

## **APPENDIX E**

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### **WATER QUALITY MANAGEMENT PLAN**

# **Preliminary Water Quality Management Plan (pWQMP)**

**Project Name:**

**Ford Road Residential  
Entitlement Phase**

**City of Newport Beach, County of Orange, CA**

**APN #s 458-361-02 & 458-361-10**

**Parcels 1, P.M. No. 16760, Book 65, Page 4**

**Site Address:**

4302 Ford Road

Newport Beach, CA 92660

Prepared for:

**Ford Road Holdings LP**

4000 MacArthur Blvd, Suite 110

Newport Beach, CA 92660

(949) 313-2200

Prepared

**January 11, 2018**

**Revised: January 22, 2019**

Prepared by:

**P S O M A S**

3 Hutton Centre Drive, Suite 200

Santa Ana, California 92707

(714) 751-7373



## Project Owner's Certification

Permit/Application No.	N/A	Grading Permit No.	N/A
Tract/Parcel Map No.	Parcels 1, P.M. No. 16760, Book 65 Page 4	Building Permit No.	N/A
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract)			APN #s 458-361-02, 10

This Water Quality Management Plan (WQMP) has been prepared for Hines Brea Place Acquisitions Partners LLC, by PSOMAS. The WQMP is intended to comply with the requirements of the local 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 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.

<b>Owner:</b>		
Name	Tom Lawless	
Title	Associate (Owner's Representative)	
Company	Ford Road Holdings LP	
Address	4000 MacArthur Blvd, Suite 110	
Email	Tom.Lawless@hines.com	
Telephone #	(949) 313-2206	
Signature		Date

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## Section I - Discretionary Permit(s) and Water Quality Conditions

<b>Project Information</b>			
Permit/Application No.	N/A	Tract/Parcel Map No.	Parcels 1, P.M.B. 16760, Book 65, Page 4
Additional Information/ Comments:	This Water Quality Management Plan (WQMP) is intended to comply with the City of Newport Beach Planning Department and Water Quality Ordinance which requires preparation of a WQMP for all priority projects and coverage under the National Pollution Discharge Elimination System (NPDES) General Permit for Construction Activities. The proposed project is considered a priority project because it is classified as a significant redevelopment project under the requirements listed in the Orange County Model WQMP table 7.II-2 row 8. A significant redevelopment project is described as one that adds or replaces 5,000 or more square feet of impervious surface.		
<b>Water Quality Conditions</b>			
Water Quality Conditions  (list verbatim)	There are no water quality conditions for this project.		
<b>Watershed-Based Plan Conditions</b>			
Provide applicable conditions from watershed - based plans including WIHMPs and TMDLS.	A Watershed Infiltration and Hydro-modification Master Plan (WIHMP) has been developed and submitted for the San Diego Creek watershed, but has not yet been approved. See section III.3 for a list of TMDLs that have been established for San Diego Creek and Upper Newport Bay.		

## Section II - Project Description

### II.1 Project Description

Description of Proposed Project				
Development Category (Verbatim from WQMP):	New Mixed Use Development			
Project Area (ft <sup>2</sup> ): 57,500 (1.32 Ac)	Number of Dwelling Units: 21 condominium units		SIC Code: 6513	
Narrative Project Description:	<p>The project site is located on the east side of the intersection between Bonita Canyon Dr and MacArthur Blvd just west of Bonita Canyon Sports park. The existing 1.32-acre site is currently vacant land within City of Newport Beach and is zoned as a public facility. The proposed development will consist of a 21 unit condominium development and underground parking structure. The landscaping will include drought tolerant shrubs and trees in the interior and perimeter landscaping. The project shall include a pool, recreation rooms, courtyards, parking both inside the proposed parking structures and nearby the existing AT&amp;T building to the east of the proposed development and trash enclosures. The project does not include outdoor materials storage areas, and equipment or vehicle maintenance, repair, outdoor food preparation areas, washing and fueling areas.</p>			
Project Area	Pervious		Impervious	
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage
Pre-Project Conditions	43,722 sq ft	76%	13,778 sq ft	24%
Post-Project Conditions	17,825 sq ft	31%	39,675 sq ft	69%
Drainage Patterns/Connections	<p>The existing site consists of relatively steep slopes that drain to the North east towards an existing storm drain structure located on the adjacent property to the North east. This existing storm drain within that North east site generally flows northly into larger storm drain pipes and channels (i.e. Bonita Channel OCFD F04) before discharging into the San Diego Creek Channel approximately a</p>			

mile North of the site. This channel eventually flows into upper Newport bay and ultimately discharges into the Pacific Ocean.

The proposed drainage pattern is similar to the existing condition, except the proposed site will runoff into infiltration BMPs before discharging to their historic low points. Heavy flows shall overflow within the infiltration basins and discharge to the historic lowpoints onsite before following the existing drainage pattern and discharging to the north east towards the existing storm drain system. No new storm drain system is proposed at this time. For additional information on drainage patterns see the Hydrology Maps in section VI.1.



## II.2 Potential Stormwater Pollutants

Pollutants of Concern			
Pollutant	Circle One: E=Expected to be of concern N=Not Expected to be of concern		Additional Information and Comments
Suspended-Solid/ Sediment	E		Expected since landscaping exists on-site.
Nutrients	E		Expected since landscaping exists on-site.
Heavy Metals		N	Not expected – no outdoor storage or metal roofs
Pathogens (Bacteria/Virus)	E		Expected from food or animal waste
Pesticides	E		Expected since landscaping exists on-site.
Oil and Grease	E		Expected from driveway and parking areas.
Toxic Organic Compounds	E		Expected in commercial development
Trash and Debris	E		Expected in commercial and multi-family residential development.

### II.3 Hydrologic Conditions of Concern

No - Show map

Yes - Describe applicable hydrologic conditions of concern below. *Refer to Section 2.2.3 in the TGD.*

Based on Figure XVI-3a, Susceptibility Analysis Bonita Canyon Channel, This project is in the potential areas of erosion, habitat and physical structure susceptibility. The site drainage enters into Bonita Canyon Creek Channel and then flows into the San Diego Creek Channel approximately a mile North of the site. Because portions of San Diego Creek are not stabilized downstream from the site (i.e. earth channel without rip-rap), this creates a hydrologic condition of concern.

## **II.4 Post Development Drainage Characteristics**

Describe post development drainage characteristics. *Refer to Section 2.2.4 in the TGD.*

The site is located in an area of low to moderate infiltration rates according to the Orange County Hydrology Map, which classifies the soil as being soil group C (infiltration rate approximately 0.25 in/hr). Due to the site being located in an area where there is not a storm drain system located in close proximity, bio retention BMPs with underdrains and an onsite storm drain system are not feasible. Therefore, for this project, infiltration BMPs are proposed. The proposed project drainage will be collected using roof downspouts, vegetated swales and concrete gutters which will allow the drainage to collect into the BMPs and infiltrate into the native soil approximately 3 feet below the finished grade. These bio treatment BMPs will consist of a layer of mulch (3”), and loosely compacted sandy loam soil media (36”).

## **II.5 Property Ownership/Management**

Describe property ownership/management. *Refer to Section 2.2.5 in the TGD.*

All parcels of the project are owned by Ford Holdings LP. No portions of the project will be transferred to a public agency and Ford Holdings LP will be responsible for long term maintenance of the projects stormwater facilities.

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## Section III - Site Description

### III.1 Physical Setting

Fill out table with relevant information. *Refer to Section 2.3.1 in the TGD.*

Planning Area/ Community Name	Newport Beach
Location/ Address	4302 Ford Road
	Newport Beach, CA 92660
Land Use	Vacant
Zoning	PF (Public Facility)
Acreage	1.32 acres
Predominant Soil Type	C

### III.2 Site Characteristics

<i>Precipitation Zone</i>	The site 24-hour, 85 <sup>th</sup> percentile rainfall is 0.70 inches per Figure XVI-1 Rainfall Zones in the Technical Guidance Document. The 2 year, 24-hour rainfall used in the flow and Tc calculations is 2.05 per the Orange County Technical Guidance Document.
<i>Topography</i>	The existing 1.32 acre site consist of mostly vacant land within the vicinity of the proposed condominium development with an existing parking lot located on the property to the east. The majority of the existing site is covered in heavy vegetation and trees. The site is consists of variable slopes ranging from 1% to 50%, with drainage shedding to the north east via surface flow.
<i>Drainage Patterns/Connections</i>	The existing site currently drains to the North east via surface flow and outlets into the Bonita Canyon Channel to the north east of the site which is an earthen trapezoidal channel.
<i>Soil Type, Geology, and Infiltration Properties</i>	The predominant soil type is C, which indicates an infiltration rate of 0.25"/hr.

<b><i>Site Characteristics (continued)</i></b>	
<i>Hydrogeological (Groundwater) Conditions</i>	No historical high groundwater level was identified on the Orange County Infiltration Study Figure XVI-2e, Mapped Shallow Groundwater in the Orange County Model WQMP Technical Guidance Document (TGD) dated May 19, 2011. According to the map, the estimated depth to groundwater is greater than 20' below ground surface.
<i>Geotechnical Conditions (relevant to infiltration)</i>	A geotechnical investigation shall be prepared for the project site to address geotechnical conditions related to infiltration.
<i>Off-Site Drainage</i>	For this project, off-site drainage drains away from the property towards the public streets and storm drains, and is not comingled with project runoff.
<i>Utility and Infrastructure Information</i>	No proposed Storm drains are proposed with this project

### **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 TGD.*

Receiving Waters	Bonita Channel and San Diego Creek Channel
303(d) Listed Impairments	Bonita Channel: Chlorpyrifos, Diazinon San Diego Creek Channel: Fecal Coliform, Nutrients, Pesticides, Sedimentation/Siltation, Selenium, Toxaphene
Applicable TMDLs	Bonita Channel: Chlorpyrifos, Diazinon San Diego Creek: Metals, Nutrients, Pesticides, Siltation
Pollutants of Concern for the Project	Suspended Solids/ Sediment Nutrients Pathogens (Bacteria/Virus) Pesticides Toxic Organic Compounds Trash and Debris
Environmentally Sensitive and Special Biological Significant Areas	There are no Environmentally Sensitive Areas (ESAs) or Areas of Special Biological Significance (ASBSs) on or within 200 feet of the project site.

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## Section IV - Best Management Practices (BMPs)

### IV. 1 Project Performance Criteria

(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 <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.	No		



## Project Performance Criteria (continued)

If HCOC exists,  
list applicable  
hydromodification  
control  
performance  
criteria (Section  
7.II-2.4.2.2 in  
MWQMP)

Based on Figure XVI-3a (Figure 4), Susceptibility Analysis Newport Bay Newport Coastal Streams, this project is in the potential areas of erosion, habitat and physical structure susceptibility. Because the imperviousness from the site will increase from 24% to 69%, the 2 year runoff volume from the site will be increased as shown below

Existing Condition:  $V_e = C \times d \times A \times 43560 \text{ sf/ac} \times 1/12 \text{ in/ft}$   
 $V_e = (0.90 \times 0.24 + 0.15) \times 2.05 \times 1.32 \times 43560 \times 1/12$   
 $V_e = 3,595 \text{ CF}$

Proposed Condition:  $V_p = C \times d \times A \times 43560 \text{ sf/ac} \times 1/12 \text{ in/ft}$   
 $V_p = (0.90 \times 0.69 + 0.15) \times 2.05 \times 1.32 \times 43560 \times 1/12$   
 $V_p = 7,573 \text{ CF}$

Total Volume in BMPs:  $V = 3,959 \text{ CF}$  (per table 1.1)

Total Runoff from site:  $V_p = 3,614 \text{ CF}$

Net Difference:  $\Delta V = 19 \text{ CF}$  (0.5% increase)

Therefore per the Orange County Technical Guidance Documents (OC TGD) there is no HCOC related to the runoff volume from the site. Next we shall analyze the change in time of concentration utilizing the Orange County approved RATSCx (AES) software. Full calculations can be found in Section VI and are summarized below.

Subarea A:

Existing Condition  $T_c = 5.91 \text{ min}$

Proposed Condition  $T_c = 7.00 \text{ min}$  (18.4% Increase)

Subarea B:

Existing Condition  $T_c = 6.08 \text{ min}$

Proposed Condition  $T_c = 6.26 \text{ min}$  (3.0% Increase)

Per the OC TGD Section 5.3 Hydromodification should show that the  $T_c$  increase should be less than 5%. However, this increase is largely due to the implementation of LID BMPs. As mentioned in footnote 4

	<p>(referenced in Section 5.3) on page 2-8, for these conditions increases in Tc are acceptable and reductions in Tc of greater than 5 percent are not acceptable. Therefore, no HCOG exists related to Tc.</p> <p>Therefore, per the OC TGD no HCOG exists for this project and Hydromodification BMPs are not needed.</p>
<p>List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)</p>	<ol style="list-style-type: none"> <li>1) Priority Projects must infiltrate, harvest and use, evapotranspire, or biotreat/biofilter, the 85<sup>th</sup> percentile, 24-hour storm event (Design Capture Volume).</li> <li>2) 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.</li> </ol>
<p>List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP)</p>	<p>For this project, no treatment control BMPs are being proposed. Because infiltration is feasible on this project, infiltration basins will be the primary storm water BMP used on the project.</p>
<p>Calculate LID design storm capture volume for Project.</p>	<p>See Table 1.1 included in section VI</p>

## **IV.2. SITE DESIGN AND DRAINAGE PLAN**

Describe site design and drainage plan 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 plot plan.
- Calculation of Design Capture Volume (DCV) for each drainage area.
- A listing of GIS coordinates for LID and Treatment Control BMPs (unless not required by local jurisdiction).

*Refer to Section 2.4.2 in the TGD.*

The first step in the LID BMP selection process is to consider HSCs. There are no significant HSCs proposed for this project.

The next step is to consider infiltration BMPs or harvest and use BMPs. Since the use of bioretention BMPs are adequate to fully retain the Design Storm Capture volume for the project, no other LID BMPs were used in the calculations. The site drainage is designed to allow the design capture volume to settle within the BMPs, and the peak flows to overflow to the historic low point located at the north end of the site.

The attached map in Section VI (WQMP Drainage/Site Plan) describes the stormwater drainage management area (DMA) and proposed BMPs. The BMP Sizing Table 1.1 in Section VI includes the Design Capture Volume (DCV) calculations.

GIS coordinates for the BMPs are as follows:

Bioretention (Subarea A-1): N 2,176,353 E 6,071,231

Bioretention (Subarea A-2): N 2,176,346 E 6,071,323

Bioretention (Subarea A-3): N 2,176,165 E 6,071,301

Bioretention (Subarea A-4): N 2,176,219 E 6,071,408

Bioretention (Subarea A-5): N 2,176,121 E 6,071,419

Bioretention (Subarea A-6): N 2,176,300 E 6,071,437

### **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 TGD for selecting LID BMPs and Section 2.4.3 in the TGD for conducting conformance analysis with project performance criteria.*

#### **IV.3.1 Hydrologic Source Controls**

The retention criteria shall be met with a dry extended detention basin, therefore HSCs are not required.

<b>Name</b>	<b>Included?</b>
Localized on-lot infiltration	<input type="checkbox"/>
Impervious area dispersion (e.g. paved parking surface disconnection)	<input type="checkbox"/>
Street trees (canopy interception)	<input type="checkbox"/>
Residential rain barrels (not actively managed)	<input type="checkbox"/>
Green roofs/Brown roofs	<input type="checkbox"/>
Blue roofs	<input type="checkbox"/>
Impervious area reduction (e.g. permeable pavers, site design)	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>

**IV.3.2 Infiltration BMPs**

The retention criteria shall be met with infiltration planter boxes and bioretention with underdrains, which will provide evapotranspiration, biological treatment and filtration, but no infiltration.

Name	Included?
Bioretention	<input type="checkbox"/>
Rain gardens	<input type="checkbox"/>
Porous landscaping	<input type="checkbox"/>
Infiltration planters	<input type="checkbox"/>
Retention swales	<input type="checkbox"/>
Infiltration trenches	<input type="checkbox"/>
Infiltration basins	<input checked="" type="checkbox"/>
Drywells	<input type="checkbox"/>
Subsurface infiltration galleries	<input type="checkbox"/>
French drains	<input type="checkbox"/>
Permeable asphalt	<input type="checkbox"/>
Permeable concrete	<input type="checkbox"/>
Permeable concrete pavers	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>

The predominant soil type is C, which typically has measured infiltration rates around 0.25"/hr which can be seen as low to moderate infiltration rates. However, due to the absence of an existing storm drain system within close proximity to the site infiltration seems to be the most feasible solution. Infiltration testing shall be done by the geotechnical engineer, Langan Engineering & Environmental Services, Inc to measure this site's infiltration rates. The design infiltration rate is based on the typical measured infiltration rate for soil type C and shall be modified when further information becomes available.

See Table 1.1 in Section VI for calculations.

**IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs**

Name	Included?
All HSCs; <i>See Section IV.3.1</i>	<input type="checkbox"/>
Surface-based infiltration BMPs	<input type="checkbox"/>
Biotreatment BMPs	<input type="checkbox"/>
Above-ground cisterns and basins	<input type="checkbox"/>
Underground detention	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>

Show calculations below to demonstrate if the LID Design Storm Capture Volume can be met with evapotranspiration, rainwater harvesting BMPs in combination with infiltration 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 either of these BMPs categories.

Harvest and reuse is not feasible due to the small size and remote location of the project, and the cost of implementing the system. Instead, infiltration BMPs are being implemented for this project.

IV.3.4 Biotreatment BMPs

<b>Name</b>	<b>Included?</b>
Bioretention with underdrains	<input type="checkbox"/>
Stormwater planter boxes with underdrains	<input type="checkbox"/>
Rain gardens with underdrains	<input type="checkbox"/>
Constructed wetlands	<input type="checkbox"/>
Vegetated swales	<input type="checkbox"/>
Vegetated filter strips	<input type="checkbox"/>
Proprietary vegetated biotreatment systems	<input type="checkbox"/>
Wet extended detention basin	<input type="checkbox"/>
Dry extended detention basin	<input type="checkbox"/>
Other:	<input type="checkbox"/>
Other:	<input type="checkbox"/>

IV.3.5 Hydromodification Control BMPs

<b>Hydromodification Control BMPs</b>	
<b>BMP Name</b>	<b>BMP Description</b>
Not applicable	



IV.3.6 Regional/Sub-Regional LID BMPs

**Regional/Sub-Regional LID BMPs**

Per Figure 7.II-7 of the model WQMP, if there is no approved regional BMP or Watershed Infiltration and Hydromodification Master Plan (WIHMP), the project site shall incorporate LID BMPs as the first priority. There is no regional BMP that this project drains into. For this project, LID BMPs are being implemented at the source.

IV.3.7 Treatment Control BMPs

Treatment control BMPs are not used since the full Design Storm Capture Volume is being treated with infiltration BMPs.

<b>Treatment Control BMPs</b>	
<b>BMP Name</b>	<b>BMP Description</b>
Not applicable	

IV.3.8 Non-structural Source Control BMPs

<b>Non-Structural Source Control BMPs</b>				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
N2	Activity Restrictions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
N3	Common Area Landscape Management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
N4	BMP Maintenance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
N5	Title 22 CCR Compliance (How development will comply)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No hazardous waste
N6	Local Industrial Permit Compliance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
N7	Spill Contingency Plan	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No storage is provided in project area
N8	Underground Storage Tank Compliance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No storage is provided in project area
N9	Hazardous Materials Disclosure Compliance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No hazardous materials
N10	Uniform Fire Code Implementation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No hazardous materials
N11	Common Area Litter Control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
N12	Employee Training	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
N13	Housekeeping of Loading Docks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No loading dock
N14	Common Area Catch Basin Inspection	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No catch basins proposed
N15	Street Sweeping Private Streets and Parking Lots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
N16	Retail Gasoline Outlets	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No retail gasoline outlet

The following non-structural BMPs are proposed for source control and reduction/elimination of pollutants: **(See WQMP Site Plan in Section VI)**

**N1 Education for Property Owners, Tenants and Occupants:** Practical informational materials are provided to occupants or tenants to increase the public's understanding of stormwater quality, sources of pollutants, and what they can do to reduce pollutants in stormwater. Educational materials available from the County of Orange can be downloaded here: <http://ocwatersheds.com/publiced/resources/bussbrochure> and are also located in Section VII of this report.

Explanation/Description: Hines Brea Place Acquisition Partners, LLC Properties will provide educational environmental awareness materials to all employees and contractors during the initial hiring and orientation process, and annually thereafter. Among other items, these educational materials will address specific chemicals (including household, commercial, industrial, automotive, and landscape types). The use of these chemicals should be limited to within the confines of the site (generally inside the building) where waste water drains directly into the public sanitary sewer system, with no discharge to gutters, paved areas, drainage devices and landscaped areas where drainage will be released from the site.

**N2 Activity Restrictions:**

Hines Brea Place Acquisition Partners, LLC Properties will provide restrictions to all employees, contractors, etc. on certain activities conducted on this property. Hines Brea Place Acquisition Partners, LLC properties will provide a list of these activity restrictions to employees, contractors, etc. upon start date and annually thereafter. If violations occur, Hines Brea Place Acquisition Partners, LLC will record the event and notify employees, contractors, etc. Hines Brea Place Acquisition Partners, LLC Properties will provide another list of these activity restrictions. If employees, contractors, etc. continue to violate these activity restrictions, City of Irvine Code Enforcement will be notified.

These restrictions include:

- Vehicle washing, maintenance or repair outside of designated areas
- Hosing down of paved areas
- Disposal of animal waste not in appropriate locations
- Use of chemicals, pesticides, toxins, etc. on paved or landscape areas
- Dumping of any waste into drainage facilities
- Blowing or sweeping of debris (leaf litter, grass clippings, litter, etc.) into drainage

facilities

- Discharges of fertilizer or pesticides to drainage facilities
- Keeping dumpster lids open
- Washing kitchen wastes or kitchen equipment to storm water drainage features

The owner will inform employees, contractors, etc. that spills are to be swept or vacuumed.

### **N3 Common area landscape maintenance:**

A licensed landscape maintenance crew will be provided by Hines Brea Place Acquisition Partners, LLC to maintain area landscaping. This maintenance crew will utilize the following efficient landscape and irrigation practices:

- Weekly inspections will be scheduled to ensure proper functioning of the irrigation system.
- Poorly functioning heads, valves, etc. will be repaired or replaced.
- Proper functioning of the irrigation system will be confirmed prior to application of pesticides, herbicides and fertilizers to avoid nuisance runoff and subsequent release of chemicals into the drainage system.
- Fertilizers will be worked into the soil to a depth of 4 to 6 inches to reduce the likelihood of their inadvertent runoff into downstream surface waters.
- All chemical applications will be carried out in strict accordance with the manufacturer's label, and using the minimum effective quantity.
- Pesticides are to be used only after recommendation from a state-licensed pest control advisor.
- Pesticides are only to be applied by or under the direct supervision of a state licensed or certified pesticide applicator or by workers with equivalent training.
- Keep irrigation system at short repeat cycles to minimize runoff and erosion.
- Replenish wood mulches to reduce evaporation and frequency of watering.

**N4 BMP maintenance:** BMP implementation, operation, and maintenance is described with each BMP Narrative in this section and in Section V, Inspection and Responsibility for BMPs.

**N11 Common Area Litter Control:** Hines Brea Place Acquisition Partners, LLC Properties will be responsible for implementing trash management and litter control procedures in all areas of the site to reduce pollution of drainage water. Hines Brea Place Acquisition Partners, LLC Properties may employ a contractor (possibly the landscape maintenance crew) to implement these procedures on a regular basis. Essential tasks will include daily inspection

of trash in paved and unpaved areas, and noting trash disposal violations by employees, contractors, etc. If violations occur, employees, contractors, etc. will be notified by the Hines Brea Place Acquisition Partners, LLC Properties, and further education will be provided.

**N12 Employee Training:** Practical informational materials and/or training are provided to employees to increase their understanding of stormwater quality, sources of pollutants, and their responsibility for reducing pollutants in stormwater.

Explanation/Description: Education program (See N1) will be provided by Hines Brea Place Acquisition Partners, LLC Properties to employees to increase their understanding of stormwater quality and responsibility to reduce pollutant discharge into stormwater.

**N15 Drive Aisle and Parking Area Sweeping:** Drive aisles and parking areas will be swept clean every two weeks and once within five days prior to Oct. 15th. It is prohibited for street sweepers to sweep debris into storm drain inlets or vegetated swales.

IV.3.9 Structural Source Control BMPs

<b>Structural Source Control BMPs</b>				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No storm drain system is proposed at this time
S2	Design and construct outdoor material storage areas to reduce pollution introduction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
S3	Design and construct trash and waste storage areas to reduce pollution introduction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
S5	Protect slopes and channels and provide energy dissipation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No slopes or channels
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
S6	Dock areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No dock areas
S7	Maintenance bays	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No maintenance bays
S8	Vehicle wash areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No vehicle wash areas
S9	Outdoor processing areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No outdoor processing areas
S10	Equipment wash areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No equipment wash areas
S11	Fueling areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No fueling areas
S12	Hillside landscaping	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No hillsides
S13	Wash water control for food preparation areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No food preparation areas
S14	Community car wash racks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No community car wash racks

The following structural BMPs are proposed for source control and reduction/elimination of pollutants: (See WQMP Site Plan in Section VI)

**Design and construct trash and waste storage areas to reduce pollution**

**introduction:** Exterior trash enclosures shall have covered roofs to prevent stormwater from mixing with trash. The trash enclosures shall also have washout drains in the center that connect to the on-site sewer system.

**Use efficient irrigation systems & landscape design:** The timing and application methods of irrigation water shall be designed to minimize the runoff of excess irrigation water into the storm drain system. The following methods have been implemented to reduce excessive irrigation runoff:

- Employment of irrometer devices (moisture sensors) to prevent irrigation after precipitation.
- The use of flow sensors and master control valves to shut down valve when triggered by a pressure drop. This shut down will control water loss in the event of broken sprinkler heads or lines.
- The irrigation application method considered shall be a drip system. A drip irrigation system is buried under the soil, which eliminates runoff and wind misting and minimizes water loss due to evaporation.
- The timing of irrigation water shall be designed at short repeat cycles to further eliminate irrigation water runoff and to minimize erosion, due to saturated soil.
- Although no native or drought-tolerant plants will be used, the plants used have low to medium water requirements and are appropriate for the climate of the area.
- Mulch is used in planter areas to minimize sediment in runoff.

The procedures for irrigation system and landscape maintenance and inspection are described in Section V, Operations and Maintenance Plan (N3). The irrigation system shall be inspected weekly in conjunction with maintenance activities.



## **IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)**

### **IV.4.1 Water Quality Credits**

<b>Description of Proposed Project</b>				
Project Types that Qualify for Water Quality Credits (Select all that apply):				
<input type="checkbox"/> Redevelopment projects that reduce the overall impervious footprint of the project site.	<input type="checkbox"/> 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.	<input type="checkbox"/> 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).		
<input type="checkbox"/> 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).	<input type="checkbox"/> 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		<input type="checkbox"/> 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).	
<input type="checkbox"/> Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.	<input type="checkbox"/> Developments in a city center area.	<input type="checkbox"/> Developments in historic districts or historic preservation areas.	<input type="checkbox"/> 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.	<input type="checkbox"/> In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.
Calculation of Water Quality Credits (if applicable)	Not applicable			

### **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 WQMP.*

Not applicable

## Section V - Inspection/Maintenance Responsibility for BMPs

Inspection and maintenance records must be kept for a minimum of five years for inspection by the regulatory agencies.

<b>BMP Inspection/Maintenance</b>			
<b>BMP</b>	<b>Reponsible Party(s)</b>	<b>Inspection/Maintenance Activities Required</b>	<b>Minimum Frequency of Activities</b>
<b>N1: Education for Property Owners, Tenants and Occupants</b>	Ford Road Holdings LP, 400 MacArthur Blvd., Suite 110 Newport Beach, CA 92660 (949) 313-2200 Tom Lawless	Ford Road Holdings LP will provide employees and contractors with educational materials regarding water quality protection. All employees and contractors must be trained and aware of the Water Quality Management Plan. Each employee and contractor will sign off on a handbook receipt indicating they have read and are aware of the document.	Upon initial hiring and orientation of employees and contractors, and annually thereafter.

**Preliminary Water Quality Management Plan (WQMP)  
 Ford Road Residential, 4302 Ford Road, Newport Beach, CA 92660**

<p><b>N2. Activity Restrictions</b></p>	<p>Ford Road Holdings LP  See above</p>	<p>Ford Road Holdings LP, will provide restrictions to all employees, contractors, tenants, etc. on activities that contribute to stormwater pollution. Property owners, employees, contractors, etc. must be trained and aware of activity restrictions. Each property owner, employee contractor, etc. will sign off on a Handbook Receipt indicating they have read and are aware of the document.</p>	<p>Property owner, contractor, employees, etc. will receive a list of activity restrictions on start date and annually thereafter.</p>
<p><b>N3. Common Area Landscape Management</b></p>	<p>Ford Road Holdings LP  See above</p>	<p>Manage landscaping in accordance with the State of California Conservation in Landscaping Act of 1990 (Model Water Efficient Landscape Ordinance), with management guidelines for use of fertilizers and pesticides (DAMP Appendix F), and with the IGCMP.</p>	<p>Weekly during regular maintenance.</p>
<p><b>N4. BMP Maintenance</b></p>	<p>Ford Road Holdings LP  See above</p>	<p>This Matrix is BMP N4</p>	
<p><b>N11. Common Area Litter Control</b></p>	<p>Ford Road Holdings LP  See above</p>	<p>Litter collection within landscape areas and outside walkways. Daily inspection of trash receptacles to ensure that lids are closed and any trash on the grounds</p>	<p>Daily</p>
<p><b>N12. Employee Training: See N1, apply to Employees</b></p>	<p>Ford Road Holdings LP  See above</p>		

**Preliminary Water Quality Management Plan (WQMP)  
 Ford Road Residential, 4302 Ford Road, Newport Beach, CA 92660**

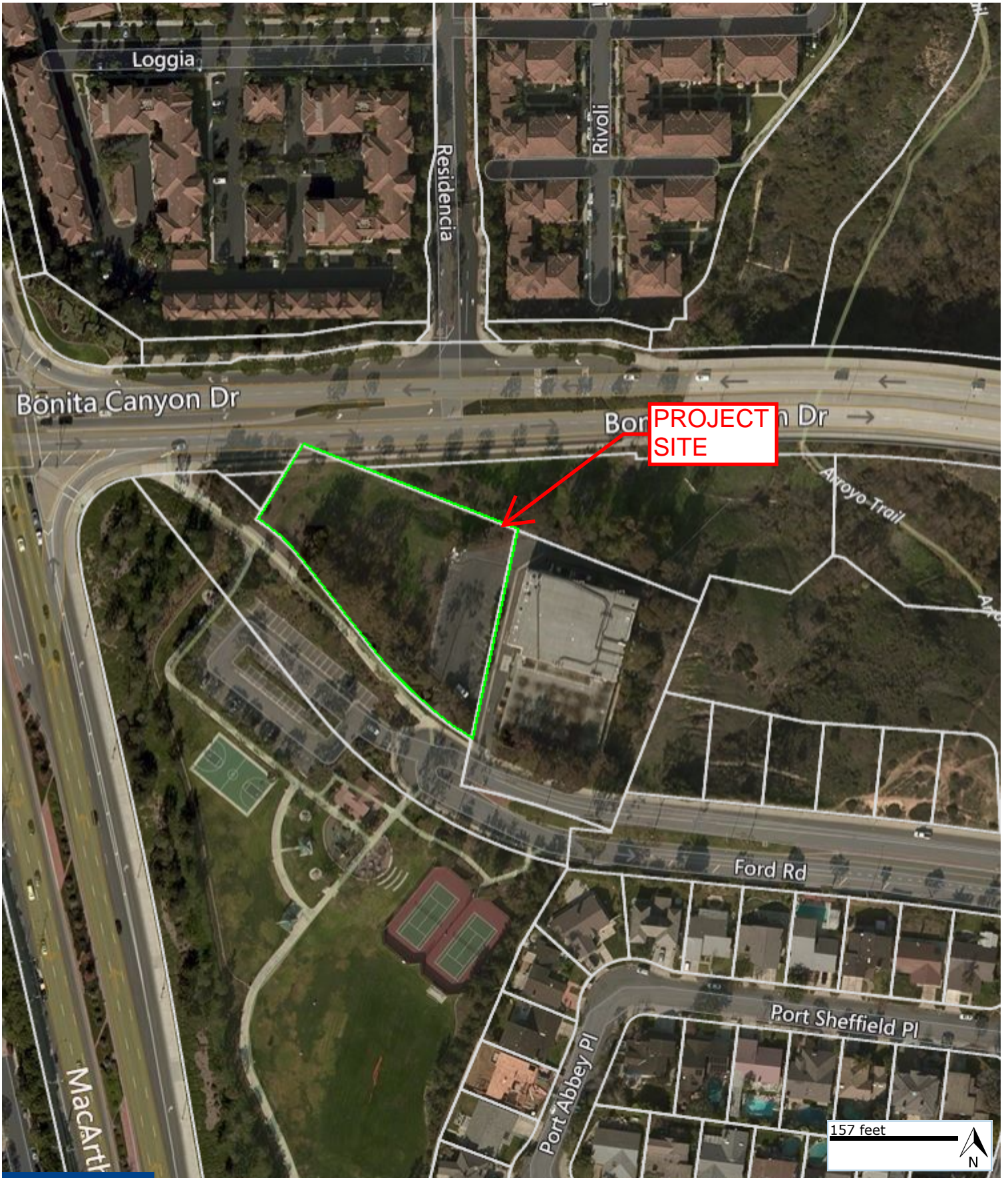
<p><b>N15. Street Sweeping Private Streets and Parking Lots</b></p>	<p>Ford Road Holdings LP  See above</p>	<p>Stormwater pollution prevention includes street sweeping of streets and parking lots.</p>	<p>Every two weeks, and once within five days prior to October 15th</p>
<p><b>S3. Design and construct trash and waste storage areas to reduce pollution introduction</b></p>	<p>Ford Road Holdings LP  See above</p>	<p>Trash areas shall be inspected daily to assure any trash or spilled waste is promptly cleaned up. No spilled waste shall be allowed to spill out of the waste storage areas. The integrity of the structural components, e.g., covers that are subject to damage must be maintained.</p>	<p>Inspected daily.</p>
<p><b>S4. Common Area Efficient Irrigation</b></p>	<p>Ford Road Holdings LP  See above</p>	<p>Design Landscaping and Irrigation to protect stormwater quality. Verify that runoff minimizing landscape design continues to function by checking that water sensors are functioning properly, that irrigation heads are adjusted properly to eliminate overspray to hardscape areas, and that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather and day or night time temperatures.</p>	<p>Weekly in conjunction with maintenance activities.</p>

## **Section VI – Drainage/Site Plan, Calculations and Support Materials**

### **VI.1 SITE PLAN AND DRAINAGE PLAN**

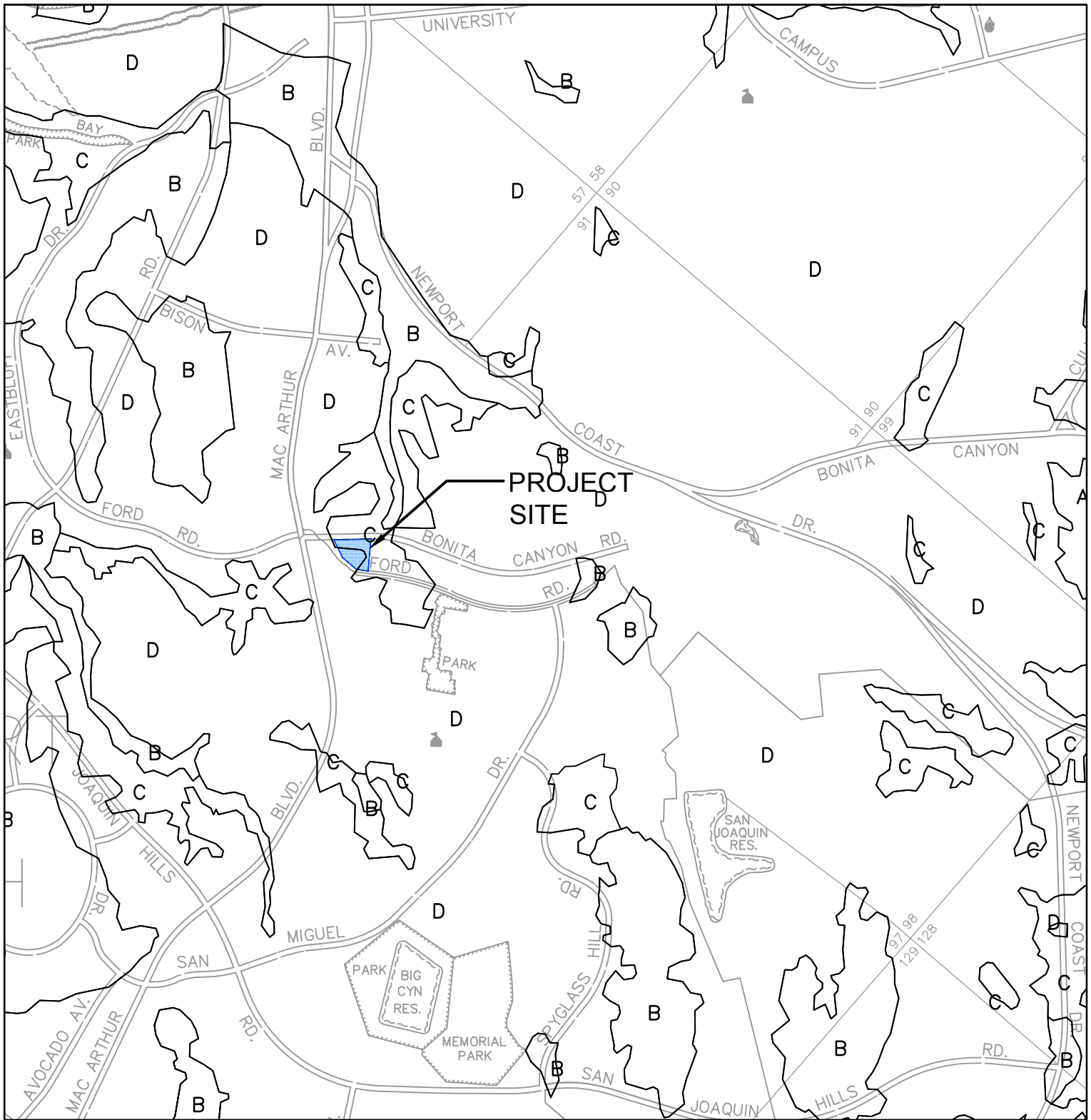
Include a site plan and drainage plan sheet set containing the following minimum information:

- Project location
- Site boundary
- Land uses and land covers, as applicable
- Suitability/feasibility constraints
- Structural BMP locations
- Drainage delineations and flow information
- Drainage connections
- Drainage Maps
- TC calculations (RATSCx)
- BMP details



**VICINITY MAP**





## HYDROLOGIC SOILS GROUP MAP

**LEGEND**


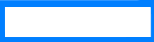


- B, C & D SITE SOILS GROUP DESIGNATIONS
- SOILS GROUP BOUNDARY

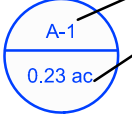
REFERENCE: HYDROLOGIC CLASSIFICATION OF SOILS  
ORANGE COUNTY, CALIFORNIA







# LEGEND

-  BIOTREATMENT BMP
-  DRAINAGE BOUNDARY
-  DRAINAGE SUB-AREA
-  DRAINAGE FLOW DIRECTION

-  SUBAREA ID  
AREA SIZE (acres)  
1.32 acres total





## STRUCTURAL BMP's

-  STORM DRAIN SYSTEM STENCILING AND SIGNAGE
-  EFFICIENT IRRIGATION AND LANDSCAPE DESIGN

## BIOTREATMENT BMP's

-  BIO-FILTRATION MEDIA

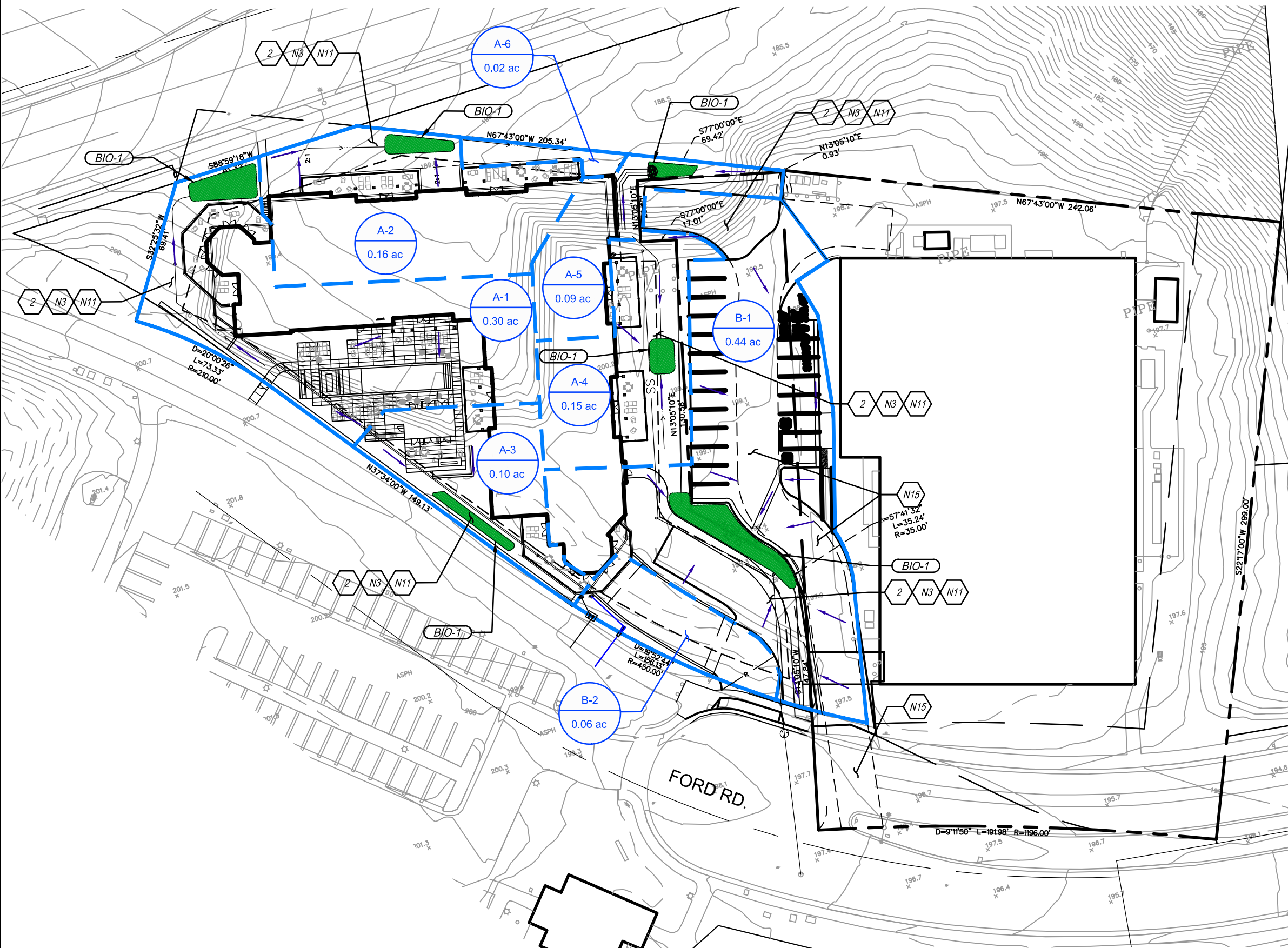
## NON-STRUCTURAL BMP's

-  LANDSCAPE MAINTENANCE
-  LITTER CONTROL
-  CATCH BASIN AND INLET INSPECTION
-  STREET SWEEPING



GRAPHIC SCALE

Note: For reduced sized prints, original scale is in inches



# WQMP SITE PLAN

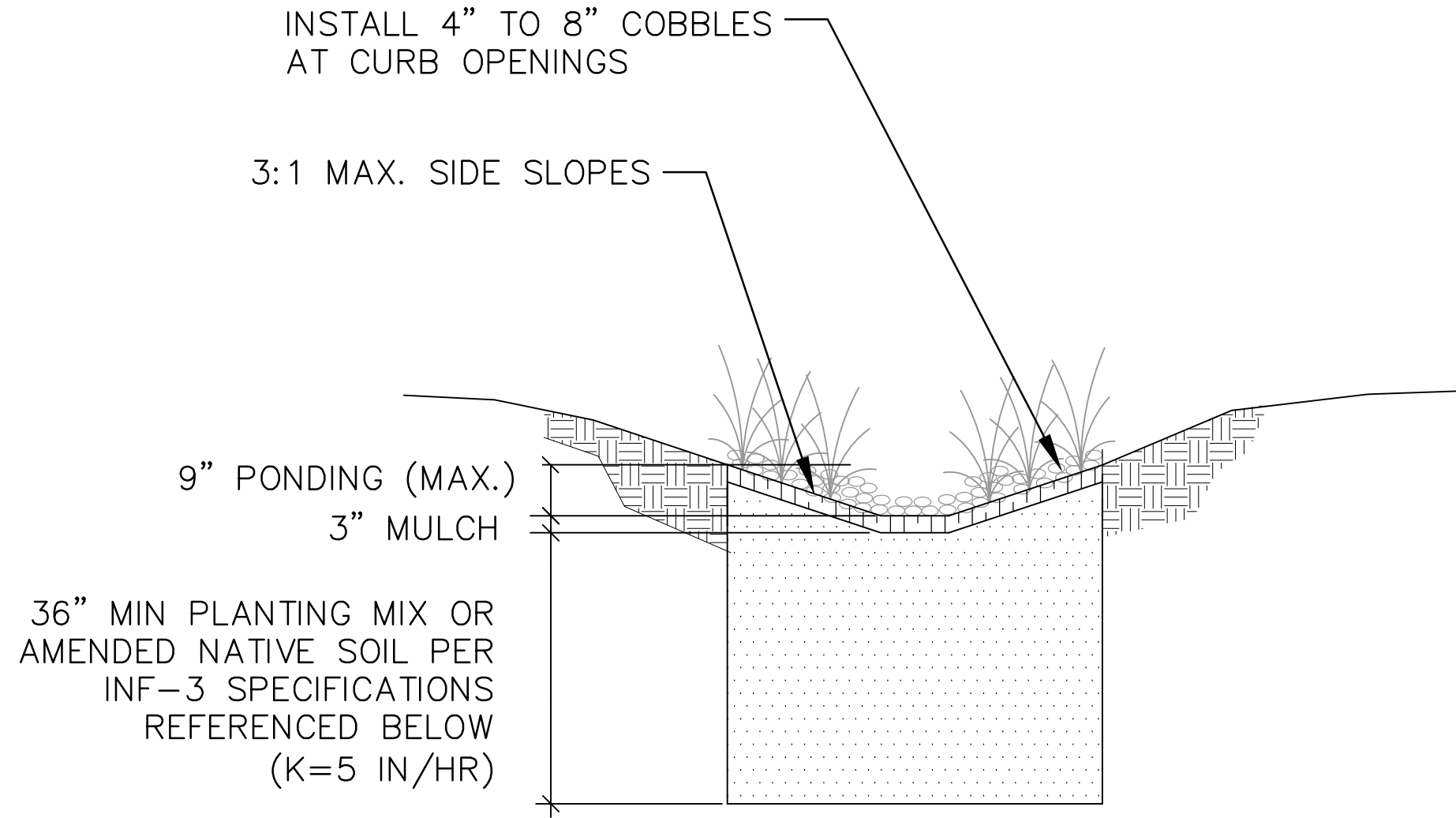
## FORD ROAD RESIDENTIAL

### Parcel 1 of PMB 16760

# PSOMAS

DATE: 12/13/18      REVISED ON:  
 JOB No: 2FOR050100      SHEET 1 OF 2

Oct 26, 2017 - 10:33PM - M:\2FOR050100\ENGR\SHEETS\SHEET SETS\CONDITIONAL USE PERMIT\WATER QUALITY EXHIBIT.DWG




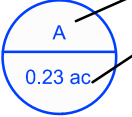


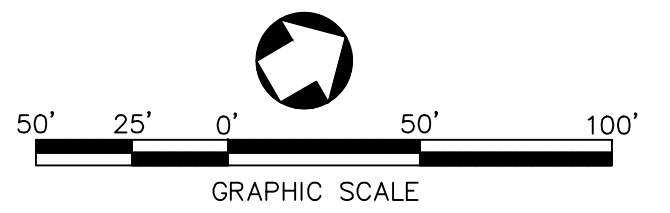
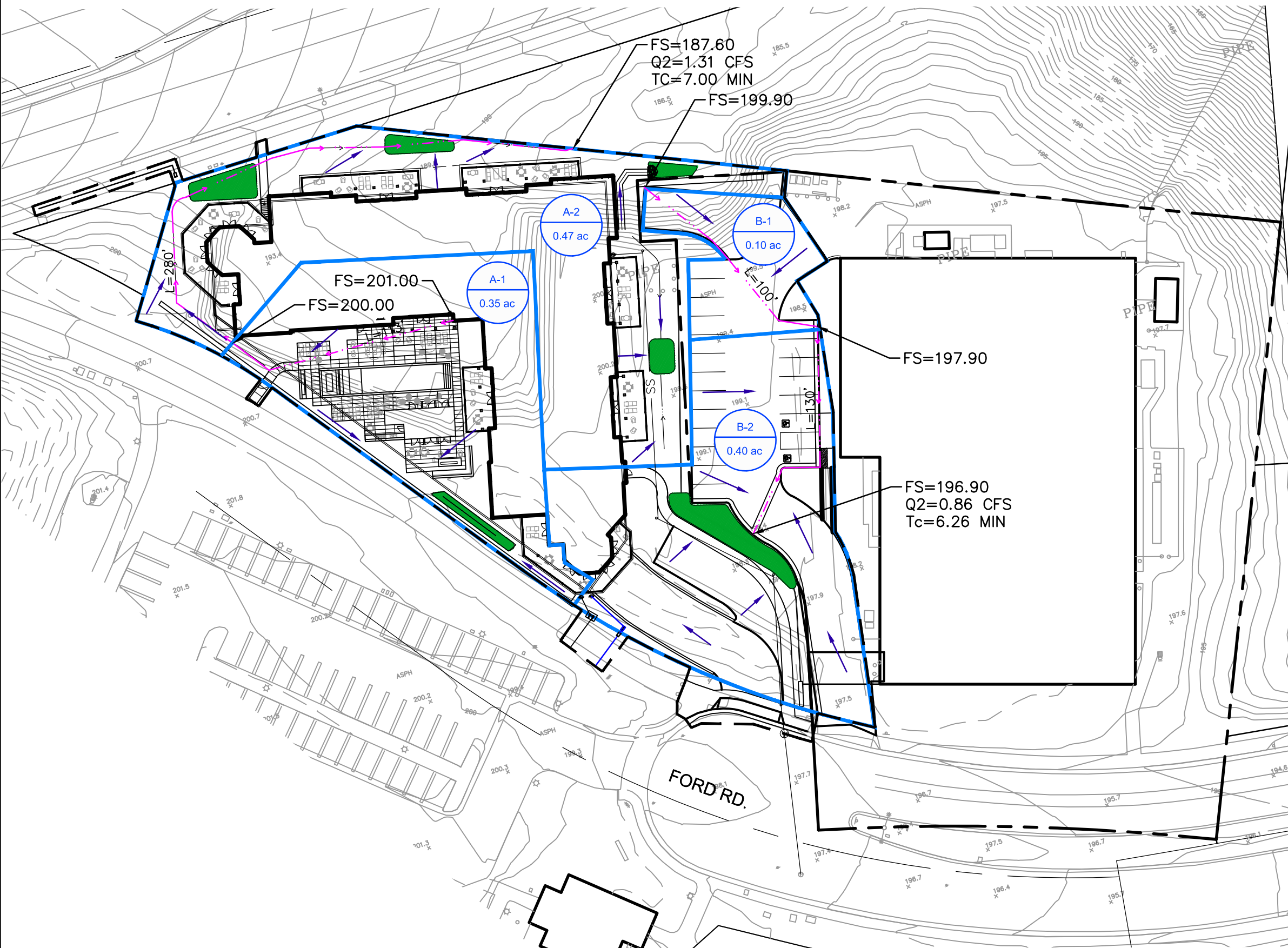
**BIORETENTION (INF-3)**

NOT TO SCALE



# LEGEND

-  BIOTREATMENT BMP
-  DRAINAGE BOUNDARY
-  DRAINAGE FLOW DIRECTION
-  SUBAREA ID  
AREA SIZE (acres)  
1.32 acres total



Note: For reduced sized prints, original scale is in inches

## PROPOSED HYDROLOGY

### FORD ROAD RESIDENTIAL

#### Parcel 1 of PMB 16760

# PSOMAS

DATE: 01/22/19      REVISED ON:  
 JOB No: 2FOR050100      SHEET 1 OF 1

# **Flow & TC Calculations**

\*\*\*\*\*  
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE  
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)  
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Ver. 19.0 Release Date: 06/01/2012 License ID 1286

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* FORD ROAD RESIDENTIAL \*  
\* 2 YEAR STORM \*  
\* EXISTING CONDITION \*  
\*\*\*\*\*

FILE NAME: FOREX.DAT  
TIME/DATE OF STUDY: 11:52 01/22/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT (YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE (INCH) = 4.00  
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.95  
\*DATA BANK RAINFALL USED\*  
\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<  
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 50.00  
ELEVATION DATA: UPSTREAM (FEET) = 202.00 DOWNSTREAM (FEET) = 199.90

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$  (MIN.) = 5.000  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 2.264

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	D	0.10	0.20	0.900	75	5.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.20  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900  
SUBAREA RUNOFF (CFS) = 0.19  
TOTAL AREA (ACRES) = 0.10 PEAK FLOW RATE (CFS) = 0.19

\*\*\*\*\*  
FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 52  
-----

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 199.90 DOWNSTREAM (FEET) = 187.60  
CHANNEL LENGTH THRU SUBAREA (FEET) = 202.00 CHANNEL SLOPE = 0.0609  
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION  
CHANNEL FLOW THRU SUBAREA (CFS) = 0.19  
FLOW VELOCITY (FEET/SEC) = 3.70 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)  
TRAVEL TIME (MIN.) = 0.91 Tc (MIN.) = 5.91  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 252.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 5.91  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 2.057  
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL ".4 DWELLING/ACRE"	C	0.75	0.25	0.900	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.25  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900  
SUBAREA AREA (ACRES) = 0.75 SUBAREA RUNOFF (CFS) = 1.24  
EFFECTIVE AREA (ACRES) = 0.85 AREA-AVERAGED Fm (INCH/HR) = 0.22  
AREA-AVERAGED Fp (INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.90  
TOTAL AREA (ACRES) = 0.9 PEAK FLOW RATE (CFS) = 1.41

\*\*\*\*\*  
FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 4.00 TO NODE 5.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 94.00  
ELEVATION DATA: UPSTREAM (FEET) = 200.00 DOWNSTREAM (FEET) = 199.00

Tc = K \* [ (LENGTH\*\* 3.00) / (ELEVATION CHANGE) ] \*\* 0.20  
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.000

\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 2.264  
 SUBAREA Tc AND LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)  
 COMMERCIAL C 0.08 0.25 0.100 69 5.00  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.25  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100  
 SUBAREA RUNOFF (CFS) = 0.16  
 TOTAL AREA (ACRES) = 0.08 PEAK FLOW RATE (CFS) = 0.16

\*\*\*\*\*  
 FLOW PROCESS FROM NODE 5.00 TO NODE 6.00 IS CODE = 91  
 -----

>>>> COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA <<<<<

=====

UPSTREAM NODE ELEVATION (FEET) = 199.00  
 DOWNSTREAM NODE ELEVATION (FEET) = 197.50  
 CHANNEL LENGTH THRU SUBAREA (FEET) = 148.00  
 "V" GUTTER WIDTH (FEET) = 3.00 GUTTER HIKE (FEET) = 0.120  
 PAVEMENT LIP (FEET) = 0.030 MANNING'S N = .0130  
 PAVEMENT CROSSFALL (DECIMAL NOTATION) = 0.01000  
 MAXIMUM DEPTH (FEET) = 0.50  
 \* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 2.023  
 SUBAREA LOSS RATE DATA (AMC II):  
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS  
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN  
 RESIDENTIAL  
 "8-10 DWELLINGS/ACRE" C 0.39 0.25 0.400 69  
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.25  
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 0.49  
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 2.28  
 AVERAGE FLOW DEPTH (FEET) = 0.15 FLOOD WIDTH (FEET) = 3.00  
 "V" GUTTER FLOW TRAVEL TIME (MIN.) = 1.08 Tc (MIN.) = 6.08  
 SUBAREA AREA (ACRES) = 0.39 SUBAREA RUNOFF (CFS) = 0.67  
 EFFECTIVE AREA (ACRES) = 0.47 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.35  
 TOTAL AREA (ACRES) = 0.5 PEAK FLOW RATE (CFS) = 0.82

END OF SUBAREA "V" GUTTER HYDRAULICS:  
 DEPTH (FEET) = 0.17 FLOOD WIDTH (FEET) = 6.14  
 FLOW VELOCITY (FEET/SEC.) = 2.39 DEPTH\*VELOCITY (FT\*FT/SEC) = 0.40  
 LONGEST FLOWPATH FROM NODE 4.00 TO NODE 6.00 = 242.00 FEET.  
 =====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 0.5 TC (MIN.) = 6.08  
 EFFECTIVE AREA (ACRES) = 0.47 AREA-AVERAGED Fm (INCH/HR) = 0.09  
 AREA-AVERAGED Fp (INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.349  
 PEAK FLOW RATE (CFS) = 0.82  
 =====

END OF RATIONAL METHOD ANALYSIS



\*\*\*\*\*  
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Ver. 19.0 Release Date: 06/01/2012 License ID 1286

Analysis prepared by:

\*\*\*\*\* DESCRIPTION OF STUDY \*\*\*\*\*  
\* FORD ROAD RESIDENTIAL \*  
\* 2 YEAR STORM \*  
\* PROPOSED CONDITION \*  
\*\*\*\*\*

FILE NAME: FORPR.DAT  
TIME/DATE OF STUDY: 12:06 01/22/2019

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--\*TIME-OF-CONCENTRATION MODEL\*--

USER SPECIFIED STORM EVENT (YEAR) = 2.00  
SPECIFIED MINIMUM PIPE SIZE (INCH) = 4.00  
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.95  
\*DATA BANK RAINFALL USED\*  
\*ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD\*

\*USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL\*

NO.	WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT- / PARK- SIDE / SIDE / WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- Relative Flow-Depth = 0.00 FEET  
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
- (Depth)\*(Velocity) Constraint = 6.0 (FT\*FT/S)

\*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.\*  
\*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

\*\*\*\*\*  
FLOW PROCESS FROM NODE 1.00 TO NODE 2.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 113.00  
ELEVATION DATA: UPSTREAM (FEET) = 201.00 DOWNSTREAM (FEET) = 200.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$   
SUBAREA ANALYSIS USED MINIMUM  $T_c$  (MIN.) = 5.526  
\* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 2.137

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
APARTMENTS	D	0.35	0.20	0.200	75	5.53

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.20  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200  
SUBAREA RUNOFF(CFS) = 0.66  
TOTAL AREA(ACRES) = 0.35 PEAK FLOW RATE(CFS) = 0.66

\*\*\*\*\*  
FLOW PROCESS FROM NODE 2.00 TO NODE 3.00 IS CODE = 52  
-----

>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<  
>>>>TRAVELTIME THRU SUBAREA<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 200.00 DOWNSTREAM(FEET) = 187.60  
CHANNEL LENGTH THRU SUBAREA(FEET) = 280.00 CHANNEL SLOPE = 0.0443  
NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION  
CHANNEL FLOW THRU SUBAREA(CFS) = 0.66  
FLOW VELOCITY(FEET/SEC) = 3.16 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)  
TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 7.00  
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 3.00 = 393.00 FEET.

\*\*\*\*\*  
FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 81  
-----

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 7.00  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.865  
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	C	0.47	0.25	0.500	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500  
SUBAREA AREA(ACRES) = 0.47 SUBAREA RUNOFF(CFS) = 0.74  
EFFECTIVE AREA(ACRES) = 0.82 AREA-AVERAGED Fm(INCH/HR) = 0.09  
AREA-AVERAGED Fp(INCH/HR) = 0.24 AREA-AVERAGED Ap = 0.37  
TOTAL AREA(ACRES) = 0.8 PEAK FLOW RATE(CFS) = 1.31

\*\*\*\*\*  
FLOW PROCESS FROM NODE 3.00 TO NODE 3.00 IS CODE = 10  
-----

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<

\*\*\*\*\*  
FLOW PROCESS FROM NODE 4.00 TO NODE 5.00 IS CODE = 21  
-----

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<  
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 100.00  
ELEVATION DATA: UPSTREAM(FEET) = 199.90 DOWNSTREAM(FEET) = 197.90

Tc = K\*[(LENGTH\*\* 3.00)/(ELEVATION CHANGE)]\*\*0.20  
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.160  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"8-10 DWELLINGS/ACRE"	C	0.10	0.25	0.400	69	5.16

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400  
SUBAREA RUNOFF(CFS) = 0.19  
TOTAL AREA(ACRES) = 0.10 PEAK FLOW RATE(CFS) = 0.19

\*\*\*\*\*

FLOW PROCESS FROM NODE 5.00 TO NODE 6.00 IS CODE = 91

>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<

UPSTREAM NODE ELEVATION(FEET) = 197.90  
DOWNSTREAM NODE ELEVATION(FEET) = 196.90  
CHANNEL LENGTH THRU SUBAREA(FEET) = 130.00  
"V" GUTTER WIDTH(FEET) = 3.00 GUTTER HIKE(FEET) = 0.120  
PAVEMENT LIP(FEET) = 0.030 MANNING'S N = .0130  
PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.01500  
MAXIMUM DEPTH(FEET) = 0.50  
\* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.991

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
MOBILE HOME PARK	C	0.40	0.25	0.250	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.25  
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.250  
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 0.54  
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 1.98  
AVERAGE FLOW DEPTH(FEET) = 0.15 FLOOD WIDTH(FEET) = 3.09  
"V" GUTTER FLOW TRAVEL TIME(MIN.) = 1.10 Tc(MIN.) = 6.26  
SUBAREA AREA(ACRES) = 0.40 SUBAREA RUNOFF(CFS) = 0.69  
EFFECTIVE AREA(ACRES) = 0.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.28  
TOTAL AREA(ACRES) = 0.5 PEAK FLOW RATE(CFS) = 0.86

END OF SUBAREA "V" GUTTER HYDRAULICS:

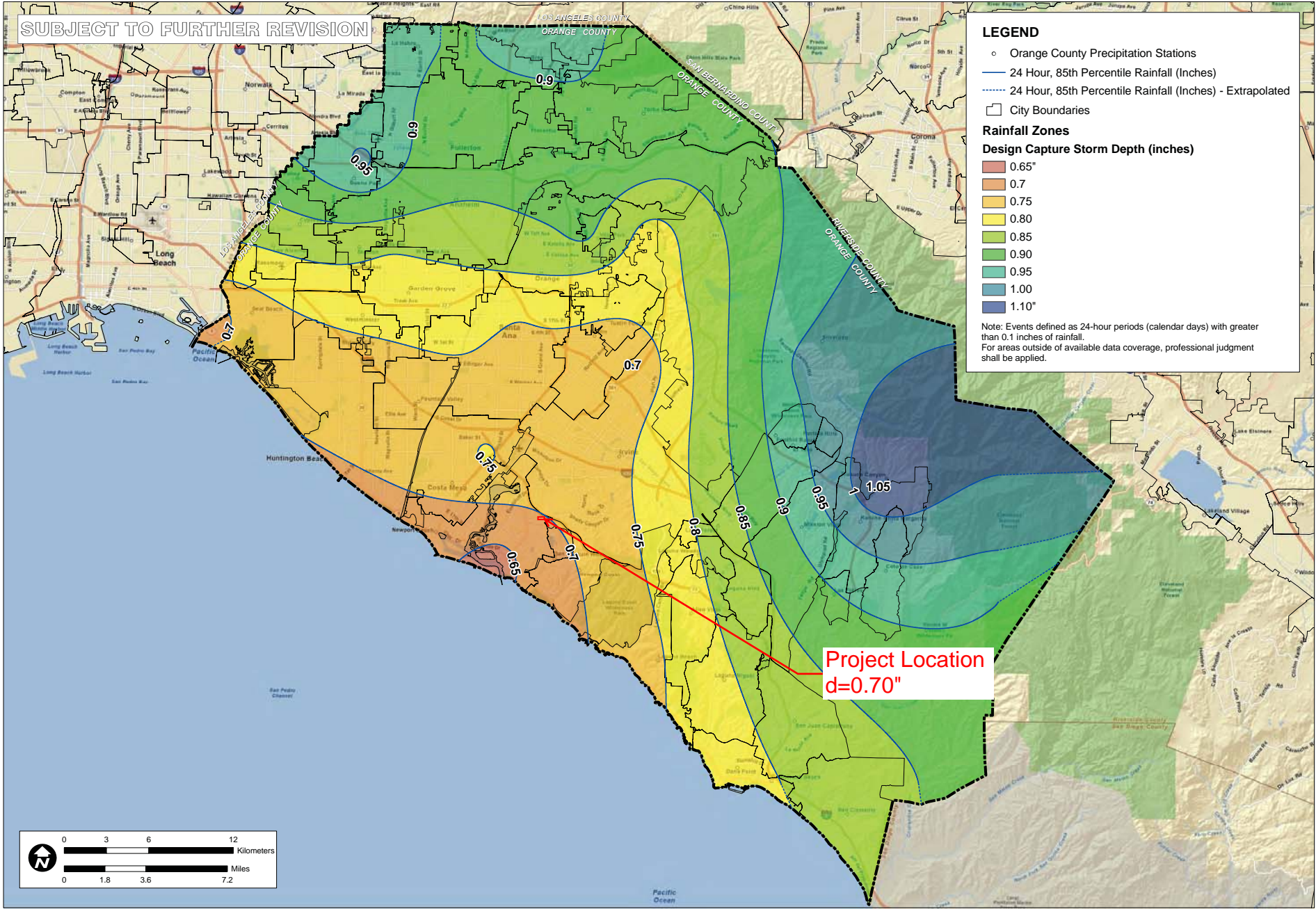
DEPTH(FEET) = 0.18 FLOOD WIDTH(FEET) = 6.74  
FLOW VELOCITY(FEET/SEC.) = 2.13 DEPTH\*VELOCITY(FT\*FT/SEC) = 0.38  
LONGEST FLOWPATH FROM NODE 4.00 TO NODE 6.00 = 230.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 0.5 TC(MIN.) = 6.26  
EFFECTIVE AREA(ACRES) = 0.50 AREA-AVERAGED Fm(INCH/HR) = 0.07  
AREA-AVERAGED Fp(INCH/HR) = 0.25 AREA-AVERAGED Ap = 0.280  
PEAK FLOW RATE(CFS) = 0.86

END OF RATIONAL METHOD ANALYSIS

SUBJECT TO FURTHER REVISION



**LEGEND**

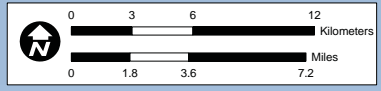
- Orange County Precipitation Stations
- 24 Hour, 85th Percentile Rainfall (Inches)
- ⋯ 24 Hour, 85th Percentile Rainfall (Inches) - Extrapolated
- City Boundaries

**Rainfall Zones**

**Design Capture Storm Depth (inches)**

- 0.65"
- 0.7
- 0.75
- 0.80
- 0.85
- 0.90
- 0.95
- 1.00
- 1.10"

Note: Events defined as 24-hour periods (calendar days) with greater than 0.1 inches of rainfall.  
For areas outside of available data coverage, professional judgment shall be applied.



RAINFALL ZONES															
ORANGE COUNTY TECHNICAL GUIDANCE DOCUMENT	ORANGE CO. CA														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>SCALE</td> <td>F = 1.8 inches</td> </tr> <tr> <td>DESIGNED</td> <td>TH</td> </tr> <tr> <td>DRAWN</td> <td>TH</td> </tr> <tr> <td>CHECKED</td> <td>BJP</td> </tr> <tr> <td>DATE</td> <td>04/22/19</td> </tr> <tr> <td>JOB NO.</td> <td></td> </tr> <tr> <td>SIZE</td> <td></td> </tr> </table>	SCALE	F = 1.8 inches	DESIGNED	TH	DRAWN	TH	CHECKED	BJP	DATE	04/22/19	JOB NO.		SIZE		
SCALE	F = 1.8 inches														
DESIGNED	TH														
DRAWN	TH														
CHECKED	BJP														
DATE	04/22/19														
JOB NO.															
SIZE															
FIGURE XVI-1															

P:\9524E\GIS\Work\Reports\Infiltration\Feasibility\_20110215\9524E\_Figures\XVI-1\_RainfallZones\_20110215.mxd

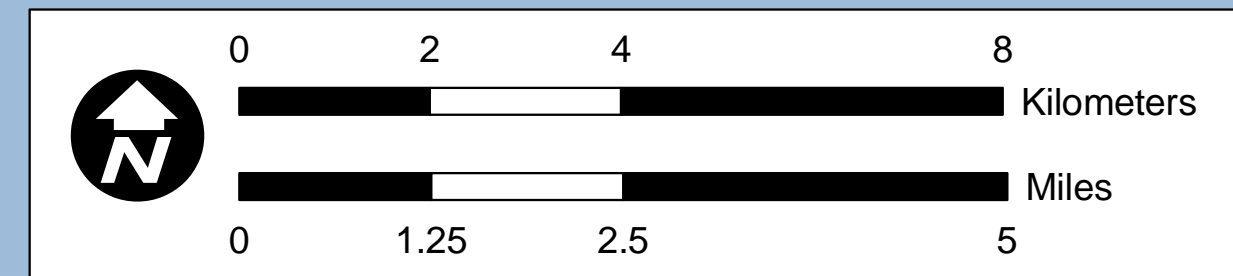
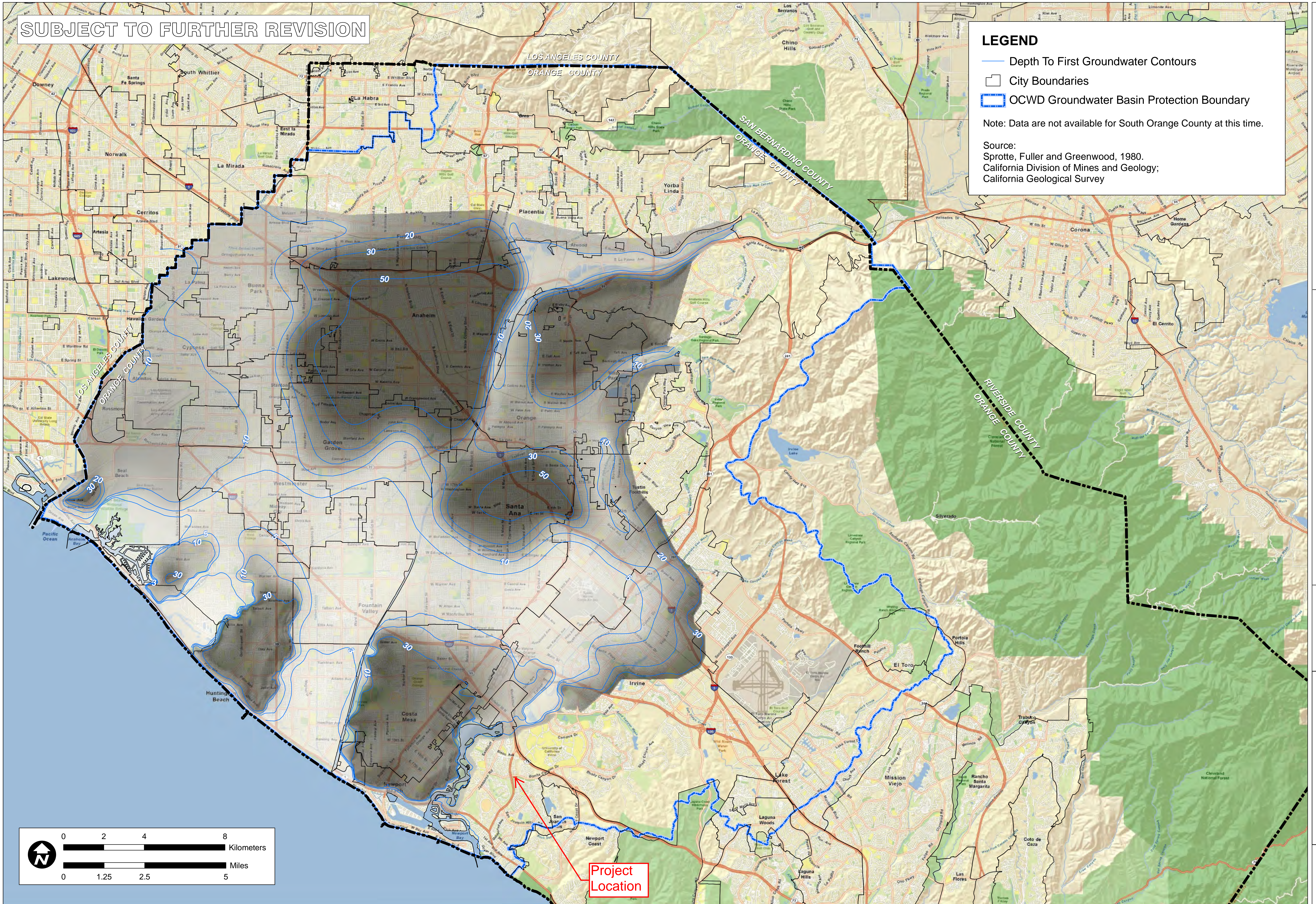
SUBJECT TO FURTHER REVISION

**LEGEND**

- Depth To First Groundwater Contours
- City Boundaries
- ▭ OCWD Groundwater Basin Protection Boundary

Note: Data are not available for South Orange County at this time.

Source:  
Sprotte, Fuller and Greenwood, 1980.  
California Division of Mines and Geology;  
California Geological Survey



TITLE		NORTH ORANGE COUNTY MAPPED DEPTH TO FIRST GROUNDWATER	
JOB		CA	
ORANGE COUNTY INFILTRATION STUDY		ORANGE CO.	
SCALE	1" = 1.25 miles	DESIGNED	TH
DRAWING	TH	CHECKED	BMP
DATE	02/09/11	JOB NO.	9526-E
		FIGURE	
		XVI-2d	

P:\9526E\6-GIS\Mxd\Reports\Infiltration\Feasibility\_20110215\9526E\_FigureXVI-2d\_DepthToGroundwaterOverview\_20110215.mxd

PRELIMINARY MAP - SUBJECT TO FURTHER REVISION

**Susceptibility**

- Potential Areas of Erosion, Habitat, & Physical Structure Susceptibility

**Channel Type**

- Earth (Unstable)
- Earth (Stabilized)
- Stabilized

**Tidel Influence**

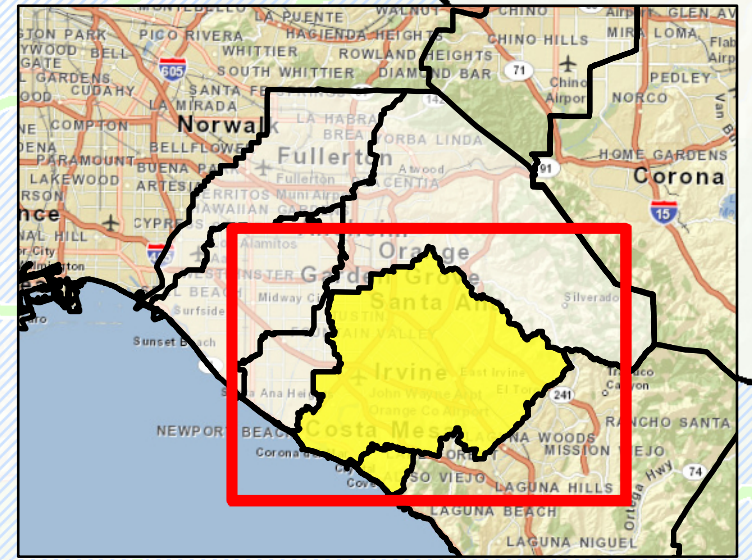
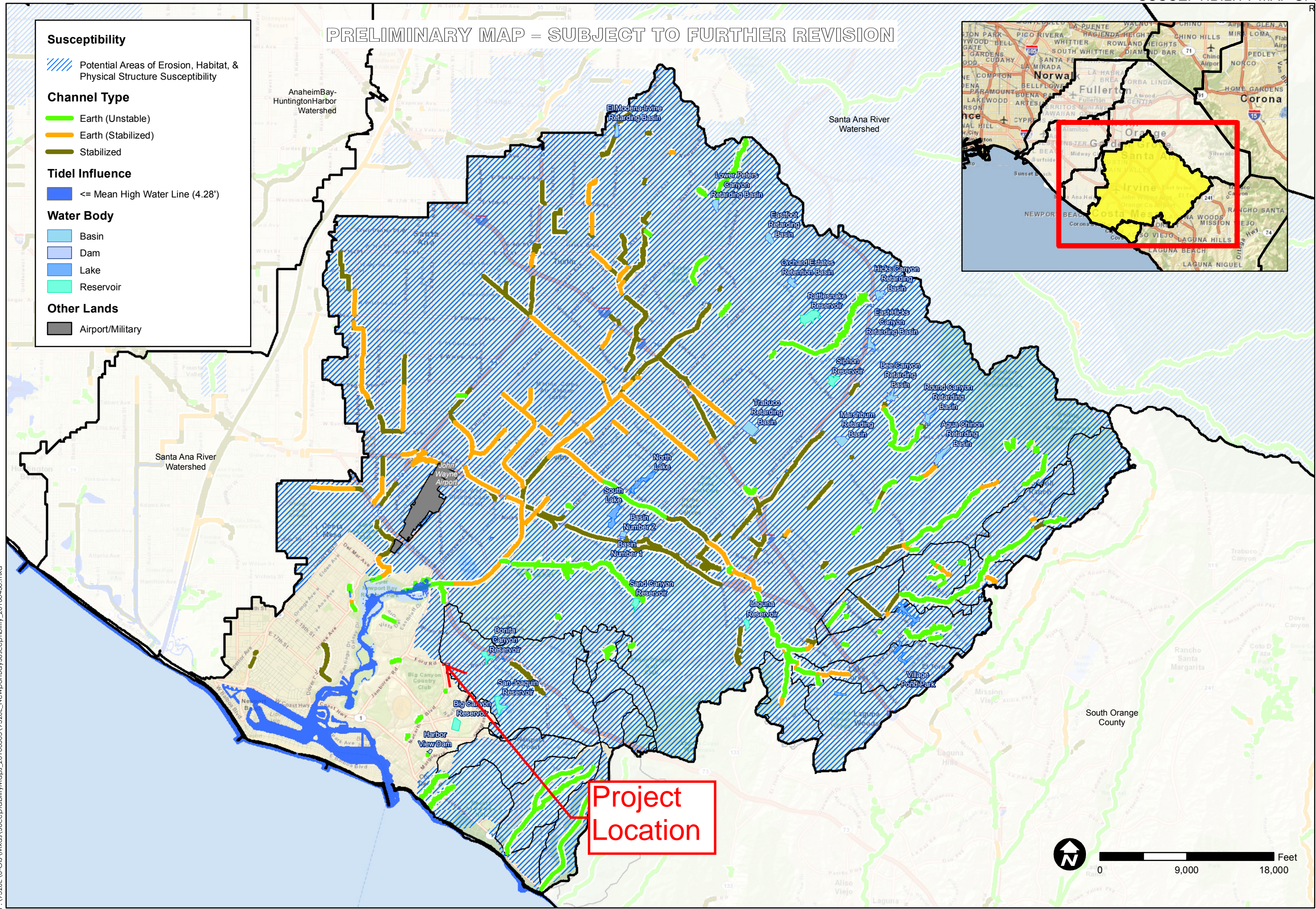
- <= Mean High Water Line (4.28')

**Water Body**

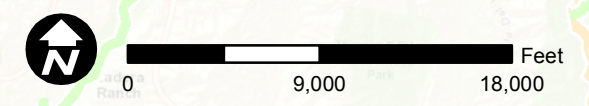
- Basin
- Dam
- Lake
- Reservoir

**Other Lands**

- Airport/Military



Project Location



P:\9526E\6-GIS\Wxds\Susceptibility\Maps\_20100505\9526E\_NewportBaySusceptibility\_20100430.mxd

TITLE

SUSCEPTIBILITY ANALYSIS  
NEWPORT BAY-  
NEWPORT COASTAL STREAMS

JOB

ORANGE COUNTY  
WATERSHED  
MASTER PLANNING

ORANGE CO. CA

SCALE	1" = 12,000'
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	04/30/10
JOB NO.	9526-E

FIGURE

4

PACE  
Advanced Water Engineering

INF-3: Bioretention with no Underdrain

Bioretention stormwater treatment facilities are landscaped shallow depressions that capture and filter stormwater runoff. These facilities function as a soil and plant-based filtration device that removes pollutants through a variety of physical, biological, and chemical treatment processes. The facilities normally consist of a ponding area, mulch layer, planting soils, and plants. As stormwater passes down through the planting soil, pollutants are filtered, adsorbed, and biodegraded by the soil and plants. For areas with low permeability native soils or steep slopes, bioretention areas can be designed with an underdrain system that routes the treated runoff to the storm drain system rather than depending entirely on infiltration.



**Feasibility Screening Considerations**

- Bioretention with no underdrains shall pass infiltration infeasibility screening criteria to be considered for use.

**Opportunity Criteria**

- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Bioretention may also be applied in parking lot islands, cul-de-sacs, traffic circles, road shoulders, and road medians.
- Drainage area is  $\leq 5$  acres, preferably  $\leq 1$  acre.
- Area available for infiltration.
- Soils are adequate for infiltration or can be amended to improve infiltration capacity. Site slope is less than 15 percent.

**OC-Specific Design Criteria and Considerations**

- Placement of BMPs should observe geotechnical recommendations with respect to geological hazards (e.g. landslides, liquefaction zones, erosion, etc.) and set-backs (e.g., foundations, utilities, roadways, etc.)
- Depth to mounded seasonally high groundwater shall not be less than 5 feet.
- If sheet flow is conveyed to the treatment area over stabilized grassed areas, the site must be graded in such a way that minimizes erosive conditions; sheet flow velocities should not exceed 1 foot per second.
- Ponding depth should not exceed 18 inches; fencing may be required if ponding depth exceeds 6 inches to mitigate the risk of drowning.
- Planting/storage media shall be based on the recommendations contained in MISC-1: Planting/Storage Media
- The minimum amended soil depth is 1.5 feet (3 feet is preferred).
- The maximum drawdown time of the planting soil is 48 hours.

- Infiltration pathways may need to be restricted due to the close proximity of roads, foundations, or other infrastructure. A geomembrane liner, or other equivalent water proofing, may be placed along the vertical walls to reduce lateral flows. This liner should have a minimum thickness of 30 mils.
- Plant materials should be tolerant of summer drought, ponding fluctuations, and saturated soil conditions for 48 hours; native plant species and/or hardy cultivars that are not invasive and do not require chemical fertilizers or pesticides should be used to the maximum extent feasible.
- The bioretention area should be covered with 2-4 inches (average 3 inches) of mulch at startup and an additional placement of 1-2 inches of mulch should be added annually.
- An optional gravel drainage layer may be installed below planting media to augment storage volume.
- An overflow device is required at the top of the ponding depth.
- Dispersed flow or energy dissipation (i.e. splash rocks) for piped inlets should be provided at basin inlet to prevent erosion.

***Simple Sizing Method for Bioretention with no Underdrain***

If the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** is used to size a bioretention area with underdrains, the user calculates the DCV and designs the system with geometry required to draw down the DCV in 48 hours. The sizing steps are as follows:

**Step 1: Determine the Bioretention Design Capture Volume**

Calculate the DCV using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1**.

**Step 2: Determine the 48-hour Ponding Depth**

The depth of effective storage depth that can be drawn down in 48 hours can be calculated using the following equation:

$$d_{48} = K_{DESIGN} \times 4$$

Where:

$d_{48}$  = bioretention 48-hour effective depth, ft

$K_{DESIGN}$  = bioretention design infiltration rate, in/hr (See **Appendix VII**)

This is the maximum effective depth of the basin below the overflow device to achieve drawdown in 48 hours. Effective depth includes ponding water and media/aggregate pore space.

**Step 3: Design System Geometry to Provide  $d_{48}$**

Design system geometry such that

$$d_{48} \geq d_{EFFECTIVE} = (d_P + n_M d_M + n_G d_G)$$

Where:

$d_{48}$  = depth of water that can drain in 48 hours

$d_{EFFECTIVE}$  = total effective depth of water stored in bioretention area, ft

$d_P$  = bioretention ponding depth, ft (should be less than or equal to 1.5 ft)

$n_M$  = bioretention media porosity

$d_M$  = bioretention media depth, ft



$n_G$  = bioretention gravel layer porosity; 0.35 may be assumed where other information is not available

$d_G$  = bioretention gravel layer depth, ft

#### Step 4: Calculate the Required Infiltrating Area

The required infiltrating area (i.e. measured at the media surface) can be calculated using the following equation:

$$A = DCV / d_{EFFECTIVE}$$

Where:

A = required infiltrating area, sq-ft (measured as the media surface area)

DCV = design capture volume, cu-ft (see Step 1)

$d_{EFFECTIVE}$  = total effective depth of water stored in bioretention area, ft (from Step 3)

This does not include the side slopes, access roads, etc. which would increase bioretention footprint.

#### Capture Efficiency Method for Bioretention with no Underdrain

If BMP geometry has already been defined and deviates from the 48 hour drawdown time, the designer can use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See [Appendix III.3.2](#)) to determine the fraction of the DCV that must be provided to manage 80 percent of average annual runoff volume. This method accounts for drawdown time different than 48 hours.

#### Step 1: Determine the drawdown time associated with the selected basin geometry

$$DD = (d_{EFFECTIVE} / K_{DESIGN}) \times 12 \text{ in/ft}$$

Where:

DD = time to completely drain infiltration basin ponding depth, hours

$$d_{EFFECTIVE} \leq (d_P + n_M d_M + n_G d_G)$$

$d_P$  = bioretention ponding depth, ft (should be less than or equal to 1.5 ft)

$n_M$  = bioretention media porosity

$d_M$  = bioretention media depth, ft

$n_G$  = bioretention gravel layer porosity; 0.35 may be assumed where other information is not available

$d_G$  = bioretention gravel layer depth, ft

$K_{DESIGN}$  = basin design infiltration rate, in/hr (See [Appendix VII](#))

#### Step 2: Determine the Required Adjusted DCV for this Drawdown Time

Use the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs (See [Appendix III.3.2](#)) to calculate the fraction of the DCV the basin must hold to achieve 80 percent capture of average annual stormwater runoff volume based on the basin drawdown time calculated above.

#### Step 4: Check that the Bioretention Effective Depth Drains in no Greater than 96 Hours

$$DD = (d_{EFFECTIVE} / K_{DESIGN}) \times 12$$

Where:

DD = time to completely drain bioretention facility, hours

$d_{EFFECTIVE}$  = total effective depth of water stored in bioretention area, ft (from Step 3)

$K_{DESIGN}$  = basin design infiltration rate, in/hr (See [Appendix VII](#))

If  $DD_{ALL}$  is greater than 96 hours, adjust bioretention media depth and/or gravel layer depth until DD is less than 96 hours. This duration is based on preventing extended periods of saturation from causing plant mortality.

### Step 5: Determine the Basin Infiltrating Area Needed

The required infiltrating area (i.e. the surface area of the top of the media layer) can be calculated using the following equation:

$$A = DCV / d_{EFFECTIVE}$$

Where:

A = required infiltrating area, sq-ft (measured at the media surface)

DCV = design capture volume, adjusted for drawdown time, cu-ft (see Step 1)

$d_{EFFECTIVE}$  = total effective depth of water stored in bioretention area, ft (from Step 3)

This does not include the side slopes, access roads, etc. which would increase bioretention footprint. If the area required is greater than the selected basin area, adjust surface area or adjust ponding depth and recalculate required area until the required area is achieved.

### Configuration for Use in a Treatment Train

---

- Bioretention areas may be preceded in a treatment train by HSCs in the drainage area, which would reduce the required volume of the bioretention cell.
- Bioretention areas can be incorporated in a treatment train to provide enhanced water quality treatment and reductions in runoff volume and rate. For example, runoff can be collected from a roadway in a vegetated swale that then flows to a bioretention area. Similarly, bioretention could be used to manage overflow from a cistern.

### Additional References for Design Guidance

---

- CASQA BMP Handbook for New and Redevelopment:  
<http://www.cabmphandbooks.com/Documents/Development/TC-32.pdf>
  - SMC LID Manual (pp 68):  
[http://www.lowimpactdevelopment.org/guest75/pub/All\\_Projects/SoCal\\_LID\\_Manual/SoCal\\_LID\\_Manual\\_FINAL\\_040910.pdf](http://www.lowimpactdevelopment.org/guest75/pub/All_Projects/SoCal_LID_Manual/SoCal_LID_Manual_FINAL_040910.pdf)
  - Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 5:  
[http://dpw.lacounty.gov/DES/design\\_manuals/StormwaterBMPDesignandMaintenance.pdf](http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf)
  - San Diego County LID Handbook Appendix 4 (Factsheet 7):  
<http://www.sdcounty.ca.gov/dplu/docs/LID-Appendices.pdf>
  - Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4.  
[http://www.laschools.org/employee/design/fs-studies-and-reports/download/white\\_paper\\_report\\_material/Storm\\_Water\\_Technical\\_Manual\\_2009-opt-red.pdf?version\\_id=76975850](http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850)
- County of Los Angeles Low Impact Development Standards Manual, Chapter 5:  
[http://dpw.lacounty.gov/wmd/LA\\_County\\_LID\\_Manual.pdf](http://dpw.lacounty.gov/wmd/LA_County_LID_Manual.pdf)



## 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.

**Table 2.7: Infiltration BMP Feasibility Worksheet**

	<b>Infeasibility Criteria</b>	<b>Yes</b>	<b>No</b>
1	<p><b>Would Infiltration BMPs pose significant risk for groundwater related concerns?</b> Refer to <a href="#">Appendix VIII</a> (Worksheet I) for guidance on groundwater-related infiltration feasibility criteria.</p>		✓
<p>Provide basis: <a href="#">There is a low potential for runoff contamination.</a></p> <p>Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
2	<p>Would Infiltration BMPs <b>pose significant risk of increasing risk of geotechnical hazards that cannot be mitigated to an acceptable level?</b> (Yes if the answer to any of the following questions is yes, as established by a geotechnical expert):</p> <ul style="list-style-type: none"> <li>• The BMP can only be located less than 50 feet away from slopes steeper than 15 percent</li> <li>• The BMP can only be located less than eight feet from building foundations or an alternative setback.</li> <li>• A study prepared by a geotechnical professional or an available watershed study substantiates that stormwater infiltration would potentially result in significantly increased risks of geotechnical hazards that cannot be mitigated to an acceptable level.</li> </ul>		✓
<p>Provide basis:</p> <p>Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
3	<p>Would infiltration of the DCV from drainage area <b>violate downstream water rights?</b></p>		✓
<p>Provide basis:</p> <p>Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			

**Table 2.7: Infiltration BMP Feasibility Worksheet (continued)**

	<b>Partial Infeasibility Criteria</b>	<b>Yes</b>	<b>No</b>
4	Is proposed infiltration facility <b>located on HSG D soils</b> or the site geotechnical investigation identifies presence of soil characteristics which support categorization as D soils?		✓
<p>Provide basis:</p> <p>Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
5	Is <b>measured infiltration rate below proposed facility less than 0.3 inches per hour?</b> This calculation shall be based on the methods described in <a href="#">Appendix VII</a> .	✓	
<p>Provide basis:</p> <p>Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
6	Would <b>reduction of over predeveloped conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?</b>		✓
<p>Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible:</p> <p>Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			
7	Would <b>an increase in infiltration over predeveloped conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?</b>		✓
<p>Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible:</p> <p>Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>			

Table 2.7: Infiltration BMP Feasibility Worksheet (continued)

Infiltration Screening Results (check box corresponding to result):		
8	<p>Is there substantial evidence that infiltration from the project would result in a significant increase in I&amp;I to the sanitary sewer that cannot be sufficiently mitigated? (See <a href="#">Appendix XVII</a>)</p> <p>Provide narrative discussion and supporting evidence:</p> <p>Summarize findings of studies provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</p>	NO
9	<p>If any answer from row 1-3 is yes: infiltration of any volume is <b>not feasible</b> within the DMA or equivalent.</p> <p>Provide basis:</p> <p>Summarize findings of infeasibility screening</p>	N/A
10	<p>If any answer from row 4-7 is yes, infiltration is <b>permissible but is not presumed to be feasible for the entire DCV</b>. Criteria for designing biotreatment BMPs to achieve the maximum feasible infiltration and ET shall apply.</p> <p>Provide basis: <a href="#">No existing storm drain system existing nearby the site</a></p> <p>Summarize findings of infeasibility screening</p>	NO
11	<p>If all answers to rows 1 through 11 are no, infiltration of the full DCV is potentially feasible, BMPs must be designed to infiltrate the full DCV to the maximum extent practicable.</p>	N/A

Harvest and Use Infeasibility

Harvest and use infeasibility criteria include:

- If inadequate demand exists for the use of the harvested rainwater. See [Appendix X](#) for guidance on determining harvested water demand and applicable feasibility thresholds.
- If the use of harvested water for the type of demand on the project violates codes or ordinances most applicable to stormwater harvesting in effect at the time of project application and a waiver of these codes and/or ordinances cannot be obtained. It is noted that codes and ordinances most applicable to stormwater harvesting may change

**Worksheet I: Summary of Groundwater-related Feasibility Criteria**

1	Is project large or small? (as defined by <a href="#">Table VIII.2</a> ) circle one	Large	<input checked="" type="radio"/>	Small
2	What is the tributary area to the BMP?	A	1.32	acres
3	What type of BMP is proposed?	INF-3 Bioretention		
4	What is the infiltrating surface area of the proposed BMP?	A <sub>BMP</sub>	1,820	sq-ft
5	What land use activities are present in the tributary area (list all)  Residential			
6	What land use-based risk category is applicable?	<input checked="" type="radio"/> L	<input type="radio"/> M	<input type="radio"/> H
7	If M or H, what pretreatment and source isolation BMPs have been considered and are proposed (describe all):			
8	What minimum separation to mounded seasonally high groundwater applies to the proposed BMP? See Section <a href="#">VIII.2</a> (circle one)	5 ft	<input checked="" type="radio"/>	10 ft
9	Provide rationale for selection of applicable minimum separation to seasonally high mounded groundwater: The depth to first groundwater per Figure XVI-2e in Section VI, is 50 feet. Because the groundwater depth is greater than 15' deep, the groundwater level does not constrain infiltration.			
10	What is separation from the infiltrating surface to seasonally high groundwater?	SHGWT		ft
11	What is separation from the infiltrating surface to mounded seasonally high groundwater?	Mounded SHGWT		ft
12	Describe assumptions and methods used for mounding analysis:  Groundwater level is based on Figure XVI-2e in Section VI			
13	Is the site within a plume protection boundary (See <a href="#">Figure</a> )	Y	<input checked="" type="radio"/> N	N/A



**Worksheet I: Summary of Groundwater-related Feasibility Criteria**

	VIII.2)?	
14	Is the site within a selenium source area or other natural plume area (See <a href="#">Figure VIII.2</a> )?	Y <input checked="" type="radio"/> N    N/A
15	Is the site within 250 feet of a contaminated site?	Y <input checked="" type="radio"/> N    N/A
16	If site-specific study has been prepared, provide citation and briefly summarize relevant findings:	
17	Is the site within 100 feet of a water supply well, spring, septic system?	Y <input checked="" type="radio"/> N    N/A
18	Is infiltration feasible on the site relative to groundwater-related criteria?	<input checked="" type="radio"/> Y    N
<p>Provide rationale for feasibility determination:</p> <p style="text-align: center;"><a href="#">Groundwater is greater than 15 feet from bottom of infiltration trench gravel layer.</a></p>		

Note: if a single criterion or group of criteria would render infiltration infeasible, it is not necessary to evaluate every question in this worksheet.

## FORD ROAD RESIDENTIAL

**Table 1.1 Proposed Biofiltration BMP Sizing Table**

BMP Designation / Drainage Area	BMP Type	% Impervious = $a_i \times 100$	C = $(0.75 \times a_i) + 0.15$	design capture storm depth, d <i>(inches)</i>	Drainage Area, A <i>(acres)</i>	Design Capture Volume, DCV <i>(ft<sup>3</sup>)</i>	Sub-surface Storage Depth, D <sub>1</sub> <i>(ft)</i>	Surface Ponding Depth, D <sub>2</sub> <i>(ft)</i>	BMP Area, A <sub>BMP</sub> <i>(SF)</i>	BMP Storage Volume, V <sub>BMP-S</sub> <i>(ft<sup>3</sup>)</i>	Design Bioiltration Rate, K <sub>design</sub> <i>(in/hr)</i>	Draw-down Period, T <sub>DD</sub> <i>(hrs)</i>	BMP Treatment Volume, V <sub>BMP-T</sub> <i>(ft<sup>3</sup>)</i>
A-1	Biretention (INF-3)	70%	0.68	0.70	0.30	<b>515</b>	3.25	0.75	414	<b>849</b>	0.13	48.00	<b>526</b>
A-2	Biretention (INF-3)	73%	0.70	0.70	0.16	<b>284</b>	3.25	0.75	239	<b>490</b>	0.13	48	<b>299</b>
A-3	Biretention (INF-3)	70%	0.68	0.70	0.10	<b>172</b>	3.25	0.75	205	<b>420</b>	0.10	48	<b>236</b>
A-4	Biretention (INF-3)	53%	0.55	0.70	0.15	<b>209</b>	3.25	0.75	193	<b>396</b>	0.13	48	<b>241</b>
A-5	Biretention (INF-3)	53%	0.55	0.70	0.09	<b>125</b>	3.25	0.75	137	<b>281</b>	0.13	48	<b>171</b>
A-6	Untreated	0%	0.15	0.70	0.02	<b>8</b>	2.75	0.50	0	<b>0</b>	0.13	48	<b>0</b>
B-1	Biretention (INF-3)	76%	0.72	0.70	0.44	<b>805</b>	3.25	0.75	743	<b>1,523</b>	0.10	48	<b>854</b>
B-2	Untreated	83%	0.77	0.70	0.06	<b>118</b>	2.75	0.50	0	<b>0</b>	0.13	48	<b>0</b>
<b>TOTAL</b>		<b>69%</b>	<b>0.67</b>	<b>0.70</b>	<b>1.32</b>	<b>2,234</b>	<b>2.75</b>	<b>0.5</b>	<b>1,931</b>	<b>3,959</b>	<b>0.13</b>	<b>71</b>	<b>2,327</b>

Note: Stormwater Quality Design Capture Volume (DCV or V<sub>design</sub>) was determined using Method (I) outlined in the 2011 Orange County Model Water Quality Management Plan (WQMP)

DCV =  $c \times d \times A \times (1 \text{ ft} / 12 \text{ in}) \times (43,560 \text{ ft}^2 / \text{acre})$ , where d = 0.70 inches (depth of rainfall for 85th percentile, 24-hour storm event)

$V_{\text{BMP-S}} = ((n \times D_1) + D_2) \times A_{\text{BMP}}$  where n is the porosity (% of voids) = 0.40 or 40%

$K_{\text{design}} = K_{\text{media}}/2$  where  $K_{\text{media}}$  is the infiltration rate of the soil media is specified to be 0.25 in/hr per Soil Type C, some areas are located within Soil Type D which is specified as 0.20 in/hr

$V_{\text{BMP-T}} = ((K_{\text{design}}/12) \times T_{\text{DD}}) \times A_{\text{BMP}} + (D_2 \times A_{\text{BMP}})$

## Section VII - Educational Materials

Refer to the Orange County Stormwater Program ([ocwatersheds.com](http://ocwatersheds.com)) for a library of materials available. For the copy submitted to the Permittee, only attach the educational materials specifically applicable to the project. Other materials specific to the project may be included as well and must be attached.

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

# The Ocean Begins at Your Front Door



PROJECT  
**Possution**  
PREVENTION

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.oilandfills.com](http://www.oilandfills.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](http://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.oilandfills.com](http://www.oilandfills.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

# The Ocean Begins at Your Front Door



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

## 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.



# For More Information

## Orange County Stormwater Program

### California Environmental Protection Agency

[www.calepa.ca.gov](http://www.calepa.ca.gov)

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

**Earth 911** - Community-Specific Environmental Information 1-800-cleanup or visit [www.1800cleanup.org](http://www.1800cleanup.org)

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

**Integrated Waste Management Dept. of Orange County** (714) 834-6752 or visit [www.oclandfills.com](http://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](http://www.ocagcomm.com)

**Stormwater Best Management Practice Handbook**  
Visit [www.cabmphandbooks.com](http://www.cabmphandbooks.com)

**UC Master Gardener Hotline**  
(714) 708-1646 or visit [www.uccemg.com](http://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](mailto:ocstormwaterinfo-join@list.ocwatersheds.com)

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](http://www.ocwatersheds.com)







***Did you know that just one quart of oil can pollute 250,000 gallons of water?***

A clean ocean and healthy creeks, rivers, bays and beaches are important to Orange County. However, not properly disposing of used oil can lead to water pollution. If you pour or drain oil onto driveways, sidewalks or streets, it can be washed into the storm drain. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering the ocean. Help prevent water pollution by taking your used oil to a used oil collection center.

Included in this brochure is a list of locations that will accept up to five gallons of used motor oil at no cost. Many also accept used oil filters. Please contact the facility before delivering your used oil. This listing of companies is for your reference and does not constitute a recommendation or endorsement of the company.

Please note that used oil filters may not be disposed of with regular household trash. They must be taken to a household hazardous waste collection or recycling center in Anaheim, Huntington Beach, Irvine or San Juan Capistrano. For information about these centers, visit [www.oilandfills.com](http://www.oilandfills.com).

Please do not mix your oil with other substances!

For more information, please call the Orange County Stormwater Program at 1-877-89-SPILL (1-877-897-7455) or visit [www.watersheds.com](http://www.watersheds.com).

For information about the proper disposal of household hazardous waste, call the Household Waste Hotline at (714) 834-6752 or visit [www.oilandfills.com](http://www.oilandfills.com).

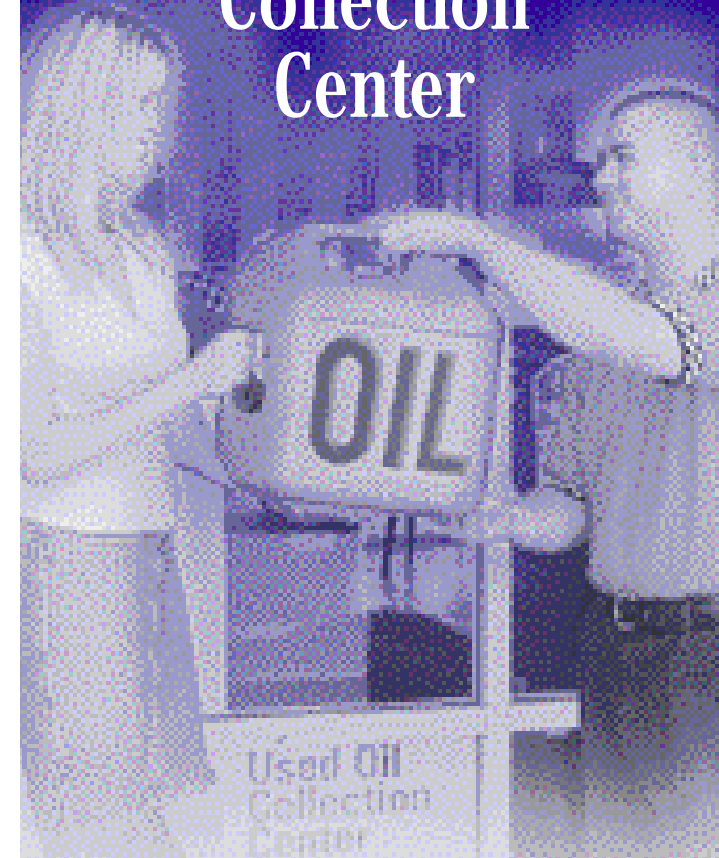


For additional information about the nearest oil recycling center, call the Used Oil Program at 1-800-CLEANUP or visit [www.cleanup.org](http://www.cleanup.org).

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printed on recycled paper 

# Help Prevent Ocean Pollution:

## Recycle at Your Local Used Oil Collection Center



### The Ocean Begins at Your Front Door



# CENTRAL COUNTY

# Used Oil Collection Centers

## Balboa

**Hill's Boat Service**  
814 E Bay Ave., Balboa, CA 92661  
(949)675-0740 ( )  
CIWMB#: 30-C-03538

## Balboa Island

**Island Marine Fuel**  
406 S Bay Front, Balboa Island, CA 92662  
(949)673-1103( )  
CIWMB#: 30-C-03728

## Corona Del Mar

**Corona Del Mar 76**  
2201 E. Pacific Coast Hwy., Corona Del Mar, CA 92625  
(949)673-3320( )  
CIWMB#: 30-C-06620

## Corona Del Mar Chevron

2546 E. Coast Hwy., Corona Del Mar, CA 92625  
(949)495-0774(14)  
CIWMB#: 30-C-06424

## Mobil (Harbor View)

2500 San Joaquin Hills Rd., Corona Del Mar, CA 92625  
(949)640-4759( )  
CIWMB#: 30-C-03363

## Costa Mesa

**AutoZone #5520**  
744 W. 19th St., Costa Mesa, CA 92627  
(901)495-7159( )  
CIWMB#: 30-C-05992

## Big O Tires #5571

3181 Harbor Blvd., Costa Mesa, CA 92626  
(949)443-4155( )  
CIWMB#: 30-C-04676

## Big O Tires #694

322 E. 17th St., Costa Mesa, CA 92627  
(949)642-4131( )  
CIWMB#: 30-C-05811

## Coast General Performance

2855 Harbor Blvd., Costa Mesa, CA 92626  
(714)540-5710( )  
CIWMB#: 30-C-05916

## Connell Chevrolet

2828 Harbor Blvd., Costa Mesa, CA 92626  
(714)546-1200( )  
CIWMB#: 30-C-06286

## EZ Lube Inc #15

3599 Harbor Blvd., Costa Mesa, CA 92626  
(714)966-1647( )  
CIWMB#: 30-C-03137

## EZ Lube Inc #46

400 E 17th St., Costa Mesa, CA 92627  
(714)556-1312( )  
CIWMB#: 30-C-05779

## EZ Lube Inc. #44

2248 Harbor Blvd., Costa Mesa, CA 92627  
(714)556-1312( )  
CIWMB#: 30-C-05737

## Firestone Store #7117

475 E 17th St., Costa Mesa, CA 92627  
(949)646-2444( )  
CIWMB#: 30-C-02120

## Jiffy Lube #1969

300 E 17th St., Costa Mesa, CA 92627  
(949)548-2505( )  
CIWMB#: 30-C-05553

## Jiffy Lube #1970

2175 Newport Blvd., Costa Mesa, CA 92627  
(949)548-4150( )  
CIWMB#: 30-C-05554

## Jiffy Lube #607

2255 Fairview Rd., Costa Mesa, CA 92627  
(949)650-5823( )  
CIWMB#: 30-C-05551

## Jiffy Lube #861

375 Bristol St., Costa Mesa, CA 92626  
(714)557-5823( )  
CIWMB#: 30-C-05552

## Kragen Auto Parts #0725

1739 Superior Ave., Costa Mesa, CA 92627  
(949)642-3384( )  
CIWMB#: 30-C-02624

## Kragen Auto Parts #0796

1175 Baker Blvd., Unit E, Costa Mesa, CA 92626  
(714)662-2005( )  
CIWMB#: 30-C-02664

## Nabers Cadillac

2600 Harbor Blvd., Costa Mesa, CA 92626  
(714)444-5200( )  
CIWMB#: 30-C-05051

## Oil Stop Inc.

Oil Stop Inc. Costa Mesa, CA 92626  
(714)434-8350( )  
CIWMB#: 30-C-06293

## Pep Boys #660

2946 Bristol St., Costa Mesa, CA 92626  
(714)549-1533( )  
CIWMB#: 30-C-03416

## Plaza Chevron Service Center

3048 Bristol Costa Mesa, CA 92626  
(714)545-4257( )  
CIWMB#: 30-C-01123

## Scher Tire Inc #15 dba Goodyear Tire

1596 Newport Blvd., Costa Mesa, CA 92627  
(949)548-9384( )  
CIWMB#: 30-C-03034

## Fountain Valley

**Firestone Store #7147**  
17975 Magnolia Ave., Fountain Valley, CA 92708  
(714)842-3341( )  
CIWMB#: 30-C-01219

## Golden Shell

8520 Warner Ave., Fountain Valley, CA 92708  
(714)842-7150( )  
CIWMB#: 30-P-05002

## Kragen Auto Parts #0734

9880 Warner Ave., Fountain Valley, CA 92708  
(714)964-6427( )  
CIWMB#: 30-C-02609

## Kragen Auto Parts #1505

16147 Harbor Blvd., Fountain Valley, CA 92708  
(714)531-8525( )  
CIWMB#: 30-C-04125

## Oil Can Henry's

9525 Warner Ave., Fountain Valley, CA 92708  
(714)473-7705( )  
CIWMB#: 30-C-05843

## Purrfect Auto Service #10

16780 Harbor Blvd., Fountain Valley, CA 92708  
(714)839-3899( )  
CIWMB#: 30-C-01380

## Huntington Beach

**AutoZone #5528**  
6800 Warner Ave., Huntington Beach, CA 92647  
(714)891-8211( )  
CIWMB#: 30-C-04777

## Bella Terra Car Wash

16061 Beach Blvd., Huntington Beach, CA 92647  
(714)847-4924( )  
CIWMB#: 30-C-06195

## Big O Tires #553

19411 Beach Blvd., Huntington Beach, CA 92648  
(714)536-7571( )  
CIWMB#: 30-C-00970

## Econo Lube N' Tune #26

19961 Beach Blvd., Huntington Beach, CA 92648  
(714)536-6519( )  
CIWMB#: 30-C-06117

## Expertec Automotive

7680 Tabert Ave Suite A & B, Huntington Beach, CA 92648  
(714)848-9222( )  
CIWMB#: 30-C-05914

## EZ Lube Inc #16

7361 Edinger Ave., Huntington Beach, CA 92647  
(714)899-3600( )  
CIWMB#: 30-C-03289

## EZ Lube Inc. #79

9862 Adams St., Huntington Beach, CA 92647  
(714)556-1312( )  
CIWMB#: 30-C-06547

## Firestone Store #7115

16171 Beach Blvd., Huntington Beach, CA 92647  
(714)847-6081( )  
CIWMB#: 30-C-02118

## Huntington Beach Car Wash

18971 Beach Blvd., Huntington Beach, CA 92648  
(714)847-4924( )  
CIWMB#: 30-C-05303

## Jiffy Lube #1857

8971 Warner Ave., Huntington Beach, CA 92647  
(714)596-7213( )  
CIWMB#: 30-C-05053

## Kragen Auto Parts #1468

10072 Adams Ave., Huntington Beach, CA 92646  
(714)593-6156( )  
CIWMB#: 30-C-04284

## Kragen Auto Parts #1511

7171 Warner Ave., Huntington Beach, CA 92647  
(714)842-4531( )  
CIWMB#: 30-C-04129

## Kragen Auto Parts #1633

18888 Beach Blvd., Huntington Beach, CA 92648  
(714)965-2353( )  
CIWMB#: 30-C-02645

## Oilmax 10 Minute Lube/Wash

9862 Adams Ave., Huntington Beach, CA 92646  
(714)964-7110( )  
CIWMB#: 30-C-03219

## Pep Boys #799

19122 Brookhurst St., Huntington Beach, CA 92646  
(714)964-0777( )  
CIWMB#: 30-C-03439

## Quik Change Lube & Oil

5841 Warner Ave., Huntington Beach, CA 92649  
(714)840-2331( )  
CIWMB#: 30-C-03208

## R Kids Tire and Service #6

5062 Warner Ave., Huntington Beach, CA 92647  
(714)846-1189( )  
CIWMB#: 30-C-05691

## Saturn of Huntington Beach

18801 Beach Blvd., Huntington Beach, CA 92648  
(714)841-5428( )  
CIWMB#: 30-C-05221

## USA Express Tire & Service Inc

7232 Edinger Ave., Huntington Beach, CA 92647  
(714)842-0717( )  
CIWMB#: 30-C-04429

## Zito's Auto Care

19002 Magnolia St., Huntington Beach, CA 92646  
(714)968-8788( )  
CIWMB#: 30-C-03251

## Irvine

**Firestone Store #71W4**  
51 Auto Center Dr., Irvine, CA 92618  
(949)829-8710( )  
CIWMB#: 30-C-03689

## Irvine City Auto Parts

14427 Culver Dr., Irvine, CA 92604  
(949)551-5588( )  
CIWMB#: 30-C-02186

## Jiffy Lube #1856 Irvine Spectrum

8777 Irvine Center Dr., Irvine, CA 92618  
(949)753-0485( )  
CIWMB#: 30-C-06094

## Jiffy Lube #1988

3080 Main St., Irvine, CA 92614  
(714)961-5491(27)  
CIWMB#: 30-C-04450

## Kragen Auto Parts #4174

15315 Culver Dr., Ste.#170, Irvine, CA 92604  
(602)631-7115( )  
CIWMB#: 30-C-06417

## Newport Beach

**Jiffy Lube #2811**  
1520 W Coast Hwy., Newport Beach, CA 92663  
(949)764-9255( )  
CIWMB#: 30-C-05629

## Newport Landing Fuel Dock

503 E Edgewater Newport Beach, CA 92661  
(949)673-7878( )  
CIWMB#: 30-C-03628

## Orange

**AutoZone #5942**  
1330 N. Glassell Orange, CA 92867  
(714)538-4551( )  
CIWMB#: 30-C-04553

## Big O Tires #570

1825 E. Katella Ave., Orange, CA 92867  
(714)538-0016( )  
CIWMB#: 30-C-00974

## David Wilsons Ford of Orange

1350 W Katella Ave., Orange, CA 92867  
(714)633-6731( )  
CIWMB#: 30-C-02341

## EZ Lube #74

3232 Chapman Ave. #E, Orange, CA 92869  
(714)556-1312(106)  
CIWMB#: 30-C-06627

## Firestone Store #7185

1690 N Tustin Ave., Orange, CA 92867  
(714)282-8144( )  
CIWMB#: 30-C-01222

## Jiffy Lube #1457

433 W. Katella Ave., Orange, CA 92867  
(714)720-5757( )  
CIWMB#: 30-C-06280

## Kragen Auto Parts #1764

910 Tustin St., Orange, CA 92867  
(714)771-3000( )  
CIWMB#: 30-C-02625

## Managed Mobile, Inc.

1030 N Batavia St., #B, Orange, CA 92867  
(714)400-0250( )  
CIWMB#: 30-C-05776

## Pep Boys #806

215 E Katella Ave., Orange, CA 92867  
(714)997-1540( )  
CIWMB#: 30-C-01759

## Santiago Hills Car Care

8544 East Chapman Ave., Orange, CA 92869  
(714)919-1060( )  
CIWMB#: 30-C-05622

## Scher Tire #33

1821 E. Katella Ave., Orange, CA 92867  
(909)343-3100( )  
CIWMB#: 30-C-06324

## Tabassi Shell Service Station

830 E Katella Ave., Orange, CA 92867  
(714)771-6990( )  
CIWMB#: 30-C-00552

## The Tune-up Center

193 S Main St., Orange, CA 92868  
(714)633-1876( )  
CIWMB#: 30-C-02091

## Tony's Fuel and Towing

1650 W La Veta Ave., Orange, CA 92868  
(714)953-7676( )  
CIWMB#: 30-C-00868

## Truck Lubrication Company

143 S. Pixley Orange, CA 92868  
(714)997-7730( )  
CIWMB#: 30-C-06001

## Santa Ana

**All Phase Environmental**  
910 E. Fourth St., Santa Ana, CA 92701  
(714)731-5995( )  
CIWMB#: 30-C-06116

## Archie's Tire & Towing

4518 Westminster Ave., Santa Ana, CA 92703  
(714)636-4518( )  
CIWMB#: 30-C-02058

## AutoZone #3320

2007 S. Main St., Santa Ana, CA 92707  
(901)495-7217( )  
CIWMB#: 30-C-06508

## AutoZone #5232

430 W 17th Santa Ana, CA 92706  
(714)547-7003( )  
CIWMB#: 30-C-04609

## AutoZone #5538

1101 S Bristol Santa Ana, CA 92704  
(714)241-0335( )  
CIWMB#: 30-C-00829

## Big O Tires

1211 W. Warner Ave., Santa Ana, CA 92707  
(714)540-8646( )  
CIWMB#: 30-C-04679

## Big O Tires #712

1302 E. 17th St., Santa Ana, CA 92705  
(714)541-6811( )  
CIWMB#: 30-C-05813

## Firestone Store #7175

3733 S Bristol Santa Ana, CA 92704  
(714)549-4015( )  
CIWMB#: 30-C-01223

## Firestone Store #71TA

101 S Main St., Santa Ana, CA 92701  
(714)542-8857( )  
CIWMB#: 30-C-02123

## Firestone Store #71W6

2005 N Tustin Ave., Ste A, Santa Ana, CA 92705  
(714)541-7977( )  
CIWMB#: 30-C-03688

## Guaranty Chevrolet Motors Inc.

711 E 17th St., Santa Ana, CA 92780  
(714)973-1711(277)  
CIWMB#: 30-C-06506

## Jiffy Lube #1303

2025 N. Tustin Santa Ana, CA 92701  
(714)720-5757( )  
CIWMB#: 30-C-06283

## John's Mobil

1465 S Main St., Santa Ana, CA 92707  
(714)835-3266( )  
CIWMB#: 30-C-00578

## Kragen Auto Parts #0736

1302 E 17th St., Santa Ana, CA 92705  
(714)953-6061( )  
CIWMB#: 30-C-02610

## Kragen Auto Parts #1253

1400 W Edinger Ave., Santa Ana, CA 92704  
(714)754-1432( )  
CIWMB#: 30-C-02627

## Kragen Auto Parts #1376

521 W 17th St., Santa Ana, CA 92706  
(714)543-4492( )  
CIWMB#: 30-C-03901

## Kragen Auto Parts #1516

2337 S Bristol Ave., Santa Ana, CA 92704  
(714)557-0787( )  
CIWMB#: 30-C-04106

## Kragen Auto Parts #1648

1015 S Main St., Santa Ana, CA 92701  
(714)568-1570( )  
CIWMB#: 30-C-05664

## Pep Boys #609

120 E 1st St., Santa Ana, CA 92701  
(714)547-7477( )  
CIWMB#: 30-C-01738

## Pep Boys #802

1107 S Harbor Blvd., Santa Ana, CA 92704  
(714)775-0828( )  
CIWMB#: 30-C-01739

## Purrfect Auto Service

2519 S Main St., Santa Ana, CA 92707  
(714)547-7900( )  
CIWMB#: 30-C-02085

## Saturn of Santa Ana

1350 Auto Mall Dr., Santa Ana, CA 92705  
(714)648-2444( )  
CIWMB#: 30-C-05222

## Scher Tire #28

1805 N Grand Ave., Santa Ana, CA 9270

# Sewage Spill Regulatory Requirements

Allowing sewage to discharge to a gutter or storm drain may subject you to penalties and/or out-of-pocket costs to reimburse cities or public agencies for clean-up efforts.

Here are the pertinent codes, fines, and agency contact information that apply.

## Orange County Stormwater Program

24 Hour Water Pollution Reporting Hotline

1-877-89-SPILL (1-877-897-7455)

- County and city water quality ordinances prohibit discharges containing pollutants.

## Orange County Health Care Agency Environmental Health

(714) 433-6419

California Health and Safety Code, Sections 5410-5416

- No person shall discharge raw or treated sewage or other waste in a manner that results in contamination, pollution or a nuisance.
- Any person who causes or permits a sewage discharge to any state waters:
  - must immediately notify the local health agency of the discharge.
  - shall reimburse the local health agency for services that protect the public's health and safety (water-contact receiving waters).
  - who fails to provide the required notice to the local health agency is guilty of a misdemeanor and shall be punished by a fine (between \$500-\$1,000) and/or imprisonment for less than one year.

## Regional Water Quality Control Board Santa Ana Region San Diego Region

(951) 782-4130

(858) 467-2952

- Requires the prevention, mitigation, response to and reporting of sewage spills.

## California Office of Emergency Services

(800) 852-7550

California Water Code, Article 4, Chapter 4, Sections 13268-13271  
California Code of Regulations, Title 23, Division 3, Chapter 9.2, Article 2, Sections 2250-2260

- Any person who causes or permits sewage in excess of 1,000 gallons to be discharged to state waters shall immediately notify the Office of Emergency Services.
- Any person who fails to provide the notice required by this section is guilty of a misdemeanor and shall be punished by a fine (less than \$20,000) and/or imprisonment for not more than one year.

# Sewage Spill Reference Guide

## Your Responsibilities as a Private Property Owner

Residences  
Businesses  
Homeowner/Condominium Associations  
Federal and State Complexes  
Military Facilities



Orange County  
Sanitation District



Health Care Agency  
Environmental Health



www.ocwatersheds.com

This brochure was designed courtesy of the Orange County Sanitation District (OCS D).  
For additional information, call (714) 962-2411, or visit their website at www.ocsd.com

# What is a Sewage Spill?

Sewage spills occur when the wastewater being transported via underground pipes overflows through a manhole, cleanout or broken pipe. Sewage spills can cause health hazards, damage to homes and businesses, and threaten the environment, local waterways and beaches.

## Common Causes of Sewage Spills

**Grease** builds up inside and eventually blocks sewer pipes. Grease gets into the sewer from food establishments, household drains, as well as from poorly maintained commercial grease traps and interceptors.

**Structure problems** caused by tree roots in the lines, broken/cracked pipes, missing or broken cleanout caps or undersized sewers can cause blockages.

**Infiltration and inflow (I/I)** impacts pipe capacity and is caused when groundwater or rainwater enters the sewer system through pipe defects and illegal connections.

## You Are Responsible for a Sewage Spill Caused by a Blockage or Break in Your Sewer Lines!

Time is of the essence in dealing with sewage spills. You are required to **immediately**:

**Control and minimize the spill.** Keep spills contained on private property and out of gutters, storm drains and public waterways by shutting off or not using the water.

**Use sandbags, dirt and/or plastic sheeting** to prevent sewage from entering the storm drain system.

**Clear the sewer blockage.** Always wear gloves and wash your hands. It is recommended that a plumbing professional be called for clearing blockages and making necessary repairs.

**Always notify your city sewer/public works department or public sewer district of sewage spills.** If the spill enters the storm drains also notify the Health Care Agency. In addition, if it exceeds 1,000 gallons notify the Office of Emergency Services. Refer to the numbers listed in this brochure.

Overflowing  
cleanout pipe  
located on  
private property



## You Could Be Liable

Allowing sewage from your home, business or property to discharge to a gutter or storm drain may subject you to penalties and/or out-of-pocket costs to reimburse cities or public agencies for clean-up and enforcement efforts. See Regulatory Codes & Fines section for pertinent codes and fines that apply.

## What to Look For

Sewage spills can be a very noticeable gushing of water from a manhole or a slow water leak that may take time to be noticed. Don't dismiss unaccounted-for wet areas.

Look for:

- Drain backups inside the building.
- Wet ground and water leaking around manhole lids onto your street.
- Leaking water from cleanouts or outside drains.
- Unusual odorous wet areas: sidewalks, external walls or ground/landscape around a building.

## Caution

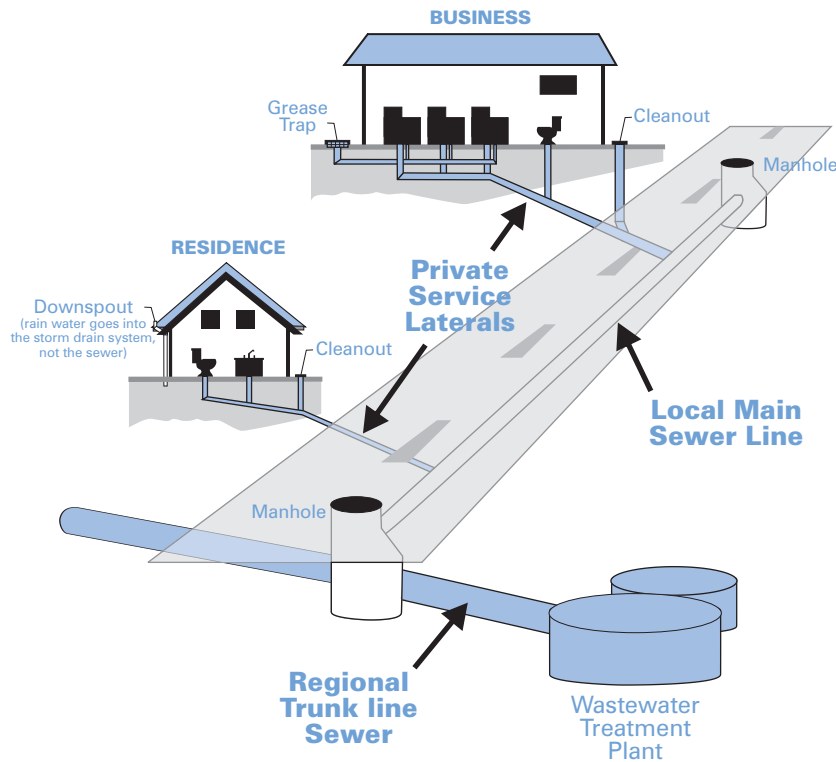
Keep people and pets away from the affected area. Untreated sewage has high levels of disease-causing viruses and bacteria. Call your local health care agency listed on the back for more information.

**If You See a Sewage Spill Occurring,  
Notify Your City Sewer/Public Works  
Department or Public Sewer District  
IMMEDIATELY!**

# How a Sewer System Works

A property owner's sewer pipes are called service laterals and are connected to larger local main and regional trunk lines. Service laterals run from the connection at the home to the connection with the public sewer (including the area under the street). These laterals are the responsibility of the property owner and must be maintained by the property owner. Many city agencies have adopted ordinances requiring maintenance of service laterals. Check with your city sewer/local public works department for more information.

Operation and maintenance of **local and regional sewer lines** are the responsibility of the city sewer/public works departments and public sewer districts.



## Preventing Grease Blockages

The drain is not a dump! Recycle or dispose of grease properly and never pour grease down the drain.

Homeowners should mix fats, oils and grease with absorbent waste materials such as paper, coffee grounds, or kitty litter and place it in the trash. Wipe food scraps from plates and pans and dump them in the trash.

Restaurants and commercial food service establishments should always use "Kitchen Best Management Practices." These include:

- Collecting all cooking grease and liquid oil from pots, pans and fryers in covered grease containers for recycling.
- Scraping or dry-wiping excess food and grease from dishes, pots, pans and fryers into the trash.
- Installing drain screens on all kitchen drains.
- Having spill kits readily available for cleaning up spills.
- Properly maintaining grease traps or interceptors by having them serviced regularly. Check your local city codes.

### How You Can Prevent Sewage Spills

- 1 Never put grease down garbage disposals, drains or toilets.**
- 2 Perform periodic cleaning to eliminate grease, debris and roots in your service laterals.**
- 3 Repair any structural problems in your sewer system and eliminate any rainwater infiltration/inflow leaks into your service laterals.**



# Orange County Agency Responsibilities

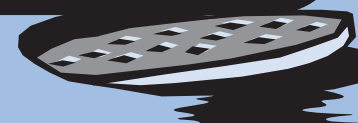
- **City Sewer/Public Works Departments**— Responsible for protecting city property and streets, the local storm drain system, sewage collection system and other public areas.
- **Public Sewer/Sanitation District**— Responsible for collecting, treating and disposing of wastewater.
- **County of Orange Health Care Agency**— Responsible for protecting public health by closing ocean/bay waters and may close food-service businesses if a spill poses a threat to public health.
- **Regional Water Quality Control Boards**— Responsible for protecting State waters.
- **Orange County Stormwater Program**— Responsible for preventing harmful pollutants from being discharged or washed by stormwater runoff into the municipal storm drain system, creeks, bays and the ocean.

## You Could Be Liable for Not Protecting the Environment

Local and state agencies have legal jurisdiction and enforcement authority to ensure that sewage spills are remedied.

They may respond and assist with containment, relieving pipe blockages, and/or clean-up of the sewage spill, especially if the spill is flowing into storm drains or onto public property.

**A property owner may be charged for costs incurred by these agencies responding to spills from private properties.**



# Report Sewage Spills!

### City Sewer/Public Works Departments

Aliso Viejo	(949) 425-2500
Anaheim	(714) 765-6860
Brea	(714) 990-7691
Buena Park	(714) 562-3655
Costa Mesa	(949) 645-8400
Cypress	(714) 229-6760
Dana Point	(949) 248-3562
Fountain Valley	(714) 593-4600
Fullerton	(714) 738-6897
Garden Grove	(714) 741-5375
Huntington Beach	(714) 536-5921
Irvine	(949) 453-5300
Laguna Beach	(949) 497-0765
Laguna Hills	(949) 707-2650
Laguna Niguel	(949) 362-4337
Laguna Woods	(949) 639-0500
La Habra	(562) 905-9792
Lake Forest	(949) 461-3480
La Palma	(714) 690-3310
Los Alamitos	(562) 431-3538
Mission Viejo	(949) 831-2500
Newport Beach	(949) 644-3011
Orange	(714) 532-6480
Orange County	(714) 567-6363
Placentia	(714) 993-8245
Rancho Santa Margarita	(949) 635-1800
San Clemente	(949) 366-1553
San Juan Capistrano	(949) 443-6363
Santa Ana	(714) 647-3380
Seal Beach	(562) 431-2527
Stanton	(714) 379-9222
Tustin	(714) 962-2411
Villa Park	(714) 998-1500
Westminster	(714) 893-3553
Yorba Linda	(714) 961-7170

### Public Sewer/Water Districts

Costa Mesa Sanitary District	(714) 393-4433/ (949) 645-8400
El Toro Water District	(949) 837-0660
Emerald Bay Service District	(949) 494-8571
Garden Grove Sanitary District	(714) 741-5375
Irvine Ranch Water District	(949) 453-5300
Los Alamitos/Rossmoor Sewer District	(562) 431-2223
Midway City Sanitary District (Westminster)	(714) 893-3553
Moulton Niguel Water District	(949) 831-2500
Orange County Sanitation District	(714) 962-2411
Santa Margarita Water District	(949) 459-6420
South Coast Water District	(949) 499-4555
South Orange County Wastewater Authority	(949) 234-5400
Sunset Beach Sanitary District	(562) 493-9932
Trabuco Canyon Sanitary District	(949) 858-0277
Yorba Linda Water District	(714) 777-3018

### Other Agencies

Orange County Health Care Agency	(714) 433-6419
Office of Emergency Services	(800) 852-7550



**C**lean 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](http://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.**

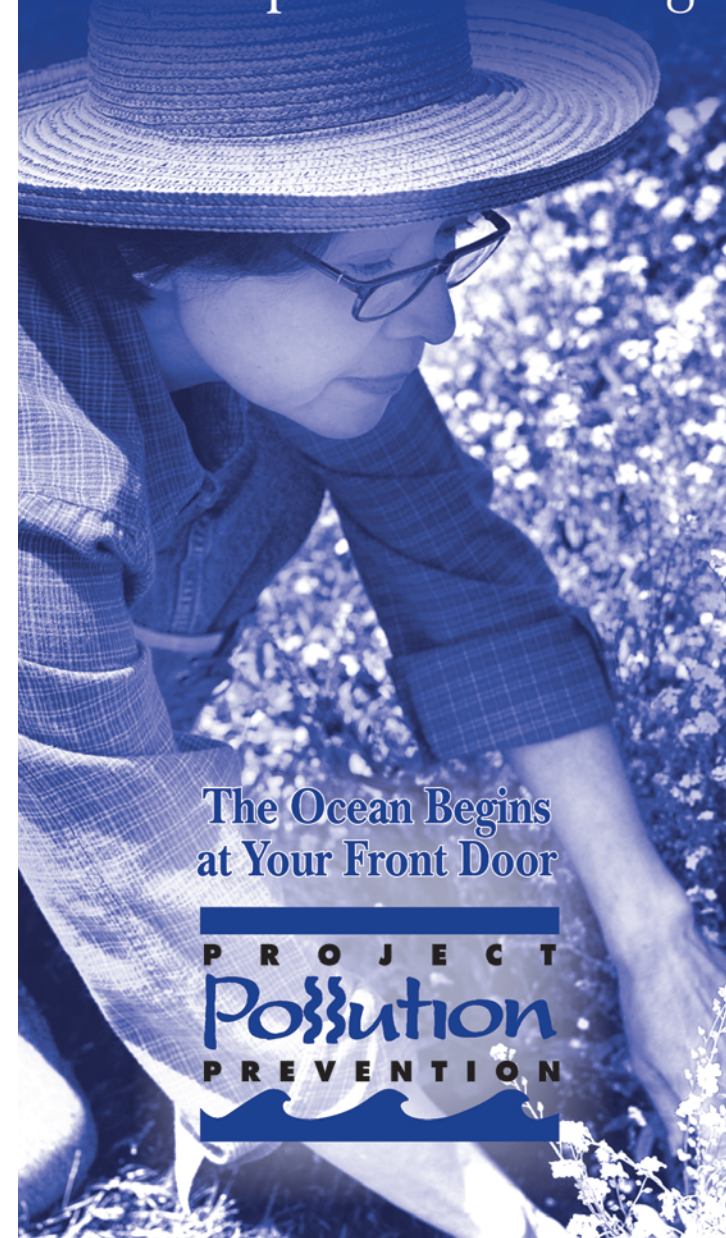
The tips contained in this brochure provide useful information to help prevent water pollution while landscaping or gardening. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.



Printed on Recycled Paper

Help Prevent Ocean Pollution:

## Tips for Landscape & Gardening



The Ocean Begins  
at Your Front Door



# 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](http://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.oilandfills.com](http://www.oilandfills.com)



## *Preventing water pollution at your commercial/industrial site*

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many landscape and building maintenance activities can lead to water pollution if you're not careful. Paint, chemicals, plant clippings and other materials can be blown or washed into 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 pour soap or fertilizers into the ocean, so why would you let them enter the storm drains? Follow these easy tips to help prevent water pollution.

Some types of industrial facilities are required to obtain coverage under the State General Industrial Permit. For more information visit: [www.swrcb.ca.gov/stormwater/industrial.html](http://www.swrcb.ca.gov/stormwater/industrial.html)

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



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Help Prevent Ocean Pollution:

# Proper Maintenance Practices for Your Business



**The Ocean Begins  
at Your Front Door**



# Proper Maintenance Practices for your Business

## *Landscape Maintenance*

- Compost grass clippings, leaves, sticks and other vegetation, or dispose of it at a permitted landfill or in green waste containers. Do not dispose of these materials in the street, gutter or storm drain.
- Irrigate slowly and inspect the system for leaks, overspraying and runoff. Adjust automatic timers to avoid overwatering.
- Follow label directions for the use and disposal of fertilizers and pesticides.
- Do not apply pesticides or fertilizers if rain is expected within 48 hours or if wind speeds are above 5 mph.
- Do not spray pesticides within 100 feet of waterways.
- Fertilizers should be worked into the soil rather than dumped onto the surface.
- If fertilizer is spilled on the pavement or sidewalk, sweep it up immediately and place it back in the container.

## *Building Maintenance*

- Never allow washwater, sweepings or sediment to enter the storm drain.
- Sweep up dry spills and use cat litter, towels or similar materials to absorb wet spills. Dispose of it in the trash.
- If you wash your building, sidewalk or parking lot, you **must** contain the water. Use a shop vac to collect the water and contact your city or sanitation agency for proper disposal information. Do not let water enter the street, gutter or storm drain.
- Use drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of materials in the trash.
- Use a ground cloth or oversized tub for mixing paint and cleaning tools.
- Use a damp mop or broom to clean floors.
- Cover dumpsters to keep insects, animals, rainwater and sand from entering. Keep the area around the dumpster clear of trash and debris. Do not overfill the dumpster.

- Call your trash hauler to replace leaking dumpsters.
- Do not dump any toxic substance or liquid waste on the pavement, the ground, or near a storm drain. Even materials that seem harmless such as latex paint or biodegradable cleaners can damage the environment.
- Recycle paints, solvents and other materials. For more information about recycling and collection centers, visit [www.oclandfills.com](http://www.oclandfills.com).
- Store materials indoors or under cover and away from storm drains.
- Use a construction and demolition recycling company to recycle lumber, paper, cardboard, metals, masonry, carpet, plastic, pipes, drywall, rocks, dirt, and green waste. For a listing of construction and demolition recycling locations in your area, visit [www.ciwmb.ca.gov/recycle](http://www.ciwmb.ca.gov/recycle).
- Properly label materials. Familiarize employees with Material Safety Data Sheets.

NEVER DISPOSE  
OF ANYTHING  
IN THE STORM  
DRAIN.