Appendices

Appendix F Preliminary Water Quality Management Plan

Appendices

This page intentionally left blank.

Preliminary Water Quality Management Plan (PWQMP)

Project Name:

1401 Quail Street

Newport Beach, CA 92660

Prepared for:

Intracorp SW, LLC

895 Dove Street, Suite 400

Newport Beach, CA 92660

949-757-8464

Prepared by:

Adams-Streeter Civil Engineers, Inc.

16755 Von Karman Ave, Suite 150
Irvine, California 92606
(949) 474-2330

DATE PREPARED: 04-25-2023

Engineer Nicholas A. Streeter Registration No. C70862

Project Owner's Certification			
Permit/Application No.	Pending	Grading Permit No.	Pending
Tract/Parcel Map No.		Building Permit No.	Pending
CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract)			

This Preliminary Water Quality Management Plan (WQMP) has been prepared for Intracorp SW, LLC by Adams Streeter Civil Engineers. 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.

Owner: Rick Puffer			
Title	Vice President		
Company	Intracorp SW, LLC		
Address	895 Dove Street , Suite 400, Newport Beach, CA 92660		
Email	rpuffer@intracorphomes.com		
Telephone #	949-757-8464		
Signature		Date	

Contents

Page No.

Attachments

Section I Discretionary Permit(s) and Water Quality Conditions

Project Infomation			
Permit/Application No.	Pending	Tract/Parcel Map No.	427-332-04
Additional Information/ Comments:			

Water Quality Conditions	
Water Quality Conditions (list verbatim)	All significant redevelopment projects, where significant redevelopment is defined as the addition or replacement of 5,000 or more square feet of impervious surface on an already developed site. A project water quality management plan (WQMP) conforming to the current water discharge requirements permit for the county of orange (order no. R8-2009-0030) (MS4 permit) prepared by a licensed civil engineer, shall be submitted to the department of public works for review and acceptance. The WQMP shall address section XII of the MS4 permit and all current surface water quality issues. The project WQMP shall include the permit and all current surface water quality issues

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

Section II Project Description

II.1 Project Description

Description of Proposed Project				
Development Category (Verbatim from WQMP):	All significant redevelopment projects, where significant redevelopment is defined as the addition or replacement of 5,000 or more square feet of impervious surface on an already developed site.			
Project Area (ft^2): 74,212	Number of Dwelling Units: 78		SIC Code: 6513	
Narrative Project Description:	This project is a residential redevelopment. The project site consists of the demolition of one existing commercial building, paved parking lot, and certain utilities. The proposed includes the construction of a multi-story building above an underground parking garage. Proposed BMPs, locations as shown on WQMP plan in Attachment C, will treat runoff for the entire site. A private round-a-bout alley will be constructed for ingress/egress along Spruce Avenue.			
Project Area	Pervious		Impervious	
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage
Pre-Project Conditions	10,060 sq ft	13.6%	64,152 sq ft	86.4%
Post-Project Conditions	10,332sq ft	13.9%	63,880sq ft	86.1%
Drainage Patterns/Connections	The existing site drainage pattern is generally flowing from the south corner of the site to the north corner of the site with surface slopes of around 0.3% to 4.0%. The majority of the site is graded to flow to an existing concrete swale which discharges at the north corner of the site to Quail Street. The runoff will then flow southeasterly alongside the curb and gutter where it will eventually drain into an existing catch basin located at the northwest corner of the intersection of Quail Street and Spruce Avenue. The east side of the building 's runoff flows perpendicularly away from the building, towards the City right-of-way. The runoff will also eventually drain into the existing catch basin as described above.			

	The catch basin discharges through a public 18″ RCP storm drain that connects to a public 42″ RCP storm drain. The storm drain eventually discharges to San Diego Creek which leads to Upper Newport Bay.

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 ☒	N ☐	Landscaping will exist.
Nutrients	E ☒	N ☐	Landscaping will exist.
Heavy Metals	E ☒	N ☐	Parking and an entrance/exit street will exist.
Pathogens (Bacteria/Virus)	E ☐	N ☒	Land use does not involve food or animal waste products.
Pesticides	E ☒	N ☐	Landscaping will exist.
Oil and Grease	E ☒	N ☐	Vehicle traffic expected.
Toxic Organic Compounds	E ☒	N ☐	Landcape maintenance and waste handling areas will exist.
Trash and Debris	E ☒	N ☐	Trash and debris expected.

II.3 Hydrologic Conditions of Concern

☐ No – Show map – OCFD Drainage Map is included in Attachment C.

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

The project site is located in area that is potentially susceptible to hydromodification impacts. The site discharge also does not remain in an engineered or stabilized channel in its entire path to a receiving water body.

In order to address the hydrologic conditions of concern. The 2 year, 24-hr post-development runoff volume does not exceed the pre-development runoff volume by more than 5 percent. The totals for the runoff volume can be seen below.

Pre-Development: 6,316 cubic feet

Post-Development: 6,011 cubic feet

Post-Development: 4.8% Decrease

Hydrology calculations and map can be found in Attachment D of this report for reference.

II.4 Post Development Drainage Characteristics

The proposed drainage is to have two different DMA's, DMA-A and DMA-B. DMA-A will include the entirety of the building along with the adjacent areas between the building and the right-of-way/property line on the north, west, and east side of the building. DMA-B will be the area south of the building, which includes the entire round-a-bout access street and the area leading to the main entry of the building.

DMA-A will utilize Biotreatment BMPs in the form of Bioretention Planters with Permavoid Boxes in lieu of gravel and underdrain to treat/retain its required DCV of 2,644 ft^3. The reason Permavoid Boxes will be used instead of gravel is because Permavoid Boxes have a 95% porosity rate compared to the 40% porosity of gravel. This allows a much greater volume of retainment with a smaller footprint. Another reason is Permavoid Boxes allows for runoff to be used as a means of irrigation for the planter box. Permavoid Boxes will infiltrate runoff upwards via capillary rise through the engineered soil media and then be used to irrigate the landscaped area of the planter box.

In regards to drainage, the majority of the DMA's runoff will be collected through roof drains. Runoff will be discharged directly on top of the Planter Boxes via roof downspout drains. Runoff will be bio-treated as it infiltrates through the engineered soil media of the planter boxes and then the runoff will be retained within the Permavoid structures/soil media/ponding. As the planter boxes are filled and the required DCV is treated/retained, runoff will be captured by an overflow inlet located at the top of ponding of the planter boxes. Runoff will then be ultimately discharged to Quail Street and Spruce Avenue via parkway culverts.

DMA-B will utilize a Harvest and Use BMP by using Permavoid Boxes for its required DCV of 1,066 ft^3. Unlike DMA-A, runoff will discharge directly underground to the Permavoid Boxes. This means runoff will not be bio-treated by an engineered soil media before being retained. The retained runoff will be used for irrigation purposes however.

The runoff of DMA-B will sheet flow to catch basins located on the south side of the proposed round-a-bout access street. The catch basins will have Flogard Filter Inserts installed to pre-treat the runoff before entering the storm drain system. The storm drain system will then direct the runoff to the bottom of a Permavoid Boxes located at the south side of the building. The entirety of the DCV will be captured and retained within the Permavoid Boxes. Runoff will infiltrate upwards via capillary rise through the engineered soil media and then be used to irrigate the landscaped area above the Permavoid Boxes. During large storm events where the Permavoid Boxes are fully saturated and the required DCV is retained, runoff will be discharged to a parkway culvert that discharges to Spruce Avenue. The landscaped areas above the Permavoid boxes will also have supplemental irrigation provided for both cases of DMA-A and DMA-B.

II.5 Property Ownership/Management

The project site is owned by Intracorp SW, LLC. The project site is to be developed into a Podium structure with retail units and condominium units. A blanket easement will be recorded over the site for access and maintenance. A property management company will be formed and will be responsible for the maintenance of all proposed infrastructure and BMP's.

Section III Site Description

III.1 Physical Setting

Planning Area/ Community Name	N/A
Location/Address	West corner of Quail Street and Spruce Avenue
	1401 Quail Street Newport Beach, CA 92660
Land Use	Proposed Condominium Complex
Zoning	Planned Community – PC11 Newport Place
Acreage	1.71 acres
Predominant Soil Type	Soil Type D

III.2 Site Characteristics

Precipitation Zone	0.75-inch Design Capture Storm Depth (per TGD Figure XVI-1)
Topography	The existing site is generally flat. The surrounding areas of the project site are a commercial building and parking lot to the northwest, a commercial building and parking lot to the southwest, Spruce Avenue to the southeast, and Quail Street to the northeast.
Drainage Patterns/Connections	The drainage pattern is generally from north to south. In the site's existing condition, there are no on-site drainage systems and the runoff would eventually flow off-site to a catch basin located at the northwest corner of the intersection of Quail Street and Spruce Avenue.
Soil Type, Geology, and Infiltration Properties	The upper 20 feet of the site is predominantly clay with low permeability which may not be suitable for infiltration. Although the soil after 20 feet is sand and has good infiltration rates, groundwater was encountered at ~25 feet, therefor infiltration is not recommended.

	The maps in the TGD indicate that the site has soil Type D. Based on this, infiltration is not feasible for the project as well.

Site Characteristics (continued)	
Hydrogeologic (Groundwater) Conditions	Groundwater was encountered at approximately 25 feet below site grade.
Geotechnical Conditions (relevant to infiltration)	The site is not in favor of infiltration. This is due to the site having soil type D and having mostly clay with low permeability within the upper 20 feet of the ground. Although infiltration tested well after 20 feet, groundwater is located shortly after at approximately 25 feet below grade. Due to this, the site is not suitable for an infiltration bmp.
Off-Site Drainage	There are no concerns of off-site run on to the project.
Utility and Infrastructure Information	In the site's existing condition, there are no on-site drainage systems. The runoff would eventually flow off-site to a catch basin located at the northwest corner of the intersection of Quail Street and Spruce Avenue.

III.3 Watershed Description

Receiving Waters	San Diego Creek Reach 1 Newport Bay, Upper (Ecological Reserve) Newport Bay, Lower
303(d) Listed Impairments	**San Diego Creek (Reach 1)**: Benthic Community Effects, DDT, Indicator Bacteria, Malathion, Nutrients, Sedimentation/Siltation, Selenium, Toxaphene, Toxicity **Newport Bay, Upper (Ecological Reserve):** Chlordane, Copper, DDT, Indicator Bacteria, Malathion, Nutrients, PCBs (Polychlorinated biphenyls), Sedimentation/Siltation, and Toxicity.

	Lower Newport Bay: Chlordane, Copper, DDT, Indicator Bacteria, Nutrients, PCBs, Toxicity.
Applicable TMDLs	San Diego Creek (Reach 1): Nutrients, Pesticides and Turbidity/Siltation. Upper Newport Bay (Ecological Reserve): Bacteria Indicators/Pathogens, Metals, Nutrients, Pesticides, and Turbidity/Siltation. Lower Newport Bay: Nutrients, Pesticides
Pollutants of Concern for the Project	Pollutants of concern: Suspended Solid/Sediments, Nutrients, Pathogens, Pesticides, Oil & Grease, Trash & Debris. Primary Pollutants of Concern: Suspended Solid/Sediments, Nutrients, Pathogens and Pesticides.
Environmentally Sensitive and Special Biological Significant Areas	There is no ESA within 200 feet of the project site.

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 ☐	NO ☒
If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.	N/A	

Project Performance Criteria (continued)	
If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP)	HCOC is not applicable for this project. See section II.3 of the report for more information.
List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)	Priority Projects must infiltrate, harvest and re-use, evapotranspire, or bio treat/bio filter, the 85th percentile, 24- hour storm event (Design Capture Volume). A properly designed Bio treatment system may only be considered if infiltration harvest re-use and evapotranspiration (ET) cannot be feasibly implemented for the full design capture volume. In this case, infiltration, harvest re-use, and ET practices must be implemented to the greatest extent feasible and bio treatment may be provided for the remaining design capture volume.
List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP)	Satisfaction of LID performance criteria also fully satisfies treatment control performance criteria. If it is not feasible to meet LID performance criteria through retention and/ or bio treatment provided on site or at a sub-regional scale, then treatment control of treatment control BMP's shall be provided on site or offsite prior to discharge to waters of the US
Calculate LID design storm capture volume for Project.	DCV = design storm capture volume, cu-ft C = runoff coefficient = (0.75 × imp + 0.15) Imp = impervious fraction of drainage area (ranges from 0 to 1) d = storm depth (inches) A = tributary area (acres)

	DMA A: Imp = 89.1% d = 0.75 inches A = 1.19acres DCV = (0.75 x **0.891**+0.15) x **0.75 inches** x **1.19ac** x 43560 sf/ac x 1/12 in/ft = 2,644 **ft³** **DMA B:** Imp = 81.0% d = 0.75 inches A = 0.52 acres DCV = (0.75 x **0.810** +0.15) x **0.75 inches** x **0.52 ac** x 43560 sf/ac x 1/12 in/ft = 1,066 **ft³**

IV.2. SITE DESIGN AND DRAINAGE PLAN

The following section describes the site design BMPs used in this project and the methods used to incorporate them. Careful consideration of site design is a critical first step in storm water pollution prevention from new developments and redevelopments.

Site Design BMPs

Minimize Impervious Area

- Impervious surfaces have been minimized by incorporating landscaped areas throughout the site surrounding the proposed building. Landscaping will be provided throughout the site within the common areas as well as around the perimeter of the building.

Preserve Existing Drainage Patterns and Time of Concentration

- Runoff from the site will continue to flow similar to existing conditions. Low-flows and first-flush runoff will drain to a Permavoid Planter Boxes. The Permavoid Planter Boxes are sized to be able to treat the required DCV of their respective DMA's.

Disconnect Impervious Areas

- Landscaping will be provided adjacent to sidewalks and along the perimeter of the building. Low-flows will drain to the proposed Permavoid Planter Box BMP's.

Protect Existing Vegetation and Sensitive Areas, and Revegetate Disturbed Areas

- There are no existing vegetated or sensitive areas to preserve on the project site. All disturbed areas will either be paved or landscaped.

Drainage Management Areas:

- In accordance with the MS4 permit and the 2013 OC TGD, the project site has been divided into Drainage Management Areas (DMAs) to be utilized for defining drainage areas and sizing LID and other treatment control BMPs. DMAs have been delineated based on the proposed site grading patterns, drainage patterns, storm drain and catch basin locations.

The Drainage Management Areas (DMA) locations, design capture volumes (DCV) and treatment flow rates (QDesign) for each DMA are illustrated and calculated in **Attachment A-BMP Site Plan** and **Attachment B-BMP Calculations**. These have been derived utilizing the "Simple Method" in accordance with the TGD Section III.1.2.

IV.3 LID BMP SELECTION AND PROJECT CONFORMANCE ANALYSIS

.

IV.3.1 Hydrologic Source Controls

HSC's are not utilized for this project. Runoff will be treated by Harvest and Use BMPs and Bio-treatment BMPs.

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

IV.3.2 Infiltration BMPs

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

Per the soils report, infiltration is not feasible due to high groundwater and poor infiltration rates. Also, the TGD Map in Attachment C indicates presence of Type D soils which are not suitable for infiltration.

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

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

Per the soils report, infiltration is not feasible due to high groundwater and poor infiltration rates. Also, the TGD Map in Attachment C indicates presence of Type D soils which are not suitable for infiltration.

DMA-B will utilize Permavoid Boxes as a Rainwater Harvest and Use BMP. Runoff of DMA-B will be collected via catch basins that have Flogard Filters installed as a pre-treatment method. Runoff will then flow through the storm drain system directly to the underground Permavoid Boxes. The entirety of DMA-B's DCV will be retained within the Permavoid Boxes which have a porosity of 95%. Once the required DCV is retained, the runoff will infiltrate upwards through via capillary rise and then be used to irrigate the plants/landscaping area above the Permavoid Boxes.

During large storm events where the Permavoid Boxes are fully saturated and the required DCV is retained, runoff will be discharged to a parkway culvert that discharges to Spruce Avenue. This discharge method will be designed to handle a 100-year storm event.

See attachment B for BMP Calculations and fact sheets.

IV.3.4 Biotreatment BMPs

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

Per the soils report, infiltration is not feasible due to high groundwater and poor infiltration rates. Also, the TGD Map in Attachment C indicates presence of Type D soils which are not suitable for infiltration.

DMA-A will utilize Biotreatment BMPs in the form of Bioretention Planters with Permavoid Boxes in lieu of gravel and underdrain. The reason DMA-A's BMP is considered biotreatment is because runoff will discharge directly on top of the planter boxes, where it will then be bio-treated by the engineered soil media.

A Permavoid Planter Box effectively operates the same as a bioretention planter with underdrain without the need for gravel and an underdrain pipe. Runoff will discharge directly on top of the planter box via roof drain downspouts. Runoff will then infiltrate downwards and be treated by the engineered soil media. Below the engineered soil media will be the Permavoid Boxes, which retain the treated runoff as if it were the gravel of a bioretention basin.

Once the Planter Box is at capacity, meaning the ponding, soil media, and Permavoid Boxes are fully saturated with stormwater, runoff will be collected by an overflow inlet at the top of

ponding. The overflow inlet will discharge the runoff through an outlet pipe and then to a parkway culvert where runoff ultimately ends in either Spruce Avenue or Quail Street.

See attachment B for BMP Calculations and fact sheets.

IV.3.8 Non-structural Source Control BMPs

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

IV.3.9 Structural Source Control BMPs

Structural Source Control BMPs				
Identifier	**Name**	**Check One**		**If not applicable, state brief reason**
		Included	**Not Applicable**	
S1	Provide storm drain system stenciling and signage	☒	☐	
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒	Outdoor storage is not anticipated
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☒	☐	
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	
S5	Protect slopes and channels and provide energy dissipation	☐	☒	No slopes anticipated onsite
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☐	☒	Project not located in SDRWQCB
S6	Dock areas	☐	☒	Not present onsite
S7	Maintenance bays	☐	☒	Not present onsite
S8	Vehicle wash areas	☐	☒	Not present onsite
S9	Outdoor processing areas	☐	☒	Not present onsite
S10	Equipment wash areas	☐	☒	Not present onsite
S11	Fueling areas	☐	☒	Not present onsite
S12	Hillside landscaping	☐	☒	Not present onsite
S13	Wash water control for food preparation areas	☐	☒	Not present onsite
S14	Community car wash racks	☐	☒	Not present onsite

IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)

IV.4.1 Water Quality Credits

<table>
<tr><th colspan="6">Description of Proposed Project</th></tr>
<tr><td colspan="6">Project Types that Qualify for Water Quality Credits (Select all that apply):</td></tr>
<tr><td colspan="2">☐Redevelopment projects that reduce the overall impervious footprint of the project site.</td><td colspan="2">☐Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped.</td><td colspan="2">☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance).</td></tr>
<tr><td colspan="2">☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution).</td><td colspan="2">☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned</td><td>☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping).</td></tr>
<tr><td>☐Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.</td><td>☐ Developments in a city center area.</td><td>☐ Developments in historic districts or historic preservation areas.</td><td>☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.</td><td>☐In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.</td></tr>
<tr><td>Calculation of Water Quality Credits
(if applicable)</td><td colspan="5">N/A</td></tr>
</table>

IV.4.2 Alternative Compliance Plan Information

Not Applicable

Section V Inspection/Maintenance Responsibility for BMPs

BMP Inspection/Maintenance			
BMP	**Responsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
Permavoid Planter Areas	Owner	-Inspect semiannually for beginning (October) and end of the wet season (April)	Ongoing
Education for Property Owners, Tenants and Occupants	Owner	Educational materials will be provided to tenants annually. Materials to be distributed are found in Attachment F. Tenants will be provided these materials by the Owner prior to occupancy and periodically thereafter	Annually
Activity Restrictions	Owner	The Owner will prescribe activity restrictions to protect surface water quality, through lease terms or other equally effective measure, for the property. Restrictions include, but are not limited to, prohibiting vehicle maintenance or vehicle washing.	Ongoing
Common Area Landscape Management	Owner	Maintenance shall be consistent with City requirements. Fertilizer and/or pesticide usage shall be consistent with County Management Guidelines	Monthly

		for Use of Fertilizers (OC DAMP Section 5.5) as well as local requirements. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting, and replacement of mulch shall be performed on an as-needed basis to prevent exposure of erodible surfaces. Trimmings, clippings, and other landscape wastes shall be properly disposed of in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and storm drain inlets.	
Common Area Litter Control	Owner	Litter patrol and other litter control activities shall be performed on a weekly basis and in conjunction with routine maintenance activities.	Weekly
Employee Training	Owner	Educate all new employees/ managers on storm water pollution prevention, particularly good housekeeping practices, prior to the start of the rainy season (October 1). Refresher courses shall be conducted on an as needed basis.	Annually
Street Sweeping Private Streets and Parking Lots	Owner	Drive aisles & parking areas must be swept at least quarterly (every 3 months), including prior to the start of the rainy season (October 1).	Quarterly

Common Area Catch Basin Inspection	Owner	Catch basin inlets and other drainage facilities shall be inspected after each storm event and once per year. Inlets and other facilities shall be cleaned prior to the rainy season, by October 1 each year.	Annually
Storm Drain Stencilling and Signage	Owner	Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1 each year. Those determined to be illegible will be re-stencilled as soon as possible.	Annually
Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	Owner	In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, and day or night time temperatures. System testing shall occur twice per year. Water from testing/flushing shall be collected and properly disposed to the sewer system and shall not discharge to the storm drain system.	Twice per year

Section VI Site Plan and Drainage Plan

VI.1 SITE PLAN AND DRAINAGE PLAN

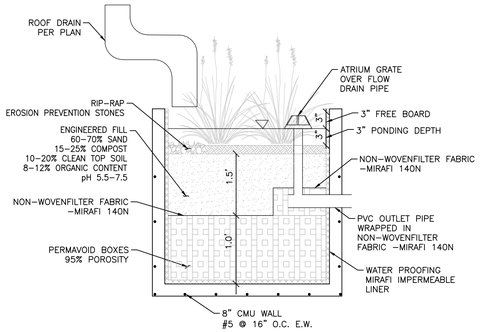
- Refer to Attachment A

ATTACHMENT A

BMP SITE PLAN

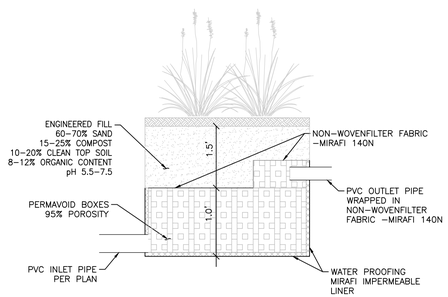
LEGEND

- BMP CATCHMENT AREA
- SD — PROPOSED SD
- DIRECTION OF FLOW
- RD — ROOF DRAIN
- CATCH BASIN WITH STENCILING AND PRE-TREATMENT FILTER INSERT
- COMMON AREA EFFICIENT IRRIGATION & RUN-OFF MINIMIZING LANDSCAPE
- IMPERVIOUS AREA
- PERMAVOID PLANTER BOX
- PROPOSED BUILDING
- CATCH BASIN
- DMA-X / X.XX — DRAINAGE AREA / AREA (ACRE)



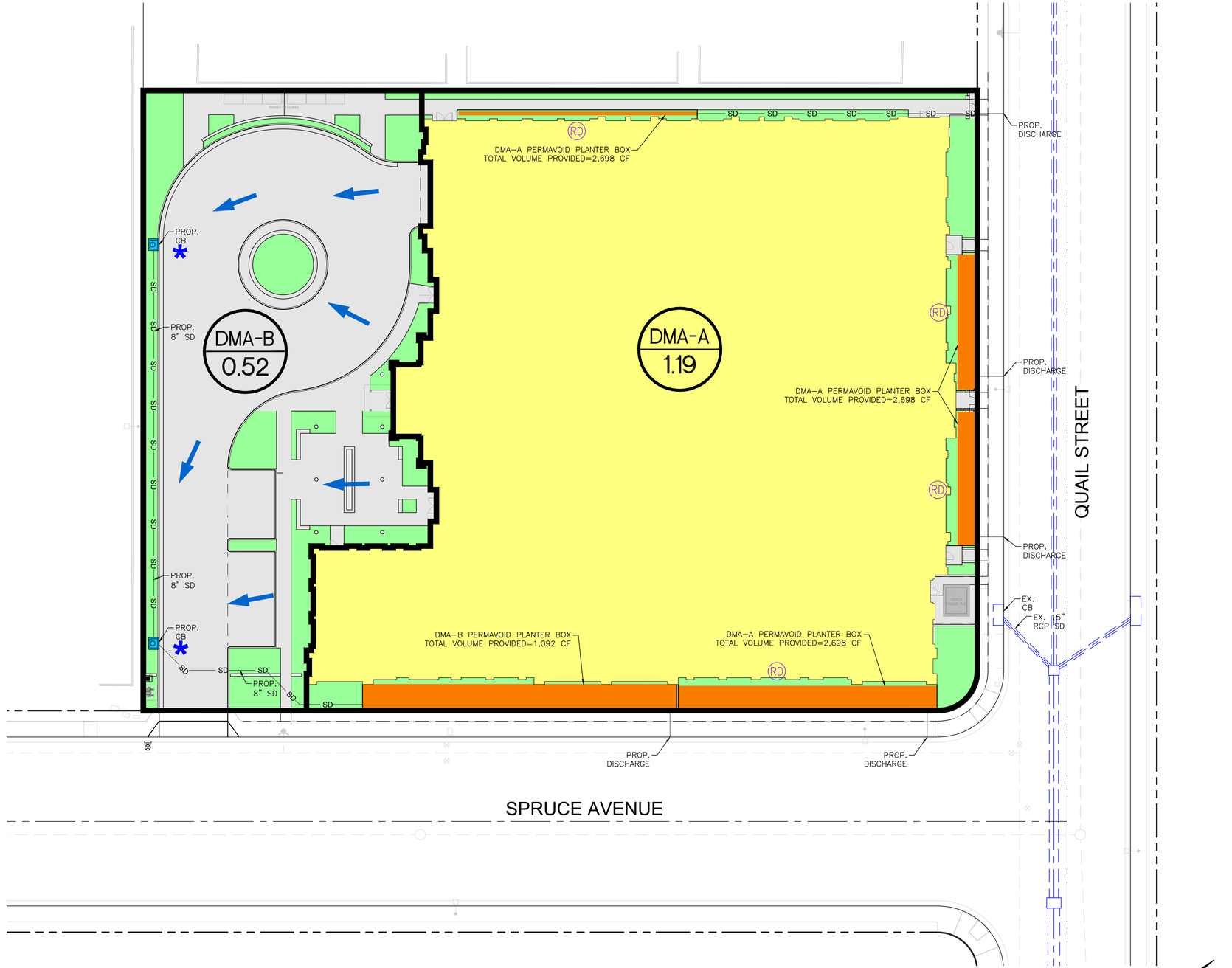
BIORETENTION PLANTERS WITH PERMAVOID FOR DMA-A

NOT TO SCALE



HARVEST AND USE PERMAVOID PLANTER FOR DMA-B

NOT TO SCALE



DRAINAGE AREAS						
DRAINAGE AREA	AREA (ACRE)	PERVIOUS AREA (ACRE)	IMPERVIOUS AREA (ACRE)	% PERVIOUS	% IMPERVIOUS	DCV (CF)
DMA-A	1.19	0.13	1.06	10.9	89.1	2644
DMA-B	0.52	0.10	0.42	19.0	81.0	1066
TOTAL	1.71	0.23	1.48	13.9	86.1	–

20' 0' 10' 20' 40'

SCALE: 1" = 20'

PREPARED BY:
ADAMS STREETER
Civil Engineers

6755 Von Karman Ave, Suite 150, Irvine, CA 92606 | 949.474.2330 | adams-streeter.com

WQMP EXHIBIT

1401 QUAIL STREET
NEWPORT BEACH, CA 92660
DATE: 4/25/2023

PROJECT NO. 22-2434

SHEET 1 OF 1

U:\2022\22-2434 QUAIL ST - INTRACORP\WQMP\ATTACHMENT A-BMP SITE PLAN\22-2434-WQMP-EXHIBIT.DWG

ATTACHMENT B

BMP CALCULATIONS

Worksheet B: Simple Design Capture Volume Sizing Method

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter design capture storm depth from Figure III.1, *d* (inches)	d=	0.75	inches
2	Enter the effect of provided HSCs, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	N/A	inches
3	Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2)	$d_{remainder}$=	0.75	inches
Step 2: Calculate the DCV				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	1.19	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.891	
3	Calculate runoff coefficient, *C= (0.75 x imp) + 0.15*	C=	0.818	
4	Calculate runoff volume, V_{design}= *(C x* $d_{remainder}$ *x A x 43560 x (1/12))*	V_{design}=	2644	cu-ft
Step 3: Design BMPs to ensure full retention of the DCV				
Step 3a: Determine design infiltration rate				
1	Enter measured infiltration rate, $K_{observed}$[1] (in/hr) (**Appendix VII**)	$K_{observed}$=	N/A	In/hr
2	Enter combined safety factor from Worksheet H, S_{total} (unitless)	S_{total}=	N/A	
3	Calculate design infiltration rate, $K_{design} = K_{observed} / S_{total}$	K_{design}=	N/A	In/hr
Step 3b: Determine minimum BMP footprint				
4	Enter drawdown time, *T* (max 48 hours)	T=	N/A	Hours
5	Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$	D_{max}=	N/A	feet
6	Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$	A_{min}=	N/A	sq-ft

[1] $K_{observed}$ is the vertical infiltration measured in the field, before applying a factor of safety. If field testing measures a rate that is different than the vertical infiltration rate (for example, three-dimensional borehole percolation rate), then this rate must be adjusted by an acceptable method (for example, Porchet method) to yield the field estimate of vertical infiltration rate, $K_{observed}$. See Appendix VII.

Worksheet B: Simple Design Capture Volume Sizing Method

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter design capture storm depth from Figure III.1, *d* (inches)	d=	0.75	inches
2	Enter the effect of provided HSCs, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	N/A	inches
3	Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2)	$d_{remainder}$=	0.75	inches
Step 2: Calculate the DCV				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	0.52	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.810	
3	Calculate runoff coefficient, *C= (0.75 x imp) + 0.15*	C=	0.757	
4	Calculate runoff volume, V_{design}= *(C x* $d_{remainder}$ *x A x 43560 x (1/12))*	V_{design}=	1,066	cu-ft
Step 3: Design BMPs to ensure full retention of the DCV				
Step 3a: Determine design infiltration rate				
1	Enter measured infiltration rate, $K_{observed}$[1] (in/hr) (**Appendix VII**)	$K_{observed}$=	N/A	In/hr
2	Enter combined safety factor from Worksheet H, S_{total} (unitless)	S_{total}=	N/A	
3	Calculate design infiltration rate, $K_{design} = K_{observed} / S_{total}$	K_{design}=	N/A	In/hr
Step 3b: Determine minimum BMP footprint				
4	Enter drawdown time, *T* (max 48 hours)	T=	N/A	Hours
5	Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$	D_{max}=	N/A	feet
6	Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$	A_{min}=	N/A	sq-ft

[1] $K_{observed}$ is the vertical infiltration measured in the field, before applying a factor of safety. If field testing measures a rate that is different than the vertical infiltration rate (for example, three-dimensional borehole percolation rate), then this rate must be adjusted by an acceptable method (for example, Porchet method) to yield the field estimate of vertical infiltration rate, $K_{observed}$. See Appendix VII.

ABT, INC.
WWW.ABTDRAINS.COM
PH: (800) 438 - 6057

permavoid

Los Angeles Low Impact Development
BMP Design & Material Summary

Project Number: PV323388
Street Address: Quail St. Project, Newport CA
85th Rainfall Depth: 0.75 inches

Date: 4/24/2023
ECD: 0 0

Design Summary												Material Summary										
												Permavoid Units (Quantity)				Capillary Cones (Quantity)						
LID BMP ID - #	Drainage Area At (ft^2)	Impervious Area Ai (%)	Catchment Area Acat (ft^2)	Design Capture Vol. Vcap (ft^3)	Required Planter Area Ap (ft^2)	Capture & Use Volume Vcu (ft^3)	Biofiltration Volume Vbf (ft^3)	Minimum Plant Factor PF ---	Soil Depth Dsoil (in.)	Ponding Depth Dpond (in.)	Planter Depth (Interior) Dip (in.)	System Type	85s	85HD	PV150	36/90	36/60+ 24/30	23/160T Pairs	Wicking Geotex. (Roll-ft)	Tie Connectors	Shear Connectors	Est. Soil Volume (CY)
CUB-1	51,836	89.1%	42,132	2633	1,989	1,860	1,160	0.44	18.0	2.0	35.0	150x2			1,468			1,468	332	7,340	245	121.6
CU-2	22,651	81.0%	16,943	1,059	1,133	1,059	0	0.44	18.0	N/A	30.0	150x2			836			836	190	4,180	140	69.2
Total	**74,487**	---	**59,075**	**3,692**	**3,122**	**2,919**	**1,160**	---	---	---	---	---	**0**	**0**	**2,304**	**0**	**0**	**2,304**	**522**	**11,520**	**385**	**190.8**

Permavoid Los Angeles LID Table 1.1

REF: 00PV323388c4846G

Permavoid Planter Soil Requirements (non-traffic loading):

- 75% (+/- 5%) by weight shall consist of sand meeting the following:
  - For soil depths of 6 to 12 inches, average particle size shall be 500μm (0.020 in.)
  - For soil depths of 12 to 24 inches, average particle size shall be 300μm (0.012 in.)
- Soils shall have a uniformity coefficient of 4.0 or less.
- Soils shall have less than 10% fines (passing 200 sieve) by weight.
- Soils used for biofiltration shall meet "*Attachment H. Biofiltration / Biofiltration Design Criteria* " as provided by the California Regional Water Quality Control Board.

ABT, INC.
WWW.ABTDRAINS.COM
PH: (800) 438 - 6057

permavoid

Los Angeles Low Impact Development
Capture & Use / Biofiltration Planter Design Calculations

Project Name: Quail St. Project, Newport CA
Project Number: PV323388

Date: 4/24/2023

Planter ID Number:	CUB	1	
Catchment Area:	Acat	42,132	ft²
85th Percentile Storm Depth:	D85	0.0625	ft
Soil Depth:	D*soil*	18.0	in.
Soil Available Water:	Wa	0%	%
Ponding Depth:	D*pond*	2.0	in.
Soil Saturated Infiltration Rate:	Ksat	5.0	in/hr
Safety Factor:	SF	2.0	
Time To Fill:	Tf	2.0	hrs
Permavoid System Depth:	150x2	11.8	in.
Permavoid Voids:	Vpv	95	%
7-Month Reference Evapotranspiration:	ETo7	21.7	in.
Permavoid Irrigation Efficiency:	IE	0.85	

Design Summary		
Planter Area:	**Ap**	**1989.1 ft²**
Capture & Use Volume:	**Vcu**	**1859.7 ft³**
Biofiltration Volume:	**Vbf**	**1160.3 ft³**
Plant Factor (min.):	**PF**	**0.44**
Internal Planter Depth:	**D*ip***	**35 in.**

Material Requirements		
Permavoid Units:	**PV-150**	**1468 Units**
Capillary Cones:	**23/160 T**	**1468 Pairs**
Wicking Geotextile Length:	**Cap. Tex.**	**232 - 332 ft**
Planting Media:	**By Others**	**121.6 CY**

*NOTES: Quantities are for estimation only. Fluctuations in material quatities will occur based on the precise configuration. Contact ABT-Permavoid for planting media recommendations based on soil depth.

Calculate the Design Capture Volume (Vcap):

Vcap = D85 · Acat
Vcap = 0.0625ft · 42132.3ft²
Vcap = 2633.3 ft³

Calculate the Permavoid Capture & Use Depth (Dcu):

Dcu = (150x2 · Vpv) + (Dsoil · Wa)
Dcu = (11.8in. · 95%) + (18in. · 0%)
Dcu = 11.22 in. = 0.935 ft

Calculate the Planter Area (Ap):

Ap = 1989.1 ft²

Calculate the Capture & Use Volume (Vcu):

Vcu = Ap · Dcu
Vcu = 1989.1 ft² · 0.935ft
Vcu = 1859.7 ft³

Calculate the Biofiltration Volume (Vbf):

Vbf = 1.5 · (Vcap - Vcu)
Vbf = 1.5 · (2633.3 ft³ - 1859.7 ft³)
Vbf = 1160.3 ft³

Calculate the Minimum Area Required (Amin):

Amin = Vbf / [Tf · (Ksat/SF) + Dpond]
Amin = 1160.3 ft³ / {[2hrs · (5.0in/hr / 2) + 2in.] / 12ipf}
Amin = 1989.1 ft²

Check the Planter Area (Ap) vs. the Minimum Area Required (Amin):

Ap vs. Amin
1989.1 ft² vs. 1989.1 ft²
1989.1 ft² = 1989.1 ft²
Ap = Amin ✓ - CHECKED

Calculate the Minimum Required Plant Factor (PF):

PF = (Vcu · IE) / (ETo7 · Ap)
PF = (1859.7 ft³ · 0.85) / [(21.7in. / 12ipf) · 1989.1 ft²]
PF = 0.44

Calculate the 7-Month Estimated Total Water Use (ETWU-7):

ETWU-7 = (ETo7 · PF · Ap) / IE
ETWU-7 = [(21.7in. / 12ipf) · 0.44 · 1989.1 ft²] / 0.85
ETWU-7 = 1859.7 ft³

Check the Capture & Use Volume (Vcu) vs. the 7-Month Estimated Total Water Usage (ETWU-7):

Vcu vs. ETWU-7
1859.7 ft³ vs. 1859.7 ft³
1859.7 ft³ = 1859.7 ft³
Vcu = ETWU-7 ✓ - CHECKED

ABT, INC.
WWW.ABTDRAINS.COM
PH: (800) 438 - 6057

permavoid

Los Angeles Low Impact Development
Capture & Use / Biofiltration Planter Design Calculations

Project Name: Quail St. Project, Newport CA
Project Number: PV323388

Date: 4/24/2023

Planter ID Number:	CU	2	
Catchment Area:	Acat	16,943	ft²
85th Percentile Storm Depth:	D85	0.0625	ft
Soil Depth:	D*soil*	18.0	in.
Soil Available Water:	Wa	0%	%
Ponding Depth:	D*pond*	0.0	Allowed
Soil Saturated Infiltration Rate:	Ksat	N/A	
Safety Factor:	SF	2.0	
Time To Fill:	Tf	2.0	
Permavoid System Depth:	150x2	11.8	in.
Permavoid Voids:	Vpv	95	%
7-Month Reference Evapotranspiration:	ETo7	21.7	in.
Permavoid Irrigation Efficiency:	IE	0.85	

Design Summary		
Planter Area:	**Ap**	**1132.6 ft²**
Capture & Use Volume:	**Vcu**	**1058.9 ft³**
Biofiltration Volume:	**Vbf**	**N/A**
Plant Factor (min.):	**PF**	**0.44**
Internal Planter Depth:	**D*ip***	**30 in.**

Material Requirements		
Permavoid Units:	**PV-150**	**836 Units**
Capillary Cones:	**23/160 T**	**836 Pairs**
Wicking Geotextile Length:	**Cap. Tex.**	**134 - 189 ft**
Planting Media:	**By Others**	**69.2 CY**

*NOTES: Quantities are for estimation only. Fluctuations in material quatities will occur based on the precise configuration. Contact ABT-Permavoid for planting media recommendations based on soil depth.

Calculate the Design Capture Volume (Vcap):

Vcap = D85 · Acat
Vcap = 0.0625ft · 16942.9ft²
Vcap = 1058.9 ft³

Calculate the Permavoid Capture & Use Depth (Dcu):

Dcu = (150x2 · Vpv) + (Dsoil · Wa)
Dcu = (11.8in. · 95%) + (18in. · 0%)
Dcu = 11.22 in. = 0.935 ft

Calculate the Planter Area (Ap):

Ap = 1132.6 ft²

Calculate the Capture & Use Volume (Vcu):

Vcu = Ap · Dcu
Vcu = 1132.6 ft² · 0.935ft
Vcu = 1058.9 ft³

Calculate the Minimum Required Plant Factor (PF):

PF = (Vcu · IE) / (ETo7 · Ap)
PF = (1058.9 ft³ · 0.85) / [(21.7in. / 12ipf) · 1132.6 ft²]
PF = 0.44

Calculate the 7-Month Estimated Total Water Use (ETWU-7):

ETWU-7 = (ETo7 · PF · Ap) / IE
ETWU-7 = [(21.7in. / 12ipf) · 0.44 · 1132.6 ft²] / 0.85
ETWU-7 = 1058.9 ft³

Check the Capture & Use Volume (Vcu) vs. the 7-Month Estimated Total Water Usage (ETWU-7):

Vcu vs. ETWU-7
1058.9 ft³ vs. 1058.9 ft³
1058.9 ft³ = 1058.9 ft³
Vcu = ETWU-7 ✓ - CHECKED

ABT permavoid

WATER IS OUR MOST PRECIOUS RESOURCE:

ABT Permavoid is a multi-functional stormwater management & water conservation system that mimics the natural water cycle and can save up to 30% on overall site drainage costs.

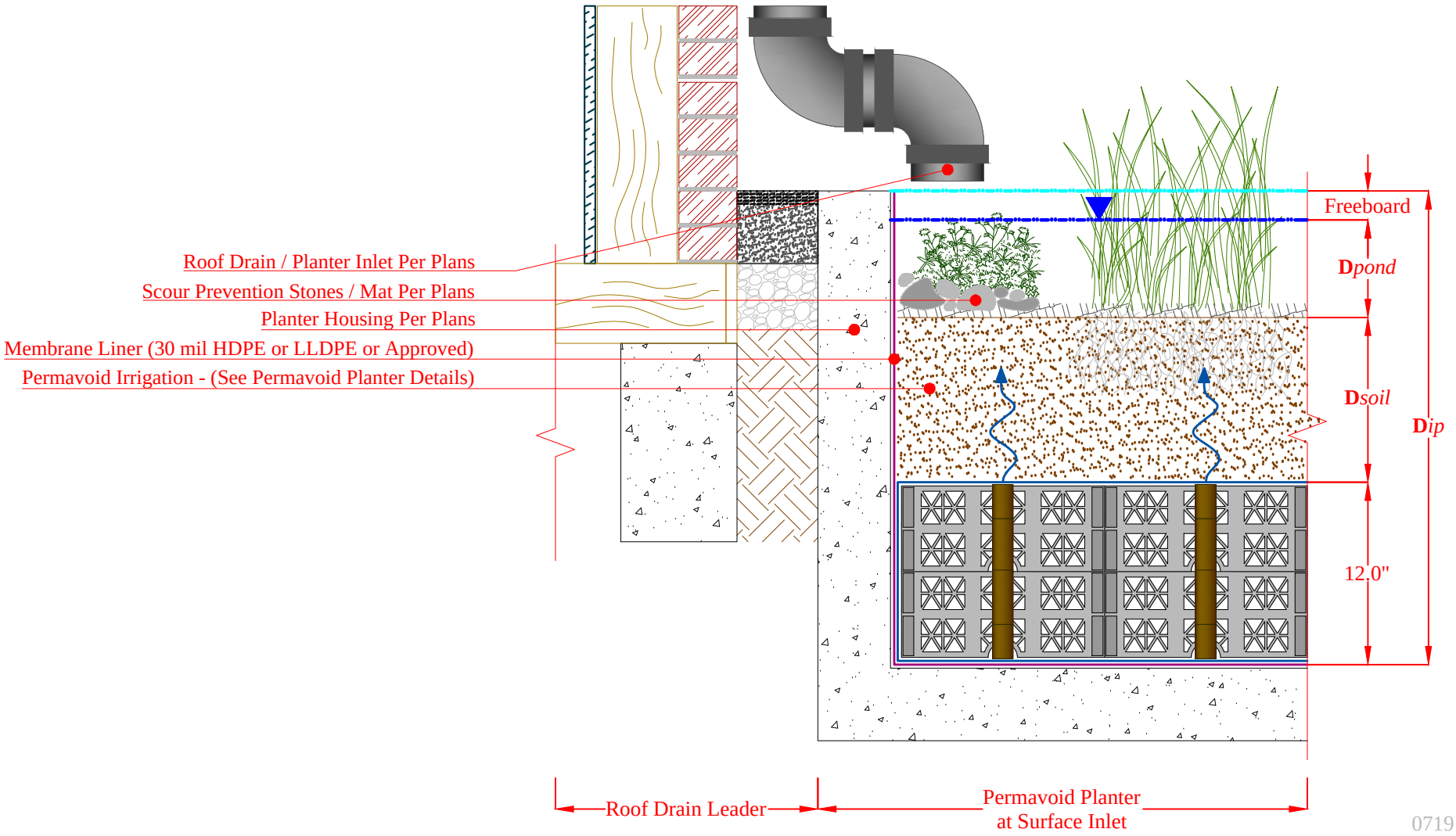
RETENTION / DETENTION	Modular units with 95% void ratio interlock with patented lateral connectors to create a monolithic stormwater management system eliminating the need for end of line ponds and tanks.
PERMEABLE INFILTRATION	The ultra-shallow profile promotes stormwater infiltration over the largest area possible, including under traditional pavements like asphalt and concrete removing the added costs of permeable paving.
STRUCTURAL SUBBASE	The ultra-high strength (104 psi yield) safely and reliably transfers traffic loads to subgrade soils replacing large volumes of hauled subbase stone.
WATER CONVEYANCE	Stormwater is efficiently transported to discharge locations or landscaped areas for natural reuse eliminating drainage and irrigation pipes.
CAPILLARY IRRIGATION	Patented wicking cones employ capillary action to bring stormwater directly to the root zone of landscaped areas while keeping it away from evaporative heat and sunlight for up to 60% savings vs traditional sprinkler irrigation.

Since its introduction ABT Permavoid has revolutionized the way about which stormwater is thought. Its unique capabilities allow even the most challenging developed sites to behave like their natural pre-development counterparts. Whether returned to the community water cycle through infiltration or utilized locally through capillary irrigation, ABT Permavoid promotes the most natural, environmentally friendly methods of managing water. It is the clear choice on sites both large and small when designing sustainable, resilient landscapes that enhance neighborhood aesthetics, mitigate flood risks and during periods of drought, conserve our most precious resource.

ABT, INC.
WWW.ABTDRAINS.COM
PH: (800) 438 - 6057

PERMAVOID INLET DETAIL - PVIOC-109

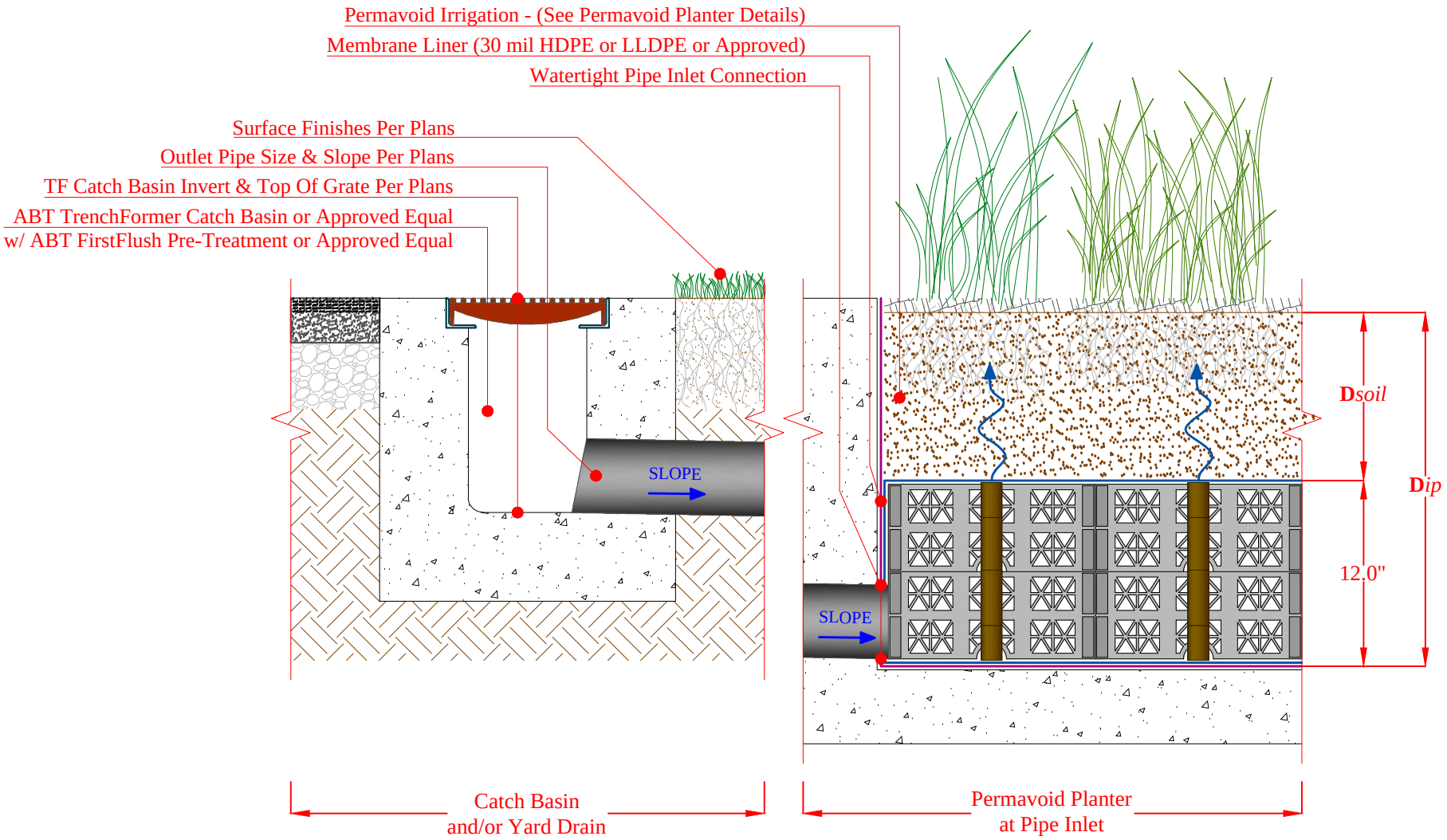
permavoid
THE FOUNDATION FOR OUR FUTURE



ABT, INC.
WWW.ABTDRAINS.COM
PH: (800) 438 - 6057

PERMAVOID INLET DETAIL - PVIOC-101

permavoid
THE FOUNDATION FOR OUR FUTURE

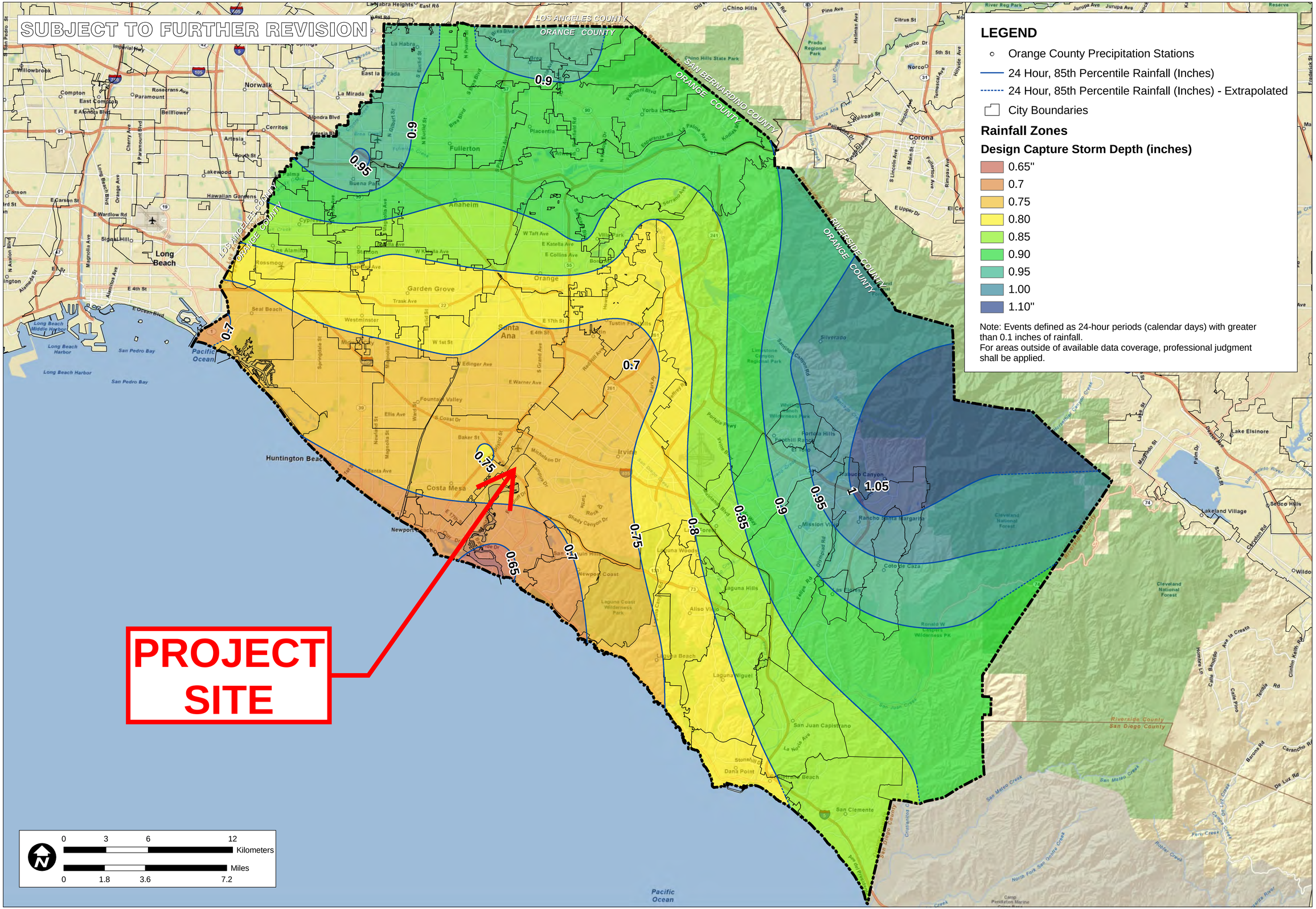


NOTES:
1. All direct pipe connections to Permavoid systems shall have pre-treatment measures to prevent sedimentation such as ABT FirstFlush or approved alternates.
2. Water fed through direct pipe connections to Permavoid is not eligible for biofiltration.

ATTACHMENT C

ORANGE COUNTY RAINFALL ZONES MAP

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.

TITLE: RAINFALL ZONES

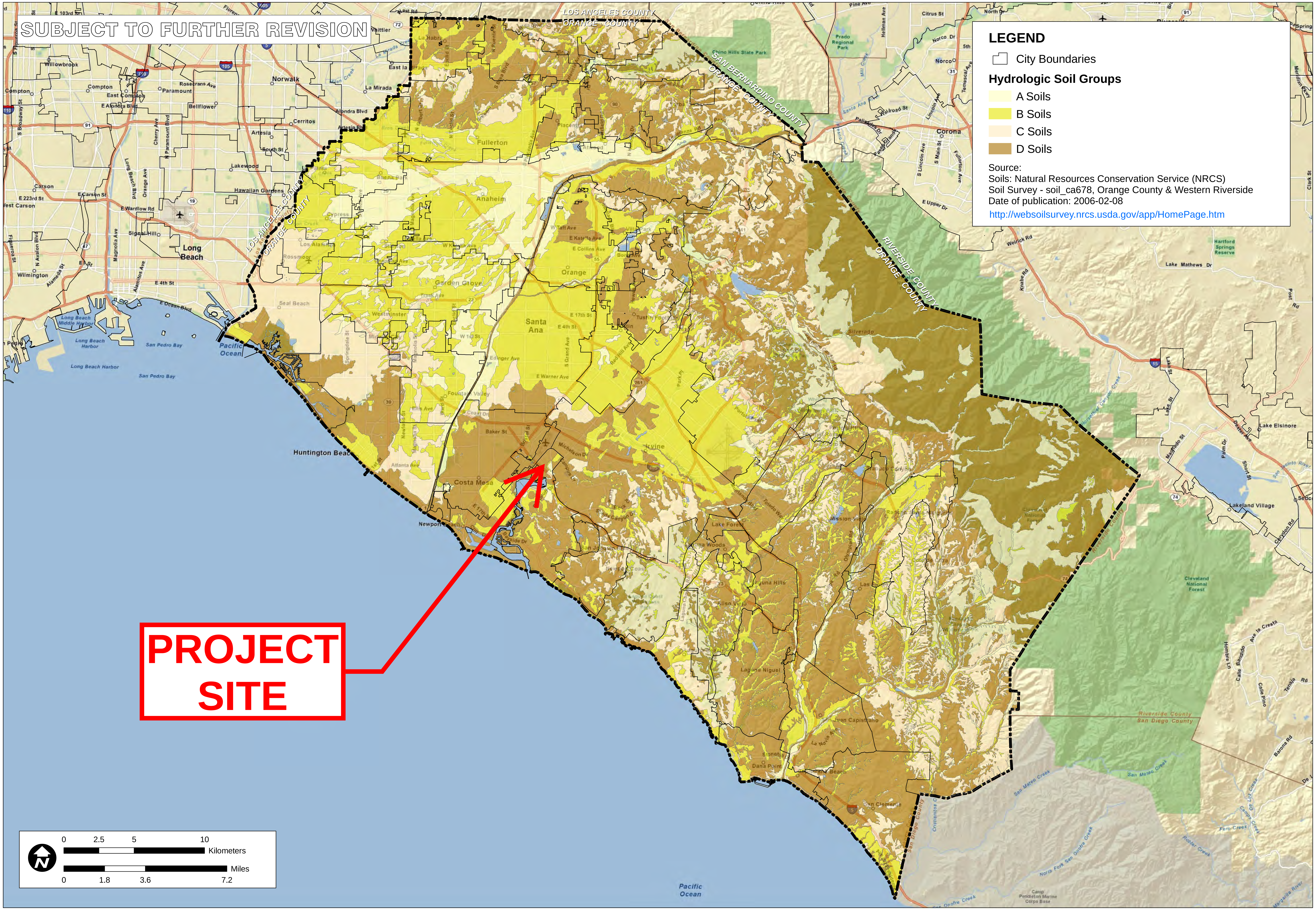
JOB: ORANGE COUNTY TECHNICAL GUIDANCE DOCUMENT — ORANGE CO., CA

SCALE	1" = 1.8 miles
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	04/22/10
JOB NO.	9526-E

PACE Advanced Water Engineering

FIGURE XVI-1

P:\9526E\6-GIS\Mxds\Reports\InfiltrationFeasability_20110215\9526E_FigureXVI-1_RainfallZones_20110215.mxd



TITLE
NRCS HYDROLOGIC SOILS GROUPS

JOB
ORANGE COUNTY INFILTRATION STUDY
ORANGE CO. CA

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

PACE Advanced Water Engineering

FIGURE
XVI-2a

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

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

LOS ANGELES COUNTY
ORANGE COUNTY

SAN BERNARDINO COUNTY
ORANGE COUNTY

RIVERSIDE COUNTY
ORANGE COUNTY

PROJECT SITE

0 2 4 8 Kilometers

0 1.25 2.5 5 Miles

P:\9526E\6-GIS\Mxds\Reports\InfiltrationFeasability_20110215\9526E_FigureXVI-2d_DepthToGroundwaterOverview_20110215.mxd

TITLE
NORTH ORANGE COUNTY
MAPPED DEPTH TO FIRST
GROUNDWATER

JOB
ORANGE COUNTY
INFILTRATION STUDY
ORANGE CO. CA

SCALE	1" = 1.25 miles
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	02/09/11
JOB NO.	9526-E

PACE
Advanced Water Engineering

FIGURE
XVI-2d

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

AnaheimBay-HuntingtonHarbor Watershed

Santa Ana River Watershed

Santa Ana River Watershed

South Orange County

El Modena-Irvine Retarding Basin
Lower Peters Canyon Retarding Basin
Eastfoot Retarding Basin
Orchard Estates Retention Basin
Hicks Canyon Retarding Basin
Rattlesnake Reservoir
East Hicks Canyon Retarding Basin
Siphon Reservoir
Bee Canyon Retarding Basin
Round Canyon Retarding Basin
Trabuco Retarding Basin
Marshburn Retarding Basin
Agua Chinon Retarding Basin
John Wayne Airport
North Lake
South Lake
Basin Number 2
Basin Number 1
Sand Canyon Reservoir
Laguna Reservoir
Bonita Canyon Reservoir
San Joaquin Reservoir
Big Canyon Reservoir
Harbor View Dam
Village Pond Park

PROJECT SITE

0 9,000 18,000 Feet

TITLE: SUSCEPTIBILITY ANALYIS NEWPORT BAY-NEWPORT COASTAL STREAMS

JOB: ORANGE COUNTY WATERSHED MASTER PLANNING ORANGE CO. CA

SCALE	DESIGNED	DRAWING	CHECKED	DATE	JOB NO.
1" = 12000'	TH	TH	BMP	04/30/10	9526-E

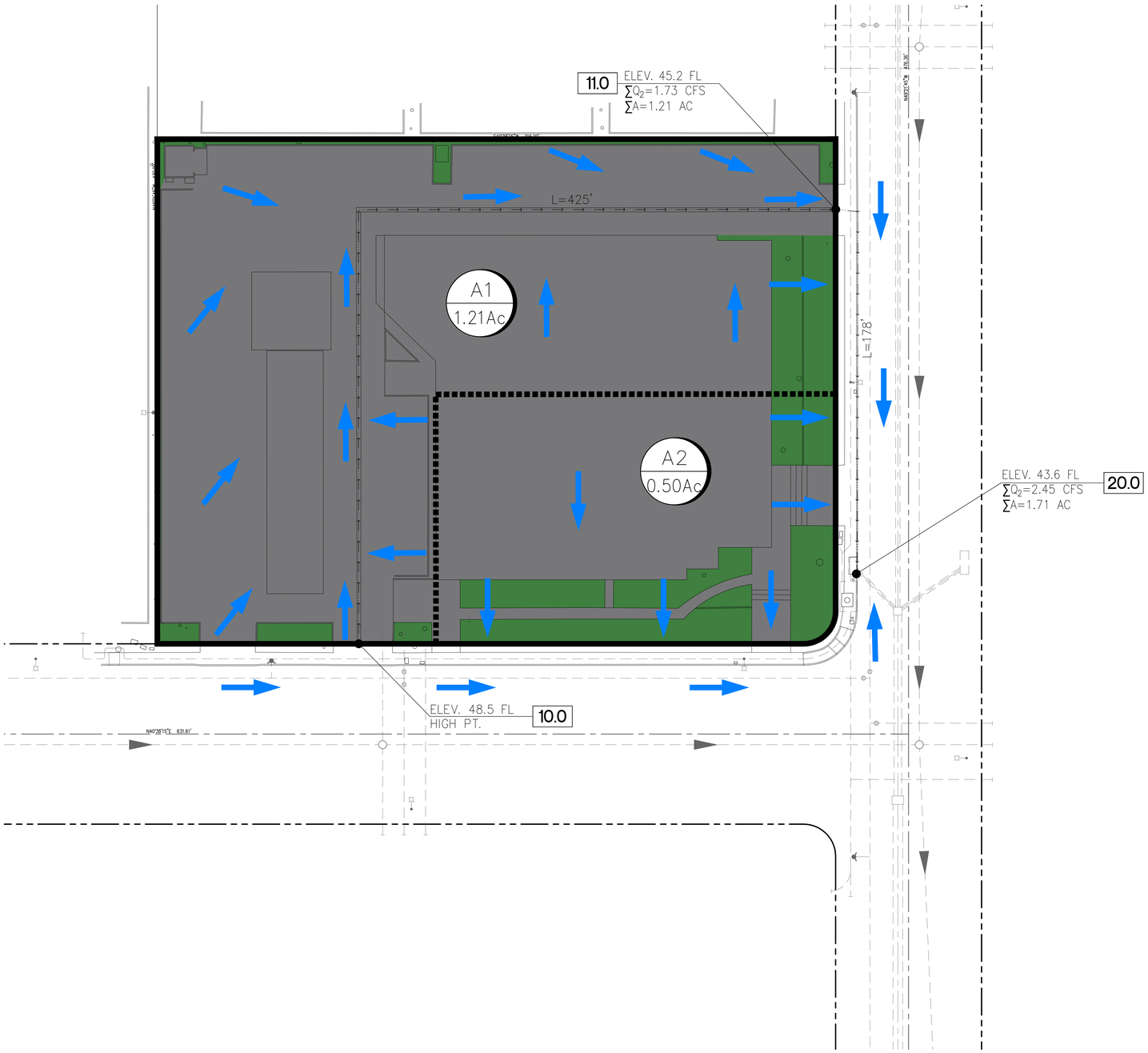
PACE Advanced Water Engineering

FIGURE 4

P:\9526E\6-GIS\Mxds\SucepIobilityMaps_20100505\9526E_NewportBaySucepItbility_20100430.mxd

ATTACHMENT D

Drainage Map and Calculations



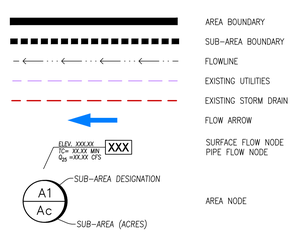
EXISTING CONDITION 2-YEAR STORM			
TOTAL AREA (AC)	PEAK FLOW (CFS)	TC (MINUTES)	VOLUME (CUBIC FT)
1.71	2.45	9.04	6,316

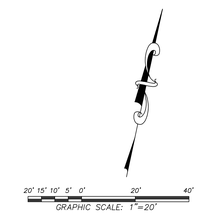
AREA CALCULATIONS:

TOTAL IMPERVIOUS AREA = 64,152 SF = 1.47 AC
TOTAL PERVIOUS AREA = 10,060 SF = 0.24 AC
TOTAL AREA = 74,212 SF = 1.71 AC

PERCENT IMPERVIOUS: 86.4%
PERCENT PERVIOUS: 13.6%

LEGEND

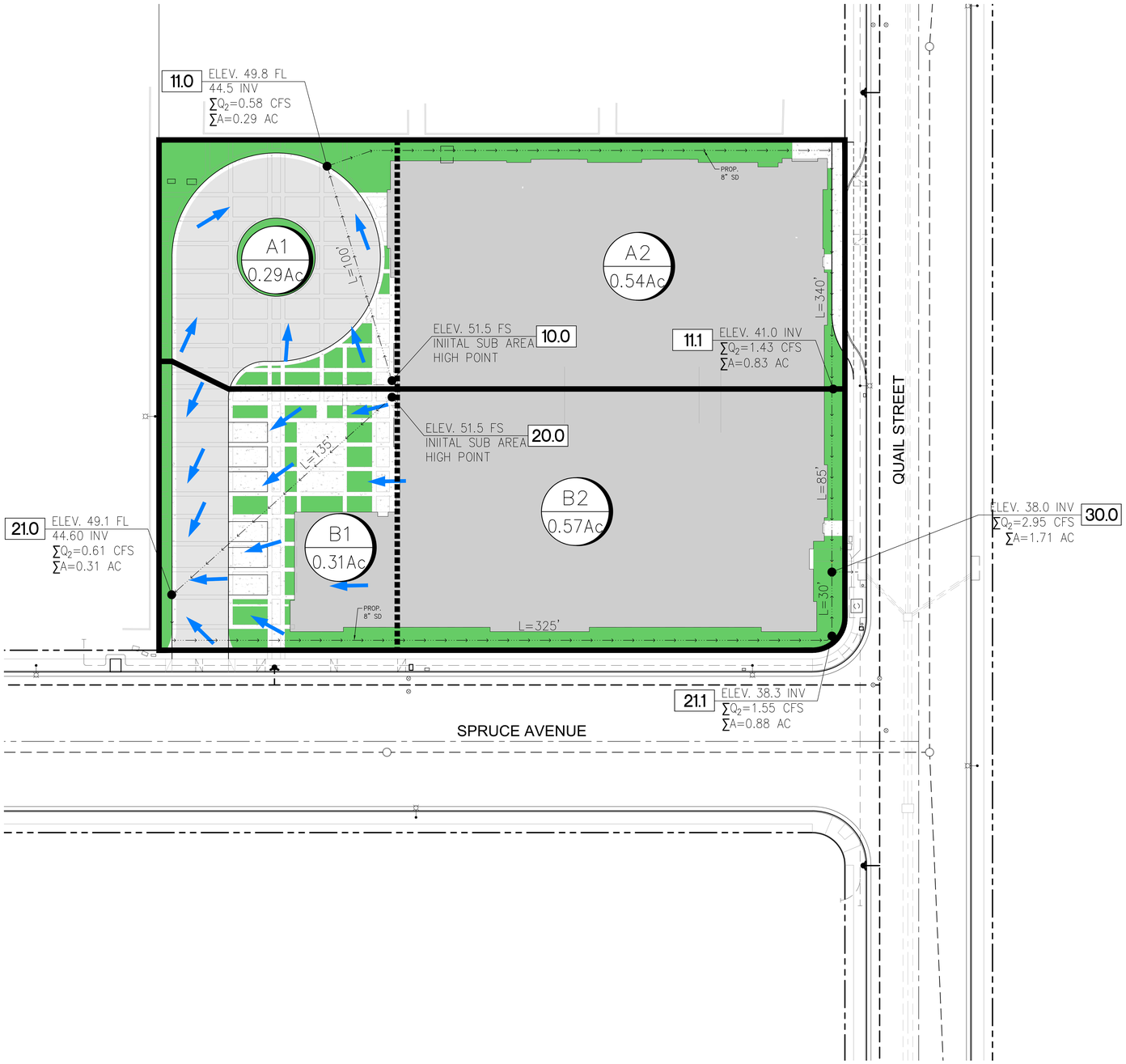




PREPARED BY:
ADAMS STREETER
Civil Engineers
16755 Von Karman, Suite 150, Irvine, CA 92606 | 949.474.2330 | adams-streeter.com

1401 QUAIL STREET
PRE-CONSTRUCTION
HYDROLOGY MAP

SHEET 1 OF 2



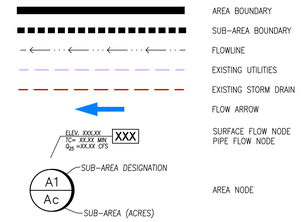
DEVELOPED CONDITION 2–YEAR STORM			
TOTAL AREA (AC)	PEAK FLOW (CFS)	TC (MINUTES)	VOLUME (CUBIC FT)
1.71	2.95	6.3	6,011

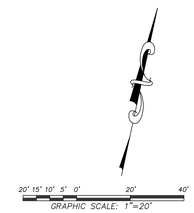
AREA CALCULATIONS:

TOTAL IMPERVIOUS AREA = 62,043 SF = 1.42 AC
TOTAL PERVIOUS AREA = 12,169 SF = 0.29 AC
TOTAL AREA = 74,212 SF = 1.71 AC

PERCENT IMPERVIOUS: 83.6%
PERCENT PERVIOUS: 16.4%

LEGEND





PREPARED BY:
ADAMS STREETER
Civil Engineers
16755 Von Karman, Suite 150, Irvine, CA 92606 | 949.474.2330 | adams-streeter.com

1401 QUAIL STREET POST-CONSTRUCTION HYDROLOGY MAP

SHEET 2 OF 2

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
       (c) Copyright 1983-2008 Advanced Engineering Software (aes)
          Ver. 15.0  Release Date: 04/01/2008  License ID 1204

 ************************* DESCRIPTION OF STUDY *************************
* PRE-DEVELOPMENT                                          *
* 2 YEAR STORM ANALYSIS                                      *
* 22-2434 QUAIL 1401                                       *
 **************************************************************************

  FILE NAME: 2434E.DAT
  TIME/DATE OF STUDY: 10:21 12/13/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
              --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
    HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
    WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)    (FT)   SIDE / SIDE/ WAY    (FT)   (FT)  (FT)  (FT)    (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:
    1. Relative Flow-Depth =  0.00 FEET
      as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *PIPE MAY BE SIZED TO HAVE A FLOW CAPACITY LESS THAN
   UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
--------------------------------------------------------------------------
```

```
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   425.00
 ELEVATION DATA: UPSTREAM(FEET) =     48.50  DOWNSTREAM(FEET) =     45.20

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.041
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.611
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/     SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL               D       1.21     0.20     0.100    57    9.04
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.73
 TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      1.73

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.04
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.611
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/     SCS SOIL   AREA      Fp        Ap     SCS
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL               D       0.50     0.20     0.100    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.50     SUBAREA RUNOFF(CFS) =    0.72
 EFFECTIVE AREA(ACRES) =      1.71   AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =       1.7      PEAK FLOW RATE(CFS) =      2.45
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       1.7  TC(MIN.) =     9.04
 EFFECTIVE AREA(ACRES) =      1.71  AREA-AVERAGED Fm(INCH/HR)=  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
 PEAK FLOW RATE(CFS)   =      2.45
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
         (C) Copyright 1989-2008 Advanced Engineering Software (aes)
             Ver. 15.0  Release Date: 04/01/2008  License ID 1204

                          Analysis prepared by:

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  PRE-DEVELOPMENT HYDROGRAPH
  2 YEAR STORM ANALYSIS
  22-2434 QUAIL 1401
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.71
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.020
    LOW LOSS FRACTION = 0.250
    TIME OF CONCENTRATION(MIN.) =  9.04
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

--------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.22
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.07

**************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------
  0.03      0.0000      0.00  Q         .         .         .         .
  0.18      0.0002      0.04  Q         .         .         .         .
  0.33      0.0007      0.04  Q         .         .         .         .
  0.48      0.0012      0.04  Q         .         .         .         .
  0.63      0.0016      0.04  Q         .         .         .         .
  0.78      0.0021      0.04  Q         .         .         .         .
  0.93      0.0026      0.04  Q         .         .         .         .
  1.08      0.0030      0.04  Q         .         .         .         .
  1.23      0.0035      0.04  Q         .         .         .         .
  1.39      0.0040      0.04  Q         .         .         .         .
  1.54      0.0045      0.04  Q         .         .         .         .
  1.69      0.0050      0.04  Q         .         .         .         .
  1.84      0.0055      0.04  Q         .         .         .         .
  1.99      0.0060      0.04  Q         .         .         .         .
```

2.14	0.0065	0.04	Q	.	.	.	.
2.29	0.0070	0.04	Q	.	.	.	.
2.44	0.0075	0.04	Q	.	.	.	.
2.59	0.0080	0.04	Q	.	.	.	.
2.74	0.0085	0.04	Q	.	.	.	.
2.89	0.0090	0.04	Q	.	.	.	.
3.04	0.0095	0.04	Q	.	.	.	.
3.19	0.0101	0.04	Q	.	.	.	.
3.34	0.0106	0.04	Q	.	.	.	.
3.49	0.0111	0.04	Q	.	.	.	.
3.65	0.0116	0.04	Q	.	.	.	.
3.80	0.0122	0.04	Q	.	.	.	.
3.95	0.0127	0.04	Q	.	.	.	.
4.10	0.0133	0.04	Q	.	.	.	.
4.25	0.0138	0.04	Q	.	.	.	.
4.40	0.0144	0.04	Q	.	.	.	.
4.55	0.0149	0.05	Q	.	.	.	.
4.70	0.0155	0.05	Q	.	.	.	.
4.85	0.0161	0.05	Q	.	.	.	.
5.00	0.0167	0.05	Q	.	.	.	.
5.15	0.0172	0.05	Q	.	.	.	.
5.30	0.0178	0.05	Q	.	.	.	.
5.45	0.0184	0.05	Q	.	.	.	.
5.60	0.0190	0.05	Q	.	.	.	.
5.75	0.0196	0.05	Q	.	.	.	.
5.91	0.0202	0.05	Q	.	.	.	.
6.06	0.0208	0.05	Q	.	.	.	.
6.21	0.0214	0.05	Q	.	.	.	.
6.36	0.0221	0.05	Q	.	.	.	.
6.51	0.0227	0.05	Q	.	.	.	.
6.66	0.0233	0.05	Q	.	.	.	.
6.81	0.0240	0.05	Q	.	.	.	.
6.96	0.0246	0.05	Q	.	.	.	.
7.11	0.0253	0.05	Q	.	.	.	.
7.26	0.0259	0.05	Q	.	.	.	.
7.41	0.0266	0.05	Q	.	.	.	.
7.56	0.0273	0.05	Q	.	.	.	.
7.71	0.0280	0.06	Q	.	.	.	.
7.86	0.0286	0.06	Q	.	.	.	.
8.01	0.0293	0.06	Q	.	.	.	.
8.17	0.0300	0.06	Q	.	.	.	.
8.32	0.0308	0.06	Q	.	.	.	.
8.47	0.0315	0.06	Q	.	.	.	.
8.62	0.0322	0.06	Q	.	.	.	.
8.77	0.0330	0.06	Q	.	.	.	.
8.92	0.0337	0.06	Q	.	.	.	.
9.07	0.0345	0.06	Q	.	.	.	.
9.22	0.0353	0.06	Q	.	.	.	.
9.37	0.0360	0.06	Q	.	.	.	.
9.52	0.0368	0.06	Q	.	.	.	.
9.67	0.0376	0.06	Q	.	.	.	.
9.82	0.0385	0.07	Q	.	.	.	.
9.97	0.0393	0.07	Q	.	.	.	.
10.12	0.0401	0.07	Q	.	.	.	.
10.27	0.0410	0.07	Q	.	.	.	.
10.43	0.0418	0.07	Q	.	.	.	.
10.58	0.0427	0.07	Q	.	.	.	.

10.73	0.0436	0.07	Q	.	.	.	.
10.88	0.0445	0.07	Q	.	.	.	.
11.03	0.0455	0.08	Q	.	.	.	.
11.18	0.0464	0.08	Q	.	.	.	.
11.33	0.0474	0.08	Q	.	.	.	.
11.48	0.0484	0.08	Q	.	.	.	.
11.63	0.0494	0.08	Q	.	.	.	.
11.78	0.0504	0.08	Q	.	.	.	.
11.93	0.0515	0.09	Q	.	.	.	.
12.08	0.0525	0.09	Q	.	.	.	.
12.23	0.0538	0.11	Q	.	.	.	.
12.38	0.0552	0.12	Q	.	.	.	.
12.53	0.0567	0.12	Q	.	.	.	.
12.69	0.0582	0.12	Q	.	.	.	.
12.84	0.0598	0.13	Q	.	.	.	.
12.99	0.0614	0.13	Q	.	.	.	.
13.14	0.0631	0.14	Q	.	.	.	.
13.29	0.0648	0.14	Q	.	.	.	.
13.44	0.0666	0.15	Q	.	.	.	.
13.59	0.0684	0.15	Q	.	.	.	.
13.74	0.0704	0.16	Q	.	.	.	.
13.89	0.0724	0.16	Q	.	.	.	.
14.04	0.0745	0.17	Q	.	.	.	.
14.19	0.0767	0.19	Q	.	.	.	.
14.34	0.0791	0.20	Q	.	.	.	.
14.49	0.0817	0.21	Q	.	.	.	.
14.64	0.0843	0.22	Q	.	.	.	.
14.79	0.0872	0.23	Q	.	.	.	.
14.95	0.0902	0.26	.Q	.	.	.	.
15.10	0.0935	0.27	.Q	.	.	.	.
15.25	0.0971	0.31	.Q	.	.	.	.
15.40	0.1011	0.33	.Q	.	.	.	.
15.55	0.1053	0.34	.Q	.	.	.	.
15.70	0.1098	0.39	.Q	.	.	.	.
15.85	0.1158	0.58	. Q	.	.	.	.
16.00	0.1244	0.80	. Q	.	.	.	.
16.15	0.1446	2.45	.	Q.	.	.	.
16.30	0.1627	0.46	.Q	.	.	.	.
16.45	0.1676	0.32	.Q	.	.	.	.
16.60	0.1714	0.29	.Q	.	.	.	.
16.75	0.1747	0.24	Q	.	.	.	.
16.90	0.1776	0.22	Q	.	.	.	.
17.05	0.1801	0.19	Q	.	.	.	.
17.21	0.1824	0.17	Q	.	.	.	.
17.36	0.1844	0.15	Q	.	.	.	.
17.51	0.1862	0.14	Q	.	.	.	.
17.66	0.1880	0.13	Q	.	.	.	.
17.81	0.1896	0.13	Q	.	.	.	.
17.96	0.1911	0.12	Q	.	.	.	.
18.11	0.1925	0.11	Q	.	.	.	.
18.26	0.1937	0.08	Q	.	.	.	.
18.41	0.1947	0.08	Q	.	.	.	.
18.56	0.1957	0.08	Q	.	.	.	.
18.71	0.1967	0.07	Q	.	.	.	.
18.86	0.1976	0.07	Q	.	.	.	.
19.01	0.1985	0.07	Q	.	.	.	.
19.16	0.1993	0.07	Q	.	.	.	.

19.31	0.2002	0.07	Q	.	.	.	.
19.47	0.2010	0.06	Q	.	.	.	.
19.62	0.2017	0.06	Q	.	.	.	.
19.77	0.2025	0.06	Q	.	.	.	.
19.92	0.2032	0.06	Q	.	.	.	.
20.07	0.2040	0.06	Q	.	.	.	.
20.22	0.2047	0.06	Q	.	.	.	.
20.37	0.2054	0.05	Q	.	.	.	.
20.52	0.2060	0.05	Q	.	.	.	.
20.67	0.2067	0.05	Q	.	.	.	.
20.82	0.2074	0.05	Q	.	.	.	.
20.97	0.2080	0.05	Q	.	.	.	.
21.12	0.2086	0.05	Q	.	.	.	.
21.27	0.2092	0.05	Q	.	.	.	.
21.42	0.2098	0.05	Q	.	.	.	.
21.57	0.2104	0.05	Q	.	.	.	.
21.73	0.2110	0.05	Q	.	.	.	.
21.88	0.2116	0.05	Q	.	.	.	.
22.03	0.2121	0.04	Q	.	.	.	.
22.18	0.2127	0.04	Q	.	.	.	.
22.33	0.2132	0.04	Q	.	.	.	.
22.48	0.2138	0.04	Q	.	.	.	.
22.63	0.2143	0.04	Q	.	.	.	.
22.78	0.2148	0.04	Q	.	.	.	.
22.93	0.2153	0.04	Q	.	.	.	.
23.08	0.2158	0.04	Q	.	.	.	.
23.23	0.2163	0.04	Q	.	.	.	.
23.38	0.2168	0.04	Q	.	.	.	.
23.53	0.2173	0.04	Q	.	.	.	.
23.68	0.2178	0.04	Q	.	.	.	.
23.83	0.2182	0.04	Q	.	.	.	.
23.99	0.2187	0.04	Q	.	.	.	.
24.14	0.2192	0.04	Q	.	.	.	.
24.29	0.2194	0.00	Q	.	.	.	.

```
**************************************************************************
          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
       (c) Copyright 1983-2008 Advanced Engineering Software (aes)
          Ver. 15.0  Release Date: 04/01/2008  License ID 1204

                    Analysis prepared by:

 ************************* DESCRIPTION OF STUDY *************************
* POST-DEVELOPMENT                                                      *
* 2 YEAR STORM ANALYSIS                                                 *
* 22-2434 QUAIL 1401                                                    *
 ************************************************************************

  FILE NAME: 2434P.DAT
  TIME/DATE OF STUDY: 17:40 12/12/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
              --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   3.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
    HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
    WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)    (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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:
    1. Relative Flow-Depth =  0.00 FEET
      as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *PIPE MAY BE SIZED TO HAVE A FLOW CAPACITY LESS THAN
   UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
```

```
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 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) =     51.50  DOWNSTREAM(FEET) =     49.80

 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  I ):
  DEVELOPMENT TYPE/     SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS               D       0.29      0.20     0.200    57    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      0.58
 TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.58

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.10 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    44.50  DOWNSTREAM(FEET) =    41.00
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.011
 DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.87
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.58
 PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =    6.46
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     11.10 =     440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.10 TO NODE     11.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.46
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.954
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/     SCS SOIL   AREA      Fp        Ap     SCS
```

```
    LAND USE          GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS             D       0.54     0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    0.54     SUBAREA RUNOFF(CFS) =    0.93
 EFFECTIVE AREA(ACRES) =      0.83   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       0.8      PEAK FLOW RATE(CFS) =       1.43

****************************************************************************
 FLOW PROCESS FROM NODE     11.10 TO NODE     30.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    41.00  DOWNSTREAM(FEET) =    38.00
 FLOW LENGTH(FEET) =    84.00   MANNING'S N =  0.010
 DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.24
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.43
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    6.63
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =     524.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   135.00
 ELEVATION DATA: UPSTREAM(FEET) =     51.50  DOWNSTREAM(FEET) =     49.10
```

```
 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.161
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.223
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/     SCS SOIL   AREA     Fp       Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS              D       0.31     0.20     0.200    57    5.16
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      0.61
 TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      0.61

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.10 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    44.60  DOWNSTREAM(FEET) =    38.30
 FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.010
 DEPTH OF FLOW IN   8.0 INCH PIPE IS   2.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.26
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.61
 PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =    6.19
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     21.10 =     460.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.10 TO NODE     21.10 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.19
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.002
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/     SCS SOIL   AREA     Fp       Ap     SCS
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS              D       0.57     0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    0.57     SUBAREA RUNOFF(CFS) =    1.01
 EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
```

```
 TOTAL AREA(ACRES) =       0.9      PEAK FLOW RATE(CFS) =      1.55

****************************************************************************
 FLOW PROCESS FROM NODE     21.10 TO NODE     30.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    38.30  DOWNSTREAM(FEET) =    38.00
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.010
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.45
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      1.55
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.30
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =     490.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM      Q     Tc   Intensity   Fp(Fm)    Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1       1.55    6.30    1.982  0.20( 0.04) 0.20      0.9     20.00
 LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =     490.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM      Q     Tc   Intensity   Fp(Fm)    Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1       1.43    6.63    1.925  0.20( 0.04) 0.20      0.8     10.00
 LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =     524.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM      Q     Tc   Intensity   Fp(Fm)    Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)        (ACRES)    NODE
    1       2.95    6.30    1.982  0.20( 0.04) 0.20      1.7     20.00
    2       2.94    6.63    1.925  0.20( 0.04) 0.20      1.7     10.00
   TOTAL AREA(ACRES) =        1.7

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

PEAK FLOW RATE(CFS) = 2.95 Tc(MIN.) = 6.303
EFFECTIVE AREA(ACRES) = 1.67 AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 1.7
LONGEST FLOWPATH FROM NODE 10.00 TO NODE 30.00 = 524.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 1.7 TC(MIN.) = 6.30
EFFECTIVE AREA(ACRES) = 1.67 AREA-AVERAGED Fm(INCH/HR)= 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.200
PEAK FLOW RATE(CFS) = 2.95

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2.95	6.30	1.982	0.20(0.04)	0.20	1.7	20.00
2	2.94	6.63	1.925	0.20(0.04)	0.20	1.7	10.00

==========

==========

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
                    SMALL AREA UNIT HYDROGRAPH MODEL
==========================================================================
         (C) Copyright 1989-2008 Advanced Engineering Software (aes)
             Ver. 15.0  Release Date: 04/01/2008  License ID 1204

                          Analysis prepared by:




**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  POST-DEVELOPMENT HYDROGRAPH
  2 YEAR STORM ANALYSIS
  22-2434 QUAIL 1401
--------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    1.71
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.040
    LOW LOSS FRACTION = 0.250
    TIME OF CONCENTRATION(MIN.) =  6.30
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

--------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.21
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.08

**************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------
  0.04      0.0000      0.00  Q         .         .         .         .
  0.14      0.0002      0.04  Q         .         .         .         .
  0.25      0.0005      0.04  Q         .         .         .         .
  0.35      0.0008      0.04  Q         .         .         .         .
  0.46      0.0011      0.04  Q         .         .         .         .
  0.56      0.0015      0.04  Q         .         .         .         .
  0.67      0.0018      0.04  Q         .         .         .         .
  0.77      0.0021      0.04  Q         .         .         .         .
  0.88      0.0024      0.04  Q         .         .         .         .
```

0.98	0.0028	0.04	Q	.	.	.	.
1.09	0.0031	0.04	Q	.	.	.	.
1.19	0.0034	0.04	Q	.	.	.	.
1.30	0.0038	0.04	Q	.	.	.	.
1.40	0.0041	0.04	Q	.	.	.	.
1.51	0.0045	0.04	Q	.	.	.	.
1.61	0.0048	0.04	Q	.	.	.	.
1.72	0.0051	0.04	Q	.	.	.	.
1.82	0.0055	0.04	Q	.	.	.	.
1.93	0.0058	0.04	Q	.	.	.	.
2.03	0.0062	0.04	Q	.	.	.	.
2.14	0.0065	0.04	Q	.	.	.	.
2.24	0.0069	0.04	Q	.	.	.	.
2.35	0.0072	0.04	Q	.	.	.	.
2.45	0.0076	0.04	Q	.	.	.	.
2.56	0.0079	0.04	Q	.	.	.	.
2.66	0.0083	0.04	Q	.	.	.	.
2.77	0.0086	0.04	Q	.	.	.	.
2.87	0.0090	0.04	Q	.	.	.	.
2.98	0.0094	0.04	Q	.	.	.	.
3.08	0.0097	0.04	Q	.	.	.	.
3.19	0.0101	0.04	Q	.	.	.	.
3.29	0.0105	0.04	Q	.	.	.	.
3.40	0.0108	0.04	Q	.	.	.	.
3.50	0.0112	0.04	Q	.	.	.	.
3.61	0.0116	0.04	Q	.	.	.	.
3.71	0.0119	0.04	Q	.	.	.	.
3.82	0.0123	0.04	Q	.	.	.	.
3.92	0.0127	0.04	Q	.	.	.	.
4.03	0.0131	0.04	Q	.	.	.	.
4.13	0.0135	0.04	Q	.	.	.	.
4.24	0.0139	0.04	Q	.	.	.	.
4.34	0.0142	0.04	Q	.	.	.	.
4.45	0.0146	0.05	Q	.	.	.	.
4.55	0.0150	0.05	Q	.	.	.	.
4.66	0.0154	0.05	Q	.	.	.	.
4.76	0.0158	0.05	Q	.	.	.	.
4.87	0.0162	0.05	Q	.	.	.	.
4.97	0.0166	0.05	Q	.	.	.	.
5.08	0.0170	0.05	Q	.	.	.	.
5.18	0.0174	0.05	Q	.	.	.	.
5.29	0.0178	0.05	Q	.	.	.	.
5.39	0.0182	0.05	Q	.	.	.	.
5.50	0.0187	0.05	Q	.	.	.	.
5.61	0.0191	0.05	Q	.	.	.	.
5.71	0.0195	0.05	Q	.	.	.	.
5.82	0.0199	0.05	Q	.	.	.	.
5.92	0.0203	0.05	Q	.	.	.	.
6.02	0.0208	0.05	Q	.	.	.	.
6.13	0.0212	0.05	Q	.	.	.	.
6.23	0.0216	0.05	Q	.	.	.	.
6.34	0.0221	0.05	Q	.	.	.	.
6.44	0.0225	0.05	Q	.	.	.	.
6.55	0.0229	0.05	Q	.	.	.	.
6.65	0.0234	0.05	Q	.	.	.	.
6.76	0.0238	0.05	Q	.	.	.	.
6.86	0.0243	0.05	Q	.	.	.	.

6.97	0.0247	0.05	Q	.	.	.	.
7.07	0.0252	0.05	Q	.	.	.	.
7.18	0.0257	0.05	Q	.	.	.	.
7.28	0.0261	0.05	Q	.	.	.	.
7.39	0.0266	0.05	Q	.	.	.	.
7.49	0.0271	0.05	Q	.	.	.	.
7.60	0.0275	0.05	Q	.	.	.	.
7.70	0.0280	0.06	Q	.	.	.	.
7.81	0.0285	0.06	Q	.	.	.	.
7.91	0.0290	0.06	Q	.	.	.	.
8.02	0.0295	0.06	Q	.	.	.	.
8.12	0.0300	0.06	Q	.	.	.	.
8.23	0.0305	0.06	Q	.	.	.	.
8.34	0.0310	0.06	Q	.	.	.	.
8.44	0.0315	0.06	Q	.	.	.	.
8.55	0.0320	0.06	Q	.	.	.	.
8.65	0.0325	0.06	Q	.	.	.	.
8.76	0.0330	0.06	Q	.	.	.	.
8.86	0.0335	0.06	Q	.	.	.	.
8.96	0.0341	0.06	Q	.	.	.	.
9.07	0.0346	0.06	Q	.	.	.	.
9.18	0.0351	0.06	Q	.	.	.	.
9.28	0.0357	0.06	Q	.	.	.	.
9.38	0.0362	0.06	Q	.	.	.	.
9.49	0.0368	0.06	Q	.	.	.	.
9.60	0.0373	0.07	Q	.	.	.	.
9.70	0.0379	0.07	Q	.	.	.	.
9.80	0.0385	0.07	Q	.	.	.	.
9.91	0.0391	0.07	Q	.	.	.	.
10.01	0.0396	0.07	Q	.	.	.	.
10.12	0.0402	0.07	Q	.	.	.	.
10.23	0.0408	0.07	Q	.	.	.	.
10.33	0.0414	0.07	Q	.	.	.	.
10.43	0.0420	0.07	Q	.	.	.	.
10.54	0.0427	0.07	Q	.	.	.	.
10.65	0.0433	0.07	Q	.	.	.	.
10.75	0.0439	0.07	Q	.	.	.	.
10.85	0.0446	0.07	Q	.	.	.	.
10.96	0.0452	0.08	Q	.	.	.	.
11.06	0.0459	0.08	Q	.	.	.	.
11.17	0.0465	0.08	Q	.	.	.	.
11.27	0.0472	0.08	Q	.	.	.	.
11.38	0.0479	0.08	Q	.	.	.	.
11.48	0.0486	0.08	Q	.	.	.	.
11.59	0.0493	0.08	Q	.	.	.	.
11.70	0.0500	0.08	Q	.	.	.	.
11.80	0.0507	0.08	Q	.	.	.	.
11.90	0.0515	0.09	Q	.	.	.	.
12.01	0.0522	0.09	Q	.	.	.	.
12.11	0.0531	0.11	Q	.	.	.	.
12.22	0.0540	0.11	Q	.	.	.	.
12.32	0.0549	0.11	Q	.	.	.	.
12.43	0.0559	0.11	Q	.	.	.	.
12.53	0.0569	0.11	Q	.	.	.	.
12.64	0.0579	0.12	Q	.	.	.	.
12.74	0.0589	0.12	Q	.	.	.	.
12.85	0.0599	0.12	Q	.	.	.	.

12.95	0.0610	0.12	Q	.	.	.	.
13.06	0.0620	0.12	Q	.	.	.	.
13.16	0.0631	0.13	Q	.	.	.	.
13.27	0.0642	0.13	Q	.	.	.	.
13.38	0.0654	0.13	Q	.	.	.	.
13.48	0.0665	0.13	Q	.	.	.	.
13.59	0.0677	0.14	Q	.	.	.	.
13.69	0.0689	0.14	Q	.	.	.	.
13.80	0.0702	0.15	Q	.	.	.	.
13.90	0.0714	0.15	Q	.	.	.	.
14.01	0.0727	0.15	Q	.	.	.	.
14.11	0.0741	0.16	Q	.	.	.	.
14.22	0.0755	0.17	Q	.	.	.	.
14.32	0.0770	0.17	Q	.	.	.	.
14.43	0.0785	0.18	Q	.	.	.	.
14.53	0.0801	0.18	Q	.	.	.	.
14.63	0.0817	0.20	Q	.	.	.	.
14.74	0.0835	0.20	Q	.	.	.	.
14.85	0.0853	0.22	Q	.	.	.	.
14.95	0.0872	0.23	Q	.	.	.	.
15.05	0.0893	0.25	Q	.	.	.	.
15.16	0.0914	0.26	.Q	.	.	.	.
15.27	0.0938	0.29	.Q	.	.	.	.
15.37	0.0964	0.30	.Q	.	.	.	.
15.48	0.0990	0.29	.Q	.	.	.	.
15.58	0.1016	0.32	.Q	.	.	.	.
15.68	0.1047	0.40	.Q	.	.	.	.
15.79	0.1085	0.47	.Q	.	.	.	.
15.90	0.1135	0.69	. Q	.	.	.	.
16.00	0.1207	0.96	. Q	.	.	.	.
16.10	0.1379	3.00	.	. Q	.	.	.
16.21	0.1533	0.55	. Q	.	.	.	.
16.32	0.1572	0.35	.Q	.	.	.	.
16.42	0.1601	0.30	.Q	.	.	.	.
16.52	0.1625	0.27	.Q	.	.	.	.
16.63	0.1647	0.24	Q	.	.	.	.
16.73	0.1667	0.21	Q	.	.	.	.
16.84	0.1684	0.19	Q	.	.	.	.
16.94	0.1700	0.18	Q	.	.	.	.
17.05	0.1714	0.16	Q	.	.	.	.
17.16	0.1728	0.15	Q	.	.	.	.
17.26	0.1741	0.14	Q	.	.	.	.
17.36	0.1753	0.14	Q	.	.	.	.
17.47	0.1764	0.13	Q	.	.	.	.
17.58	0.1776	0.13	Q	.	.	.	.
17.68	0.1786	0.12	Q	.	.	.	.
17.78	0.1797	0.12	Q	.	.	.	.
17.89	0.1807	0.11	Q	.	.	.	.
17.99	0.1816	0.11	Q	.	.	.	.
18.10	0.1825	0.09	Q	.	.	.	.
18.20	0.1832	0.08	Q	.	.	.	.
18.31	0.1840	0.08	Q	.	.	.	.
18.42	0.1847	0.08	Q	.	.	.	.
18.52	0.1854	0.08	Q	.	.	.	.
18.62	0.1860	0.08	Q	.	.	.	.
18.73	0.1867	0.07	Q	.	.	.	.
18.83	0.1873	0.07	Q	.	.	.	.

18.94	0.1879	0.07	Q	.	.	.	.
19.05	0.1885	0.07	Q	.	.	.	.
19.15	0.1891	0.07	Q	.	.	.	.
19.26	0.1897	0.07	Q	.	.	.	.
19.36	0.1903	0.06	Q	.	.	.	.
19.47	0.1908	0.06	Q	.	.	.	.
19.57	0.1914	0.06	Q	.	.	.	.
19.67	0.1919	0.06	Q	.	.	.	.
19.78	0.1924	0.06	Q	.	.	.	.
19.89	0.1929	0.06	Q	.	.	.	.
19.99	0.1934	0.06	Q	.	.	.	.
20.09	0.1939	0.06	Q	.	.	.	.
20.20	0.1944	0.06	Q	.	.	.	.
20.31	0.1949	0.06	Q	.	.	.	.
20.41	0.1954	0.05	Q	.	.	.	.
20.52	0.1959	0.05	Q	.	.	.	.
20.62	0.1963	0.05	Q	.	.	.	.
20.73	0.1968	0.05	Q	.	.	.	.
20.83	0.1972	0.05	Q	.	.	.	.
20.93	0.1977	0.05	Q	.	.	.	.
21.04	0.1981	0.05	Q	.	.	.	.
21.14	0.1985	0.05	Q	.	.	.	.
21.25	0.1989	0.05	Q	.	.	.	.
21.36	0.1994	0.05	Q	.	.	.	.
21.46	0.1998	0.05	Q	.	.	.	.
21.57	0.2002	0.05	Q	.	.	.	.
21.67	0.2006	0.05	Q	.	.	.	.
21.77	0.2010	0.05	Q	.	.	.	.
21.88	0.2014	0.05	Q	.	.	.	.
21.98	0.2018	0.04	Q	.	.	.	.
22.09	0.2022	0.04	Q	.	.	.	.
22.19	0.2025	0.04	Q	.	.	.	.
22.30	0.2029	0.04	Q	.	.	.	.
22.41	0.2033	0.04	Q	.	.	.	.
22.51	0.2037	0.04	Q	.	.	.	.
22.61	0.2040	0.04	Q	.	.	.	.
22.72	0.2044	0.04	Q	.	.	.	.
22.83	0.2047	0.04	Q	.	.	.	.
22.93	0.2051	0.04	Q	.	.	.	.
23.03	0.2055	0.04	Q	.	.	.	.
23.14	0.2058	0.04	Q	.	.	.	.
23.25	0.2061	0.04	Q	.	.	.	.
23.35	0.2065	0.04	Q	.	.	.	.
23.45	0.2068	0.04	Q	.	.	.	.
23.56	0.2072	0.04	Q	.	.	.	.
23.67	0.2075	0.04	Q	.	.	.	.
23.77	0.2078	0.04	Q	.	.	.	.
23.88	0.2081	0.04	Q	.	.	.	.
23.98	0.2085	0.04	Q	.	.	.	.
24.08	0.2088	0.04	Q	.	.	.	.
24.19	0.2090	0.00	Q	.	.	.	.

ATTACHMENT E

INFILTRATION STUDY

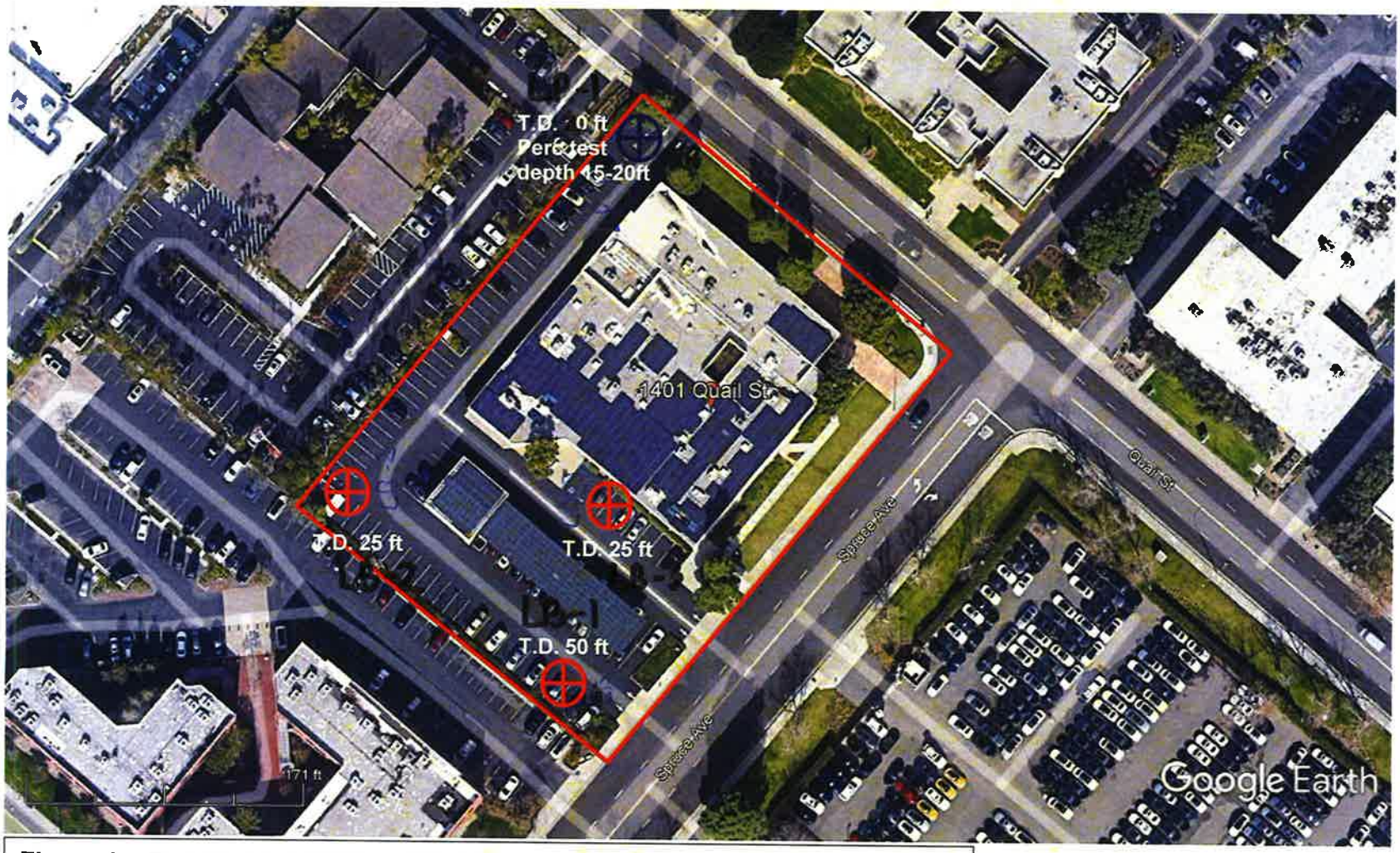


Figure 1 – Proposed Boring Location Map **IR22-273 Intracorp**
1401 Quail Street, Newport Beach, CA

⊕ Approximate location of hollow stem auger boring showing proposed depth (T.D.) in feet below adjacent grade. Project boundary outlined above in red.

⊕ Proposed infiltration test boring shown with test depth between 15-20ft

GEOTECHNICAL BORING LOG LB-1

Project No.	13542.001	**Date Drilled**	5-20-22
Project	Intracorp Quail St	**Logged By**	LFO
Drilling Co.	Martini Drilling Corp	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	44'
Location	See Figure 2 - Geotechnical Map	**Sampled By**	LFO

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
40	0			BB-1					@Surface: 3" asphalt over 8" CLAY w/ Sand base	
									Undocumented Artificial Fill (Afu)	
				R-1	12 9 9			SM	@2': Silty SAND, reddish brown, medium dense, predominantly fine sand, trace medium and coarse sand, some rootlets, slightly moist	
	5			R-2	4 9 11			CL	@4': Sandy CLAY, dark yellow brown, very stiff, fine sand, low plasticity, weakly laminated, moist	
				R-3	5 11 12			CL	@6': Sandy CLAY, reddish brown, very stiff, fine sand, low to medium plasticity, laminated, moist	
35				R-4	6 8 13			CL	@8': CLAY, reddish brown mottled gray, very stiff, some fine sand, low to medium plasticity, trace MnO, moist	
	10			R-5	8 13 21			CL	@10': CLAY, reddish brown mottled gray, very stiff, some fine sand, low to medium plasticity, some MnO and carbonate blebs, moist	
30										
	15			S-6	3 5 10			CL	@15': CLAY, gray brown mottled white, very stiff, trace fine sand, low plasticity, large carbonate blebs, moist	
25										
	20			R-7	14 20 28			ML	@20': Sandy SILT, gray brown mottled yellow and orange (heavily Fe-stained), dense, predominantly fine sand, trace medium sand, friable, very moist	
20										
	25			S-8	4 8 16			SP	@25': Poorly-graded SAND, gray brown, dense, predominantly medium sand, trace fine and coarse sand, Fe-stained, micaceous, friable, wet	
15	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

Leighton

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LB-1

Project No.	13542.001	**Date Drilled**	5-20-22
Project	Intracorp Quail St	**Logged By**	LFO
Drilling Co.	Martini Drilling Corp	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	44'
Location	See Figure 2 - Geotechnical Map	**Sampled By**	LFO

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R-9	25 50/2"			SP	@30': Poorly-graded SAND, gray brown, very dense, predominantly medium sand, trace fine and coarse sand, Fe-stained, micaceous, friable, wet	
10	35			S-10	9 24 30			SP	@35': Poorly-graded SAND, gray brown, very dense, predominantly medium sand, trace fine and coarse sand, Fe-stained, micaceous, friable, abundant white shell fragments, wet	
5	40			S-11	1 2 2			SP CH	@40': Same as above @40.5': Fat CLAY, bluish gray, medium stiff, high plasticity, moist	
0	45			S-12	Push Push 2			CH	@45': Fat CLAY, bluish gray, soft, high plasticity, trace white shell fragments, wet	
-5	50			S-13	Push Push 3			CH	@50': Same as above	
-10	55								**T.D. 51.5 feet bgs** **Groundwater encountered at 25 feet bgs.** **Borehole backfilled with soil cuttings and patched with cold-patch asphalt.**	
-15	60									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

Leighton

GEOTECHNICAL BORING LOG LB-2

Project No.	13542.001	**Date Drilled**	5-20-22
Project	Intracorp Quail St	**Logged By**	LFO
Drilling Co.	Martini Drilling Corp	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	43'
Location	See Figure 2 - Geotechnical Map	**Sampled By**	LFO

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
43	0			BB-1					@Surface: 8" asphalt over 4" CLAY w/ Sand base	
									Undocumented Artificial Fill (Afu)	
40				R-1	6 8 10			SM	@2': Silty SAND, reddish brown, medium dense, fine sand, trace clay, slightly moist	
	5			R-2	10 12 14			CL	@4': Sandy CLAY, reddish brown mottled gray, very stiff, fine sand, trace MnO, moist	
				R-3	7 14 23			SM	@6': Silty SAND, orange brown, dense, predominantly fine sand, trace medium sand, friable, moist	
35				R-4	8 16 23			CL	@8': Lean CLAY, reddish brown, hard, low plasticity, some MnO stringers, moist	
	10			R-5	7 13 21			CL	@10': Lean CLAY, reddish brown, very stiff, low plasticity, some MnO blebs, moist	
30										
	15			S-6	3 6 12			CL	@15': Sandy CLAY, gray brown, very stiff, fine sand, low plasticity, abundant carbonate blebs, moist	
25										
	20			R-7	13 20 25			ML	@20': Sandy SILT, gray brown mottled orange from Fe-staining, dense, fine sand, weakly laminated, friable, moist	
20										
	25			S-8	5 13 20			SP	@25': Poorly-graded SAND, graybrown mottled orange from Fe-staining, dense, predominantly fine to medium sand, trace coarse sand, very moist	
									T.D. 26.5 feet bgs **Groundwater encountered at 25 feet bgs.** **Borehole backfilled with soil cuttings and patched with cold-patch asphalt.**	
15										
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

Leighton

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LB-3

Project No.	13542.001	**Date Drilled**	5-20-22
Project	Intracorp Quail St	**Logged By**	LFO
Drilling Co.	Martini Drilling Corp	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	42'
Location	See Figure 2 - Geotechnical Map	**Sampled By**	LFO

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
40	0			BB-1					@Surface: 4" asphalt over 4" CLAY base **Undocumented Artificial Fill (Afu)**	
				R-1	5 13 22			SM	@3': Silty SAND, yellow brown, dense, predominantly fine sand, trace medium sand, trace clay, weakly laminated, moist	
35	5			R-2	9 14 21			SC	@5': Clayey SAND, gray yellow brown, medium dense, fine sand, low plasticity, moist	
				R-3	7 13 19			CL	@7': Sandy CLAY, orange brown, very stiff, fine sand, low plasticity, trace MnO, some carbonate blebs, slightly moist	
30	10			R-4	6 14 20			CL	@10': Sandy CLAY, reddish brown mottled gray brown, very stiff, fine sand, low plasticity, slightly moist	
25	15			R-5	6 10 15			CL	@15': Sandy CLAY, gray brown, very stiff, fine sand, low plasticity, abundant carbonate blebs, slightly moist	
								SM	@17': Changes to yellow Silty SAND in tailings	
20	20			S-6	4 8 9			SM	@20': Silty SAND, gray mottled yellow and orange from Fe-staining, medium dense, fine sand, trace clay, friable, very moist	
15	25			S-7	7 17 21			SP	@25': Poorly-graded SAND, gray brown, very dense, fine sand, friable, micaceous, very moist	
									T.D. 26.5 feet bgs **Groundwater encountered at 25 feet bgs.** **Borehole backfilled with soil cuttings and patched with cold-patch asphalt.**	
10	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

Leighton

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LP-1

Project No.	13542.001	**Date Drilled**	5-20-22
Project	Intracorp Quail St	**Logged By**	LFO
Drilling Co.	Martini Drilling Corp	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	41'
Location	See Figure 2 - Geotechnical Map	**Sampled By**	LFO

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
40	0			BB-1					@Surface: 4" asphalt over 5" CLAY base	
									Undocumented Artificial Fill (Afu)	
									Silty SAND w/ Clay, yellow brown, fine sand, low plasticity, friable, slightly moist	
35	5			R-1	6 14 22			SP-SM	@5': Poorly-graded SAND w/ Silt and Clay, yellow brown, dense, fine sand, low plasticity, friable, slightly moist	
				R-2	7 11 15			SP-SM	@7': Poorly-graded SAND w/ Silt, yellow brown, medium dense, predominantly fine sand, trace medium sand, trace clay, slightly moist	
30	10			R-3	8 13 19			SP	@10': Poorly-graded SAND, orange brown, predominantly fine to medium sand, medium dense, micaceous, friable, slightly moist	
									@11': Lean CLAY, orange brown mottled gray brown, low plasticity, trace MnO staining, moist	
25	15			R-4 BB-2	7 12 18			CL	@15': Lean CLAY, gray, very stiff, low plasticity, abundant carbonate blebs, moist	
20	20			S-5	4 9 10			SP	@20': Poorly-graded SAND, mustard yellow, medium dense, predominantly fine sand, friable, micaceous, moist	
15	25								**T.D. 21.5 feet bgs** **No groundwater encountered during drilling.** **Borehole backfilled with soil cuttings and patched with cold-patch asphalt.**	
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

Leighton

*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

Boring Percolation Test Data Sheet

Project Number:	13542.001	**Test Hole Number:**	LP-1
Project Name:	IntraCorp Quail Street	**Date Excavated:**	5/20/2022
Earth Description:	Alluvium	**Date Tested:**	5/20/2022
Liquid Description:	Tap water	**Depth of boring (ft):**	20
Tested By:	BTM/LFO	**Radius of boring (in):**	4
Time Interval Standard		**Radius of casing (in):**	1
Start Time for Pre-Soak:	8:21 AM	**Length of slotted of casing (ft):**	5
Start Time for Standard:	8:59 AM	**Depth to Initial Water Depth (ft):**	
Standard Time Interval	13	**Porosity of Annulus Material, *n* :**	0.35
Between Readings, mins:	5	**Bentonite Plug at Bottom:**	No

Field Percolation Data - Falling Head Test

Reading	Time	Time Interval, Δt (min.)	Initial/Final Depth to Water (ft.)	Initial/Final Water Height, H_0/H_f (in.)	Total Water Drop, Δd (in.)	Infiltration Rate (in./hr.)
P1	8:21	13	15.00	60.0	54.0	5.56
	8:34		19.50	6.0		
P2	8:39	15	15.00	60.0	54.0	4.99
	8:55		19.50	6.0		
1	8:59	5	15.00	60.0	27.8	5.43
	9:04		17.32	32.2		
2	9:06	5	15.00	60.0	28.3	5.55
	9:11		17.36	31.7		
3	9:12	5	15.00	60.0	28.9	5.70
	9:17		17.41	31.1		
4	9:19	5	15.00	60.0	28.7	5.64
	9:24		17.39	31.3		
5	9:25	5	15.00	60.0	29.0	5.73
	9:30		17.42	31.0		
6	9:32	5	15.00	60.0	28.6	5.61
	9:37		17.38	31.4		
7	9:38	5	15.00	60.0	28.6	5.61
	9:43		17.38	31.4		
8	9:45	5	15.00	60.0	29.0	5.73
	9:50		17.42	31.0		
9	9:54	5	15.00	60.0	28.8	5.67
	9:59		17.40	31.2		
10	10:02	5	15.00	60.0	25.4	4.84
	10:07		17.12	34.6		
11	10:09	5	15.00	60.0	29.8	5.92
	10:14		17.48	30.2		
12	10:16	5	15.00	60.0	29.3	5.80
	10:21		17.44	30.7		
13	10:24	5	15.00	60.0	29.4	5.83
	10:29		17.45	30.6		
14	10:30	5	15.00	60.0	30.1	6.02
	10:35		17.51	29.9		
15	10:38	5	15.00	60.0	29.9	5.95
	10:43		17.49	30.1		
16	10:44	5	15.00	60.0	29.4	5.83
	10:49		17.45	30.6		
17	10:52	5	15.00	60.0	30.0	5.98
	10:57		17.50	30.0		
18	10:58	5	15.00	60.0	28.9	5.70
	11:03		17.41	31.1		
19	10:07	5	15.00	60.0	28.9	5.70
	11:12		17.41	31.1		
20	11:13	5	15.00	60.0	28.9	5.70
	11:18		17.41	31.1		
17	11:19	5	15.00	60.0	30.5	6.11
	11:24		17.54	29.5		
18	11:27	5	15.00	60.0	30.4	6.08
	11:32		17.53	29.6		
19	11:35	5	15.00	60.0	30.8	6.21
	11:40		17.57	29.2		
20	11:41	5	15.00	60.0	30.8	6.21
	11:46		17.57	29.2		
21	11:48	5	15.00	60.0	30.0	5.98
	11:53		17.50	30.0		
22	11:54	5	15.00	60.0	30.1	6.02
	11:59		17.51	29.9		

Infiltration Rate (I) = Discharge Volume/Surface Area of Test Section/Time Interval

Measured Infiltration Rate, I (Average of Last 3 Readings) = **6.07** **in./hr.**

ATTACHMENT F

EDUCATIONAL MATERIALS

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

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

For emergencies, dial 911.

The tips contained in this brochure provide useful information to help prevent water pollution. 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 Residential Pool, Landscape and Hardscape Drains

The Ocean Begins at Your Front Door

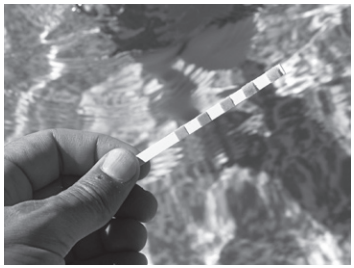
PROJECT Pollution PREVENTION

Tips for Residential Pool, Landscape and Hardscape Drains

Pool Maintenance

All pool water discharged to the curb, gutter or permitted pool drain from your property must meet the following water quality criteria:

- The residual chlorine does not exceed 0.1 mg/L (parts per million).
- The pH is between 6.5 and 8.5.
- The water is free of any unusual coloration.
- There is no discharge of filter media or acid cleaning wastes.



Some cities have ordinances that do not allow pool water to be discharged to the storm drain. Check with your city.

Landscape and Hardscape Drains

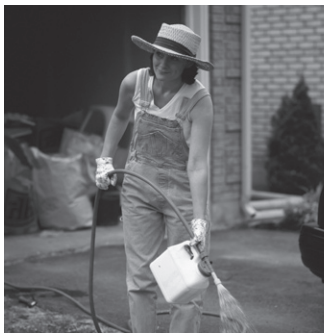
The following recommendations will help reduce or prevent pollutants from your landscape and hardscape drains from entering the street, gutter or storm drain. Unlike water that enters the sewer (from sinks and toilets), water that enters a landscape or hardscape drain is not treated before entering our creeks, rivers, bays and ocean.

Household Activities

- Do not rinse spills of materials or chemicals to any drain.
- Use dry cleanup methods such as applying cat litter or another absorbent material, then sweep it up and dispose of it in the trash. If the material is hazardous, dispose of it at a Household Hazardous Waste Collection Center (HHWCC). For locations, call **(714) 834-6752** or visit **www.oclandfills.com**.
- Do not hose down your driveways, sidewalks or patios to your landscape or hardscape drain. Sweep up debris and dispose of it in the trash.
- Always pick up after your pet. Flush waste down the toilet or dispose of it in the trash.
- Do not store items such as cleaners, batteries, automotive fluids, paint products, TVs, or computer monitors uncovered outdoors. Take them to a HHWCC for disposal.

Yard Maintenance

- Do not overwater. Water by hand or set automated irrigation systems to reflect seasonal water needs.
- Follow directions on pesticides and fertilizers (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Cultivate your garden often to control weeds and reduce the need to use chemicals.



Vehicle Maintenance

- Never pour oil or antifreeze down your landscape or hardscape drain. Recycle these substances at a service station, a waste collection center or used oil recycling center. For locations, contact the Used Oil Program at **1-800-CLEANUP** or visit **www.CLEANUP.org**.
- Whenever possible, take your vehicle to a commercial car wash.
- If you do wash your vehicle at home, do not allow the washwater to go down your landscape or hardscape drain. Instead, dispose of it in the sanitary sewer (a sink or toilet) or onto an absorbent surface such as your lawn.
- Use a spray nozzle that will shut off the water when not in use.

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

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

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

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

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

For emergencies, dial 911.

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

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

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Responsible Pest Control

Tips for Pest Control

Key Steps to Follow:

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

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

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

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

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

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

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

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

UC CE University of California Cooperative Extension

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

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

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

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

Step 4: Wear appropriate protective clothing.

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

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

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

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

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

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

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

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

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

Step 7: Properly store and dispose of unused pesticides.

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

Store unused chemicals in a locked cabinet.

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

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

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

PROJECT Pollution PREVENTION

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

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

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

UCCE Master Gardener Hotline:
(714) 708-1646

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

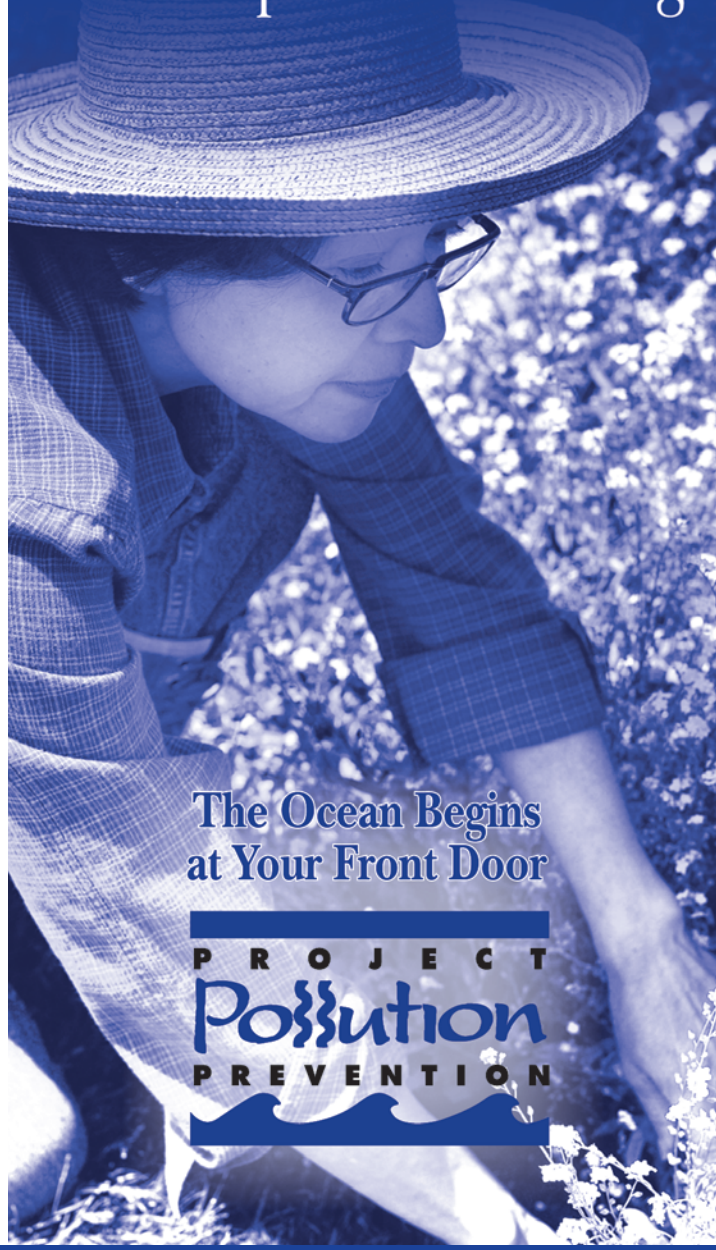
For emergencies, dial 911.

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

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Tips for Landscape & Gardening



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Tips for Landscape & Gardening

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

General Landscaping Tips

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

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

Garden & Lawn Maintenance

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

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

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

Household Hazardous Waste Collection Centers

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

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

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**

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

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

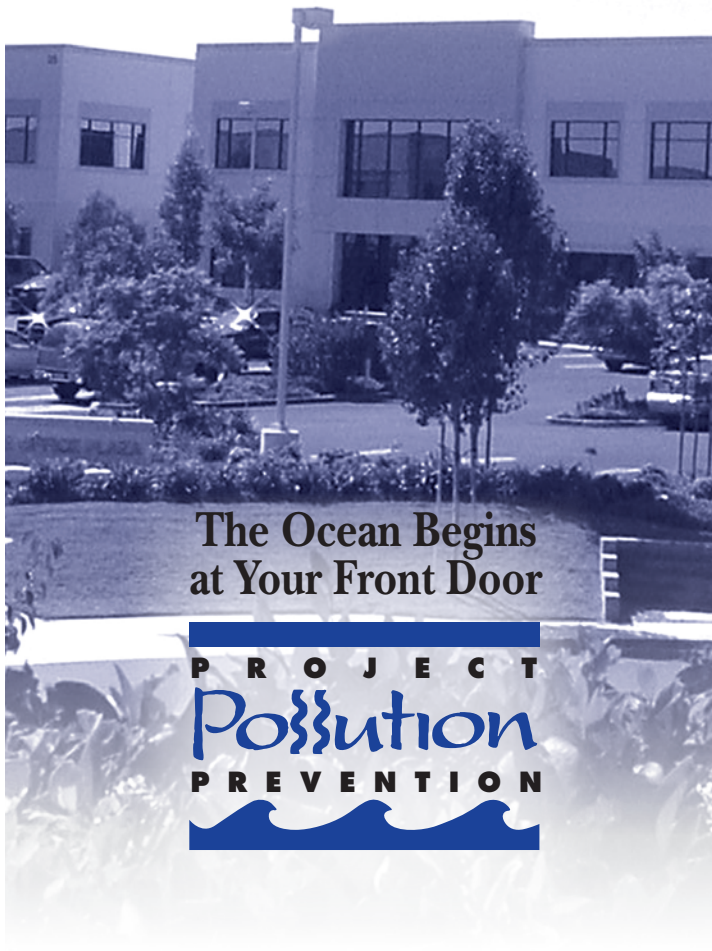
For emergencies, dial 911.

RECYCLE USED OIL

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Proper Maintenance Practices for Your Business



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

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.

NEVER DISPOSE OF ANYTHING IN THE STORM DRAIN.

- Recycle paints, solvents and other materials. For more information about recycling and collection centers, visit **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.**
- Properly label materials. Familiarize employees with Material Safety Data Sheets.

PROJECT Pollution PREVENTION

ATTACHMENT G

OPERATION AND MAINTENANCE INFORMATION

WQMP
Operation & Maintenance (O&M) Plan

Prepared for:

1401 Quail Street

Newport Beach, CA 92660

Legal Project Description:

REAL PROPERTY IN THE CITY OF NEWPORT BEACH, COUNTY OF ORANGE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

PARCEL 1 OF PARCEL MAP NO. 341, AS PER MAP FILED IN BOOK 44, PAGE 38 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

EXCEPT THE FULL RIGHTS TO ALL MINERALS, PETROLEUM, GAS AND OTHER HYDROCARBON SUBSTANCES EXISTING BELOW 500 FEET FROM THE SURFACE OF SAID REAL PROPERTY DESCRIBED ABOVE, PROVIDED, HOWEVER, THAT GRANTOR HEREBY EXPRESSLY WAIVES THE RIGHT TO ENTER UPON THE SURFACE OF SAID REAL PROPERTY FOR THE PURPOSE OF EXPLORING FOR, OR PRODUCING THE MINERALS, PETROLEUM, GAS AND OTHER HYDROCARBON SUBSTANCES SO RESERVED, AS RESERVED IN THE DEED RECORDED AUGUST 22, 1973 IN BOOK 10863, PAGE 782 OF OFFICIAL RECORDS.

APN: 427-332-04

BMP Inspection/Maintenance			
BMP	**Responsible Party(s)**	**Inspection/ Maintenance Activities Required**	**Minimum Frequency of Activities**
Permavoid Planter Areas	Owner	-Inspect semiannually for beginning (October) and end of the wet season (April)	Ongoing
Education for Property Owners, Tenants and Occupants	Owner	Educational materials will be provided to tenants annually. Materials to be distributed are found in Attachment F. Tenants will be provided these materials by the Owner prior to occupancy and periodically thereafter	Annually
Activity Restrictions	Owner	The Owner will prescribe activity restrictions to protect surface water quality, through lease terms or other equally effective measure, for the property. Restrictions include, but are not limited to, prohibiting vehicle maintenance or vehicle washing.	Ongoing
Common Area Landscape Management	Owner	Maintenance shall be consistent with City requirements. Fertilizer and/or pesticide usage shall be consistent with County Management Guidelines for Use of Fertilizers (OC DAMP Section 5.5) as well as local requirements. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting, and replacement of	Monthly

		mulch shall be performed on an as-needed basis to prevent exposure of erodible surfaces. Trimmings, clippings, and other landscape wastes shall be properly disposed of in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and storm drain inlets.	
Common Area Litter Control	Owner	Litter patrol and other litter control activities shall be performed on a weekly basis and in conjunction with routine maintenance activities.	Weekly
Employee Training	Owner	Educate all new employees/ managers on storm water pollution prevention, particularly good housekeeping practices, prior to the start of the rainy season (October 1). Refresher courses shall be conducted on an as needed basis.	Annually
Street Sweeping Private Streets and Parking Lots	Owner	Drive aisles & parking areas must be swept at least quarterly (every 3 months), including prior to the start of the rainy season (October 1).	Quarterly
Common Area Catch Basin Inspection	Owner	Catch basin inlets and other drainage facilities shall be inspected after each storm event and once per year. Inlets and other facilities shall be cleaned prior to the rainy season, by October 1 each year.	Annually

Storm Drain Stencilling and Signage	Owner	Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1 each year. Those determined to be illegible will be re-stencilled as soon as possible.	Annually
Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	Owner	In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, and day or night time temperatures. System testing shall occur twice per year. Water from testing/flushing shall be collected and properly disposed to the sewer system and shall not discharge to the storm drain system.	Twice per year

BMP OPERATION & MAINTENANCE LOG

Today's Date: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

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

TRAINING / EDUCATIONAL LOG

Date of Training/Educational Activity: _____

Name of Person Performing Activity (Printed): _____

Signature: _____

Topic of Training/Educational Activity: _____

_____

Name of Participant	Signature of Participant

For newsletter or mailer educational activities, please include the following information:

- **Date of mailing**
- **Number distributed**
- **Method of distribution**
- **Topics addressed**

If a newsletter article was distributed, please include a copy of it.