design capture volume. The location of the biotreatment basins can be seen on the conceptual WQMP Plot Plan included in Attachment D.

GIS Coordinates for the project BMP area:
GPS coordinates shall be provided upon final WQMP.

## IV.3 LID BMP Selection and Project Conformance Analysis

Each sub-section below documents that the proposed design features conform to the applicable project performance criteria via check boxes, tables, calculations, narratives, and/or references to worksheets. *Refer to Section 2.4.2.3 in the Technical Guidance Document (TGD) for selecting LID BMPs and Section 2.4.3 in the Technical Guidance Document (TGD) for conducting conformance analysis with project performance criteria.*

### IV.3.1 Hydrologic Source Controls (HSCs)

If required HSCs are included, fill out applicable check box forms. If the retention criteria are otherwise met with other LID BMPs, include a statement indicating HSCs not required.

| Name | Included? |
|---|---|
| Localized on-lot infiltration | ☐ |
| Impervious area dispersion (e.g. roof top disconnection) | ☐ |
| Street trees (canopy interception) | ☐ |
| Residential rain barrels (not actively managed) | ☐ |
| Green roofs/Brown roofs | ☐ |
| Blue roofs | ☐ |
| Impervious area reduction (e.g. permeable pavers, site design) | ☐ |
| Other: | ☐ |
| Other: | ☐ |
| Other: | ☐ |
| Other: | ☐ |
| Other: | ☐ |
| Other: | ☐ |
| Other: | ☐ |
| Other: | ☐ |

## IV.3.2 Infiltration BMPs

Identify infiltration BMPs to be used in project. If design volume cannot be met, state why.

| Name | Included? |
|---|---|
| Bioretention without underdrains | ☐ |
| Rain gardens | ☐ |
| Porous landscaping | ☐ |
| Infiltration planters | ☐ |
| Retention swales | ☐ |
| Infiltration trenches | ☐ |
| Infiltration basins | ☐ |
| Drywells | ☐ |
| Subsurface infiltration galleries | ☐ |
| French drains | ☐ |
| Permeable asphalt | ☐ |
| Permeable concrete | ☐ |
| Permeable concrete pavers | ☐ |
| Other: | ☐ |
| Other: | ☐ |

Show calculations below to demonstrate if the LID Design Strom Capture Volume can be met with infiltration BMPs. If not, document how much can be met with infiltration and document why it is not feasible to meet the full volume with infiltration BMPs.

Infiltration is not recommended because the site consists of Type D soils, which are not feasible for infiltration.

## IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

If the full Design Storm Capture Volume cannot be met with infiltration BMPs, describe any evapotranspiration and/or rainwater harvesting BMPs included.

| Name | Included? |
|---|---|
| All HSCs; *See Section IV.3.1* | ☐ |
| Surface-based infiltration BMPs | ☐ |
| Biotreatment BMPs | ☐ |
| Above-ground cisterns and basins | ☐ |
| Underground detention | ☐ |
| Other: | ☐ |
| Other: | ☐ |
| Other: | ☐ |

Show calculations below to demonstrate if the LID Design Storm Capture Volume can be met with evapotranspiration and/or rainwater harvesting BMPs in combination with infiltration BMPs. If not, document below how much can be met with either infiltration BMPs, evapotranspiration, rainwater harvesting BMPs, or a combination, and document why it is not feasible to meet the full volume with these BMP categories.

N/A

## IV.3.4 Biotreatment BMPs

If the full Design Storm Capture Volume cannot be met with infiltration BMPs, and/or evapotranspiration and rainwater harvesting BMPs, describe biotreatment BMPs included. Include sections for selection, suitability, sizing, and infeasibility, as applicable.

| Name | Included? |
|---|---|
| Bioretention with underdrains | ☒ |
| Stormwater planter boxes with underdrains | ☐ |
| Rain gardens with underdrains | ☐ |
| Constructed wetlands | ☐ |
| Vegetated swales | ☐ |
| Vegetated filter strips | ☐ |
| Proprietary vegetated biotreatment systems | ☒ |
| Wet extended detention basin | ☐ |
| Dry extended detention basins | ☐ |
| Other: | ☐ |
| Other: | ☐ |

Show calculations below to demonstrate if the LID Design Storm Capture Volume can be met with infiltration, evapotranspiration, rainwater harvesting and/or biotreatment BMPs. If not, document how much can be met with either infiltration BMPs, evapotranspiration, rainwater harvesting BMPs, or a combination, and document why it is not feasible to meet the full volume with these BMP categories.

Please Refer to Appendix 'B' of this report for BMP calculations.

## IV.3.5 Hydromodification Control BMPs

Describe hydromodification control BMPs. *See Section 5 of the Technical Guidance Document (TGD).* Include sections for selection, suitability, sizing, and infeasibility, as applicable. Detail compliance with Prior Conditions of Approval (if applicable).

| Hydromodification Control BMPs | |
|---|---|
| **BMP Name** | **BMP Description** |
| N/A | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

## IV.3.6 Regional/Sub-Regional LID BMPs

Describe regional/sub-regional LID BMPs in which the project will participate. *Refer to Section 7.II-2.4.3.2 of the Model WQMP*.

| Regional/Sub-Regional LID BMPs |
|---|
| N/A |

## IV.3.7 Treatment Control BMPs

Treatment control BMPs can only be considered if the project conformance analysis indicates that it is not feasible to retain the full design capture volume with LID BMPs. Describe treatment control BMPs including sections for selection, sizing, and infeasibility, as applicable.

| Treatment Control BMPs | |
|---|---|
| **BMP Name** | **BMP Description** |
| N/A | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

## IV.3.8 Non-structural Source Control BMPs

Fill out non-structural source control check box forms or provide a brief narrative explaining if non-structural source controls were not used.

| Non-Structural Source Control BMPs | | | | |
|---|---|---|---|---|
| **Identifier** | **Name** | **Check One** | | **If not applicable, state brief reason** |
| | | **Included** | **Not Applicable** | |
| N1 | Education for Property Owners, Tenants and Occupants | ☒ | ☐ | |
| N2 | Activity Restrictions | ☒ | ☐ | |
| N3 | Common Area Landscape Management | ☒ | ☐ | |
| N4 | BMP Maintenance | ☒ | ☐ | |
| N5 | Title 22 CCR Compliance (How development will comply) | ☒ | ☐ | |
| N6 | Local Industrial Permit Compliance | ☐ | ☒ | No industrial waste discharges are anticipated |
| N7 | Spill Contingency Plan | ☐ | ☒ | No storage of hazardous waste |
| N8 | Underground Storage Tank Compliance | ☒ | ☐ | |
| N9 | Hazardous Materials Disclosure Compliance | ☒ | ☐ | |
| N10 | Uniform Fire Code Implementation | ☒ | ☐ | |
| N11 | Common Area Litter Control | ☒ | ☐ | |
| N12 | Employee Training | ☒ | ☐ | |
| N13 | Housekeeping of Loading Docks | ☐ | ☒ | No loading docks on property |
| N14 | Common Area Catch Basin Inspection | ☒ | ☐ | |
| N15 | Street Sweeping Private Streets and Parking Lots | ☒ | ☐ | |
| N16 | Retail Gasoline Outlets | ☐ | ☒ | No retail gasoline on property |

*N1-Education for property Owners, Tenants and occupants & N-12 Employee Training*
The property owner shall prepare a training manual for all existing and future employees. The manual shall include information regarding proper practices that contribute to the protection of the stormwater quality. Training shall be provided upon hire of new associates. A copy of the training manual shall remain in the building at all times for employees to use as needed. The manual shall include all Educational Material included on Attachment A of this report. Additional education material may be found in the following website: http://www.ocwatershed.com/PublicEd/resources/business-brochures.html

*N2-Activity Restrictions*
The property owner shall ensure that the rules and guidelines as determined on the project conditions, covenants and restrictions (CC&R's) and lease terms or other policies are followed at all times once the project is operations. Prohibited activities for the project that promoted water quality includes:
· Prohibit discharges of fertilizer, pesticides, or animal wastes to streets or storm drains.
· Prohibit blowing or sweeping of debris (leaf litter, grass clippings, litter, etc.) into streets or storm drains.
· Requirement to keep dumpster lids closed at all times.
· Prohibit vehicle washing, maintenance, or repair on the premised or restrict those activities to designated areas.

*N3-Common Area Landscape Management*
Specific practices are followed for landscape maintenance. Ongoing maintenance is conducted to minimize erosion and over-irrigation, conserve water and reduce pesticide and fertilizer applications.
All maintenance must be consistent with the City of Tustin requirements. Proper maintenance practices should help reduce and/or eliminate pollution from pesticides, nutrients, trash/debris and sediments. The project common area landscape maintenance should be consistent with the following documents included in Attachment A:
· Building and Ground Maintenance Guidelines
· Housekeeping practices
· Plaza and sidewalk cleaning
· Landscape maintenance

*N4-BMP Maintenance*
BMP maintenance, implementation schedules and responsible parties are included with each specific BMP narrative in section V.

*N5-Title 22 CCR compliance*
Hazardous waste shall be managed properly trough compliance with applicable title 22 regulations. Storage and transportation of hazardous materials shall be per the title 22 of the California Code of Regulations and the Health and Safety Code.

*N9-Hazardous Material Disclosure Compliance*
The Owner is responsible for obtaining the required permits for the use and transportation of hazardous materials. Permits may be required from the County of Orange Health Department, City of Tustin, and other local authorities.

*N10-Uniform Fire Code Implementation*
The Owner is responsible for complying with the Los Angeles Fire Department requirements regarding proper management of hazardous materials and emergency response plans. An inventory of hazardous materials should be maintained on-site and an emergency response plans should be established.

*N11-Common area litter control*
The Owner will be required to implement trash management and litter control procedures in the common areas aimed at reducing pollution of drainage water. The Owner may contract with their landscape maintenance firm to provide this service with regularly scheduled maintenance, which should consist of litter patrol, emptying of trash receptacles in common areas, and noting trash disposal violations and reporting the violations to the Owner for investigation.

*N12-Employee Training*
The Owner will be required to implement an education program as it would apply to future employees.

*N14-Common area catch basin inspection*
The Owner must ensure that the on-site drain inlets, grates, and drain pipes will be periodically inspected visually. Cleaning should take place in the late summer/early fall prior to the start of the rainy season. If necessary, clean, repair, or replace any drainage facility prior to the start of each rainy season (no later than October 15 of each year). Also refer to "Drainage System Maintenance" in Attachment A.

*N15-Street Sweeping Private Streets and Parking Lots*
The Owner must sweep outdoor lots regularly (minimum monthly), and prior to the storm season (no later than October 15 each year). Sweeping shall be done with a vacuum-type sweeper. Under no circumstances are outdoor areas/lots to be rinsed or washed with water unless said rinse/wash water is collected and disposed of properly (i.e. into the sewer).

## IV.3.9 Structural Source Control BMPs

Fill out structural source control check box forms or provide a brief narrative explaining if structural source controls were not used.

| Structural Source Control BMPs | | | | |
|---|---|---|---|---|
| **Identifier** | **Name** | **Check One** | | **If not applicable, state brief reason** |
| | | **Included** | **Not Applicable** | |
| S1 | Provide storm drain system stenciling and signage | ☒ | ☐ | |
| S2 | Design and construct outdoor material storage areas to reduce pollution introduction | ☐ | ☒ | |
| S3 | Design and construct trash and waste storage areas to reduce pollution introduction | ☒ | ☐ | |
| S4 | Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control | ☒ | ☐ | |
| S5 | Protect slopes and channels and provide energy dissipation | ☒ | ☐ | |
| | Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit) | ☐ | ☒ | |
| S6 | Dock areas | ☐ | ☒ | |
| S7 | Maintenance bays | ☐ | ☒ | |
| S8 | Vehicle wash areas | ☐ | ☒ | |
| S9 | Outdoor processing areas | ☐ | ☒ | |
| S10 | Equipment wash areas | ☐ | ☒ | |
| S11 | Fueling areas | ☐ | ☒ | |
| S12 | Hillside landscaping | ☐ | ☒ | |
| S13 | Wash water control for food preparation areas | ☒ | ☐ | |
| S14 | Community car wash racks | ☐ | ☒ | |

*S1-Provide storm drain system stenciling and signage*
All catch basins/inlets/outlets on site must be marked using the City's "No Dumping – Drains to Ocean" curb marker or stenciled. An approved stencil shall be used to paint this message on the top of curb directly above the inlet, and on one side of the curb face. Labeling for catch basins is to be inspected regularly and maintained so as to be reasonably legible at all times. The inspection and maintenance is to be performed by the Owner. This stencil is to alert the public/employees to the destination of pollutants discharged into the storm water.

*S3-Design and construct trash and waste storage areas to reduce pollution introduction*
The owner shall post signs on trash enclosure gates that state "Keep Dumpster Lids Closed." The Owner will monitor dumpster usage such that dumpsters are not overfilled and the dumpster lids can close completely. The Owner shall increase the trash pickup schedule as necessary to prevent dumpsters from overfilling. The Owner will observe and damage to the trash enclosure wall and any discharge from the trash storage area.

*S4-Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control*
All irrigation systems will be inspected to ensure that the systems are functioning properly and that the programmable timers are set correctly.

## IV.4 Alternative Compliance Plan (If Applicable)

Describe an alternative compliance plan (if applicable). Include alternative compliance obligations (i.e., gallons, pounds) and describe proposed alternative compliance measures. *Refer to Section 7.II 3.0 in the WQMP.*

### IV.4.1 Water Quality Credits

Determine if water quality credits are applicable for the project. *Refer to Section 3.1 of the Model WQMP for description of credits and Appendix VI of the Technical Guidance Document (TGD) for calculation methods for applying water quality credits.*

<table>
<tr><th colspan="5">Description of Proposed Project</th></tr>
<tr><td colspan="5">Project Types that Qualify for Water Quality Credits (Select all that apply):</td></tr>
<tr><td>☐Redevelopment projects that reduce the overall impervious footprint of the project site.</td><td colspan="2">☐Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped.</td><td colspan="2">☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance).</td></tr>
<tr><td colspan="2">☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution).</td><td colspan="2">☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned</td><td>☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping).</td></tr>
<tr><td>☐Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.</td><td>☐ Developments in a city center area.</td><td>☐ Developments in historic districts or historic preservation areas.</td><td>☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.</td><td>☐In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.</td></tr>
</table>

| | |
|---|---|
| Calculation of Water Quality Credits<br>(if applicable) | N/A |

## IV.4.2 Alternative Compliance Plan Information

Describe an alternative compliance plan (if applicable). Include alternative compliance obligations (i.e., gallons, pounds) and describe proposed alternative compliance measures. *Refer to Section 7.II 3.0 in the Model WQMP.*

N/A

# Section V Inspection/Maintenance Responsibility for BMPs

Fill out information in table below. Prepare and attach an Operation and Maintenance Plan. Identify the funding mechanism through which BMPs will be maintained. Inspection and maintenance records must be kept for a minimum of five years for inspection by the regulatory agencies. *Refer to Section 7.II 4.0 in the Model WQMP.*

| BMP Inspection/Maintenance | | | |
|---|---|---|---|
| **BMP** | **Reponsible Party(s)** | **Inspection/ Maintenance Activities Required** | **Minimum Frequency of Activities** |
| Biotreatment Basin | Owner | Biotreatment BMP (Bioretention with Underdrains) Inspection and repair of treatment area's components. Check for standing water. Corrective measures such as removal and replacement of top soil layer, top 3 inches of engineered soil; or more as needed to ensure proper infiltration rate to achieve sufficient drawdown time are necessary to prevent creating mosquito and other vector habitat if drawdown time exceeds 72 hours after a storm event. Replant eroded and bare areas prior to each rainy season. Replace vegetation as needed if dying or an invasive species takes over. Most BMP vegetation is anticipated to be native however vegetation surrounding visible areas to the public will include specific non-native species. | Weekly and as needed, replant eroded and bare areas prior to each rainy season. Test draw down time once a year at a minimum. |
| Modular Wetland System (MWS) Linear Unit | Owner | Remove Trash from Screening Device – average maintenance interval is 6 to 12 months. (5 minute average service time). -Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months. (10 minute average service time). -Replace Cartridge Filter Media – average maintenance interval 12 to 24 months. (10-15 minute per cartridge average service time). -Replace Drain Down Filter Media – | Prior and following the rainy season After each rain event |

| | | | |
|---|---|---|---|
| | | average maintenance interval is 12 to 24 months. (5 minute average service time). | |
| N1 - Education for Property Owners, Tenants and Occupants | Property Management Association | Provide environmental awareness educational materials made available by the City of Anaheim and/or the County of Orange. These materials will describe the use of chemicals that should be limited to the property, with no discharges of wastes via hosing or other direct discharge to gutters, catch basins and storm drains. | Upon initial tenancy and ongoing thereafter. |
| N2 - Activity Restrictions | Property Management Association | Use restrictions that may include car washing, rinsing, waste disposal, or other activity potentially detrimental to downstream receiving waters.<br>Restricted activities to be developed by the PMA and implemented through lease terms. | Upon initial tenancy and ongoing thereafter. |
| N3 - Common Area Landscape Management | Property Management Association | Utilize landscape maintenance practices aimed at minimizing use of irrigation, fertilizers and pesticides.<br>Usage shall be consistent with Management Guidelines for Use of Fertilizers (DAMP Section 5.5).<br>Landscaping shall correlate to the climate, soil, and related natural resources of the area.<br>Plantings shall be grouped with plants of similar water requirements. | Ongoing. Review and revise annually, and as needed. |
| N4 - BMP Maintenance | Property Management Association | Inspection of all structural and non- structural BMP's.<br>Scheduling of required cleaning and maintenance activities. BMP inspection and any resulting maintenance activity shall be performed at regular intervals as part of the overall Landscape Management program, and prior to the start of the rainy season. | Varies by BMP. Annually at a minimum (prior to the rainy season). |

| | | | |
|---|---|---|---|
| N5 - Title 22 CCR Compliance | Property Management Association | Comply with all applicable local water quality ordinances. The local jurisdiction (City), under local water quality ordinances, have authority to ensure clean stormwater discharges from areas of concern to public properties. | Ongoing. Review and revise annually, and as needed. |
| N9 - Hazardous Materials Disclosure Compliance | Property Management Association | Comply with State regulations dealing with hazardous materials, enforced by the City on behalf of the State. Hazardous materials shall either be placed in an enclosure that prevents contact with runoff or is protected by a secondary containment structure such as a berm, dyke, or curb. Any storage area containing hazardous materials shall be paved and sufficiently impervious to contain any leaks and/or spills. Storage areas containing hazardous materials shall have a roof or awning to minimize direct precipitation and collection of stormwater within the secondary containment area. Any stormwater retained within the containment area shall be disposed of in accordance with the applicable hazardous material disposal ordinances. Hazardous materials shall be disposed of at the nearest Hazard Materials Disposal Center. CASQA BMP Handbook SC-34 and SC-60 shall be used as a resource when developing applicable hazardous material cleanup and prevention strategies. | Ongoing. Review and revise annually, and as needed. |
| N10 - Uniform Fire Code Implementation | Property Management Association | Comply with Article 80 of the Uniform Fire Code enforced by the fire protection agency. | Ongoing. Review and revise annually, and as needed. |
| N11 - Common Area Litter Control | Property Management Association | Good housekeeping practices shall be adhered to that aim to minimize litter and trash production on the site. Good housekeeping practices include but are not limited to: covering storage areas, using drip pans or absorbent | Ongoing. Review and revise annually, and as needed. |

| | | | |
|---|---|---|---|
| | | materials when working with oils/greases, checking storage containers regularly for leaks or damage, regular sweeping and clean-up of trash storage and recycling areas, and regular clean-up of loose trash and debris around site. | |
| N12 - Employee Training | Property Management Association | Provide employee training / education information to janitorial, maintenance, landscaping, and other staff for activities that may impact water quality. Educational materials will utilize brochures obtained from the City, County and State resources Public Education Materials is available in Attachment A of this WQMP. | Employee training shall take place at a minimum at the time of hiring, and annually thereafter. |
| N14 - Common Area Catch Basin Inspection | Property Management Association | Conduct regular inspection, cleaning, and maintenance of common area catch basins. Cleaning and maintenance activities may include removal of trash, sediment, debris, or other deleterious material from the catch basin. Catch basins shall be visually inspected for illegal dumping. If illegal dumping has occurred the proper authorities shall be notified as soon as practicable. | At minimum 2-times per year, both before the rainy season and after at least one major storm to check for standing water. Adjust inspection schedule as needed. |
| N15 - Street Sweeping Private Streets and Parking Lots | Property Management Association | Provide vacuum sweeping for paved areas. Sweeping operations shall be performed during dry weather. CASQA BMP Handbook SC- 43 and SC-70 shall be used as a resource for determining the frequency and procedures for providing vacuum sweeping of the paved areas. Sweeping and/or spraying of permeable paver areas is not recommended as it tends to move the sediment rather than remove it. Also, sweeping and spraying may move the sediment deeper into the surface openings, making them more difficult to remove. | At minimum 2-times per year, both before the rainy season and after at least one major storm to check for standing water. Adjust inspection schedule as needed. |

| | | | |
|---|---|---|---|
| S1 - Provide storm drain system stenciling and signage | Property Management Association | Provide stenciling that is easily visible on or near each catch basin. Stenciling shall provide a brief statement, which prohibits the dumping of improper materials into the storm drain. | Stenciling shall be inspected annually and maintained or repainted as needed. |
| S3 - Design and construct trash and waste storage areas to reduce pollution introduction | Owner then Property Management Association | All trash enclosure areas shall be paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements around the area, screened or walled to prevent off- site transport of trash, and shall include solid roofing or an awning to prevent direct precipitation. Trash area drains to the storm drain system is prohibited. | During design/construction activities. Ongoing inspection and maintenance thereafter. |
| S4 - Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control | Owner then Property Management Association | Implement irrigation methods to minimize runoff of excess irrigation water across impervious surfaces and into the stormwater conveyance system. Such measures include employing rain-triggered shutoff devices to eliminate or reduce irrigation during and immediately after precipitation, using mulches (such as wood chips) to minimize sediment in runoff and to maintain soil infiltration capacity, and coordinating design of the irrigation system and landscape to minimize overspray and runoff. Irrigation systems should consider the use of flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or water supply lines. Water conservation devices such as programmable irrigation timers, drip irrigation, and soil moisture sensors should also be considered. | During design/constructio n activities. Ongoing inspection and maintenance thereafter. |

| | | | |
|---|---|---|---|
| S5 - Protect slopes and channels and provide energy dissipation | Property Management Association | Protect slopes, channels, and energy dissipation devices so function is maintained. The potential for erosion of slopes and/or channels shall be minimized by incorporating the following BMP's, as applicable: immediate stabilization of disturbed slopes; vegetate slopes with native or drought tolerant vegetation; control and treat flows in landscaping prior to reaching existing natural drainage system. | Regular inspection and any resulting maintenance of slopes, channels, and energy dissipation devices shall be on- going and part of the overall Landscape/Site Management program. |

# Section VI BMP Exhibit (Site Plan)

## VI.1 BMP Exhibit (Site Plan)

Include a BMP Exhibit (Site Plan), at a size no less than 24" by 36," which includes the following minimum information:

- Insert in the title block (lower right hand corner) of BMP Exhibit: the WQMP Number (assigned by staff) and the grading/building or Planning Application permit numbers
- Project location (address, tract/lot number(s), etc.)
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural BMP locations
- Drainage delineations and flow information
- Delineate the area being treated by each structural BMP
- GIS coordinates for LID and Treatment Control BMPs
- Drainage connections
- BMP details
- Preparer name and stamp

Please do not include any areas outside of the project area or any information not related to drainage or water quality. The approved BMP Exhibit (Site Plan) shall be submitted as a plan sheet on all grading and building plan sets submitted for plan check review and approval. The BMP Exhibit shall be at the same size as the rest of the plan sheets in the submittal and shall have an approval stamp and signature prior to plan check submittal.

## VI.2 Submittal and Recordation of Water Quality Management Plan

Following approval of the Final Project-Specific WQMP, three copies of the approved WQMP (including BMP Exhibit, Operations and Maintenance (O&M) Plan, and Appendices) shall be submitted. In addition, these documents shall be submitted in a PDF format.

Each approved WQMP (including BMP Exhibit, Operations and Maintenance (O&M) Plan, and Appendices) shall be recorded in the Orange County Clerk-Recorder's Office, prior to close-out of grading and/or building permit. Educational Materials are not required to be included.

# Section VII Educational Materials

Refer to the Orange County Stormwater Program (ocwatersheds.com) for a library of materials available. Please only attach the educational materials specifically applicable to this project. Other materials specific to the project may be included as well and must be attached.

| Education Materials | | | |
|---|---|---|---|
| **Residential Material (http://www.ocwatersheds.com)** | **Check If Applicable** | **Business Material (http://www.ocwatersheds.com)** | **Check If Applicable** |
| The Ocean Begins at Your Front Door | ☒ | Tips for the Automotive Industry | ☐ |
| Tips for Car Wash Fund-raisers | ☐ | Tips for Using Concrete and Mortar | ☒ |
| Tips for the Home Mechanic | ☐ | Tips for the Food Service Industry | ☒ |
| Homeowners Guide for Sustainable Water Use | ☒ | Proper Maintenance Practices for Your Business | ☒ |
| Household Tips | ☒ | **Other Material** | **Check If Attached** |
| Proper Disposal of Household Hazardous Waste | ☒ | | |
| Recycle at Your Local Used Oil Collection Center (North County) | ☒ | | ☐ |
| Recycle at Your Local Used Oil Collection Center (Central County) | ☐ | | ☐ |
| Recycle at Your Local Used Oil Collection Center (South County) | ☐ | | ☐ |
| Tips for Maintaining a Septic Tank System | ☐ | | ☐ |
| Responsible Pest Control | ☒ | | ☐ |
| Sewer Spill | ☒ | | ☐ |
| Tips for the Home Improvement Projects | ☒ | | ☐ |
| Tips for Horse Care | ☐ | | ☐ |
| Tips for Landscaping and Gardening | ☒ | | ☐ |
| Tips for Pet Care | ☒ | | ☐ |
| Tips for Pool Maintenance | ☒ | | ☐ |
| Tips for Residential Pool, Landscape and Hardscape Drains | ☒ | | ☐ |
| Tips for Projects Using Paint | ☒ | | ☐ |

# Attachment A

# Educational Materials

# The Ocean Begins at Your Front Door


*Never allow pollutants to enter the street, gutter or storm drain!*

*Even if you live miles from the Pacific Ocean, you may be unknowingly polluting it.*

*Dumping one quart of motor oil into a storm drain can contaminate 250,000 gallons of water.*

## Did You Know?

- Most people believe that the largest source of water pollution in urban areas comes from specific sources such as factories and sewage treatment plants. In fact, the largest source of water pollution comes from city streets, neighborhoods, construction sites and parking lots. This type of pollution is sometimes called “non-point source” pollution.
- There are two types of non-point source pollution: stormwater and urban runoff pollution.
- Stormwater runoff results from rainfall. When rainstorms cause large volumes of water to rinse the urban landscape, picking up pollutants along the way.
- Urban runoff can happen any time of the year when excessive water use from irrigation, vehicle washing and other sources carries trash, lawn clippings and other urban pollutants into storm drains.

## Where Does It Go?

- Anything we use outside homes, vehicles and businesses – like motor oil, paint, pesticides, fertilizers and cleaners – can be blown or washed into storm drains.
- A little water from a garden hose or rain can also send materials into storm drains.
- Storm drains are separate from our sanitary sewer systems; unlike water in sanitary sewers (from sinks or toilets), water in storm drains is not treated before entering our waterways.

## Sources of Non-Point Source Pollution

- Automotive leaks and spills.
- Improper disposal of used oil and other engine fluids.
- Metals found in vehicle exhaust, weathered paint, rust, metal plating and tires.
- Pesticides and fertilizers from lawns, gardens and farms.
- Improper disposal of cleaners, paint and paint removers.
- Soil erosion and dust debris from landscape and construction activities.
- Litter, lawn clippings, animal waste, and other organic matter.
- Oil stains on parking lots and paved surfaces.

## The Effect on the Ocean

Non-point source pollution can have a serious impact on water quality in Orange County. Pollutants from the storm drain system can harm marine life as well as coastal and wetland habitats. They can also degrade recreation areas such as beaches, harbors and bays.

Stormwater quality management programs have been developed throughout Orange County to educate and encourage the public to protect water quality, monitor runoff in the storm drain system, investigate illegal dumping and maintain storm drains.

Support from Orange County residents and businesses is needed to improve water quality and reduce urban runoff pollution. Proper use and disposal of materials will help stop pollution before it reaches the storm drain and the ocean.

Follow these simple steps to help reduce water pollution:

## Household Activities

- Do not rinse spills with water. Use dry cleanup methods such as applying cat litter or another absorbent material, sweep and dispose of in the trash. Take items such as used or excess batteries, oven cleaners, automotive fluids, painting products and cathode ray tubes, like TVs and computer monitors, to a Household Hazardous Waste Collection Center (HHWCC).
- For a HHWCC near you call (714) 834-6752 or visit www.oclandfills.com.
- Do not hose down your driveway, sidewalk or patio to the street, gutter or storm drain. Sweep up debris and dispose of it in the trash.

## Automotive

- Take your vehicle to a commercial car wash whenever possible. If you wash your vehicle at home, choose soaps, cleaners, or detergents labeled non-toxic, phosphate- free or biodegradable. Vegetable and citrus-based products are typically safest for the environment.
- Do not allow washwater from vehicle washing to drain into the street, gutter or storm drain. Excess washwater should be disposed of in the sanitary sewer (through a sink or toilet) or onto an absorbent surface like your lawn.
- Monitor your vehicles for leaks and place a pan under leaks. Keep your vehicles well maintained to stop and prevent leaks.
- Never pour oil or antifreeze in the street, gutter or storm drain. Recycle these substances at a service station, a waste oil collection center or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.1800cleanup.org.

## Pool Maintenance

- Pool and spa water must be dechlorinated and free of excess acid, alkali or color to be allowed in the street, gutter or storm drain.
- When it is not raining, drain dechlorinated pool and spa water directly into the sanitary sewer.
- Some cities may have ordinances that do not allow pool water to be disposed of in the storm drain. Check with your city.

## Landscape and Gardening

- Do not over-water. Water your lawn and garden by hand to control the amount of water you use or set irrigation systems to reflect seasonal water needs. If water flows off your yard onto your driveway or sidewalk, your system is over-watering. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of waste by composting, hauling it to a permitted landfill, or as green waste through your city's recycling program.
- Follow directions on pesticides and fertilizer, (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Take unwanted pesticides to a HHWCC to be recycled. For locations and hours of HHWCC, call (714) 834-6752 or visit www.oclandfills.com.

## Trash

- Place trash and litter that cannot be recycled in securely covered trash cans.
- Whenever possible, buy recycled products.
- Remember: Reduce, Reuse, Recycle.

## Pet Care

- Always pick up after your pet. Flush waste down the toilet or dispose of it in the trash. Pet waste, if left outdoors, can wash into the street, gutter or storm drain.
- If possible, bathe your pets indoors. If you must bathe your pet outside, wash it on your lawn or another absorbent/permeable surface to keep the washwater from entering the street, gutter or storm drain.
- Follow directions for use of pet care products and dispose of any unused products at a HHWCC.

## Common Pollutants

### *Home Maintenance*

- Detergents, cleaners and solvents
- Oil and latex paint
- Swimming pool chemicals
- Outdoor trash and litter

### *Lawn and Garden*

- Pet and animal waste
- Pesticides
- Clippings, leaves and soil
- Fertilizer

### *Automobile*

- Oil and grease
- Radiator fluids and antifreeze
- Cleaning chemicals
- Brake pad dust

# For More Information

**California Environmental Protection Agency**
www.calepa.ca.gov

- **Air Resources Board**
  www.arb.ca.gov
- **Department of Pesticide Regulation**
  www.cdpr.ca.gov
- **Department of Toxic Substances Control**
  www.dtsc.ca.gov
- **Integrated Waste Management Board**
  www.ciwmb.ca.gov
- **Office of Environmental Health Hazard Assessment**
  www.oehha.ca.gov
- **State Water Resources Control Board**
  www.waterboards.ca.gov

**Earth 911** - Community-Specific Environmental Information 1-800-cleanup or visit www.1800cleanup.org

**Health Care Agency's Ocean and Bay Water Closure and Posting Hotline**
(714) 433-6400 or visit www.ocbeachinfo.com

**Integrated Waste Management Dept. of Orange County** (714) 834-6752 or visit www.oclandfills.com for information on household hazardous waste collection centers, recycling centers and solid waste collection

**O.C. Agriculture Commissioner**
(714) 447-7100 or visit www.ocagcomm.com

**Stormwater Best Management Practice Handbook**
Visit www.cabmphandbooks.com

**UC Master Gardener Hotline**
(714) 708-1646 or visit www.uccemg.com

The Orange County Stormwater Program has created and moderates an electronic mailing list to facilitate communications, take questions and exchange ideas among its users about issues and topics related to stormwater and urban runoff and the implementation of program elements. To join the list, please send an email to ocstormwaterinfo-join@list.ocwatersheds.com

## Orange County Stormwater Program

| | |
|---|---|
| Aliso Viejo | (949) 425-2535 |
| Anaheim Public Works Operations | (714) 765-6860 |
| Brea Engineering | (714) 990-7666 |
| Buena Park Public Works | (714) 562-3655 |
| Costa Mesa Public Services | (714) 754-5323 |
| Cypress Public Works | (714) 229-6740 |
| Dana Point Public Works | (949) 248-3584 |
| Fountain Valley Public Works | (714) 593-4441 |
| Fullerton Engineering Dept. | (714) 738-6853 |
| Garden Grove Public Works | (714) 741-5956 |
| Huntington Beach Public Works | (714) 536-5431 |
| Irvine Public Works | (949) 724-6315 |
| La Habra Public Services | (562) 905-9792 |
| La Palma Public Works | (714) 690-3310 |
| Laguna Beach Water Quality | (949) 497-0378 |
| Laguna Hills Public Services | (949) 707-2650 |
| Laguna Niguel Public Works | (949) 362-4337 |
| Laguna Woods Public Works | (949) 639-0500 |
| Lake Forest Public Works | (949) 461-3480 |
| Los Alamitos Community Dev. | (562) 431-3538 |
| Mission Viejo Public Works | (949) 470-3056 |
| Newport Beach, Code & Water Quality Enforcement | (949) 644-3215 |
| Orange Public Works | (714) 532-6480 |
| Placentia Public Works | (714) 993-8245 |
| Rancho Santa Margarita | (949) 635-1800 |
| San Clemente Environmental Programs | (949) 361-6143 |
| San Juan Capistrano Engineering | (949) 234-4413 |
| Santa Ana Public Works | (714) 647-3380 |
| Seal Beach Engineering | (562) 431-2527 x317 |
| Stanton Public Works | (714) 379-9222 x204 |
| Tustin Public Works/Engineering | (714) 573-3150 |
| Villa Park Engineering | (714) 998-1500 |
| Westminster Public Works/Engineering | (714) 898-3311 x446 |
| Yorba Linda Engineering | (714) 961-7138 |
| Orange County Stormwater Program | (877) 897-7455 |

Orange County 24-Hour
Water Pollution Problem Reporting Hotline
1-877-89-SPILL (1-877-897-7455)

On-line Water Pollution Problem Reporting Form
www.ocwatersheds.com

Printed on Recycled Paper

# The Ocean Begins at Your Front Door

# The Pollution Solution

Several residential activities can result in water pollution. Among these activities are car washing and hosing off driveways and sidewalks. Both activities can waste water and result in excess runoff. Water conservation methods described in this pamphlet can prevent considerable amounts of runoff and conserve water. By taking your car to a commercial car wash and by sweeping driveways and sidewalks, you can further prevent the transport of pollutants to Orange County waterways. Here are some of the common pollutants for which you can be part of the solution:

## 1 Pesticides and Fertilizer

- **Pollution:** The same pesticides that are designed to be toxic to pests can have an equally lethal impact on our marine life. The same fertilizer that promotes plant growth in lawns and gardens can also create nuisance algae blooms, which remove oxygen from the water and clog waterways when it decomposes.

- **Solution:** Never use pesticides or fertilizer within 48 hours of an anticipated rainstorm. Use only as much as is directed on the label and keep it off driveways and sidewalks.

## 2 Dirt and Sediment

- **Pollution:** Dirt or sediment can impede the flow of the stormwater and negatively impact stream habitat as it travels through waterways and deposits downstream. Pollutants can attach to sediment, which can then be transported through our waterways.

- **Solution:** Protect dirt stockpiles by covering them with tarps or secure plastic sheets to prevent wind or rain from allowing dirt or sediment to enter the storm drain system.

## 3 Metals

- **Pollution:** Metals and other toxins present in car wash water can harm important plankton, which forms the base of the aquatic food chain.

- **Solution:** Take your car to a commercial car wash where the wash water is captured and treated at a local wastewater treatment plant.

***DID YOU KNOW?***

***Did you know that most of the pollution found in our waterways is not from a single source, but from a "non-point" source meaning the accumulation of pollution from residents and businesses throughout the community***

## 4 Pet Waste

- **Pollution:** Pet waste carries bacteria through our watersheds and eventually will be washed out to the ocean. This can pose a health risk to swimmers and surfers.

- **Solution:** Pick up after your pets!

## 5 Trash and Debris

- **Pollution:** Trash and debris can enter waterways by wind, littering and careless maintenance of trash receptacles. Street sweeping collects some of this trash; however, much of what isn't captured ends up in our storm drain system where it flows untreated out to the ocean.

- **Solution:** Don't litter and make sure trash containers are properly covered. It is far more expensive to clean up the litter and trash that ends up in our waterways than it is to prevent it in the first place. Come out to one of Orange County's many locations for Coastal and Inner-Coastal Cleanup Day, which is held in September.

## 6 Motor Oil / Vehicle Fluids

- **Pollution:** Oil and petroleum products from our vehicles are toxic to people, wildlife and plants.

- **Solution:** Fix any leaks from your vehicle and keep the maintenance up on your car. Use absorbent material such as cat litter on oil spills, then sweep it up and dispose of it in the trash. Recycle used motor oil at a local Household Hazardous Waste Collection Center.

## A TEAM EFFORT

The Orange County Stormwater Program has teamed with the Municipal Water District of Orange County (MWDOC) and the University of California Cooperative Extension Program (UCCE) to develop this pamphlet.

Low Impact Development (LID) and sustainable water use prevents water pollution and conserves water for drinking and reuse. Reducing your water use and the amount of water flowing from your home protects the environment and saves you money.

## Thank you for making water protection a priority!

For more information, please visit www.ocwatersheds.com/publiced/

www.mwdoc.com

www.uccemg.com


To report a spill, call the Orange County 24-Hour Water Pollution Prevention Reporting Hotline at 1-877-89-SPILL \ (1-877-897-7455)

**Special Thanks to**
The City of Los Angeles Stormwater Program for the use of its artwork

The Metropolitan Water District of Southern California for the use of the California-Friendly Plant and Native Habitat photos

PROJECT Pollution PREVENTION

UCCE University of California Cooperative Extension

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

# RUNOFF, RAINWATER AND REUSE

## Where Does Water Runoff Go?

Stormwater, or water from rainfall events, and runoff from outdoor water use such as sprinklers and hoses flows from homes directly into catch basins and the storm drain system. After entering the storm drain, the water flows untreated into streams, rivers, bays and ultimately the Pacific Ocean. Runoff can come from lawns, gardens, driveways, sidewalks and roofs. As it flows over hard, impervious surfaces, it picks up pollutants. Some pollutants carried by the water runoff include trash, pet waste, pesticides, fertilizer, motor oil and more.

## Water Conservation

Pollution not only impairs the water quality for habitat and recreation, it can also reduce the water available for reuse. Runoff allowed to soak into the ground is cleaned as it percolates through the soil, replenishing depleted groundwater supplies. Groundwater provides at least 50% of the total water for drinking and other indoor household activities in north and central Orange County. When land is covered with roads, parking lots, homes, etc., there is less land to take in the water and more hard surfaces over which the water can flow.

In Orange County, 60-70% of water used by residents and businesses goes to irrigation and other outdoor uses. Reusing rainwater to irrigate our lawn not only reduces the impact of water pollution from runoff, but it also is a great way to conserve our precious water resources and replenish our groundwater basin.

### What is Low Impact Development (LID)?

Low Impact Development (LID) is a method of development that seeks to maintain the natural hydrologic character of an area. LID provides a more sustainable and pollution-preventative approach to water management.

New water quality regulations require implementation of LID in larger new developments and encourage implementation of LID and other sustainable practices in existing residential areas. Implementing modifications to your lawn or garden can reduce pollution in our environment, conserve water and reduce your water bill.

Permeable pavement allows water runoff to infiltrate through the soil and prevents most pollutants from reaching the storm drain system.

# OPTIONS FOR RAINWATER HARVESTING AND REUSE

Rainwater harvesting is a great way to save money, prevent pollution and reduce potable water use. To harvest your rainwater, simply redirect the runoff from roofs and downspouts to rain barrels. Rain gardens are another option; these reduce runoff as well as encourage infiltration.

## Downspout Disconnection/Redirection

Disconnecting downspouts from pipes running to the gutter prevents runoff from transporting pollutants to the storm drain. Once disconnected, downspouts can be redirected to rain gardens or other vegetated areas, or be connected to a rain barrel.

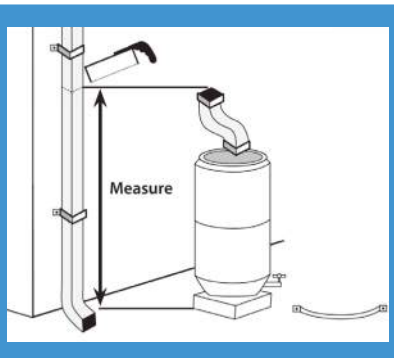
## Rain Barrels

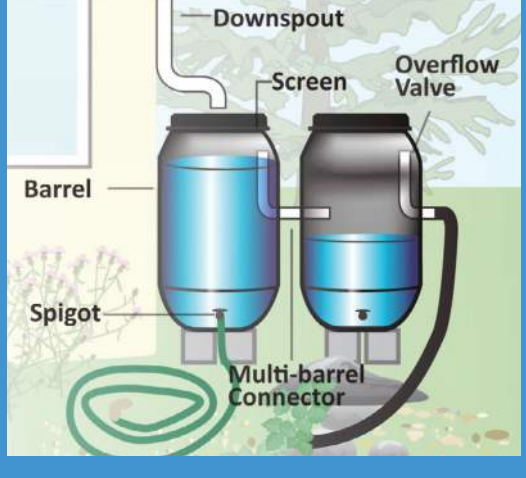
Rain barrels capture rainwater flow from roofs for reuse in landscape irrigation. Capacity of rain barrels needed for your home will depend on the amount of roof area and rainfall received. When purchasing your rain barrel, make sure it includes a screen, a spigot to siphon water for use, an overflow tube to allow for excess water to run out and a connector if you wish to connect multiple barrels to add capacity of water storage.

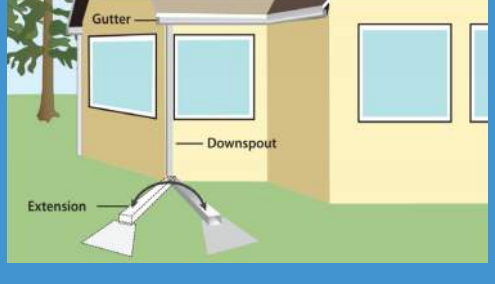
Mosquito growth prevention is very important when installing a rain barrel. The best way to prevent mosquito breeding is to eliminate entry points by ensuring all openings are sealed tightly. If these methods are unsuccessful, products are available to kill mosquito larvae, but that are harmless to animals and humans. Regular application of these products is essential. Please visit the Orange County Vector Control website for more information at www.ocvcd.org/mosquitoes3.php.

## Rain Gardens

Rain gardens allow runoff to be directed from your roof downspout into a landscaped area. Vegetation and rocks in the garden will slow the flow of water to allow for infiltration into the soil. Plants and soil particles will absorb pollutants from the roof runoff. By utilizing a native plant palate, rain gardens can be maintained all year with minimal additional irrigation. These plants are adapted to the semi-arid climate of Southern California, require less water and can reduce your water bill.




Before modifying your yard to install a rain garden, please consult your local building and/or planning departments to ensure your garden plan follows pertinent building codes and ordinances. Besides codes and ordinances, some home owner associations also have guidelines for yard modifications. If your property is in hill areas or includes engineered slopes, please seek professional advice before proceeding with changes.

For information on how to disconnect a downspout or to install and maintain a rain barrel or rain garden at your home, please see the Los Angeles Rainwater Harvesting Program, A Homeowner's "How-To" Guide, November 2009 at www.larainwaterharvesting.org/

# OTHER WATER CONSERVATION AND POLLUTION PREVENTION TECHNIQUES

### Native Vegetation and Maintenance

"California Friendly" plants or native vegetation can significantly reduce water use. These plants often require far less fertilizers and pesticides, which are two significant pollutants found in Orange County waterways. Replacing water "thirsty" plants and grass types with water efficient natives is a great way to save water and reduce the need for potentially harmful pesticides and fertilizer.

Please see the California Friendly Garden Guide produced by the Metropolitan Water District of Southern California and associated Southern California Water Agencies for a catalog of California friendly plants and other garden resources at www.bewaterwise.com/Gardensoft.

### Weed Free Yards

Weeds are water thieves. They often reproduce quickly and rob your yard of both water and nutrients. Weed your yard by hand if possible. If you use herbicides to control the weeds, use only the amount recommended on the label and never use it if rain is forecast within the next 48 hours.

### Soil Amendments

Soil amendments such as green waste (e.g. grass clippings, compost, etc.) can be a significant source of nutrients and can help keep the soil near the roots of plants moist. However, they can cause algal booms if they get into our waterways, which reduces the amount of oxygen in the water and impacts most aquatic organisms. It is important to apply soil amendments more than 48 hours prior to predicted rainfall.

# IRRIGATE EFFICIENTLY

Water runoff from sprinklers left on too long will carry pollutants into our waterways.

### Smart Irrigation Controllers

Smart Irrigation Controllers have internal clocks as well as sensors that will turn off the sprinklers in response to environmental changes. If it is raining, too windy or too cold, the smart irrigation control sprinklers will automatically shut off.

Check with your local water agency for available rebates on irrigation controllers and smart timers.

- Aim your sprinklers at your lawn, not the sidewalk – By simply adjusting the direction of your sprinklers you can save water, prevent water pollution from runoff, keep your lawn healthy and save money.
- **Set a timer for your sprinklers** – lawns absorb the water they need to stay healthy within a few minutes of turning on the sprinklers. Time your sprinklers; when water begins running off your lawn, you can turn them off. Your timer can be set to water your lawn for this duration every time.
- **Water at Sunrise** – Watering early in the morning will reduce water loss due to evaporation. Additionally, winds tend to die down in the early morning so the water will get to the lawn as intended.
- **Water by hand** – Instead of using sprinklers, consider watering your yard by hand. Hand-watering ensures that all plants get the proper amount of water and you will prevent any water runoff, which wastes water and carries pollutants into our waterways.
- **Fix leaks** - Nationwide, households waste one trillion gallons of water a year to leaks – that is enough water to serve the entire state of Texas for a year. If your garden hose is leaking, replace the nylon or rubber hose washer and ensure a tight connection. Fix broken sprinklers immediately.

**Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities such as pest control can lead to water pollution if you're not careful. Pesticide treatments must be planned and applied properly to ensure that pesticides do not enter the street, gutter or storm drain. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.**

**You would never dump pesticides into the ocean, so don't let it enter the storm drains. Pesticides can cause significant damage to our environment if used improperly. If you are thinking of using a pesticide to control a pest, there are some important things to consider.**

For more information,
please call
University of California Cooperative
Extension Master Gardeners at
(714) 708-1646
or visit these Web sites:
www.uccemg.org
www.ipm.ucdavis.edu

For instructions on collecting a specimen sample visit the Orange County Agriculture Commissioner's website at:
http://www.ocagcomm.com/ser_lab.asp

To report a spill, call the
**Orange County 24-Hour**
**Water Pollution Problem**
**Reporting Hotline**
**at 1-877-89-SPILL (1-877-897-7455).**

**For emergencies, dial 911.**

Information From:
Cheryl Wilen, Area IPM Advisor; Darren Haver, Watershed Management Advisor; Mary Louise Flint, IPM Education and Publication Director; Pamela M. Geisel, Environmental Horticulture Advisor; Carolyn L. Unruh, University of California Cooperative Extension staff writer. Photos courtesy of the UC Statewide IPM Program and Darren Haver.

Funding for this brochure has been provided in full or in part through an agreement with the State Water Resources Control Board (SWRCB) pursuant to the Costa-Machado Water Act of 2000 (Prop. 13).

Printed on Recycled Paper

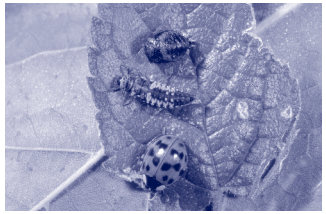
Help Prevent Ocean Pollution:

# Responsible Pest Control

# Tips for Pest Control

## *Key Steps to Follow:*

### *Step 1:* Correctly identify the pest (insect, weed, rodent, or disease) and verify that it is actually causing the problem.



Three life stages of the common lady beetle, a beneficial insect.

This is important because beneficial insects are often mistaken for pests and sprayed with pesticides needlessly.

Consult with a Certified Nursery Professional at a local nursery or garden center or send a sample of the pest to the Orange County Agricultural Commissioner's Office.

Determine if the pest is still present – even though you see damage, the pest may have left.

### *Step 2:* Determine how many pests are present and causing damage.

Small pest populations may be controlled more safely using non-pesticide techniques. These include removing food sources, washing off leaves with a strong stream of water, blocking entry into the home using caulking and replacing problem plants with ones less susceptible to pests.

Integrated Pest Management (IPM) usually combines several least toxic pest control methods for long-term prevention and management of pest problems without harming you, your family, or the environment.

UC CE University of California Cooperative Extension

### *Step 3:* If a pesticide must be used, choose the least toxic chemical.

Obtain information on the least toxic pesticides that are effective at controlling the target pest from the UC Statewide Integrated Pest Management (IPM) Program's Web site at www.ipm.ucdavis.edu.

Seek out the assistance of a Certified Nursery Professional at a local nursery or garden center when selecting a pesticide. Purchase the smallest amount of pesticide available.

Apply the pesticide to the pest during its most vulnerable life stage. This information can be found on the pesticide label.

### *Step 4:* Wear appropriate protective clothing.

Follow pesticide labels regarding specific types of protective equipment you should wear. Protective clothing should always be washed separately from other clothing.

### *Step 5:* Continuously monitor external conditions when applying pesticides such as weather, irrigation, and the presence of children and animals.

Never apply pesticides when rain is predicted within the next 48 hours. Also, do not water after applying pesticides unless the directions say it is necessary.

Apply pesticides when the air is still; breezy conditions may cause the spray or dust to drift away from your targeted area.

In case of an emergency call 911 and/or the regional poison control number at (714) 634-5988 or (800) 544-4404 (CA only).

For general questions you may also visit www.calpoison.org.

### *Step 6:* In the event of accidental spills, sweep up or use an absorbent agent to remove any excess pesticides. Avoid the use of water.

Be prepared. Have a broom, dust pan, or dry absorbent material, such as cat litter, newspapers or paper towels, ready to assist in cleaning up spills.

Contain and clean up the spill right away. Place contaminated materials in a doubled plastic bag. All materials used to clean up the spill should be properly disposed of according to your local Household Hazardous Waste Disposal site.

### *Step 7:* Properly store and dispose of unused pesticides.

Purchase Ready-To-Use (RTU) products to avoid storing large concentrated quantities of pesticides.

Store unused chemicals in a locked cabinet.

Unused pesticide chemicals may be disposed of at a Household Hazardous Waste Collection Center.

Empty pesticide containers should be triple rinsed prior to disposing of them in the trash.

**Household Hazardous Waste Collection Center**
**(714) 834-6752**
**www.oclandfills.com**

PROJECT Pollution PREVENTION

**Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Fertilizers, pesticides and other chemicals that are left on yards or driveways can be blown or washed into storm drains that flow to the ocean. Overwatering lawns can also send materials into storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.**

**You would never pour gardening products into the ocean, so don't let them enter the storm drains. Follow these easy tips to help prevent water pollution.**

For more information,
please call the
**Orange County Stormwater Program**
at **1-877-89-SPILL** (1-877-897-7455)
or visit
**www.ocwatersheds.com**

**UCCE Master Gardener Hotline:**
**(714) 708-1646**

To report a spill,
call the
**Orange County 24-Hour**
**Water Pollution Problem**
**Reporting Hotline**
**1-877-89-SPILL** (1-877-897-7455).

**For emergencies, dial 911.**

The tips contained in this brochure provide useful information to help prevent water pollution while landscaping or gardening. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

Printed on Recycled Paper

Help Prevent Ocean Pollution:

# Tips for Landscape & Gardening

**The Ocean Begins at Your Front Door**

PROJECT Pollution PREVENTION

# Tips for Landscape & Gardening

Never allow gardening products or polluted water to enter the street, gutter or storm drain.

## *General Landscaping Tips*

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.
- Plant native vegetation to reduce the amount of water, fertilizers, and pesticide applied to the landscape.

- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

## *Garden & Lawn Maintenance*

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.

- Use slow-release fertilizers to minimize leaching, and use organic fertilizers.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.

- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting. For more information, visit **www.ipm.ucdavis.edu**.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Hazardous Waste Collection Center to be recycled. Locations are provided below.

**Household Hazardous Waste Collection Centers**

| | |
|---|---|
| **Anaheim:** | 1071 N. Blue Gum St. |
| **Huntington Beach:** | 17121 Nichols St. |
| **Irvine:** | 6411 Oak Canyon |
| **San Juan Capistrano:** | 32250 La Pata Ave. |

**For more information, call (714) 834-6752 or visit www.oclandfills.com**

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities such as painting can lead to water pollution if you're not careful. Paint must be used, stored and disposed of properly to ensure that it does not enter the street, gutter or storm drain. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never dump paint into the ocean, so don't let it enter the storm drains. Follow these easy tips to help prevent water pollution.

For more information, please call the **Orange County Stormwater Program** at **1-877-89-SPILL** (1-877-897-7455) or visit **www.ocwatersheds.com**

To report a spill, call the **Orange County 24-Hour Water Pollution Problem Reporting Hotline** at **1-877-89-SPILL** (1-877-897-7455).

**For emergencies, dial 911.**

The tips contained in this brochure provide useful information to help prevent water pollution while using, storing and disposing of paint. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

Printed on Recycled Paper

Help Prevent Ocean Pollution:

# Tips for Projects Using Paint

# Tips for Projects Using Paint

Paint can cause significant damage to our environment. Whether you hire a contractor or do it yourself, it is important to follow these simple tips when purchasing, using, cleaning, storing and disposing of paint.

## *Purchasing Paint*

- Measure the room or object to be painted, then buy only the amount needed.
- Whenever possible, use water-based paint since it usually does not require hazardous solvents such as paint thinner for cleanup.

## *Painting*

- Use only one brush or roller per color of paint to reduce the amount of water needed for cleaning.
- Place open paint containers or trays on a stable surface and in a position that is unlikely to spill.
- Always use a tarp under the area or object being painted to collect paint drips and contain spills.

## *Cleaning*

- Never clean brushes or rinse paint containers in the street, gutter or storm drain.
- For oil-based products, use as much of the paint on the brushes as possible. Clean brushes with thinner. To reuse thinner, pour it through a fine filter (e.g. nylon, metal gauze or filter paper) to remove solids such as leftover traces of paint.
- For water-based products, use as much of the paint on the brushes as possible, then rinse in the sink.
- Collect all paint chips and dust. Chips and dust from marine paints or paints containing lead, mercury or tributyl tin are hazardous waste. Sweep up and dispose of at a Household Hazardous Waste Collection Center (HHWCC).

## *Storing Paint*

- Store paint in a dry location away from the elements.
- Store leftover water-based paint, oil-based paint and solvents separately in original or clearly marked containers.
- Avoid storing paint cans directly on cement floors. The bottom of the can will rust much faster on cement.
- Place the lid on firmly and store the paint can upside-down to prevent air from entering. This will keep the paint usable longer. Oil-based paint is usable for up to 15 years. Water-based paint remains usable for up to 10 years.

## *Alternatives to Disposal*

- Use excess paint to apply another coat, for touch-ups, or to paint a closet, garage, basement or attic.
- Give extra paint to friends or family. Extra paint can also be donated to a local theatre group, low-income housing program or school.
- Take extra paint to an exchange program such as the **"Stop & Swap"** that allows you to drop off or pick up partially used home care products free of charge. **"Stop & Swap"** programs are available at most HHWCCs.
- For HHWCC locations and hours, call **(714) 834-6752** or visit **www.oclandfills.com**.

## *Disposing of Paint*

- Never put wet paint in the trash.

### *For water-based paint:*

- If possible, brush the leftover paint on cardboard or newspaper. Otherwise, allow the paint to dry in the can with the lid off in a well-ventilated area protected from the elements, children and pets. Stirring the paint every few days will speed up the drying.
- Large quantities of extra paint should be taken to a HHWCC.
- Once dried, paint and painted surfaces may be disposed of in the trash. When setting a dried paint can out for trash collection, leave the lid off so the collector will see that the paint has dried.

### *For oil-based paint:*

- Oil-based paint is a household hazardous waste. All leftover paint should be taken to a HHWCC.

### *Aerosol paint:*

- Dispose of aerosol paint cans at a HHWCC.

## *Spills*

- Never hose down pavement or other impermeable surfaces where paint has spilled.
- Clean up spills immediately by using an absorbent material such as cat litter. Cat litter used to clean water-based paint spills can be disposed of in the trash. When cleaning oil-based paint spills with cat litter, it must be taken to a HHWCC.
- Immediately report spills that have entered the street, gutter or storm drain to the County's 24-Hour Water Pollution Problem Reporting Hotline at **(714) 567-6363** or visit **www.ocwatersheds.com** to fill out an incident reporting form.

PROJECT Pollution PREVENTION

Clean beaches and healthy creeks, rivers, bays, and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Materials and excess concrete or mortar can be blown or washed into the storm drains that flow to the ocean. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never throw building materials into the ocean, so don't let them enter the storm drains. Follow these easy tips to help prevent water pollution.

For more information, please call the **Orange County Stormwater Program** at **1-877-89-SPILL** (1-877-897-7455) or visit **www.ocwatersheds.com.**

To report a spill, call the **Orange County 24-Hour Water Pollution Reporting Hotline** at **1-877-89-SPILL** (1-877-897-7455).

**For emergencies, dial 911.**

The Tips contained in this brochure provide useful information about how you can keep materials and washwater from entering the storm drain system. If you have other suggestions for how water and materials may be contained, please contact your city's stormwater representative or call the Orange County Stormwater Program.

# Tips for Using Concrete and Mortar

**The Ocean Begins at Your Front Door**

PROJECT Pollution PREVENTION

# Tips for Using Concrete and Mortar

Never allow materials or washwater to enter the street or storm drain.

## *Before the Project*

- Schedule projects for dry weather.
- Store materials under cover, with temporary roofs or plastic sheets, to eliminate or reduce the possibility that the materials can be carried from the project site to streets, storm drains or adjacent properties via rainfall, runoff or wind.
- Minimize waste by ordering only the amount of materials needed to complete the job.
- Take measures to block nearby storm drain inlets.

## *During the Project*

- Set up and operate small mixers on tarps or heavy drop cloths.
- Do not mix more fresh concrete or cement than is needed for the job.

- When breaking up pavement, pick up all chunks and pieces and recycle them at a local construction and demolition recycling company. (See information to the right)
- When making saw cuts in pavement, protect nearby storm drain inlets during the saw-cutting operation and contain the slurry. Collect the slurry residue from the pavement or gutter and remove from the site.

## *Clean-Up*

- Dispose of small amounts of dry concrete, grout or mortar in the trash.
- Never hose materials from exposed aggregate concrete, asphalt or similar treatments into a street, gutter, parking lot, or storm drain.
- Wash concrete mixers and equipment in designated washout areas where the water can flow into a containment area or onto dirt. Small amounts of dried material can be disposed of in the trash. Large amounts should be recycled at a local construction and demolition recycling company. (See information below)

- Recycle cement wash water by pumping it back into cement mixers for reuse.

## *Spills*

- Never hose down pavement or impermeable surfaces where fluids have spilled. Use an absorbent material such as cat litter to soak up a spill, then sweep and dispose in the trash.
- Clean spills on dirt areas by digging up and properly disposing of contaminated dry soil in trash.
- Immediately report significant spills to the County's 24-Hour Water Pollution Problem Reporting Hotline at 714-567-6363 or log onto the County's website at www.ocwatersheds.com and fill out an incident reporting form.

**For a list of construction and demolition recycling locations in your area visit www.ciwmb.ca.gov/Recycle/.**

**For additional information on how to control, prevent, remove, and reduce pollution refer to the Stormwater Best Management Practice Handbook, available on-line at www.cabmphandbooks.com.**

# Building & Grounds Maintenance SC-41

**Objectives**

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

**Targeted Constituents**

| | |
|---|---|
| Sediment | ✓ |
| Nutrients | ✓ |
| Trash | |
| Metals | ✓ |
| Bacteria | ✓ |
| Oil and Grease | |
| Organics | |

## Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

## Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *Pollution Prevention*

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.

CASQA California Stormwater Quality Association

- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

### *Suggested Protocols*

*Pressure Washing of Buildings, Rooftops, and Other Large Objects*

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

*Landscaping Activities*

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures on exposed soils.

*Building Repair, Remodeling, and Construction*

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.
- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

*Mowing, Trimming, and Planting*

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- Use hand weeding where practical.

*Fertilizer and Pesticide Management*

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- Apply pesticides only when wind speeds are low.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Dispose of empty pesticide containers according to the instructions on the container label.

- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

*Inspection*

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.

***Training***

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

***Spill Response and Prevention***

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- Clean up spills immediately.

***Other Considerations***

Alternative pest/weed controls may not be available, suitable, or effective in many cases.

## Requirements

***Costs***

- Cost will vary depending on the type and size of facility.
- Overall costs should be low in comparison to other BMPs.

***Maintenance***

Sweep paved areas regularly to collect loose particles. Wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

## Supplemental Information

***Further Detail of the BMP***

*Fire Sprinkler Line Flushing*

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

## References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

# Parking/Storage Area Maintenance SC-43

**Objectives**

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

**Targeted Constituents**

| | |
|---|---|
| Sediment | ✓ |
| Nutrients | |
| Trash | ✓ |
| Metals | ✓ |
| Bacteria | |
| Oil and Grease | ✓ |
| Organics | ✓ |

## Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

## Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas and storage areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

### *Pollution Prevention*

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook)
- Keep accurate maintenance logs to evaluate BMP implementation.

CASQA California Stormwater Quality Association

# SC-43 Parking/Storage Area Maintenance

***Suggested Protocols***

*General*

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Discharge soapy water remaining in mop or wash buckets to the sanitary sewer through a sink, toilet, clean-out, or wash area with drain.

*Controlling Litter*

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel, and dispose of litter in the trash.

*Surface Cleaning*

- Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- Follow the procedures below if water is used to clean surfaces:
  - Block the storm drain or contain runoff.
  - Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- Follow the procedures below when cleaning heavy oily deposits:
  - Clean oily spots with absorbent materials.
  - Use a screen or filter fabric over inlet, then wash surfaces.

- Do not allow discharges to the storm drain.
- Vacuum/pump discharges to a tank or discharge to sanitary sewer.
- Appropriately dispose of spilled materials and absorbents.

*Surface Repair*

- Preheat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.
- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

*Inspection*

- Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

***Training***

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

***Spill Response and Prevention***

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

***Other Considerations***

Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

# SC-43 Parking/Storage Area Maintenance

## Requirements

### *Costs*

Cleaning/sweeping costs can be quite large. Construction and maintenance of stormwater structural controls can be quite expensive as well.

### *Maintenance*

- Sweep parking lot regularly to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities regularly to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

## Supplemental Information

### *Further Detail of the BMP*

*Surface Repair*

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Only use only as much water as is necessary for dust control to avoid runoff.

## References and Resources


California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

# Drainage System Maintenance SC-44

## Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

## Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

## Targeted Constituents

| | |
|---|---|
| Sediment | ✓ |
| Nutrients | |
| Trash | ✓ |
| Metals | |
| Bacteria | ✓ |
| Oil and Grease | |
| Organics | |

## Approach

### *Pollution Prevention*

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

### *Suggested Protocols*

*Catch Basins/Inlet Structures*

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

CASQA California Stormwater Quality Association

- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

*Storm Drain Conveyance System*

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

*Pump Stations*

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

*Open Channel*

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

*Illicit Connections and Discharges*

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

*Illegal Dumping*

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

### *Training*

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).
- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

***Spill Response and Prevention***

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

***Other Considerations (Limitations and Regulations)***

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

## Requirements

***Costs***

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:
  - Purchase and installation of signs.
  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.
  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.
  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

***Maintenance***

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

## Supplemental Information

***Further Detail of the BMP***

*Storm Drain Flushing*

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

## References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

# Housekeeping Practices SC-60

## Description

Promote efficient and safe housekeeping practices (storage, use, and cleanup) when handling potentially harmful materials such as fertilizers, pesticides, cleaning solutions, paint products, automotive products, and swimming pool chemicals. Related information is provided in BMP fact sheets SC-11 Spill Prevention, Control & Cleanup and SC-34 Waste Handling & Disposal.

## Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

## Approach

### *Pollution Prevention*

- Purchase only the amount of material that will be needed for foreseeable use. In most cases this will result in cost savings in both purchasing and disposal. See SC-61 Safer Alternative Products for additional information.
- Be aware of new products that may do the same job with less environmental risk and for less or the equivalent cost. Total cost must be used here; this includes purchase price, transportation costs, storage costs, use related costs, clean up costs and disposal costs.

### *Suggested Protocols*

*General*

- Keep work sites clean and orderly. Remove debris in a timely fashion. Sweep the area.
- Dispose of wash water, sweepings, and sediments, properly.
- Recycle or dispose of fluids properly.
- Establish a daily checklist of office, yard and plant areas to confirm cleanliness and adherence to proper storage and security. Specific employees should be assigned specific inspection responsibilities and given the authority to remedy any problems found.
- Post waste disposal charts in appropriate locations detailing for each waste its hazardous nature (poison, corrosive, flammable), prohibitions on its disposal (dumpster, drain, sewer) and the recommended disposal method (recycle, sewer, burn, storage, landfill).
- Summarize the chosen BMPs applicable to your operation and post them in appropriate conspicuous places.

## Targeted Constituents

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | ☑ |
| Oil and Grease | ☑ |
| Organics | ☑ |
| Oxygen Demanding | ☑ |

- Require a signed checklist from every user of any hazardous material detailing amount taken, amount used, amount returned and disposal of spent material.
- Do a before audit of your site to establish baseline conditions and regular subsequent audits to note any changes and whether conditions are improving or deteriorating.
- Keep records of water, air and solid waste quantities and quality tests and their disposition.
- Maintain a mass balance of incoming, outgoing and on hand materials so you know when there are unknown losses that need to be tracked down and accounted for.
- Use and reward employee suggestions related to BMPs, hazards, pollution reduction, work place safety, cost reduction, alternative materials and procedures, recycling and disposal.
- Have, and review regularly, a contingency plan for spills, leaks, weather extremes etc. Make sure all employees know about it and what their role is so that it comes into force automatically.

***Training***

- Train all employees, management, office, yard, manufacturing, field and clerical in BMPs and pollution prevention and make them accountable.
- Train municipal employees who handle potentially harmful materials in good housekeeping practices.
- Train personnel who use pesticides in the proper use of the pesticides. The California Department of Pesticide Regulation license pesticide dealers, certify pesticide applicators and conduct onsite inspections.
- Train employees and contractors in proper techniques for spill containment and cleanup. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur.

***Spill Response and Prevention***

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and Countermeasure (SPCC) plant up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

***Other Considerations***

- There are no major limitations to this best management practice.
- There are no regulatory requirements to this BMP. Existing regulations already require municipalities to properly store, use, and dispose of hazardous materials

## Requirements

### *Costs*

- Minimal cost associated with this BMP. Implementation of good housekeeping practices may result in cost savings as these procedures may reduce the need for more costly BMPs.

### *Maintenance*

- Ongoing maintenance required to keep a clean site. Level of effort is a function of site size and type of activities.

## Supplemental Information

### *Further Detail of the BMP*

- The California Integrated Waste Management Board's Recycling Hotline, 1-800-553-2962, provides information on household hazardous waste collection programs and facilities.

### *Examples*

There are a number of communities with effective programs. The most pro-active include Santa Clara County and the City of Palo Alto, the City and County of San Francisco, and the Municipality of Metropolitan Seattle (Metro).

## References and Resources

British Columbia Lake Stewardship Society. Best Management Practices to Protect Water Quality from Non-Point Source Pollution. March 2000.
http://www.nalms.org/bclss/bmphome.html#bmp

King County Stormwater Pollution Control Manual - http://dnr.metrokc.gov/wlr/dss/spcm.htm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities, Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July, 1998, Revised by California Coastal Commission, February 2002.

Orange County Stormwater Program
http://www.ocwatersheds.com/stormwater/swp_introduction.asp

San Mateo STOPPP - (http://stoppp.tripod.com/bmp.html)

# Plaza and Sidewalk Cleaning SC-71

**Objectives**

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

**Targeted Constituents**

| | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | ☑ |
| Oil and Grease | ☑ |
| Organics | ☑ |
| Oxygen Demanding | ☑ |

## Description

Pollutants on sidewalks and other pedestrian traffic areas and plazas are typically due to littering and vehicle use. This fact sheet describes good housekeeping practices that can be incorporated into the municipality's existing cleaning and maintenance program.

## Approach

### *Pollution Prevention*

- Use dry cleaning methods whenever practical for surface cleaning activities.
- Use the least toxic materials available (e.g. water based paints, gels or sprays for graffiti removal).

### *Suggested Protocols*

*Surface Cleaning*

- Regularly broom (dry) sweep sidewalk, plaza and parking lot areas to minimize cleaning with water.
- Dry cleanup first (sweep, collect, and dispose of debris and trash) when cleaning sidewalks or plazas, then wash with or without soap.
- Block the storm drain or contain runoff when cleaning with water. Discharge wash water to landscaping or collect water and pump to a tank or discharge to sanitary sewer if allowed. (Permission may be required from local sanitation district.)

- Block the storm drain or contain runoff when washing parking areas, driveways or drive-throughs. Use absorbents to pick up oil; then dry sweep. Clean with or without soap. Collect water and pump to a tank or discharge to sanitary sewer if allowed. Street Repair and Maintenance.

*Graffiti Removal*

- Avoid graffiti abatement activities during rain events.
- Implement the procedures under Painting and Paint Removal in SC-70 Roads, Streets, and Highway Operation and Maintenance fact sheet when graffiti is removed by painting over.
- Direct runoff from sand blasting and high pressure washing (with no cleaning agents) into a dirt or landscaped area after treating with an appropriate filtering device.
- Plug nearby storm drain inlets and vacuum/pump wash water to the sanitary sewer if authorized to do so if a graffiti abatement method generates wash water containing a cleaning compound (such as high pressure washing with a cleaning compound). Ensure that a non-hazardous cleaning compound is used or dispose as hazardous waste, as appropriate.

*Surface Removal and Repair*

- Schedule surface removal activities for dry weather if possible.
- Avoid creating excess dust when breaking asphalt or concrete.
- Take measures to protect nearby storm drain inlets prior to breaking up asphalt or concrete (e.g. place hay bales or sand bags around inlets). Clean afterwards by sweeping up as much material as possible.
- Designate an area for clean up and proper disposal of excess materials.
- Remove and recycle as much of the broken pavement as possible to avoid contact with rainfall and stormwater runoff.
- When making saw cuts in pavement, use as little water as possible. Cover each storm drain inlet completely with filter fabric during the sawing operation and contain the slurry by placing straw bales, sandbags, or gravel dams around the inlets. After the liquid drains or evaporates, shovel or vacuum the slurry residue from the pavement or gutter and remove from site.
- Always dry sweep first to clean up tracked dirt. Use a street sweeper or vacuum truck. Do not dump vacuumed liquid in storm drains. Once dry sweeping is complete, the area may be hosed down if needed. Wash water should be directed to landscaping or collected and pumped to the sanitary sewer if allowed.

*Concrete Installation and Repair*

- Schedule asphalt and concrete activities for dry weather.

- Take measures to protect any nearby storm drain inlets and adjacent watercourses, prior to breaking up asphalt or concrete (e.g. place san bags around inlets or work areas).
- Limit the amount of fresh concrete or cement mortar mixed, mix only what is needed for the job.
- Store concrete materials under cover, away from drainage areas. Secure bags of cement after they are open. Be sure to keep wind-blown cement powder away from streets, gutters, storm drains, rainfall, and runoff.
- Return leftover materials to the transit mixer. Dispose of small amounts of hardened excess concrete, grout, and mortar in the trash.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile, or dispose in the trash.
- Protect applications of fresh concrete from rainfall and runoff until the material has dried.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- Wash concrete trucks off site or in designated areas on site designed to preclude discharge of wash water to drainage system.

*Controlling Litter*

- Post "No Littering" signs and enforce anti-litter laws.
- Provide litter receptacles in busy, high pedestrian traffic areas of the community, at recreational facilities, and at community events.
- Cover litter receptacles and clean out frequently to prevent leaking/spillage or overflow.
- Clean parking lots on a regular basis with a street sweeper.

***Training***

- Provide regular training to field employees and/or contractors regarding surface cleaning and proper operation of equipment.
- Train employee and contractors in proper techniques for spill containment and cleanup.
- Use a training log or similar method to document training.

***Spill Response and Prevention***

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

### *Other Considerations*

- Limitations related to sweeping activities at large parking facilities may include current sweeper technology to remove oil and grease.
- Surface cleaning activities that require discharges to the local sewering agency will require coordination with the agency.
- Arrangements for disposal of the swept material collected must be made, as well as accurate tracking of the areas swept and the frequency of sweeping.

## Requirements

### *Costs*

- The largest expenditures for sweeping and cleaning of sidewalks, plazas, and parking lots are in staffing and equipment. Sweeping of these areas should be incorporated into street sweeping programs to reduce costs.

### *Maintenance*

Not applicable

## Supplemental Information

### *Further Detail of the BMP*

Community education, such as informing residents about their options for recycling and waste disposal, as well as the consequences of littering, can instill a sense of citizen responsibility and potentially reduce the amount of maintenance required by the municipality.

Additional BMPs that should be considered for parking lot areas include:

- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low concentrations.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.
- Structural BMPs such as storm drain inlet filters can be very effective in reducing the amount of pollutants discharged from parking facilities during periods of rain.

## References and Resources

Bay Area Stormwater Management Agencies Association (BASMAA). 1996. Pollution From Surface Cleaning Folder http://www.basmaa.org

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

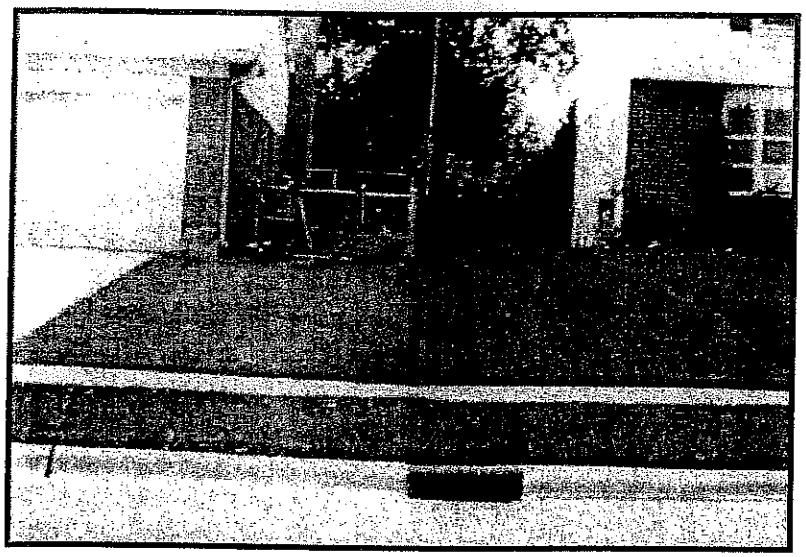
Orange County Stormwater Program
http://www.ocwatersheds.com/stormwater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

Santa Clara Valley Urban Runoff Pollution Prevention Program. Maintenance Best Management Practices for the Construction Industry. Brochures: Landscaping, Gardening, and Pool; Roadwork and Paving; and Fresh Concrete and Mortar Application. June 2001.

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Plan. 2001. Municipal Activities Model Program Guidance. November.

# Efficient Irrigation SD-12



**Design Objectives**

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

## Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

## Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

## Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

## Design Considerations

### *Designing New Installations*

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

***Redeveloping Existing Installations***

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

## Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

# Trash Storage Areas SD-32

## Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

## Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

**Design Objectives**

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

## Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

## Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

### *Designing New Installations*

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

### *Redeveloping Existing Installations*

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

## Additional Information

### *Maintenance Considerations*

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

## Other Resources

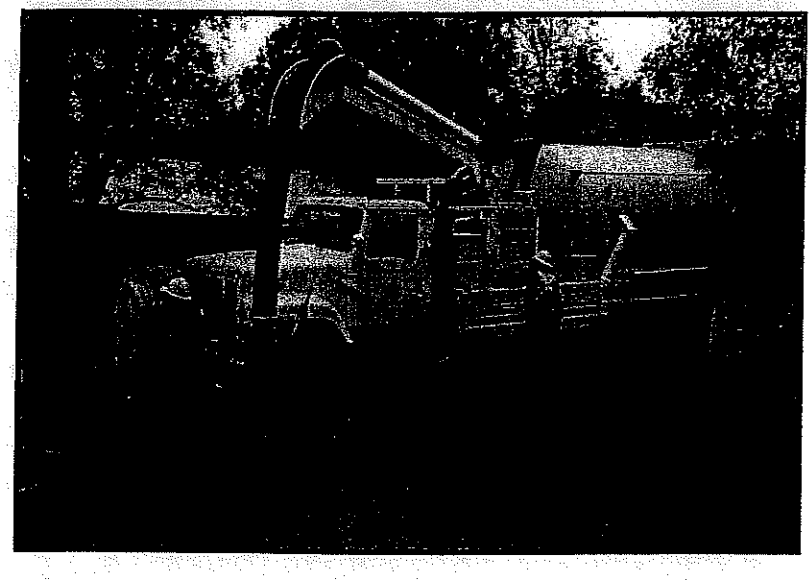
A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

# Drainage System Maintenance SC-44



**Objectives**

- Cover
- Contain
- Educate
- Reduce/Minimize

## Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

**Targeted Constituents**

| | |
|---|---|
| Sediment | ✓ |
| Nutrients | |
| Trash | ✓ |
| Metals | |
| Bacteria | ✓ |
| Oil and Grease | |
| Organics | |

## Approach

### *Pollution Prevention*

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

### *Suggested Protocols*

*Catch Basins/Inlet Structures*

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

CASQA California Stormwater Quality Association

- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

*Storm Drain Conveyance System*

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

*Pump Stations*

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

*Open Channel*

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

*Illicit Connections and Discharges*

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

*Illegal Dumping*

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

***Training***

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).
- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

***Spill Response and Prevention***

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

***Other Considerations (Limitations and Regulations)***

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

## Requirements

***Costs***

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:
  - Purchase and installation of signs.
  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.
  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.
  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

***Maintenance***

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

## Supplemental Information

***Further Detail of the BMP***

*Storm Drain Flushing*

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

## References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

# Attachment B

# Calculations

**Project:** **1300 Bristol**
**Total Area(AC)** **1.93**
**Total DCV (required) cf** **2,945**

| Drainage Area | Area (sf) | Area (AC) | Rainfall Depth (in) | Pervious Area (sf) | Pervious Area (ac) | Impervious Area (ac) | Impervious ratio | C (0.75ximp+0.15) | TC (MIN) | I1 | $Q_{DESIGN}$ (CFS) | DCV(cf) (CxdxA) | BMP USED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 19,743 | 0.45 | 0.75 | 5000 | 0.11 | 0.34 | 0.75 | 0.71 | - | - | - | 876 | Bioretention Planter |
| B | 39,858 | 0.92 | 0.75 | 3700 | 0.08 | 0.83 | 0.91 | 0.83 | - | - | - | 2,069 | Bioretention Planter |
| C | 24,670 | 0.57 | 0.75 | 4500 | 0.10 | 0.46 | 0.82 | 0.76 | 5 | 0.275 | 0.119 | - | MWS 4X8 |
| Total | 84,271 | 1.93 | | 13,200 | 0.30 | 1.63 | 0.84 | 0.78 | | | | 2,945 | |

| 1300 Bristol St - Design Capture Volume (DCV) | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Drainage Area* | *Area* (square feet) | *Area* (acres) | *Rainfall Depth* (inches) | *Impervious Area* (acres) | *Impervious Ratio* | *C* (0.75*imp+0.15) | *DCV* (cf) |
| A | 19,743 | 0.45 | 0.75 | 0.34 | 0.75 | 0.71 | 879 |
| B | 39,858 | 0.92 | 0.75 | 0.83 | 0.91 | 0.83 | 2068 |
| C | 24,670 | 0.57 | 0.75 | 0.46 | 0.81 | 0.76 | 1171 |
| | | | | | | **Total** | **4,118** |

**Simple Sizing Method for Bioretention with Underdrain**

| **Bio-retention Basin A** | | |
|---|---|---|
| DCV = | 808 | cu-ft |
| $d_p$ (ponding depth) = | 1 | ft |
| nm (bioretention media porosity) = | 0.3 | |
| dm (bioretention media depth, ft) = | 2.5 | ft |
| ng (bioretention gravel layer porosity) = | 0.40 | |
| dg (bioretention gravel depth, ft) = | 1 | ft |
| deff (dp+nm*dm+ng*dg, ft) = | 2.15 | ft |
| Required Facility Surface Area= A=(DCV/($d_{EFFECTIVE}$) | 376 | sq-ft |
| **Provided Planter Bottom Surface Area=** | **400** | **sq-ft** |

*Equations per Page XIV-34 in the Technical Guidance Document Appendices

**Simple Sizing Method for Bioretention with Underdrain**

| **Bio-retention Basin B** | | |
|---|---|---|
| DCV = | 2069 | cu-ft |
| $d_p$ (ponding depth) = | 1 | ft |
| nm (bioretention media porosity) = | 0.3 | |
| dm (bioretention media depth, ft) = | 2.5 | ft |
| ng (bioretention gravel layer porosity) = | 0.40 | |
| dg (bioretention gravel depth, ft) = | 1 | ft |
| deff (dp+nm*dm+ng*dg, ft) = | 2.15 | ft |
| Required Facility Surface Area= A=(DCV/($d_{EFFECTIVE}$) | 962 | sq-ft |
| **Provided Planter Bottom Surface Area=** | **970** | **sq-ft** |

*Equations per Page XIV-34 in the Technical Guidance Document Appendices

**HCOC CALCULATIONS**

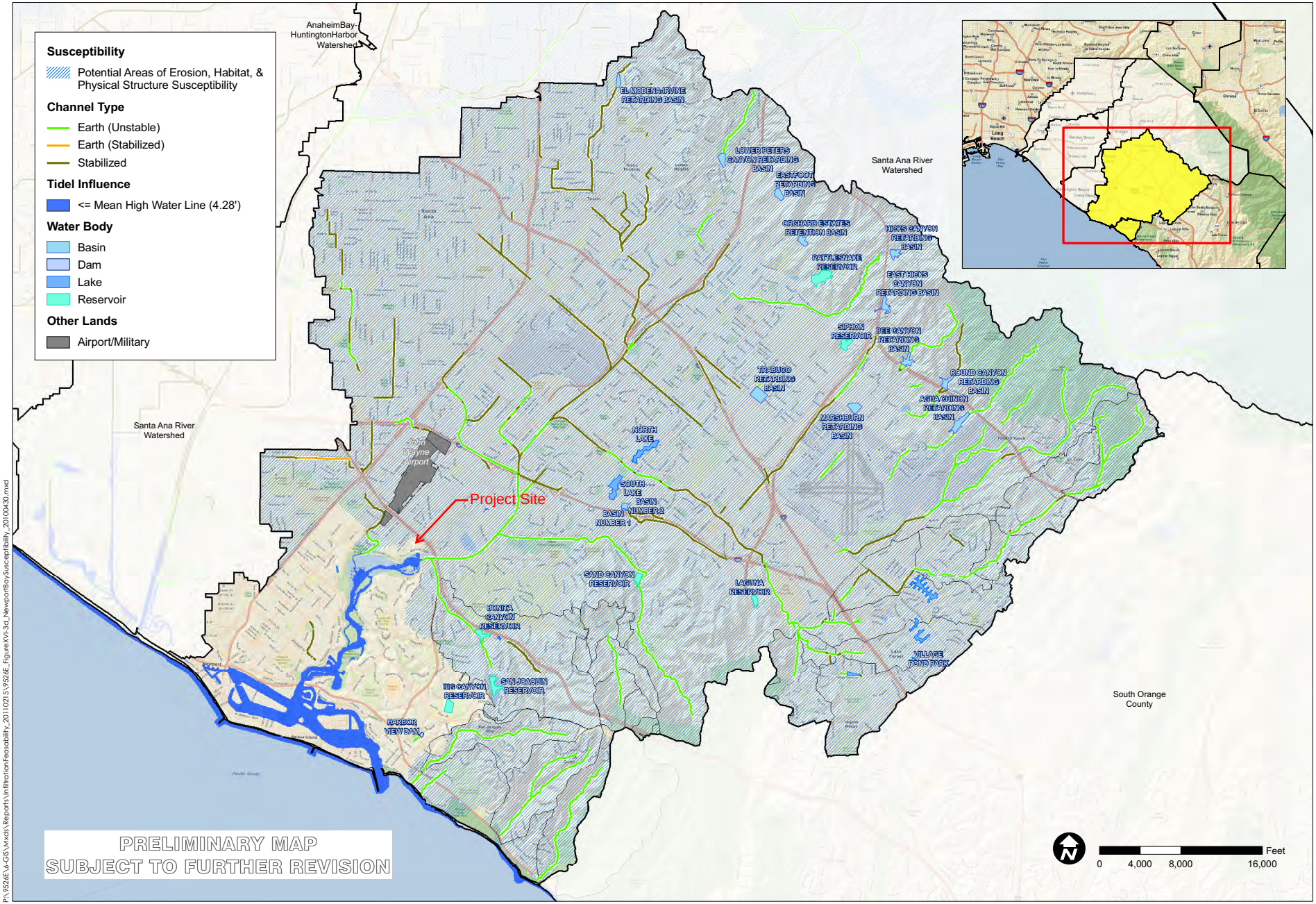
| **Proposed** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Drainage Area* | *Area* | *Area* | *Rainfall Depth* | *Pervious Area* | *Impervious Area* | *Impervious Area* | *Impervious Ratio* | *C* | *V* |
| | (square feet) | (acres) | (ft) | (sf) | (sf) | (acres) | | (0.75*imp+0.15) | (cf) |
| A | 19,743 | 0.45 | 0.18 | 5000 | 0.11 | 0.34 | 0.75 | 0.71 | 210 |
| B | 39,858 | 0.92 | 0.18 | 4100 | 0.09 | 0.82 | 0.90 | 0.82 | 492 |
| C | 24,670 | 0.57 | 0.18 | 5780 | 0.13 | 0.43 | 0.77 | 0.72 | 268 |
| Total | 84271 | 1.93 | | 14880 | 0 | 1.59 | 0.82 | | **970** |

| **Existing** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Drainage Area* | *Area* | *Area* | *Rainfall Depth* | *Pervious Area* | *Impervious Area* | *Impervious Area* | *Impervious Ratio* | *C* | *V* |
| | (square feet) | (acres) | (ft) | (sf) | (sf) | (acres) | | (0.75*imp+0.15) | (cf) |
| A | 17235 | 0.40 | 0.18 | 5251 | 11984 | 0.28 | 0.70 | 0.67 | 174 |
| B | 67037 | 1.54 | 0.18 | 11300 | 55737 | 1.28 | 0.83 | 0.77 | 778 |
| Total | 84272 | 1.93 | | 16551 | 67721 | 1.55 | 0.80 | **Total** | **951** |

**1.97%** Increase

# Attachment C

# Orange County Technical Guidance Maps




P:\9526E\6-GIS\Mxds\Reports\Infiltration Feasibility_20110215\9526E_FigureXVI-3d_NewportBaySusceptibility_20100430.mxd

TITLE
SUSCEPTIBILITY ANALYIS
NEWPORT BAY-
NEWPORT COASTAL STREAMS

JOB
ORANGE COUNTY
WATERSHED
MASTER PLANNING
ORANGE CO. CA

| | |
|---|---|
| SCALE | 1" = 4000' |
| DESIGNED | TH |
| DRAWING | TH |
| CHECKED | BMP |
| DATE | 04/30/10 |
| JOB NO. | 9526-E |

PACE
Advanced Water Engineering

FIGURE
XVI-3d


Map Scale: 1:1,060 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Lines**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Soil Rating Points**

A

A/D

B

B/D

C

C/D

D

Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: Orange County and Part of Riverside County, California
Survey Area Data: Version 14, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 27, 2020—Mar 30, 2020

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

# Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| 100 | Alo clay, 9 to 15 percent slopes | D | 0.8 | 40.9% |
| 178 | Myford sandy loam, thick surface, 0 to 2 percent slopes | D | 1.2 | 59.1% |
| **Totals for Area of Interest** | | | **2.0** | **100.0%** |

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

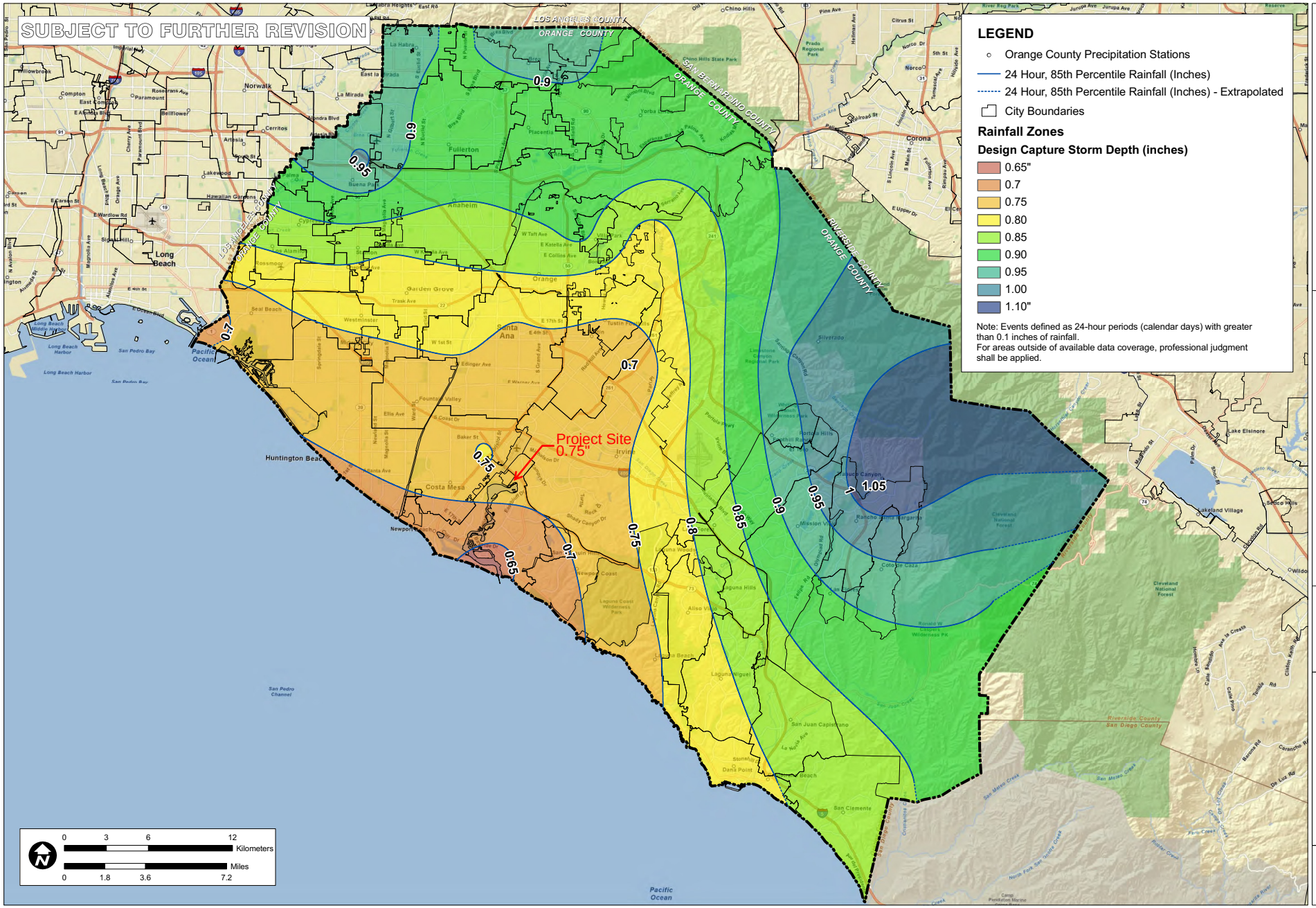
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher




P:\Y526E\6-GIS\Mxds\Reports\InfiltrationFeasability_20110215\Y526E_FigureXVI-1_RainfallZones_20110215.mxd

TITLE
RAINFALL ZONES

ORANGE COUNTY
TECHNICAL GUIDANCE
DOCUMENT

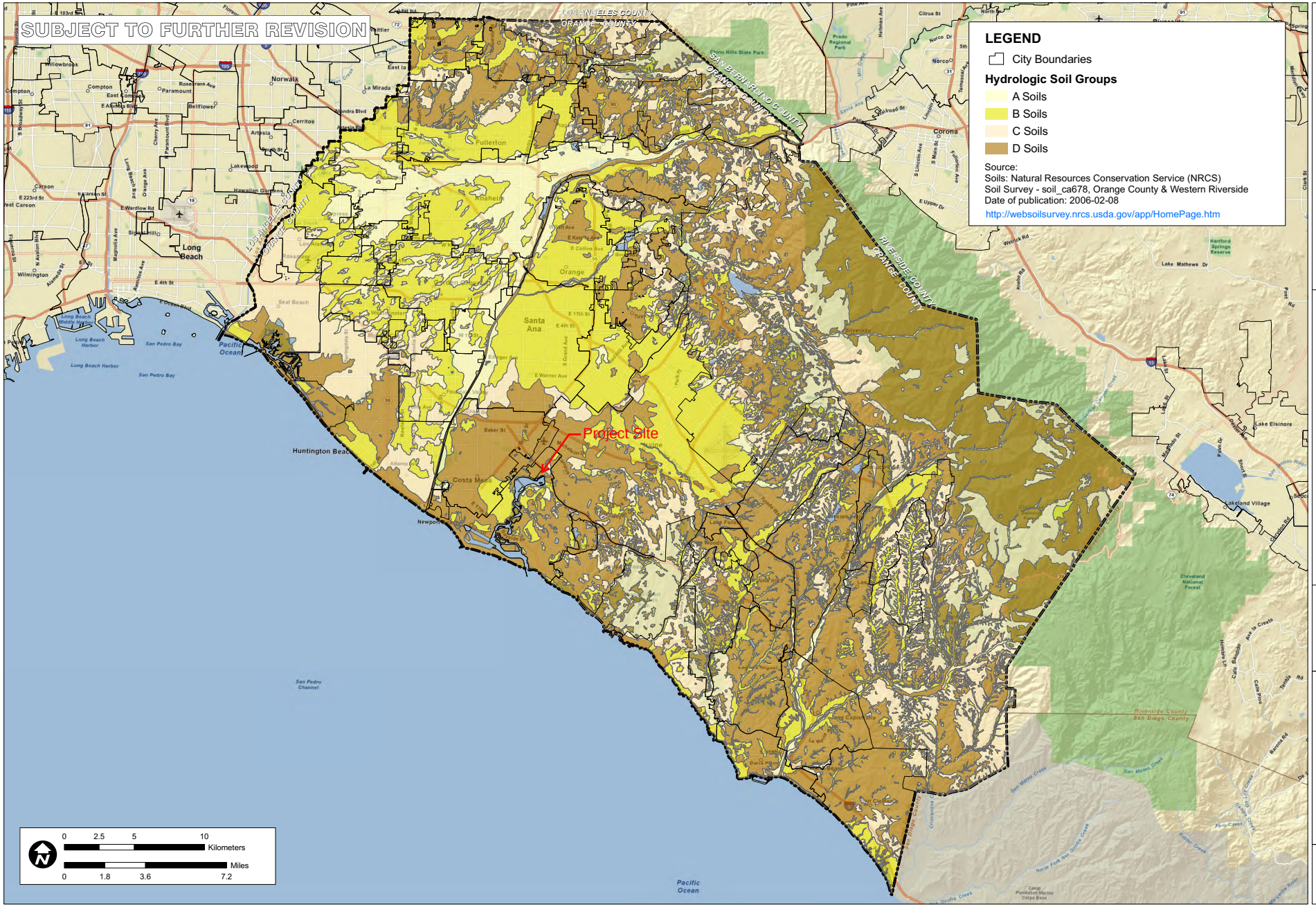
CA
ORANGE CO.

JOB

| | |
|---|---|
| SCALE | 1" = 1.8 miles |
| DESIGNED | TH |
| DRAWING | TH |
| CHECKED | BMP |
| DATE | 04/29/10 |
| JOB NO. | 9526-E |

PACE
Advanced Water Engineering

FIGURE
XVI-1




TITLE
NRCS HYDROLOGIC SOILS GROUPS

JOB
ORANGE COUNTY INFILTRATION STUDY
CA
ORANGE CO.

| | |
|---|---|
| SCALE | 1" = 1.8 miles |
| DESIGNED | TH |
| DRAWING | TH |
| CHECKED | BMP |
| DATE | 02/09/11 |
| JOB NO. | 9526-E |

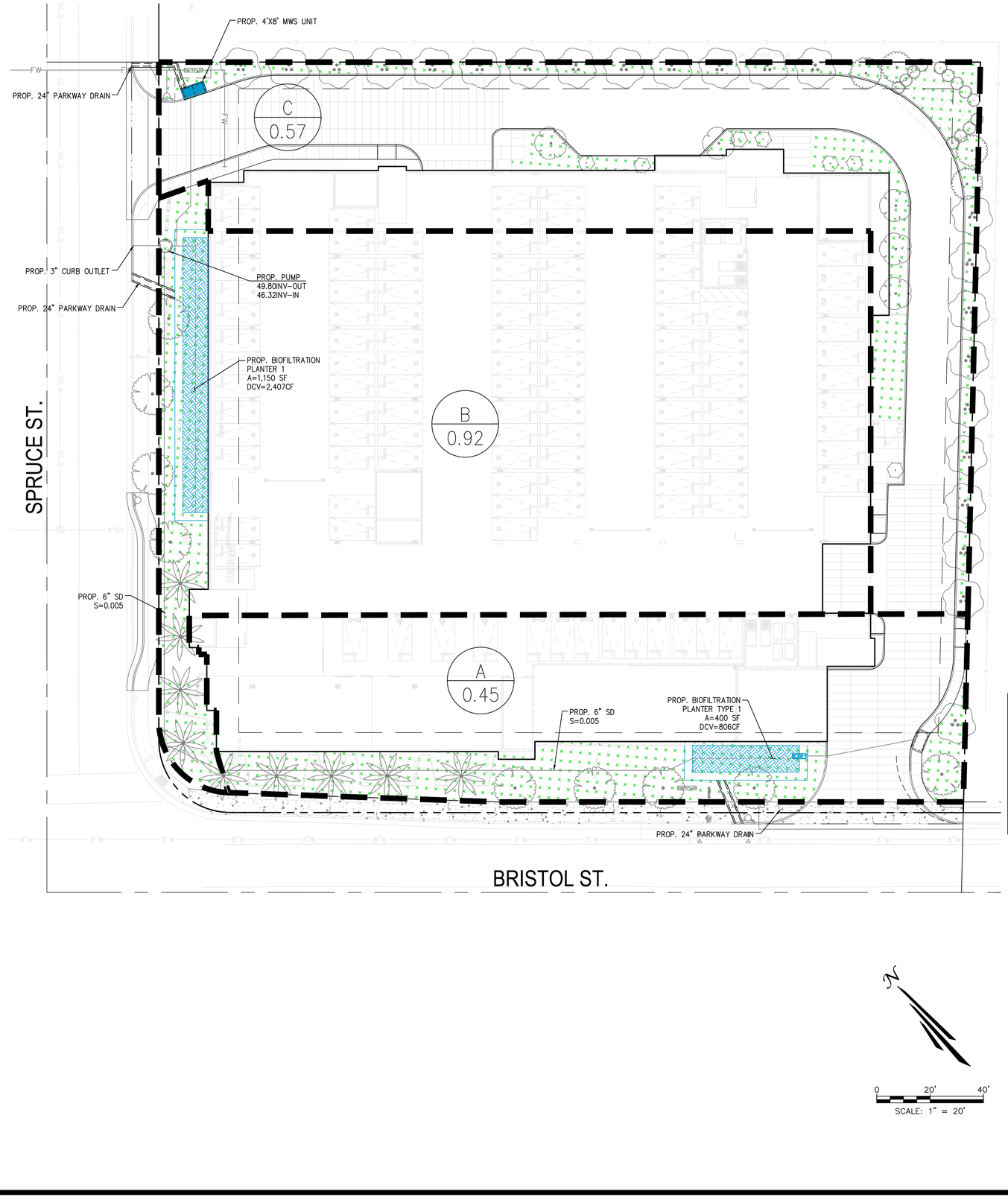
PACE
Advanced Water Engineering

FIGURE
XVI-2a

P:\9526E\6-GIS\Mxds\Reports\InfiltrationFeasability_20110215\9526E_FigureXVI-2a_HydroSoils_20110215.mxd

# Attachment D

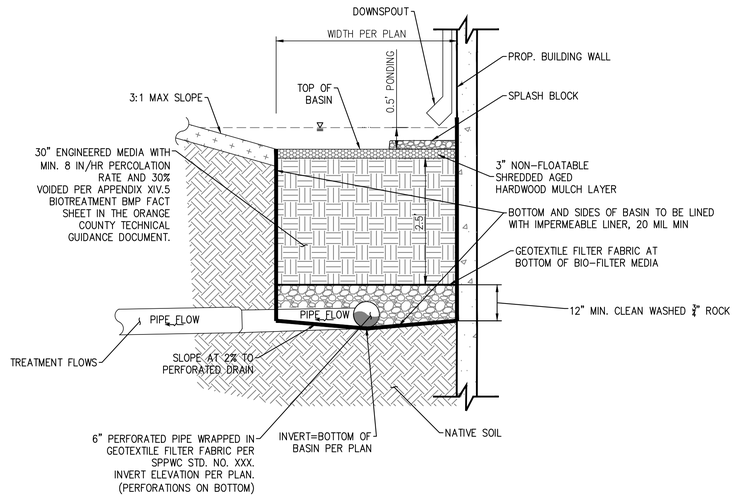
# Drainage Maps & Hydrology Narrative




## LEGEND

- PROPERTY LINE
- PROPOSED BIOFILTRATION PLANTER
- PROPOSED MODULAR WETLANDS UNIT
- X / X.XX — DRAINAGE AREA / ACREAGE
- DRAINAGE AREAS
- PROPOSED LANDSCAPE


STORM DRAIN SIGNAGE DETAIL




WATER QUALITY BASIN TYPE
NTS

| Project: | 1300 Bristol |
|---|---|
| Total Area(AC) | 1.93 |
| Total DCV (required) cf | 2,945 |

| Drainage Area | Area (sf) | Area (AC) | Rainfall Depth (in) | Pervious Area (sf) | Pervious Area (ac) | Impervious Area (ac) | Impervious ratio | C (0.75ximp+0.15) | TC (MIN) | I1 | $Q_{DESIGN}$ (CFS) | DCV(cf) (CxdxA) | BMP USED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | 19,743 | 0.45 | 0.75 | 5000 | 0.11 | 0.34 | 0.75 | 0.71 | - | - | - | 876 | Bioretention Planter |
| B | 39,858 | 0.92 | 0.75 | 3700 | 0.08 | 0.83 | 0.91 | 0.83 | - | - | - | 2,069 | Bioretention Planter |
| C | 24,670 | 0.57 | 0.75 | 4500 | 0.10 | 0.46 | 0.82 | 0.76 | 5 | 0.275 | 0.119 | | MWS 4X8 |
| Total | 84,271 | 1.93 | | 13,200 | 0.30 | 1.63 | 0.84 | 0.78 | | | | 2,945 | |

## CONCEPTUAL DRAINAGE NOTES:

1. BASIN CONFIGURATION: BASIN CONFIGURATION DEPICTED ON CONCEPTUAL GRADING PLANS ARE SCHEMATIC AND INTENDED TO DEPICT THE EXTENT OF THE BASINS REQUIRED. ULTIMATE CONFIGURATION WILL BE COORDINATED WITH FINAL LANDSCAPE IMPROVEMENT PLANS TO ALLOW TREE AND SITE AMENITY CONSTRUCTION
2. WATER QUALITY (LOW) FLOWS TO BE PUMPED: SITE GRADING AND DRAINAGE HAS BEEN DESIGNED TO TREAT THE FULL DESIGN CAPTURE VOLUME WITHIN THE THREE NOTED BIO-BASINS. POST FILTRATION (LOW) FLOWS FROM THE SUB-DRAINS WILL BE DIRECTED TO A STORM DRAIN SUMP PUMP THAT WILL DISCHARGE THE FILTERED RUNOFF TO THE SPRUCE AVENUE CURB FACE.
3. PEAK FLOW DISCHARGE: PEAK FLOW DISCHARGE WILL OCCUR, AT GRADE, TO THE CURB AND GUTTER ON SPRUCE AVENUE AND BRISTOL STREET VIA PROPOSED PARKWAY DRAINS TO MATCH THE EXISTING TRIBUTARY AREAS OF THE SITE.

N

0 20' 40'
SCALE: 1" = 20'

| NO | DESCRIPTION | BY | DATE | CHK |
|---|---|---|---|---|
| | REVISIONS | | | |

TAIT
Since 1964
701 N. Parkcenter Drive
Santa Ana, CA 92705
p: 714/560/8200
www.tait.com
f: 714/560/8211
Los Angeles Ontario
Sacramento San Diego
San Francisco Boise
Dallas Denver
Phoenix Portland

# CONCEPTUAL WQMP PLOT PLAN

## 1300 BRISTOL STREET

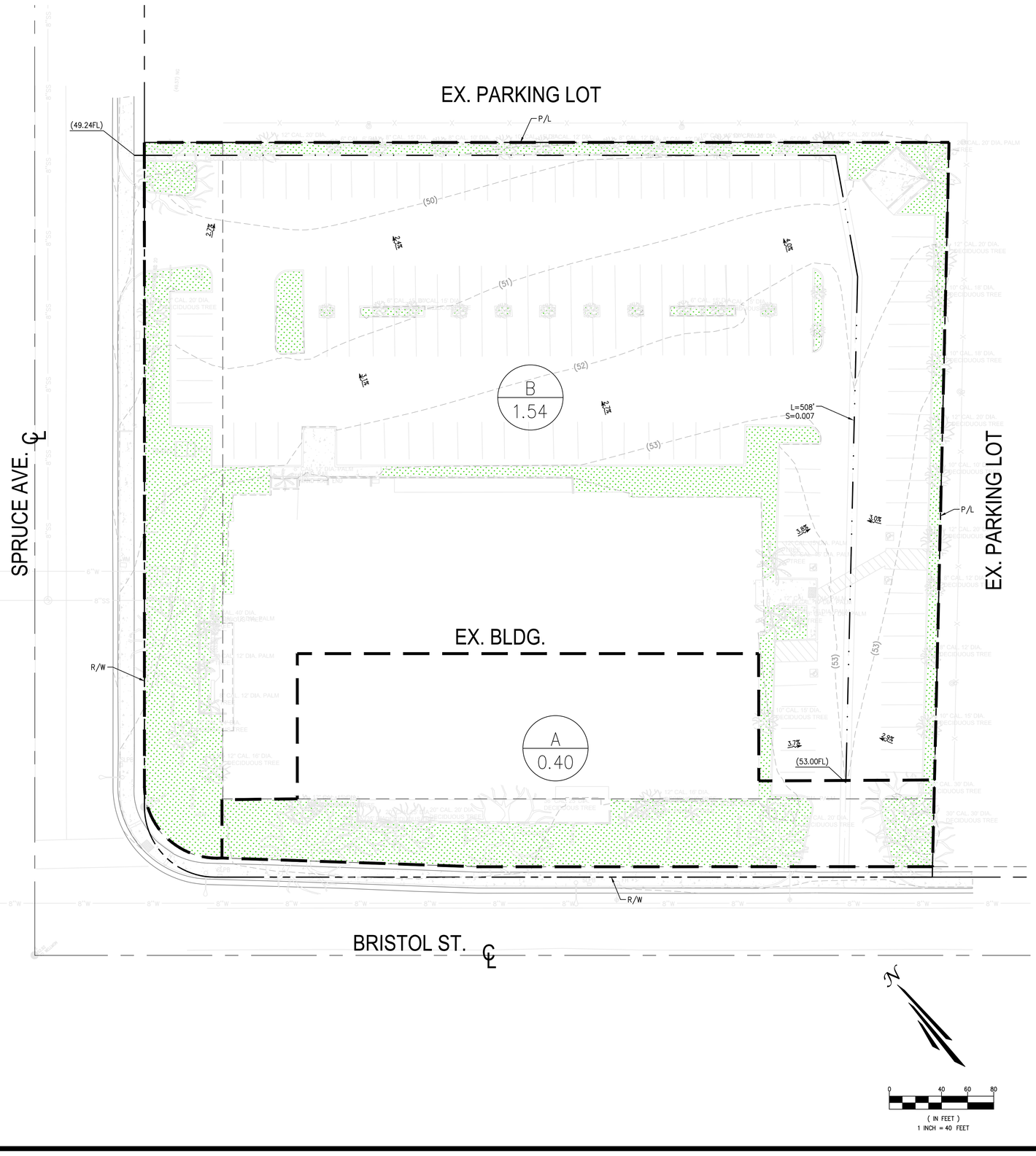
CITY OF NEWPORT BEACH

TPG (KCN) ACQUISITION, LLC
5000 BIRCH ST., SUITE 600
NEWPORT BEACH, CA 92660

DRAWN:
DATE: 9/24/2021
CHECKED: MT
DATE: 9/24/2021
REVISION #: 1
DATE:
JOB NO. SP8772

C5.01

K:\Drawings\SP\SP8772 – Newport Beach, CA\ENG\WQMP\SP8772-PWQMP.dwg
PLOTTED: 9/27/2021 9:03:46 AM BY Michael Tran PAGESETUP: ---- PLOTSTYLE: Tait2014.ctb




## LEGEND

- DRAINAGE SUBAREA BOUNDARY
- DRAINAGE FLOW PATH
- L=150' / 0.5% — FLOW PATH LENGTH AND SLOPE
- DIRECTION OF RUNOFF
- X / 0.06 — DRAINAGE SUBAREA ID / SUBAREA AREA (ACRES)
- PERVIOUS AREA

| NO | DESCRIPTION | BY | DATE | CHK |
|---|---|---|---|---|
| | REVISIONS | | | |


TAIT
Since 1964
701 N. Parkcenter Drive
Santa Ana, CA 92705
p: 714/560/8200
f: 714/560/8211
www.tait.com
Los Angeles Sacramento San Francisco Dallas Phoenix
Ontario San Diego Boise Denver Portland


EXISTING CONDITION

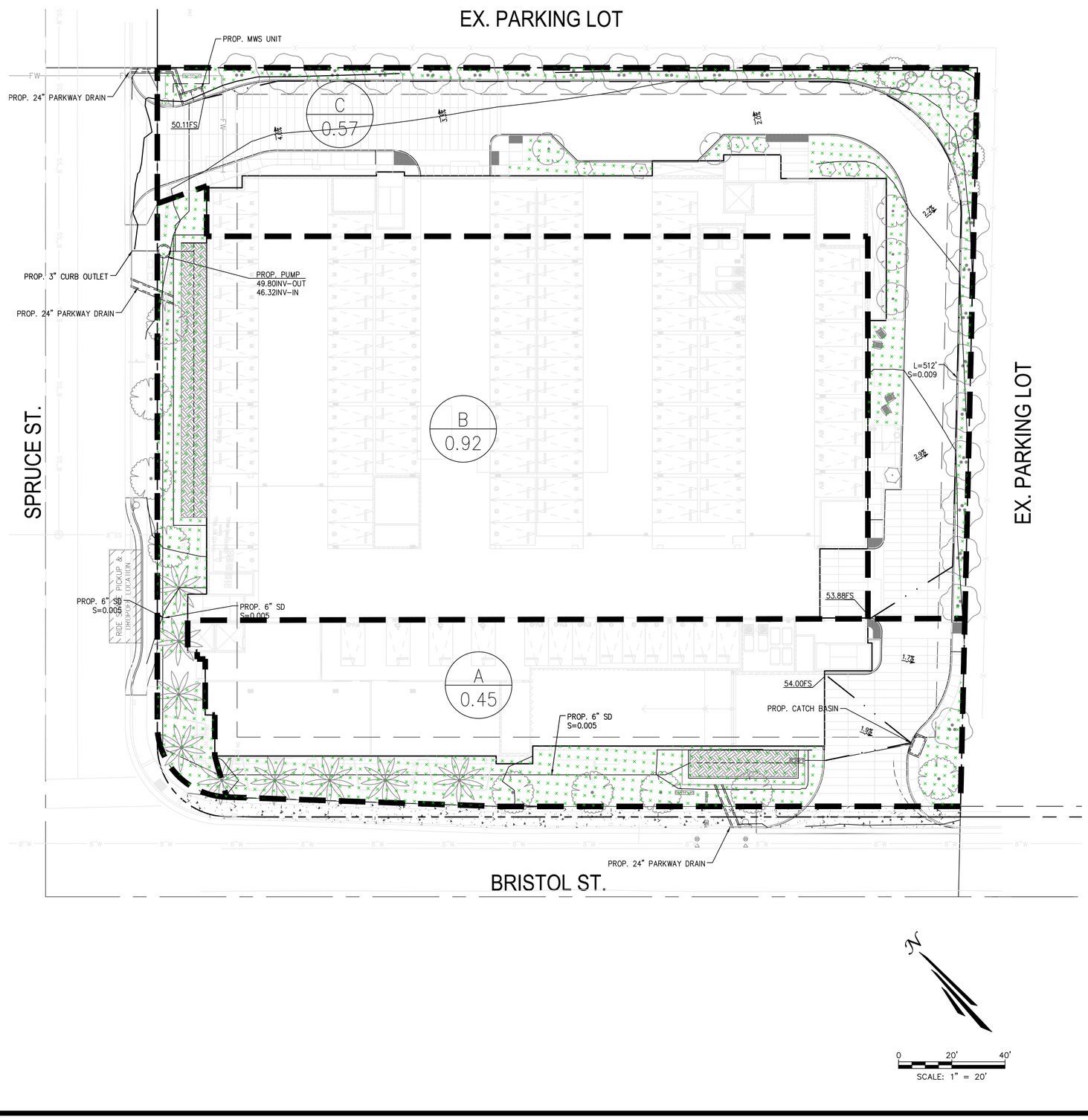
1300 BRISTOL STREET
CITY OF NEWPORT BEACH

TPG (KCN) ACQUISITION, LLC
5000 BIRCH ST., SUITE 600
NEWPORT BEACH, CA 92660

DRAWN:
DATE: 8/21/20
CHECKED: MT
DATE: 8/21/20
REVISION #: 1
DATE: 12/17/20
JOB NO: SP8772

C2.01

K:\Drawings\SP\SP8772 – Newport Beach, CA\ENG\Hydrology\SP8772 – PRE HYDROLOGY.dwg
PLOTTED: 6/14/2021 3:01:48 PM BY Michael Tron PAGESETUP: ---- PLOTSTYLE: Tait2014.ctb




## LEGEND

- DRAINAGE SUBAREA BOUNDARY
- DRAINAGE FLOW PATH
- L=150' / 0.5% — FLOW PATH LENGTH AND SLOPE
- DIRECTION OF RUNOFF
- X / 0.06 — DRAINAGE SUBAREA ID / SUBAREA AREA (ACRES)
- PERVIOUS AREA

| NO | DESCRIPTION | BY | DATE | CHK |
|---|---|---|---|---|
| | REVISIONS | | | |


TAIT
Since 1964
701 N. Parkcenter Drive
Santa Ana, CA 92705
p: 714/560/8200
www.tait.com
f: 714/560/8211
Los Angeles Ontario Sacramento San Diego San Francisco Boise Dallas Denver Phoenix Portland


# POST HYDROLOGY MAP

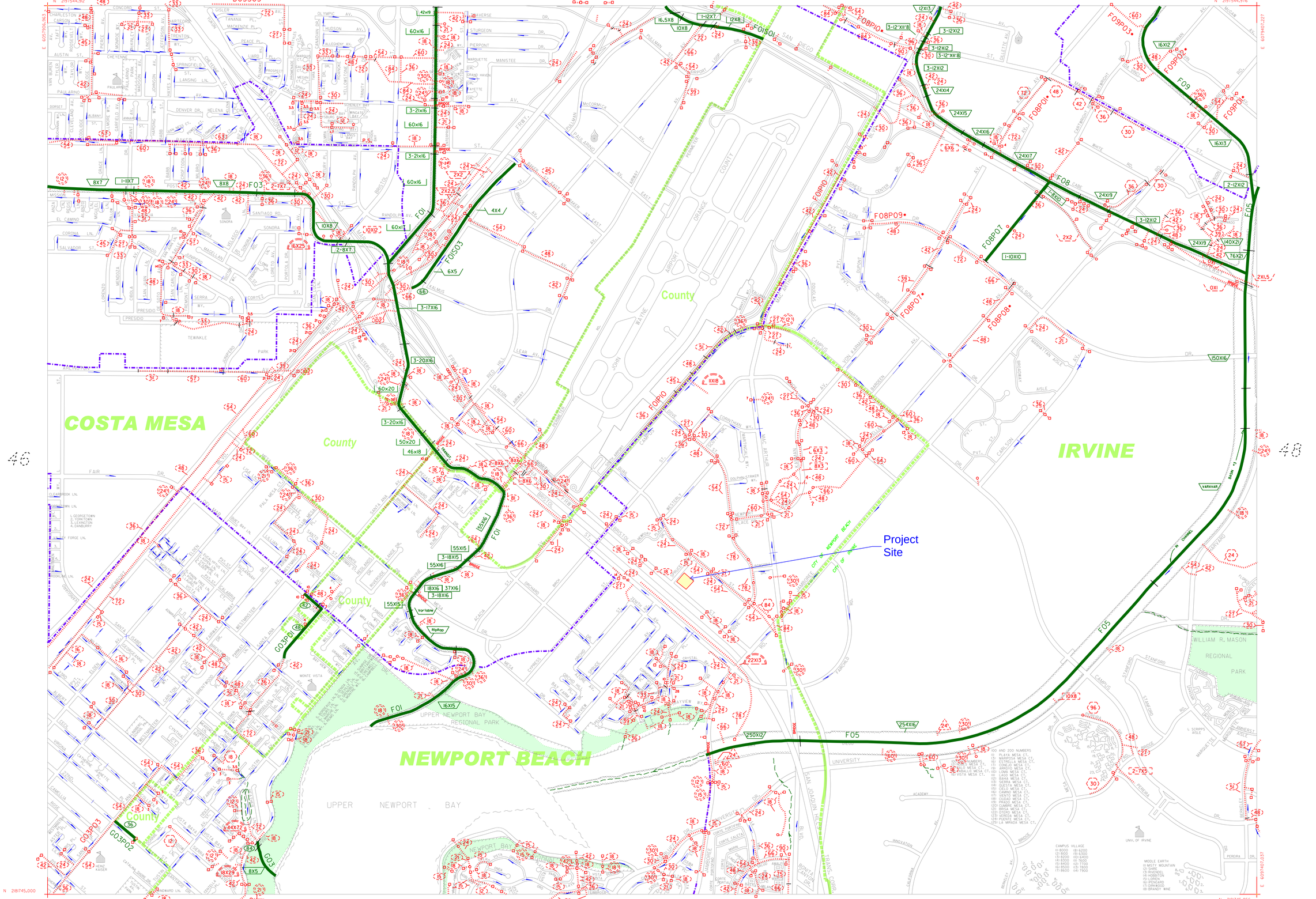
1300 BRISTOL STREET
CITY OF NEWPORT BEACH

TPG (KCN) ACQUISITION, LLC
5000 BIRCH ST., SUITE 600
NEWPORT BEACH, CA 92660

DRAWN:
DATE: 9/24/2021
CHECKED: MT
DATE: 9/24/2021
REVISION #: 1
DATE:
JOB NO: SP8772

01

K:\Drawings\SP\SP8772 — Newport Beach, CA\ENG\Hydrology\SP8772-POST HYDROLOGY.dwg
PLOTTED: 9/27/2021 9:03:19 AM BY Michael Tron PAGESETUP: ----- PLOTSTYLE: Tait2014.ctb




46

48

47

47

## NOTICE

The drainage information has been prepared for information purposes only. The location, ownership, facility information and limits have been determined from available information provided by public agencies, but may not be exact, accurate, or up-to-date. The user of this information is responsible for verifying exact location, ownership, accuracy, and the regional versus local character of drainage facilities.

Additional information may be obtained from public plans and recorded deeds. Facility designations included with this information are for convenience only and are not controlling or intended to imply ownership by the County or the Orange County Flood Control District (OCFCD). The information is being provided as a courtesy and neither the County of Orange nor OCFCD assume any liabilities for inaccuracy of the information.

To notify OC Public Works Flood Control Section of additions or corrections, please contact Sal Gutierrez at (714) 647-3992 or by email at sal.gutierrez@ocpw.ocgov.com

ORANGE COUNTY FLOOD CONTROL DISTRICT

# BASE MAP OF DRAINAGE FACILITIES IN ORANGE COUNTY

| REVISION | DATE | SHEET NO. | DWG. NO. |
|---|---|---|---|
| S. GUTIERREZ | JAN. 26 2012 | 47 | MAPS-113-3 |

- Channel Drainage Area Boundary
- Major Sub-Area Drainage Boundary
- Minor Sub-Area Drainage Boundary
- Existing O.C.F.C.D. Facility
- Existing Local Facility
- Existing Retarding Basin or Reservoir
- Natural Watercourse
- City Limits
- G G Greenbelt
- P.S. P.S. Pump Station
- Catch Basin (length in feet)
- Drop Inlet or Other Entry
- OCFCD Basins or Reservoirs

Ownership (If other than City or County): Private = P State = S Federal = F

EXISTING FACILITIES

| O.C.F.C.D. | LOCAL | |
|---|---|---|
| | | Earth Trapezoidal Channel (base width by height in feet) |
| | | Reinforced Concrete Trapezoidal Channel (base width by height in feet) |
| | | Reinforced Concrete Rectangular Channel (base width by height in feet) |
| | | Reinforced Concrete Box (RCB) (number of barrels-span by height in feet) |
| | | Reinforced Concrete Pipe (RCP) (diameter in inches) |
| | | Metal Sheet Channel (MSC) (Base width by pile height in feet./Sheet pile total length) |
| | | Corrugated Metal Pipe (CMP) (diameter in inches) |
| | | Concrete Pipe (diameter in inches) |
| | | Concrete Oval Pipe (width by height in inches) |
| | | Steel Pipe (diameter in inches) |
| | | Reinforced Concrete Arch (base span by height in inches) |
| | | Corrugated Metal Arch (base span by height in inches) |

0 200 400 600 800 FEET

# Attachment E

# Geotechnical Report

# Attachment F

# Water Quality Impairment List

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | San Diego Creek Reach 1 | River & Stream | 80111000 / 18070201 | • Benthic Community Effects<br>◦ Source Unknown | 7.8 Miles | 2014 | 5A | 2027 | |
| | | | | • DDT (Dichlorodiphenyltrichloroethane)<br>◦ See TMDL documentation | 7.8 Miles | 2014 | 5B | 2013 | |
| | | | | *The USEPA approved the Newport Bay Organochlorine compounds TMDL on November 12, 2013 which includes this pollutant (Total DDT-sum of 4,4'- and 2,4'- isomers of DDT, DDE, and DDD) for San Diego Creek. The data used for the TMDL assessment includes additional data and may use different assessment guidelines than those used in the integrated report. Nonetheless, it is important to note that this pollutant is being addressed by an USEPA approved TMDL.* | | | | | |
| | | | | • Indicator Bacteria<br>◦ Source Unknown | 7.8 Miles | 2014 | 5A | 2019 | |
| | | | | *While this Decision was based on a sufficient number of exceedances the of E. coli Single Sample objective, it should be noted that Enterococcus, Fecal Coliform and Total Coliform objectives no longer apply to the REC 1 Beneficial Use for fresh waters in Region 8. As such the Enterococcus, Fecal Coliform and Total Coliform LOEs will be retired. Further, the Single Sample objective was only used because of the lack of representative 30-day, 5-sample Geomean values, as per the Region 8 Basin Plan (2016 update) on page 4-17, footnote 3. When representative 30-day, 5-sample Geomean values are collected the Single Sample E. coli LOE will be retired.* | | | | | |
| | | | | • Malathion<br>◦ Source Unknown | 7.8 Miles | 2014 | 5A | 2027 | |
| | | | | • Nutrients<br>◦ Source Unknown | 7.8 Miles | 1996 | 5B | 1999 | |
| | | | | • Sedimentation/Siltation<br>◦ Source Unknown | 7.8 Miles | 1996 | 5B | 1999 | |
| | | | | • Selenium<br>◦ Source Unknown | 7.8 Miles | 2006 | 5A | 2007 | |
| | | | | • Toxaphene<br>◦ See TMDL documentation | 7.8 Miles | 2006 | 5B | 2013 | |
| | | | | • Toxicity<br>◦ Source Unknown | 7.8 Miles | 2014 | 5A | 2025 | |
| 8 | Newport Bay, Upper (Ecological Reserve) | Estuary | 80111000 / 18070201 | • Chlordane<br>◦ See TMDL documentation | 653 Acres | 2006 | 5B | 2013 | |
| | | | | • Copper<br>◦ Marinas and Recreational Boating | 653 Acres | 2006 | 5A | 2007 | |
| | | | | • DDT (Dichlorodiphenyltrichloroethane)<br>◦ See TMDL documentation | 653 Acres | 2006 | 5B | 2013 | |
| | | | | • Indicator Bacteria<br>◦ Source Unknown | 653 Acres | 2010 | 5B | 2000 | |
| | | | | *The following LOEs had been incorrectly linked to Upper Newport Bay during the 2010 cycle : 8075, 8076, 8077 and 8078. They have not been used in the Final Use Rating in the 2014 cycle and will be retired prior to the next cycle. They have been copied over to Lower Newport Bay (where the sampling points are located) and have new LOE #'s.* | | | | | |
| | | | | • Malathion<br>◦ Source Unknown | 653 Acres | 2014 | 5A | 2027 | |
| | | | | • Nutrients<br>◦ Source Unknown | 653 Acres | 2006 | 5B | 1999 | |
| | | | | • PCBs (Polychlorinated biphenyls)<br>◦ See TMDL documentation | 653 Acres | 2006 | 5B | 2013 | |
| | | | | • Sedimentation/Siltation<br>◦ Agriculture<br>◦ Channel Erosion<br>◦ Construction/Land Development<br>◦ Erosion/Siltation | 653 Acres | 2006 | 5B | 1999 | |
| | | | | • Toxicity<br>◦ Source Unknown | 653 Acres | 2014 | 5A | 2027 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 8 | Newport Bay, Lower (entire lower bay, including Rhine Channel, Turning Basin and South Lido Channel to east end of H-J Moorings) | Bay & Harbor | 80114000 / 18070201 | • Chlordane<br>◦ See TMDL documentation | 767 Acres | 2006 | 5B | 2013 |
| | | | | • Copper<br>◦ Marinas and Recreational Boating | 767 Acres | 2006 | 5A | 2019 |
| | | | | • DDT (Dichlorodiphenyltrichloroethane)<br>◦ See TMDL documentation | 767 Acres | 1990 | 5B | 2013 |
| | | | | • Indicator Bacteria<br>◦ Source Unknown | 767 Acres | 2010 | 5B | 2000 |
| | | | | *The following LOEs had been incorrectly linked to Lower Newport Bay during the 2010 cycle : 8147, 8148, 8149, 8150, 8151, 8152, 8153, 8154, 8155, 8156, 8157, 8158, 8159, 8160, 8161, 8162, 28355, 28357, 28361, 28367, 28373, 28377, 28379, 28381, 28383. They have not been used in the Final Use Rating in the 2014 cycle and will be retired prior to the next cycle. They have been copied over to Upper Newport Bay (where the sampling points are located) and have new LOE #'s. LOE 26162 was created during the 2010 cycle and incorrectly combined sampling locations in both Upper and Lower Newport Bay. The data in LOE 26162 has been reanalyzed and 2 new LOEs have been created for those data in the proper waterbodies. LOE 26162 is not used in the Final Use Rating in the 2014 cycle and will be retired prior to the next cycle. In the 2010 cycle, the Shellfish Harvest Objective that was used in the LOEs was the Ocean Plan Total Coliform value, rather than the existing Region 8 Basin Plan Objective that was based on Fecal Coliform. While combining the LOEs written using the Ocean Plan Total Coliform objective results in a delisting for the Shellfish Harvest Beneficial Use, analysis of the 2008 -2010 Fecal Coliform data from the Beach Watch program resulted in 7 months of exceedance out of 23 months (where samples were collected) and based on weight of evidence, the decision was made to leave the Shellfish Harvest listing in place for Fecal Coliform.* | | | | |
| | | | | • Nutrients<br>◦ Source Unknown | 767 Acres | 1992 | 5B | 1999 |
| | | | | • PCBs (Polychlorinated biphenyls)<br>◦ See TMDL documentation | 767 Acres | 1990 | 5B | 2013 |
| | | | | • Toxicity<br>◦ Source Unknown | 767 Acres | 2014 | 5A | 2019 |

# Attachment G

# Infiltration BMP Feasibility Worksheet & Summary of Harvested

### Table X.8: Minimum Irrigated Area for Potential Partial Capture Feasibility

| General Landscape Type | Conservation Design: $K_L$ = 0.35 | | | Active Turf Areas: $K_L$ = 0.7 | | |
|---|---|---|---|---|---|---|
| *Closest ET Station* | *Irvine* | *Santa Ana* | *Laguna* | *Irvine* | *Santa Ana* | *Laguna* |
| **Design Capture Storm Depth, inches** | **Minimum Required Irrigated Area per Tributary Impervious Acre for Potential Partial Capture, ac/ac** | | | | | |
| 0.60 | 0.66 | 0.68 | 0.72 | 0.33 | 0.34 | 0.36 |
| 0.65 | 0.72 | 0.73 | 0.78 | 0.36 | 0.37 | 0.39 |
| 0.70 | 0.77 | 0.79 | 0.84 | 0.39 | 0.39 | 0.42 |
| 0.75 | 0.83 | 0.84 | 0.90 | 0.41 | 0.42 | 0.45 |
| 0.80 | 0.88 | 0.90 | 0.96 | 0.44 | 0.45 | 0.48 |
| 0.85 | 0.93 | 0.95 | 1.02 | 0.47 | 0.48 | 0.51 |
| 0.90 | 0.99 | 1.01 | 1.08 | 0.49 | 0.51 | 0.54 |
| 0.95 | 1.04 | 1.07 | 1.14 | 0.52 | 0.53 | 0.57 |
| 1.00 | 1.10 | 1.12 | 1.20 | 0.55 | 0.56 | 0.60 |

### Worksheet J: Summary of Harvested Water Demand and Feasibility

| | | | | |
|---|---|---|---|---|
| 1 | What demands for harvested water exist in the tributary area (check all that apply): | | | |
| 2 | Toilet and urinal flushing | | ☐ | |
| 3 | Landscape irrigation | | ☑ | |
| 4 | Other:_____ | | ☐ | |
| 5 | What is the design capture storm depth? (**Figure III.1**) | d | 0.75 | inches |
| 6 | What is the project size? | A | 1.93 | ac |
| 7 | What is the acreage of impervious area? | IA | 1.59 | ac |
| | For projects with multiple types of demand ( toilet flushing, indoor demand, and/or other demand) | | | |
| 8 | What is the minimum use required for partial capture? (**Table X.6**) | N/A | | gpd |
| 9 | What is the project estimated wet season total daily use? | N/A | | gpd |
| 10 | Is partial capture potentially feasible? (Line 9 > Line 8?) | N/A | | |
| | For projects with only toilet flushing demand | | | |
| 11 | What is the minimum TUTIA for partial capture? (**Table X.7**) | N/A | | |
| 12 | What is the project estimated TUTIA? | N/A | | |

**Worksheet J: Summary of Harvested Water Demand and Feasibility**

| | | | |
|---|---|---|---|
| 13 | Is partial capture potentially feasible? (Line 12 > Line 11?) | | |
| | For projects with only irrigation demand | | |
| 14 | What is the minimum irrigation area required based on conservation landscape design? ( **Table X.8**) | X | ac |
| 15 | What is the proposed project irrigated area? (multiply conservation landscaping by 1; multiply active turf by 2) | X | ac |
| 16 | Is partial capture potentially feasible? (Line 15 > Line 14?) | No | |

Provide supporting assumptions and citations for controlling demand calculation:

Line 14: KL x Line 7
Line 14: 1.59 x 0.84 =
Line 15: Landscape area = 0.34
Line 15 < Line 14 ; Therefore, re-use for irrigation is not feasible

**Table VIII.1: Recommendations/Requirements for BMP Selection to Minimize Groundwater Quality Impacts**

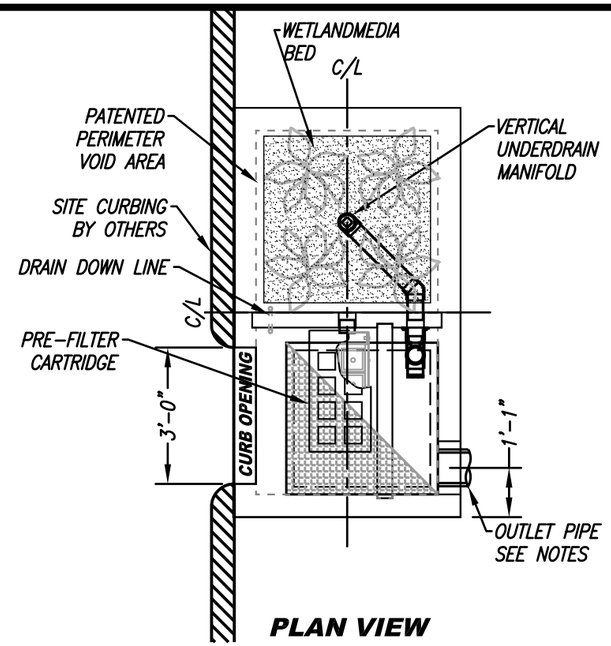
| Tributary Area Risk Category | Narrative Description of Category | Example Land Use Activities | BMP Selection Requirements |
|---|---|---|---|
| **Low Runoff Contamination Potential** | BMP receives runoff from a mix of land covers that are expected to have relatively clean runoff; significant spills in tributary area are unlikely. | • Rooftops with roofing material and downspouts free of copper and zinc<br>• Patios, sidewalks, and other pedestrian areas<br>• Mixed residential land uses with applicable source controls<br>• Institutional land uses with applicable source controls<br>• Driveways and minor streets | • Any infiltration BMP type may be used<br>• Pretreatment for sediment is strongly recommended, as applicable, to mitigate clogging |
| **Moderate Runoff Contamination Potential** | BMP receives runoff from a mix of land covers, more than 10 percent of which have the potential to generate stormwater pollutants at levels that could potentially contaminate groundwater; there is potential for minor spills in the tributary area. | • Roadways greater than 5,000 ADT but less than 25,000 ADT<br>• Commercial and institutional parking lots<br>• Commercial land uses<br>• Light industrial that does not include usage of chemicals that are mobile in stormwater and groundwater<br>• Trash storage areas | • Any infiltration BMP type may be used<br>• Pretreatment shall be used<br>• The type of pretreatment shall be selected to address potential groundwater contaminants potentially found in stormwater runoff. |
| **High Runoff Contamination Potential** | BMP receives runoff from a mix of land covers, more than 10 percent of which have significant unavoidable potential to generate stormwater pollutants in quantities that could be detrimental to groundwater quality; and/or there is significant potential for major spills that could drain to BMPs. | • Roads greater than 25,000 ADT<br>• Heavy and light industrial pollutant source areas, including areas with exposed industrial activity and high use industrial truck traffic, and any areas that cannot be isolated these areas. Does not include lower risk source sources areas within industrial zones (e.g., roofs, offices, and parking areas) that are hydrologically isolated from industrial pollutant source areas<br>• Automotive repair shops<br>• Car washes<br>• Fleet storage areas<br>• Nurseries, agriculture, and heavily managed landscape areas with extensive use of fertilizer<br>• Fueling stations (infiltration prohibited under all conditions) | • Infiltration is prohibited unless advanced pretreatment and spill isolation can be feasibly used and enhanced monitoring and inspection are implemented.<br>• Large projects[18] must evaluate feasibility of advanced pretreatment and spill isolation.<br>• Small projects[18] may consider infiltration to be infeasible with narrative discussion. |

[18] See Table VIII.2 for definition of "Large" and "Small" projects.

# Attachment H

# BMP's info & Details

| SITE SPECIFIC DATA | | | |
|---|---|---|---|
| PROJECT NUMBER | | | |
| ORDER NUMBER | | | |
| PROJECT NAME | | | |
| PROJECT LOCATION | | | |
| STRUCTURE ID | | | |
| TREATMENT REQUIRED | | | |
| VOLUME BASED (CF) | | FLOW BASED (CFS) | |
| | | | |
| TREATMENT HGL AVAILABLE (FT) | | | |
| PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE | | | |
| PIPE DATA | I.E. | MATERIAL | DIAMETER |
| INLET PIPE 1 | | | |
| INLET PIPE 2 | | | |
| OUTLET PIPE | | | |
| | PRETREATMENT | BIOFILTRATION | DISCHARGE |
| RIM ELEVATION | | | |
| SURFACE LOAD | PEDESTRIAN | OPEN PLANTER | PEDESTRIAN |
| FRAME & COVER | 36" X 36" | N/A | N/A |
| WETLANDMEDIA VOLUME (CY) | | | TBD |
| ORIFICE SIZE (DIA. INCHES) | | | TBD |
| NOTES: PRELIMINARY NOT FOR CONSTRUCTION. | | | |



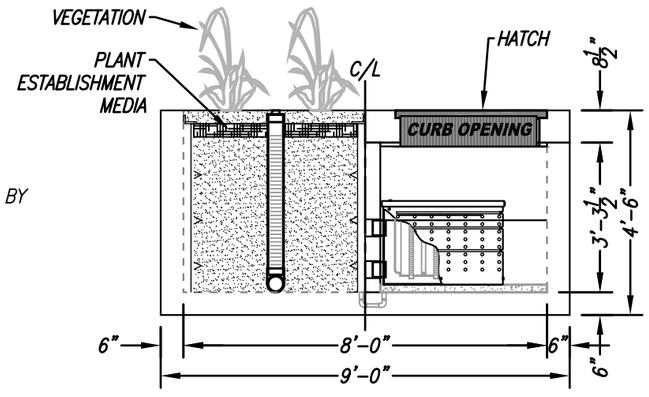

**PLAN VIEW**

## INSTALLATION NOTES

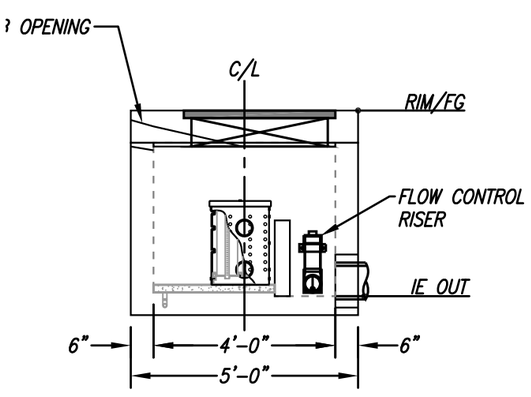
1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURERS WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

## GENERAL NOTES

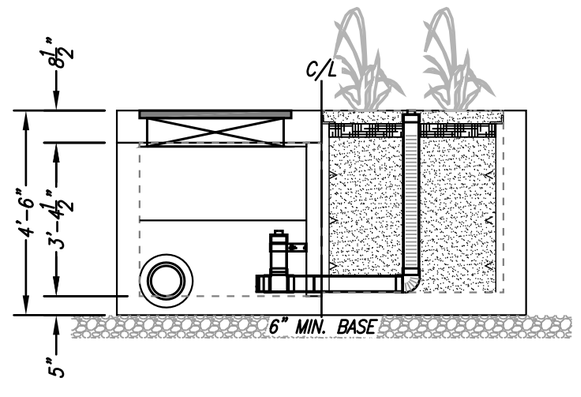
1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.




**LEFT END VIEW**




**ELEVATION VIEW**




**RIGHT END VIEW**

| | |
|---|---|
| TREATMENT FLOW (CFS) | 0.115 |
| OPERATING HEAD (FT) | 3.4 |
| PRETREATMENT LOADING RATE (GPM/SF) | 2.0 |
| WETLAND MEDIA LOADING RATE (GPM/SF) | 1.0 |

MODULAR WETLANDS



Bio Clean
A Forterra Company

# MWS-L-4-8-C
## STORMWATER BIOFILTRATION SYSTEM
## STANDARD DETAIL

# Attachment I

# Master Covenant and Agreement and Maintenance & Operation Plan

# Operations and Maintenance (O&M) Plan

## Water Quality Management Plan
## for

## 1300 Bristol

## 1300 Bristol St.

## Newport Beach, CA 92660

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| | **Non-Structural Source Control BMPs** | | |
| Yes | **N1. Education for Property Owners, Tenants and Occupants**<br>The owner shall prepare a training manual along with the Operations and Maintenance Manual for all existing and future employees. The manual shall include information regarding proper practices that contribute to the protection of the stormwater quality. Training shall be provided upon hire of new associates. A copy of the training manual shall remain in the building at all times for employees to use as needed. The manual shall include all Educational Materials. Additional education material may be found in the following website : http://www.ocwatershed.com/PublicEd/resources/business-brochures.html | Ongoing | Owner |
| Yes | **N2. Activity Restrictions**<br>The property owner shall ensure that the rules and guidelines as determined on the project conditions of approval or other policies are followed at all times once the project is operations. Prohibited activities for the project that promoted water quality includes:<br>Prohibit discharges of fertilizer, pesticides, or animal wastes to streets or storm drains.<br>Prohibit blowing or sweeping of debris (leaf litter, grass clippings, litter, etc.) into streets or storm drains.<br>Requirement to keep dumpster lids closed at all times.<br>Prohibit vehicle washing, maintenance, or repair on the premises or restrict those activities to designated areas. | Ongoing | Owner |
| Yes | **N3. Common Area Landscape Management**<br>Ongoing maintenance is conducted to minimize erosion and over-irrigation, conserve water and reduce pesticide and fertilizer applications. | Weekly | Owner |
| Yes | **N4. BMP Maintenance**<br>All proposed BMP's shall be regularly maintained. | Ongoing | Owner |
| No | **N5. Title 22 CCR Compliance** | Every time | Owner |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| No | **N6. Local Water Quality Permit Compliance** | | |
| No | **N7. Spill Contingency Plan** | | |
| No | **N8. Underground Storage Tank Compliance** | | |
| No | **N9. Hazardous Materials Disclosure Compliance** | | |
| No | **N10. Uniform Fire Code Implementation** | Procedures shall be established prior to building occupancy. | Owner |
| Yes | **N11. Common Area Litter Control**<br>The Owner will be required to implement trash management and litter control procedures in the common areas aimed at reducing pllution of drainage water. The Owner may contract with their landscape maintenace firm to provide this service with regularly scheduled maintenance, which should consist of litter patrol, emptying of trash receptacles in common areas, and noting trash disposal violations and reporting the violations to the Owner for investigation | Ongoing | Owner |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | **N12. Employee Training**<br>The owner shall prepare a training manual for all existing and future employees. The manual shall include information regarding proper practices that contribute to the protection of the stormwater quality. Training shall be provided upon hire of new associates. A copy of the training manual shall remain in the building at all times for employees to use as needed. The manual shall include all Educational Materials. Additional education material may be found in the following website : http://www.ocwatershed.com/PublicEd/resources/business-brochures.html | Quarterly.<br>Training shall be provided upon hire and regular intervals thereafter. | Owner |
| No | **N13. Housekeeping of Loading Docks** | | |
| Yes | **N14. Common Area Catch Basin Inspection**<br>The owner must ensure that the on-site inlet and drain pipe will be periodically inspected visually. Cleaning should take place in the late summer/early fall prior to the start of the rainy season. If necessary, clean, repair, or replace any drainage facility prior to the start of each rainy season (no later than October 15 of each year). | Monthly<br>-Before and after predicted storm events | Owner |
| Yes | **N15. Street Sweeping Private Streets and Parking Lots**<br>The Owner must sweep outdoor lots regularyly (minimum monthly), or as needed to maintain parking lot surface without trash, debris, or other removable solids, and prior to the storm season (no later than October 15 each year). Sweeping shall be done with a vacuum-type sweeper. Under no circumstances are outdoor areas/lots to be rinsed or washed with water unless said rinse/wash water is collected and disposed of properly (i.e. into the sewer). | Monthly | Owner |
| **Structural Source Control BMPs** | | | |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| Yes | **S1. Provide Storm Drain System Stenciling and Signage**<br>All catch basins/inlets/outlets/parkway drains on site must be marked using the City's "No Dumping – Drains to Ocean" curb marker or stenciled using an approved stencil to paint this message on the top of curb directly above the inlet, and on one side of the curb face. Labeling for catch basins & parkway drains is to be inspected regularly and maintained so as to be reasonably legible at all times. The inspection and maintenance is to be performed by the Owner. This stencil is to alert the public/employees to the destination of pollutants discharged into the storm water. | Annually | Owner |
| No | **S2. Design Outdoor Hazardous Material Storage Areas to Reduce Pollutant Introduction** | | |
| Yes | **S3. Design Trash Enclosures to Reduce Pollutant Introduction**<br>The owner shall post signs on trash enclosure gates that state "Keep Dumpster Lids Closed." The Owner will monitor dumpster usage such that dumpsters are not overfilled and the dumpster lids can close completely. The Owner shall increase the trash pickup schedule as necessary to prevent dumpsters from overfilling. The Owner will observe and damage to the trash enclosure wall and any discharge from the trash storage area. | Ongoing | Owner |
| Yes | **S4. Use Efficient Irrigation Systems and Landscape Design**<br>All irrigation systems will be inspected to ensure that the systems are functioning properly and that the programmable timers are set correctly.<br><br>See CASQA Stormwater Handbook BMP Fact Sheet SD-12 for additional information S4. Use Efficient Irrigation Systems and Landscape Design implementation/maintenance activities. | Monthly | Owner |
| No | **S5. Protect Slopes and Channels** | | |

| BMP Applicable? Yes/No | BMP Name and BMP Implementation, Maintenance and Inspection Procedures | Implementation, Maintenance, and Inspection Frequency and Schedule | Person or Entity with Operation & Maintenance Responsibility |
|---|---|---|---|
| No | **S6. Loading Dock Areas** | | |
| No | **S7. Maintenance Bays and Docks** | | |
| Yes | **S8. Vehicle Wash Areas**<br>Visual Inspection for trash, debris, and pet waste accumulation and proper dispose of any trash, debris, and pet waste. Vehicle wash out of pet fecal matter, urine or animal fluids shall only be undertaken in areas with sewer drain. Washout of pet fecal material, urine and animal fluids shall not be made where water flows to public storm drain line. Contaminated accumulated water must be disposed of in accordance with applicable laws and cannot be discharged directly to the storm drain or sanitary sewer system without the appropriate permit. | | |
| No | **S9. Outdoor Processing Areas** | | |
| No | **S10. Equipment Wash Areas** | | |
| No | **S11. Fueling Areas** | | |
| No | **S12. Site Design and Landscape Planning** | | |
| No | **S13. Wash Water Controls for Food Preparation Areas** | | |
| No | **S14. Community Car Wash Racks** | | |
| Yes | **Modular Wetland Systems**<br>Visual Inspection for trash and debris accumulation and dispose of any trash and debris accumulation. Inspect for standing water, and vegetation condition per the specifications included in the manual. In addition to the items listed above, refer to the following pages for Bioretention Operations and Maintenance General Requirements. | Per maintenance manual provided. | Owner |

## Required Permits

This section must list any permits required for the implementation, operation, and maintenance of the BMPs. Possible examples are:

- Permits for connection to sanitary sewer
- Permits from California Department of Fish and Game
- Encroachment permits

If no permits are required, a statement to that effect should be made.

## Forms to Record BMP Implementation, Maintenance, and Inspection

The form that will be used to record implementation, maintenance, and inspection of BMPs is attached.

## Recordkeeping

All records must be maintained for at least five (5) years and must be made available for review upon request.

## RECORD OF BMP IMPLEMENTATION, MAINTENANCE, AND INSPECTION

**Today's Date:** _____

**Name of Person Performing Activity (Printed):** _____

**Signature:** _____

| BMP Name (As Shown in O&M Plan) | Brief Description of Implementation, Maintenance, and Inspection Activity Performed |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

# Maintenance Procedures

## Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

## Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

## Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

## Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.

# Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

# Maintenance Procedure Illustration

## Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.

## Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.

## Cartridge Filters

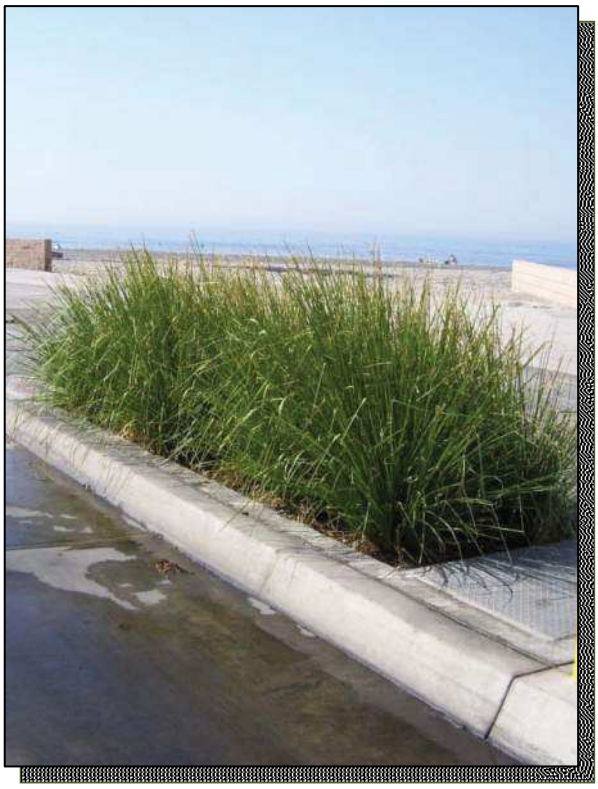
The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.


## Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.

## Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.



# Inspection Form

**Modular Wetland System, Inc.**
**P. 760.433-7640**
**F. 760-433-3176**
**E. Info@modularwetlands.com**

**www.modularwetlands.com**

# Inspection Report
# Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

| For Office Use Only |
|---|
| (Reviewed By) |
| (Date) |
| Office personnel to complete section to the left. |

## Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

| **Structural Integrity:** | **Yes** | **No** | **Comments** |
|---|---|---|---|
| Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure? | | | |
| Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure? | | | |
| Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)? | | | |
| Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly? | | | |
| **Working Condition:** | | | |
| Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit? | | | |
| Is there standing water in inappropriate areas after a dry period? | | | |
| Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system? | | | |
| Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber. | | | Depth: |
| Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber? | | | Chamber: |
| Any signs of improper functioning in the discharge chamber? Note issues in comments section. | | | |
| **Other Inspection Items:** | | | |
| Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)? | | | |
| Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below. | | | |
| Is there a septic or foul odor coming from inside the system? | | | |

| **Waste:** | **Yes** | **No** |
|---|---|---|
| Sediment / Silt / Clay | | |
| Trash / Bags / Bottles | | |
| Green Waste / Leaves / Foliage | | |

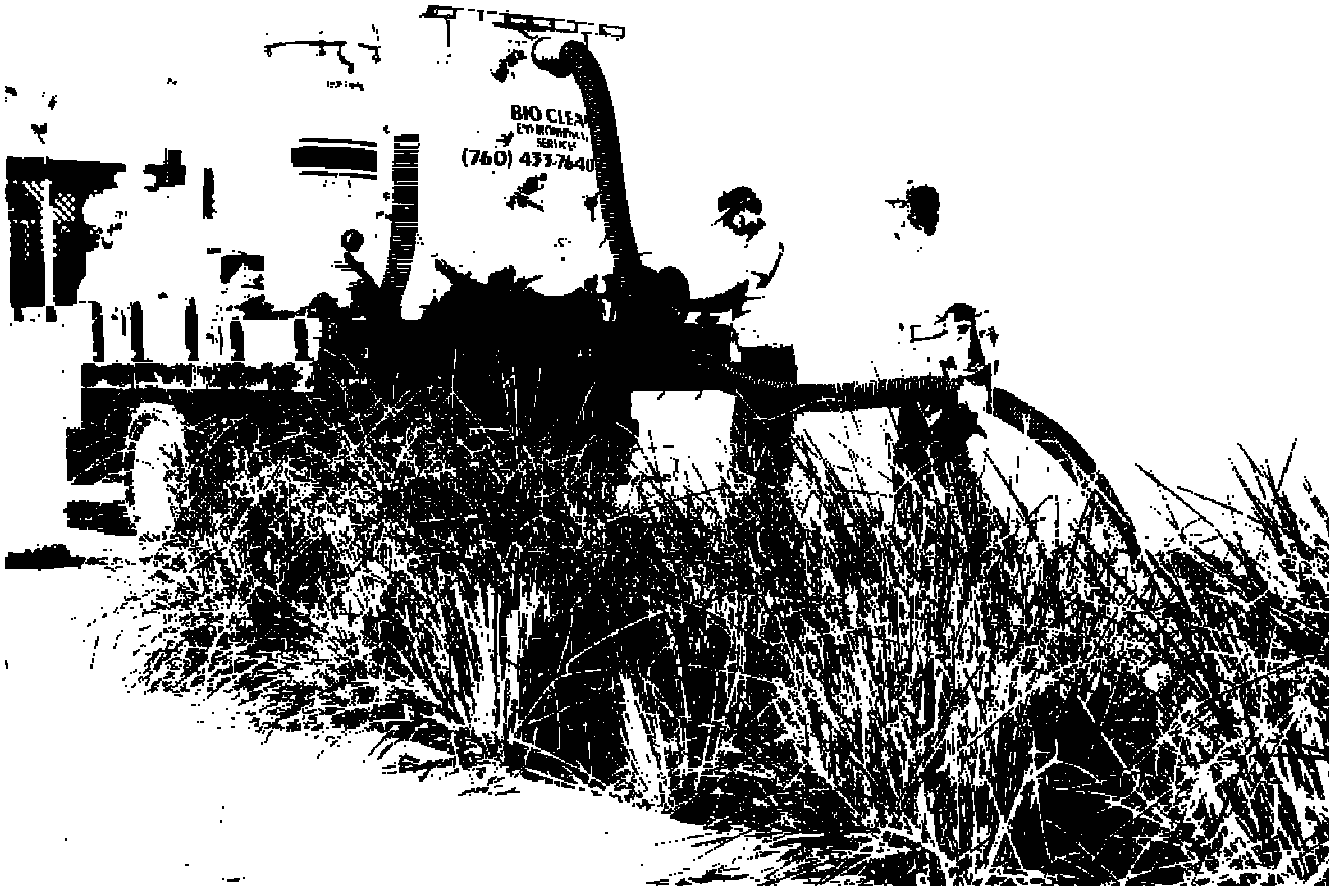
| **Recommended Maintenance** | |
|---|---|
| No Cleaning Needed | |
| Schedule Maintenance as Planned | |
| Needs Immediate Maintenance | |

| **Plant Information** | |
|---|---|
| Damage to Plants | |
| Plant Replacement | |
| Plant Trimming | |

Additional Notes: _____

2972 San Luis Rey Road, Oceanside, CA 92058 P (760) 433-7640 F (760) 433-3176

# Maintenance Report



**Modular Wetland System, Inc.**
**P. 760.433-7640**
**F. 760-433-3176**
**E. Info@modularwetlands.com**

**www.modularwetlands.com**

# Cleaning and Maintenance Report
# Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

| For Office Use Only |
|---|
| (Reviewed By) |
| (Date) |
| Office personnel to complete section to the left. |

| Site Map # | GPS Coordinates of Insert | Manufacturer / Description / Sizing | Trash Accumulation | Foliage Accumulation | Sediment Accumulation | Total Debris Accumulation | Condition of Media 25/50/75/100 (will be changed @ 75%) | Operational Per Manufactures' Specifications (If not, why?) |
|---|---|---|---|---|---|---|---|---|
| | Lat:<br>Long: | MWS Catch Basins | | | | | | |
| | | MWS Sedimentation Basin | | | | | | |
| | | Media Filter Condition | | | | | | |
| | | Plant Condition | | | | | | |
| | | Drain Down Media Condition | | | | | | |
| | | Discharge Chamber Condition | | | | | | |
| | | Drain Down Pipe Condition | | | | | | |
| | | Inlet and Outlet Pipe Condition | | | | | | |

Comments:

2972 San Luis Rey Road, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176