Appendix F:
Hydrology and Water Quality Supporting Information

THIS PAGE INTENTIONALLY LEFT BLANK

PRELIMINARY PRIORITY
WATER QUALITY MANAGEMENT PLA
(WQMP)

For:
TRACT 17847

Prepared for:
MILAN REI X, LLC
701 SOUTH PARKER STREET SUITE 5200
ORANGE, CA 92868
(714) 687-0000

Prepared by:
Hunsaker & Associates Irvine, Inc.
157 Technology Drive
Irvine, CA 92618
(949) 583-1010

Original: July 14, 2025

Public Works Director _____ Date _____

City Engineer _____ Date _____

OWNER'S CERTIFICATION
WATER QUALITY MANAGEMENT PLAN
FOR
"TRACT 17847"

This Water Quality Management Plan (WQMP) for the "Tract 17847" Project has been prepared for Milan REI X, LLC. This WQMP is intended to comply with the requirements of Resolution No. 11118, adopted November 13, 2018, requiring the preparation of a Priority Project WQMP.

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 City of Orange Local Implementation Plan (LIP), and the intent of NPDES Permit and Waste Discharge Requirements for the City of Orange, County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region.

This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party having responsibility for implementing portions of this WQMP. Maintenance requirements within Section V and Appendix D will be adhered to with particular emphasis on maintaining the BMPs described within Sections IV and V. The Owner's Annual Self Certification Statement along with a BMP maintenance implementation table will be submitted by June 30th every year following project completion. At least one copy of the approved WQMP shall be available on the subject property in perpetuity.

Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. The City of Orange will be notified of the change of ownership and the new owner will submit a new certification.

Signature: Diane Scioli Date: 8.5.25

Name: Diane Scioli

Title: Construction Manager

Company: Milan REI X, LLC

Address: 701 South Parker Street, Ste. 5200
Orange CA 92868

Telephone Number: (714) 687-0000

Notice of Transfer of Responsibility
Water Quality Management Plan (WQMP)

WQMP Number – As assigned by the City of Orange: _____

Submission of this Notice of Transfer of Responsibility constitutes notice to the City that responsibility for the Water Quality Management Plan (WQMP) for the subject property identified below, and implementation of that plan, is being transferred from the Previous Owner (and his/her agent) of the site (or portion thereof) to the New Owner, as further described below.

I. Previous Owner/ Responsible Party Information

Company/Individual: Milan REI X, LLC Contact Person: Diane Scioli

Street Address: 701 South Parker Street Ste. 5200 Title:Construction Manager

City: Orange State: CA Zip: 92868 Phone: (714) 687-0000

II. Information about Site Relevant to WQMP

Name of Project: Tract 17847

Title of WQMP applicable to site: Priority Water Quality Management Plan for Tract 17847

Street Address of the site: 6146 East Santiago Canyon Road, Orange CA 92869

Date of Transfer of Responsibility: _____

III. New Owner/ Responsible Party Information

Company/Individual: _____ Contact Person: _____

Street Address: _____ Title: _____

City: _____ State: _____ Zip: _____ Phone: _____

Table of Contents

I. Discretionary Permit Number(s), Water Quality Condition Number(s) and Conditions of Approval 1
II. Project Description 3
III. Site Description 7
IV. Best Management Practices 8
IV.1 Site Design and Drainage Characteristics 8
IV.2 Source Control BMPs 9
IV.3 Low Impact Development BMP Selection 12
IV.4 Water Quality Credits 16
IV.5 Alternative Compliance Plan 16
IV.6 Vector Control 17
IV.7 Drainage Management Area (DMA) 17
IV.8 Calculations 18
V. Implementation, Maintenance and Inspection Responsibility for BMPs (O&M Plan) 25
VI. Location Map, Site Plan, and BMP Details 32
VII. Educational Materials 33

Appendices

A. Conditions of Approval, City Council Resolution No. 11118 dated November 13, 2018
B. Educational Material
C. BMP Details
D. BMP Maintenance Information
E. Geotechnical Infiltration Testing and Hydrology Information (for reference only)

List of Tables

Table 1 Site Design BMPs 8
Table 2 Routine Non-Structural BMPs 9
Table 3 Routine Structural BMPs 11
Table 4 Hydrologic Source Control BMPs 12
Table 5 Infiltration BMPs 13
Table 6 Evapotranspiration, Rainwater Harvesting BMP 13
Table 7 Biotreatment BMPs 14
Table 8 Frequency Inspection Matrix 25

I. Discretionary Permit Number(s), Water Quality Condition Number(s) and Conditions of Approval

Tract No.: Tract 17847 Lot No.: 1

GPS Coordinates: 33.818107, -117.787263

Water Quality Conditions (WQMP conditions listed below)

A complete copy of the signed Conditions of Approval, City Council Resolution No. 11118 dated November 13, 2018 are included as Appendix A.

Conditions of Approval:

Prior to Grading Permit Issuance:

35. Prior to any grading permit issuance, the applicant shall submit a Priority Project WQMP for review and approval to the Public Works Department that:

a. Prioritizes the use of Low Impact Development principles as follows: preserves natural features; minimizes runoff and reduces impervious surfaces; and utilizes infiltration of runoff as the method of pollutant treatment. Infiltration BMPs to be considered include the use of permeable materials such as concrete and concrete pavers, infiltration trenches, infiltration planters, and other infiltration BMPs as applicable,

b. Incorporates the applicable Site Design, Routine Source, Structural Control and Low Impact BMPs as defined in the Model Water Quality Management Plan and Technical Guidance Document,

c. Maintains the hydrologic characteristics of the site by matching time of concentration, runoff, velocity, volume and hydrograph for a 2-year storm event,

d. Minimizes the potential increase in downstream erosion and avoids downstream impacts to physical structures, aquatic and riparian habitat,

e. Generally describes the long-term operation and maintenance requirements for structural and Treatment Control BMPs,

f. Identifies the entity or employees that will be responsible for long-term operation, maintenance, repair and or replacement of the structural and Treatment Control BMPs and the training that qualifies them to operate and maintain the BMPs,

g. Describes the mechanism for funding the long-term operation and maintenance and inspection activities,

h. Includes a copy of the forms to be used in conducting maintenance and inspection activities,

i. Meets recordkeeping requirements (forms to be kept for 5 years).

j. Includes a copy of the form to be submitted annually by the project owner to Public Works Department that certifies that the project's structural and treatment BMPs are being inspected and maintained in accordance with the project's WQMP.

36. Prior to recordation of the final tract map, the applicant shall demonstrate the following to the Public Works Department:

a. That all structural and treatment control best management practices (BMPs) described in the Project WQMP have been constructed and installed in conformance with the approved plans and specifications,

b. That the applicant is prepared to implement all non-structural BMPs described in the Project WQMP,

c. That an adequate number of copies of the project's approved final Project WQMP are available for future occupiers.

37. Prior to the recordation of the final tract map, the applicant shall demonstrate to the satisfaction of Public Works, that the preparer of the WQMP has reviewed the BMP maintenance requirements in Section V of the WQMP with the responsible person and that a copy of the WQMP has been provided to that person. A certification letter from the WQMP preparer may be used to satisfy this condition.

38. Prior to the issuance of building permits, the applicant shall review the approved Water Quality Management Plan (WQMP) and grading plan to ensure the structure's downspouts or drainage outlet locations are consistent with those documents. Copies of the building or architectural plans specifically showing the downspouts and drainage outlets shall be submitted to the Public Works Department for review.

39. The project applicant shall maintain all structural, treatment and low impact development BMPs at the frequency specified in the approved WQMP. Upon transfer of ownership or management responsibilities for the project site, the applicant shall notify the City of Orange Public Works Department of the new person(s) or entity responsible for maintenance of the BMPs.

40. For those projects with Covenants, Conditions and Restrictions (CC&Rs): Prior to recordation of the final map, a copy of the project's CC&Rs shall be provided to the Public Works Department for review and approval that includes requirements for maintenance and funding of the project's structural and treatment water quality best management practices as approved by the City in the project's WQMP.

41. Prior to City approval of the landscape plans, the applicant shall review the approved Water Quality Management Plan to ensure the proposed landscape plans are consistent with the project grading plans and that they show the proposed storm water infiltration devices and other treatment BMP's affecting landscaping areas. A copy of the proposed landscape plans shall be submitted to the Public Works Surface Water Quality Section for review and comments.

II. Project Description

Planning Area: Orange Park Acres

Project Size (ac): 7.4 Groos

Project Disturbed Area (ac): 7.1

Percent Change in Impermeable Surfaces: +50%

SIC Code (if applicable):

Project Description

The proposed project, "Tract 17847", encompasses approximately 7.4 acres within the City of Orange. The site is bound to the north by existing sand and gravel operations, to the west by existing single family homes; to the east by institutional uses, an existing church and school; and to the south by existing single family homes. Proposed entrance into the site will be at northwest side of the project at North Nicky Way and E. Santiago Canyon Road.

The proposed project will include 30 detached single-family dwelling units, on approximately 7.4 acres of land. The project will include grading activities, street, sidewalk, equestrian trail lots, storm drain and water quality improvements.

All improvements are shown in the WQMP Site Plan in Section VI of this WQMP.

Project Purpose and Activities

The purpose of the project is to develop an equestrian friendly community consisting of 30 single-family detached dwelling units on approximately 7.4 acres. Anticipated activities conducted on a daily basis for the residential units include recreation, commuting, jogging, cleaning, yard maintenance and other activities typical of residential developments.

Potential Storm Water Pollutants

Table 2.1, Anticipated and Potential Pollutants Generated by Land Use Type from the Technical Guidance Document (December 2013) lists the following Pollutants of Concern (POC's) associated with Detached Residential Project's: Suspended Solid/Sediments, Nutrients, Pathogens (Bacteria/Virus), Pesticides, Toxic Organic Compounds, Oil & Grease and Trash & Debris.

Hydrologic Conditions of Concern

In the North Orange County permit area, HCOCs are considered to exist if any streams located downstream from the project are determined to be potentially susceptible to hydromodification impacts and either of the following conditions exists:

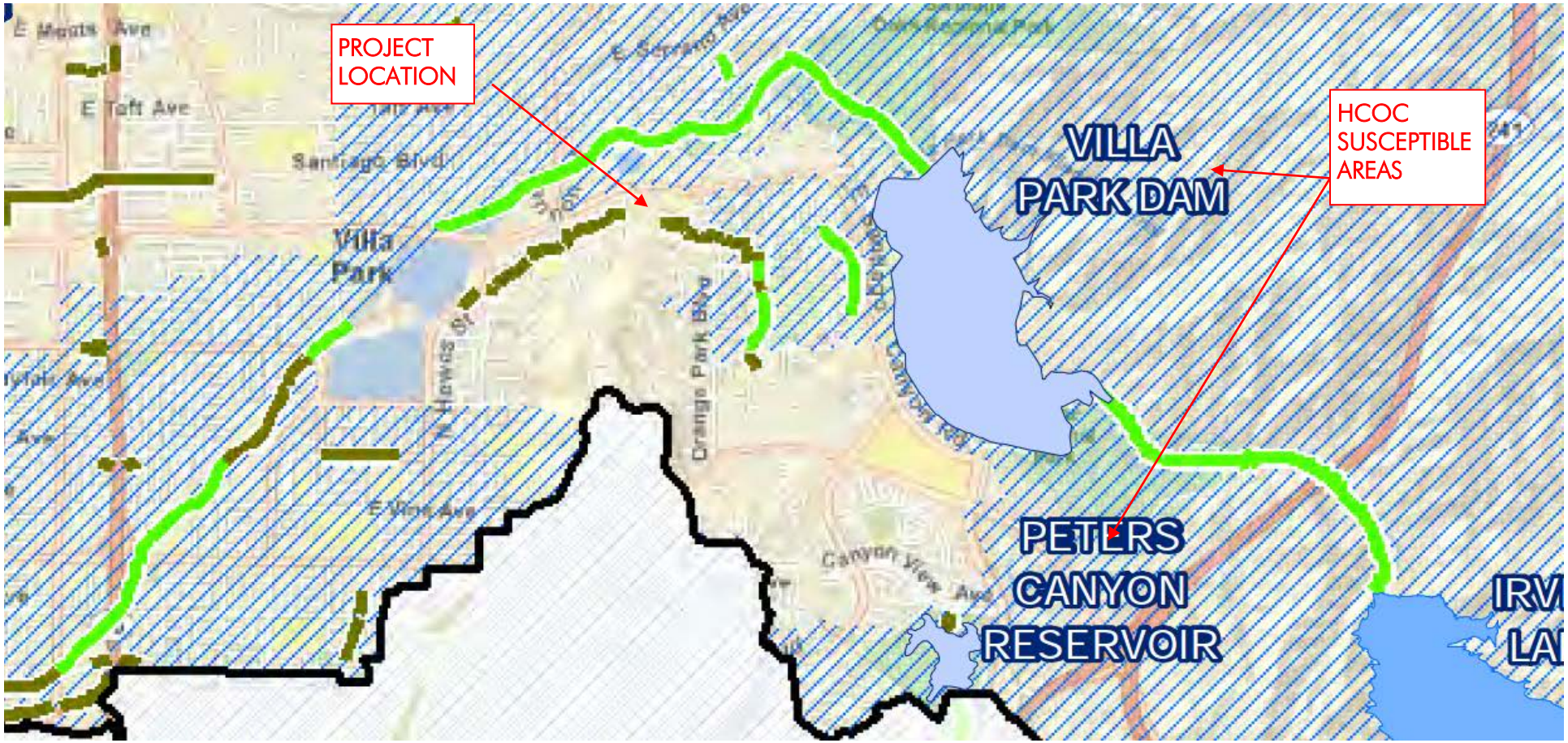
- Post-development runoff volume for the 2-yr, 24-hr storm exceeds the pre-development runoff volume for the 2-yr, 24-hr storm by more than 5 percent.

or

- Time of concentration (Tc) of post-development runoff for the 2-yr, 24-hr storm event is less than the time of concentration of the pre-development condition for the 2-yr, 24-hr storm event by more than 5 percent.

Based on County's current hydromodification susceptibility map, the project is not subject to the specific 2-year criteria noted above (see following page).

Figure 1 – HCOC Susceptibility Map



Source: County of Orange TGD Figure XVI.3-3 – Susceptibility Analysis for Santa Ana River

Post Development Drainage Characteristics

In general, each of the proposed lots will drain towards "A" Street. Low flows will be conveyed towards two Modular Wetland Systems at the intersection of "A" Street and North Nicky Way to satisfy the project's LID BMP requirements. Low flows from North Nicky Way will flow northerly and conveyed towards two Modular Wetland Systems and the intersection of Nicky Way and E. Santiago Canyon Road. All low flows will connect to the existing 12'x9' RCB Culvert (Handy Creek Box Culvert).

Runoff is then conveyed to Santiago Creek and confluences with Santa Ana River near the River View Golf Course. Flows will continue westerly in the Santa Ana River and ultimately discharge in the Pacific Ocean.

The proposed development will consist of single-family detached dwelling units. The project will also include street, sidewalk, storm drain and water quality improvements. The proposed project includes the improvement of Nicky Way from a narrow, unstriped paved travel lane to a fully improved street with two 11-foot travel lanes, on-street parking, parkways, and sidewalks on both sides of the street.

Paved and other impervious areas of the site include project streets, curb, sidewalk and gutter improvements, driveways and the residential building footprint. Total impervious will consist of approximately 65% of the overall project site.

Site Ownership and any Easements

The property owner, Milian Rei X, LLC, shall assume all BMP maintenance and inspection responsibilities until such time, all site responsibilities have been transferred to the HOA. Thereafter, the HOA shall be the mechanism responsible for the long time funding, inspection and maintenance of all private common areas and backbone improvements onsite.

There are no existing easements onsite.

The locations of improvements pertaining to this WQMP are provided in the WQMP Site Plan in Section VI of this WQMP.

III. Site Description

Reference Location Map: The site is located on the southeast corner of Nicky Way and East Santiago Canyon Road.

The project area is shown in the Vicinity Map provided in Section VI.

Site Address: 6146 East Santiago Canyon Road.

Zoning: R-1-40 (Single-Family Residential)

Predominant Soil Type:

Pre-project percent pervious: 80% **Post-project percent pervious:** 65%

Pre-project percent impervious: 20% **Post-project percent impervious:** 35%

Site Characteristics

The subject site has been primarily used for agriculture. The former agricultural ground surface has been modified to create an equestrian facility. The equestrian facility includes an arena, parking lot and small building that is currently used as a produce stand. In general, the site consists of alluvial terrace deposits underlain by bedrock units. The alluvial terrace gravels designated as Qoa.1 are well consolidated and suitable for the support of engineered fills for future uses.

Based on the most recent TGD information, the site is not situated over existing groundwater plumes.

Watershed Characteristics

Watershed: Santa Ana River Watershed

Downstream Receiving Waters: Santiago Creek, Santa Ana River (Reach 2), Santa Ana River (Reach 1), Santa Ana River (Mouth)

Water Quality Impairments (if applicable): Based on the current 303 (d) list, there are no water quality impairments (303(d) or TMDL) for the project's downstream receiving waters.

Identify hydromodification susceptibility: Based on the most current TGD Maps provided (as provided in Section II, page 4), the project site is not located within an area susceptible to hydromodification impacts.

Identify watershed management priorities: There are currently no watershed management priorities identified for Santa Ana River. The project is not located within 200' of areas identified by the Basin Plan as an environmentally sensitive area (ESA) or area of special biological significance (ASBS).

IV. Best Management Practices

Best Management Practices (BMPs) are principles, schedules, techniques, measures and structural devices, what when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to downstream waters. The goal of BMPs is to reduce or eliminate storm water contaminants, thereby minimizing impacts to downstream waters.

The following sections (VI.1 to V.3) describe the various classifications of BMPs considered for the project to address pollutants of concern. Each section also addresses the selection process involved in determining the applicability or non-applicability of each BMP.

IV.1 Site Design and Drainage Characteristics

The primary goal of site design principles and techniques is to reduce land development impacts on water quality and downstream hydrologic conditions. Benefits of site design include reductions in the size of downstream BMPs, conveyance systems, pollutant loading and hydromodification impacts.

Site design BMPs were selected based on existing site conditions or constraints (such as soil type and presence of natural areas) that would allow for (or prevent) various site design BMPs to be incorporated into the proposed site plan.

Table 1 Site Design BMPs

Technique	Included?		If no, state justification.
	Yes	No	
Minimize Directly Connected Impervious Areas (DCIAs) (C-Factor Reduction)	X		
Create Reduced or "Zero Discharge" Areas (Runoff Volume Reduction)[1]	X		
Minimize Impervious Area/Maximize Permeability (C-Factor Reduction)[2]	X		
Conserve Natural Areas (C-Factor Reduction)		X	No natural areas within the developed project area to conserve.

1 Detention and retention areas incorporated into landscape design provide areas for retaining and detaining stormwater flows, resulting in lower runoff rates and reductions in volume due to limited infiltration and evaporation. Such Site Design BMPs may reduce the size of Treatment Control BMPs.

2 The "C Factor" is a representation of the ability of a surface to produce runoff. Surfaces that produce higher volumes of runoff are represented by higher C Factors. By incorporating more pervious, lower C Factor surfaces into a development, lower volumes of runoff will be produced. Lower volumes and rates of runoff translate directly to lowering treatment requirements.

Minimize Directly Connected Impervious Areas (DCIAs) – The project has been designed with landscaping within the residential lots.

Create Reduced or "Zero Discharge" Areas – Where feasible, proposed landscaping will be designed as self-retaining. Stormwater flows will be directed to project catch basins and to proposed Modular Wetland Systems.

Minimize Impervious Area/Maximize Permeability – The project proposes one interior streets to be built to the minimum street standards, minimizing the project's impervious footprint to approximately 65%.

Conserve Natural Areas – The project does not currently have existing natural areas to conserve and in the proposed condition will be similar.

IV.2 Source Control BMPs

The project's source control BMPs were selected based on each BMP's applicability to the project as well as site constraints. Selected source control BMPs are discussed in the following sections.

IV.2.1 Routine Non-Structural BMPs

The table below indicates all Non-Structural Source Control BMPs to be utilized in the project, with justification provided for non-applicable BMPs. Discussions of the selected BMPs are provided in the BMP Inspection and Maintenance Responsibility Matrix provided in Section V of this WQMP.

Table 2 Routine Non-Structural BMPs

BMP No.	Name	Check One		If not applicable, state brief reason.
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	X		
N2	Activity Restriction	X		
N3	Common Area Landscape Management	X		
N4	BMP Maintenance	X		
N5	Title 22 CCR Compliance		X	Project will not generate waste subject to Title 22 of CCR.
N6	Local Water Quality Permit Compliance		X	This BMP is not applicable. The City of Orange does not issue water quality permits.
N7	Spill Contingency Plan		X	Not applicable to residential developments.
N8	Underground Storage Tank Compliance		X	No underground storage tanks proposed.
N9	Hazardous Materials Disclosure Compliance		X	Project will not store or generate hazardous materials.
N10	Uniform Fire Code Implementation		X	Project not subject to UFC Article 80 requirements.
N11	Common Area Litter Control (Including pet wastes)	X		

BMP No.	Name	Check One		If not applicable, state brief reason.
		Included	Not Applicable	
N12	Employee Training	X		
N13	Housekeeping of Loading Docks		X	Project will only employ simple loading areas (paved areas) for self-storage loading and unloading.
N14	Common Area Catch Basin Inspection	X		
N15	Street Sweeping Private Streets and Parking Lots	X		

A discussion of each selected Non-Structural Source Control BMP is provided in the following section. The implementation of each BMP is described in the Inspection and Maintenance Responsibility Matrix provided in Section V of this WQMP.

N1 Education for Property Owners, Tenants and Occupants – Educational materials will be provided to owners and periodically thereafter to inform them of their potential impacts to downstream water quality.

N2 Activity Restrictions – Activity restrictions to minimize potential impacts to water quality and with the purpose of protecting water quality will be prescribed via lease or rental agreements for each facility, or other equally effective measure. Restrictions are anticipated to include (but not limited to) prohibiting vehicle washing onsite, littering and improper storing or disposal of materials.

N3 Common Area Landscape Management – Maintenance activities for landscape areas shall be consistent with City's Integrated Pest Management (IPM) policy and manufacturer guidelines for fertilizer and pesticide use. The use of fertilizers and pesticides shall be prohibited within 48 hours prior to forecast rain events. Maintenance includes trimming, weeding and debris removal and vegetation planting and replacement. Stockpiled materials during maintenance activities shall be placed away from drain inlets and runoff conveyance devices. Wastes shall be properly disposed of or recycled.

N4 BMP Maintenance – Responsibility for implementation, inspection and maintenance of all BMPs (structural and non-structural) shall be consistent with the BMP Inspection and Maintenance Responsibilities Matrix provided in Section V of this WQMP, with documented records of inspections and maintenance activities completed.

N11 Common Area Litter Control – Litter control onsite will include the use of litter patrols by facilities management, violation reporting and clean up during landscaping maintenance activities and as needed to ensure good housekeeping of the project's common areas. In addition to litter patrols, pet waste stations (OC DAMP BMP R-5) will be provided in designated areas throughout the project site (as shown in the WQMP Site Plan) to ensure that residents and facility users are equipped with appropriate measures for proper disposal of pet wastes.

N12 Employee Training – All employees shall be trained on the potential impacts of their

actions on water quality. Training shall be conducted upon hire and annually thereafter.

N14 Common Area Catch Basin Inspection – All of the project's private drainage facilities shall be inspected, cleaned/maintained annually, prior to October 1st of each year, and when debris is observed/present.

N15 Street Sweeping Private Streets and Parking Lots – The project's streets shall be swept, at minimum, on a bi-weekly basis.

IV.2.2 Routine Structural BMPs

The table below indicates all Structural Source Control BMPs to be utilized in the project, with justification provided for non-applicable BMPs. Discussions of the selected BMPs are provided in the BMP Inspection and Maintenance Responsibility Matrix provided in Section V of this WQMP.

Table 3 Routine Structural BMPs

Name	Check One		If not applicable, state brief reason
	Included	Not Applicable	
Provide storm drain system stenciling and signage- "No Dumping – Drains to Ocean"	X		
Design and construct outdoor material storage areas to reduce pollution introduction		X	No designated outdoor storage proposed.
Design and construct trash and waste storage areas to reduce pollution introduction		X	None proposed.
Use efficient irrigation systems & landscape design	X		
Protect slopes and channels and provide energy dissipation	X		
Incorporate requirements applicable to individual project features		X	Not in project scope.
a. Dock areas		X	None proposed.
b. Maintenance bays		X	None proposed.
c. Vehicle or community wash areas		X	None proposed.
d. Outdoor processing areas		X	None proposed.
e. Equipment wash areas		X	None proposed.
f. Fueling areas		X	None proposed.
g. Hillside landscaping		X	None proposed.
h. Wash water control for food preparation areas		X	Project is not food service facility.

A discussion of each selected Structural Source Control BMP is provided in the following section. The implementation of each BMP and the responsible party are described in the Inspection and Maintenance Responsibility Matrix provided in Section V of this WQMP.

S1 Storm Drain Stenciling – Storm drain stencils or signage prohibiting dumping and discharge of materials ("No Dumping – Drains to Ocean") shall be provided adjacent to

each of the project's proposed inlets. The stencils shall be inspected and re-stenciled as needed to maintain legibility.

S4 Use Efficient Irrigation Systems and Landscape Design – Irrigation systems shall be designed to minimize runoff from excessive irrigation. Methods include the use of smart controllers, rain shutoff devices, timing devices, mulch use and other equally effective measures. In conjunction with routine landscaping maintenance activities, inspect irrigation for signs of leaks, overspray and repair or adjust accordingly. Adjust system cycle to accommodate seasonal fluctuations in water demand and temperatures. Ensure use of native or drought tolerant/non-invasive plant species to minimize water consumption.

S5 Protect Slopes and Channels – The project's landscaped slopes shall be inspected for adequate vegetation cover, vegetation health and signs of erosion. Dead or dying vegetation shall be replaced as needed. Signs of erosion and concentrated flow areas shall be noted and repaired as needed.

IV.3 Low Impact Development BMP Selection

Proposed LID BMPs were selected based on the required hierarchy of evaluation as well as feasibility to be incorporated into the proposed site plan.

IV.3.1 Hydrologic Source Controls

Hydrologic source controls (HSCs) can be considered to be an integration of site design practices and LID BMPs. The goal of HSCs is to reduce runoff volume for a given drainage area without reducing the site's true impervious area.

Table 4 Hydrologic Source Control BMPs

Name	Check If Used
Localized on-lot infiltration[1]	☐
Impervious area dispersion (e.g. roof top disconnection)	☐
Street trees (canopy interception)	☐
Residential rain barrels (not actively managed)[2]	☐
Green roofs/Brown roofs[3]	☐
Blue roofs[3]	☐
Other:	☐

[1] Note employed due to presence of HSG D soils and the presence of a siltstone bedrock layer underlying the project site.
[2] May be considered for use by private homeowners. Project will incorporate impervious dispersion areas.
[3] Not suitable for residential units due to slope and loading on roofs.

At current, the project does not propose the use of HSC BMP credits to reduce the project's required DCV. The project will employ the use of LID BMPs to address the full DCV. However, the practice of HSC BMPs will be integrated in the project by allowing roof drains to drain to adjacent landscaping areas where feasible.

IV.3.2 Infiltration BMPs

Various portions of the site have been disturbed and infilled with undocumented and non-engineered fills, generally derived locally, which consist of silty to gravelly sand with cobbles, and boulders. Infiltration BMPs have not been selected for the project. Please see Section IV.8 for the project's infiltration feasibility worksheets as well as the project's geotechnical report.

Table 5 Infiltration BMPs

Name	Check If Used
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	☐
Others:	☐

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

Evapotranspiration BMPs are a class of retention BMPs that discharges stored volume predominately to ET, though some infiltration may occur. ET includes both evaporation and transpiration, and ET BMPs may incorporate one or more of these processes. BMPs must be designed to achieve the maximum feasible ET, where required to demonstrate that the maximum amount of water has been retained on-site. Since ET is not the sole process in the proposed BMPs, specific design and sizing criteria have not been developed for ET-based BMPs.

Harvest and Reuse (aka. Rainwater Harvesting) BMPs are LID BMPs that capture and store storm water runoff for later use. These BMPs are engineered to store a specified volume of water and have no design surface discharge until this volume is exceeded. Harvest and use BMPs include both above-ground and below-ground cisterns. Examples of uses for harvested water include irrigation, toilet and urinal flushing, vehicle washing, evaporative cooling, industrial processes and other non-potable uses.

Table 6 Evapotranspiration, Rainwater Harvesting BMP

Name	Check If Used
All HSCs; *See Section IV.3.1*	☐

Surface-based infiltration BMPs	☐
Biotreatment BMPs	☐
Above-ground cisterns and basins	☐
Underground detention	☐
Other:	☐

The project does not propose the use of harvesting BMPs, as harvesting runoff exclusively for landscape irrigation or toilet/urinal flushing was determined to be infeasible since the project's minimum required number of use (toilet flushing) or irrigation area for each harvesting BMP would exceed the project's estimated uses (See Worksheet J in Section IV.8).

Consideration was also given to harvesting runoff for multiples uses (both irrigation and toilet flushing). However, harvesting runoff for multiple uses was determined to be infeasible due to the difficulty in conveying harvested runoff from a focal collection point to each residential unit and also proposed irrigated landscaping areas. Therefore, biotreatment BMPs will be employed to address the project's storm water runoff.

IV.3.4 Biotreatment BMPs

Biotreatment BMPs are a class of structural LID BMPs that treat suspended solids and dissolved pollutants in storm water using mechanisms characteristic of biologically active systems. These BMPs are considered treat and release facilities and include treatment mechanisms that employ soil microbes and plants. Additional benefits of these BMPs may include aesthetic enjoyment, recreational use, wildlife habitat and reduction in storm water volume.

As discussed in Section IV.3.2 and 3.3, due to the infeasibility for retention BMPs (infiltration and harvesting BMPs), biotreatment BMPs have been selected for the project to address runoff pollutants of concern prior to discharging offsite.

Table 7 Biotreatment BMPs

Name	Check If Used
Bioretention with underdrains	☐
Storm water 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:	☐

Name	Check If Used
Other:	☐

Proposed Biotreatment BMPs

Runoff from the project's Drainage Management Areas will be conveyed as surface flow, gutter flow and storm drain flow to four proprietary biotreatment systems for water quality treatment to treat all pollutants of concern to a medium to high level of effectiveness.

Modular Wetlands are proprietary biotreatment systems that utilize multi-stage treatment processes including screening media filtration, settling, and biofiltration. The pre-treatment chamber contains the first three stages of treatment and includes a catch basin inlet filter to capture trash, debris, gross solids and sediments, a settling chamber for separating out larger solids, and a media filter cartridge for capturing fine TSS, metals, nutrients, and bacteria. Runoff then flows through the wetland chamber where treatment is achieved through a variety of physical, chemical, and biological processes. AS storm water passes down through the planting soil, pollutants are filtered, adsorbed, biodegraded and sequestered by the soil and plants, functioning similar to bioretention systems. The discharge chamber at the end of the unit collects treated flows and discharges back into the storm drain system.

This system was selected based on its ability to treat the project's pollutants of concerns to a medium or high effectiveness, in accordance with the Model WQMP and TGD requirements.

Two Modular Wetland System (MWS) units will be installed to treat runoff from the proposed residential lots in DMA1, and two MWS units are proposed at the northerly end of Nicky Way to treat the proposed street improvements.

BMP Selection Criteria

Biotreatment BMPs were selected based on their efficacy in addressing the project's identified pollutants of concern with medium to high removal rates and the ability to incorporate the BMP system into the project's design and layout, given the existing site constraints on infiltration BMPs and lack of demand to effectively utilized harvest and use BMPs.

BMP Performance

Based on County of Orange Technical Guidance Document (TGD, December 2013), a project's proposed BMPs must be effective in addressing pollutants of concern to a medium to high effectiveness. The following table provides the project's anticipated BMP removal efficiency.

Suspended Solid/Sediments, Nutrients, Pathogens (Bacteria/Virus), Pesticides, Toxic Organic Compounds, Oil & Grease and Trash & Debris.

In addition to the proposed LID BMPs, the project will also incorporate the use of structural and non-structural source control BMPs selected in Section IV.2.1 and 2.2, such as Litter Management to address trash, litter and pet wastes (provide pet waste stations); and Common Area Landscape Management to limit the use of fertilizers, pesticides and to restrict the application of either material within 48 hours prior to predicted rain events. These will be enforced by the owner/operator (site management).

In accordance with the Model WQMP and TGD, the bioretention/biotreatment BMPs will be sized to treat runoff from the Design Capture Storm (85th percentile, 24-hour). Since Modular Wetlands are sized based on flow rate, they were sized utilizing the methodology for flow based BMPs (TGD Section III.1.2 and Worksheet D).

MODULAR WETLAND SYSTEM DESIGN SUMMARY							
DMA[1]	Tributary Drainage Area (Ac.)	Imp.	Tc (min)	Design Intensity (in/hr)	Q_{BMP}[2] (cfs)	Size/Model[3]	Treatment Capacity (cfs)
1	6.81	0.65	12.7	0.23	0.99	(1) MWS-L-8-24 (1) MWS-L-8-12	1.039
2	0.3	0.90	18.5	0.21	0.052	MWS-L-4-4	0.052
3	0.4	0.90	18.5	0.21	0.069	MWS-L-4-6	0.073

Notes:

[1]See also Section IV.2.2.
[2]Detailed calculations and worksheets are included in Section IV.
[3]Unit details and specifications are included in Section VI.

IV.3.5 Hydromodification Control BMPs

Based on the most current TGD maps (Figure 1 in Section II), the project is not subject to the hydromodification criteria of the TGD.

IV.3.6 Regional/Sub-Regional LID BMPs

N/A. The project is able to meet LID BMP requirements onsite.

IV.3.7 Treatment Control BMPs

N/A. The project is able to meet LID BMP requirements onsite.

IV.4 Water Quality Credits

N/A. The project is able to meet LID BMP requirements onsite.

IV.5 Alternative Compliance Plan

N/A. The project is able to meet LID BMP requirements onsite.

IV.6 Vector Control

The project's proposed LID BMPs are all designed with drawdown times of less than 48 hours. There is no ponding required for flow-based proprietary biotreatment BMPs.

IV.7 Drainage Management Area (DMA)

The project's improvement areas are divided into four (4) DMA's. Sizing of the BMPs are provided in the following:

DRAINAGE MANAGEMENT AREAS (DMAs)								
DMA Number	BMP	Tributary Drainage Area	Imp %	Design Storm Depth (in)	Estimated Tc (min)	Rainfall Intensity (in/hr)	Simple Method DCV (cu-ft)	Qdesign (cfs)
1	Proprietary Biotreatment	6.81	65	0.85	12.7	0.23	13,395	0.99
2	Proprietary Biotreatment	0.3	90	0.85	18.5	0.21	763	0.052
3	Proprietary Biotreatment	0.4	90	0.85	18.5	0.21	1,018	0.069
4	Self-Treating Area[1]	0.47	0	0.85	15.0	0.21	326	0.027
[1]DMA 4 consists of landscape slopes, landscape parkway area and proposed equestrian trail that will sheet flow towards E. Santiago Canyon Road and westerly to an existing catch basin.								

IV.8 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=	0.85	inches
2	Enter the effect of provided HSCs, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
3	Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2)	$d_{remainder}$=	0.85	inches
Step 2: Calculate the DCV				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	See table below	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=		
3	Calculate runoff coefficient, $C= (0.75 \times imp) + 0.15$	C=		
4	Calculate runoff volume, $V_{design}= (C \times d_{remainder} \times A \times 43560 \times (1/12))$	V_{design}=		cu-ft
Step 3: Design BMPs to ensure full retention of the DCV				
Step 3a: Determine design infiltration rate				
1	Enter measured infiltration rate, $K_{measured}$ (in/hr) (Appendix VII)	$K_{measured}$=	N/A	In/hr
2	Enter combined safety factor from Worksheet H, S_{final} (unitless)	S_{final}=		
3	Calculate design infiltration rate, $K_{design} = K_{measured} / S_{final}$	K_{design}=		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}=		feet
6	Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$	A_{min}=		sq-ft
Calculations				

DMA	Tributary Drainage Area (Ac.)	Imp.	C-value	Design Storm Depth (in.)	Simple Method DCV (cu-ft)
1	6.81	0.65	0.6375	0.85	13,395
2	0.3	0.50	0.825	0.85	763
3	0.4	0.90	0.825	0.85	1,018
4	0.47	0	0.225	0.85	326
Total		--	--	--	

Worksheet D: Capture Efficiency Method for Flow-Based BMPs – DMA 1-4

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter the time of concentration, T_c (min) (See Appendix IV.2)	T_c=		min
2	Using Figure III.4, determine the design intensity at which the estimated time of concentration (T_c) achieves 80% capture efficiency, I_1	I_1=		in/hr
3	Enter the effect depth of provided HSCs upstream, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
4	Enter capture efficiency corresponding to d_{HSC}, Y_2 (Worksheet A)	Y_2=	0	%
5	Using Figure III.4, determine the design intensity at which the time of concentration (T_c) achieves the upstream capture efficiency(Y_2), I_2	I_2=	0	
6	Determine the design intensity that must be provided by BMP $I_{design} = I_1 - I_2$	I_{design}=		
Step 2: Calculate the design flowrate				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	See Table Below	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=		
3	Calculate runoff coefficient, $C = (0.75 \times imp) + 0.15$	C=		
4	Calculate design flow rate, $Q_{design} = (C \times i_{design} \times A)$	Q_{design} =		cfs

Supporting Calculations

Describe system: Runoff will be conveyed as pipe flow from the roof drains and area drains to a MWS for storm water treatment.

DMA	Tributary Drainage Area (Ac.)	% Imp.	C-value	Design Intensity (in/hr)	Design Flowrate (cfs)	Model/ Capacity
1	6.81	0.65	0.525	0.23	0.99	MWS-L-8-20 (0.577 cfs) MWS-L-8-12 (0.346)
2	0.30	0.90	0.525	0.21	0.052	MWS-L-4-4 (0.052 cfs)
3	0.40	0.90	0.825	0.21	0.069	MWS-L-4-6 (0.073 cfs)

Worksheet D: Capture Efficiency Method for Flow-Based BMPs – DMA 1-4

Provide time of concentration assumptions: T_c based on 2-year storm.

Graphical Operations

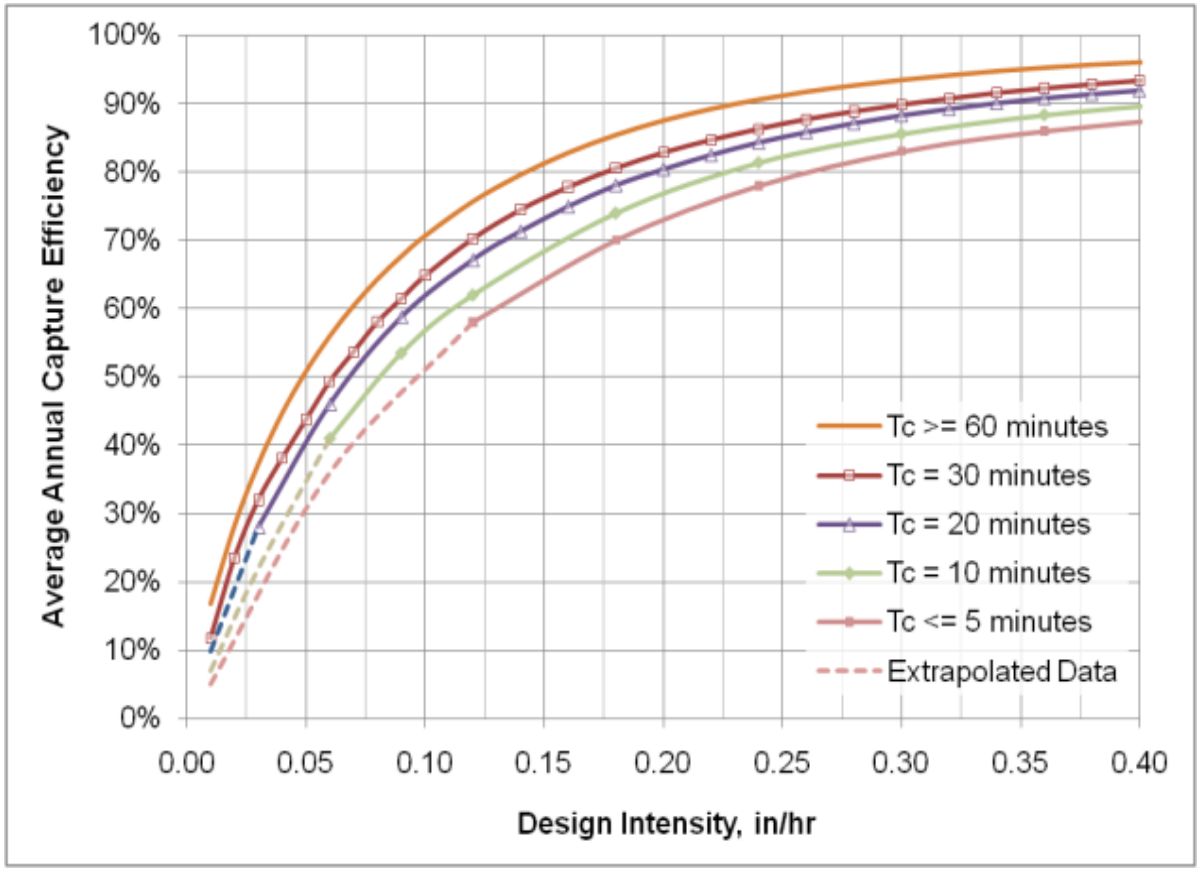


Table 2.7: Infiltration BMP Feasibility Worksheet

	Infeasibility Criteria	*Yes*	*No*
1	**Would Infiltration BMPs pose significant risk for groundwater related concerns?** Refer to Appendix VII (Worksheet I) for guidance on groundwater-related infiltration feasibility criteria.		X
Provide basis: Based on project's geotechnical investigation, groundwater is greater than 50' below existing grade.			
2	Would Infiltration BMPs **pose significant risk of increasing risk of geotechnical hazards that cannot be mitigated to an acceptable level**? (Yes if the answer to any of the following questions is yes, as established by a geotechnical expert): • The BMP can only be located less than 50 feet away from slopes steeper than 15 percent • The BMP can only be located less than eight feet from building foundations or an alternative setback. • A study prepared by a geotechnical professional or an available watershed study substantiates that stormwater infiltration would potentially result in significantly increased risks of geotechnical hazards that cannot be mitigated to an acceptable level.		X
Provide basis: No restrictions based on geotechnical report.			
3	Would infiltration of the DCV from drainage area **violate downstream water rights**?		X
Provide basis: No restrictions on water rights for project site.			
	Partial Infeasibility Criteria	*Yes*	*No*
4	Is proposed infiltration facility **located on HSG D soils** or the site geotechnical investigation identifies presence of soil characteristics which support categorization as D soils?	X	
Provide basis: Per geotechnical investigation, onsite soil consists primarily of silty to gravelly sand with cobbles, and boulders. Portions of the site have been disturbed with undocumented and non-engineered fills.			
5	Is **measured infiltration rate below proposed facility less than 0.3 inches per hour**? This calculation shall be based on the methods described in Appendix VII.		x

Table 2.7: Infiltration BMP Feasibility Worksheet

<table>
<tr><td colspan="4">Provide basis: Infiltration results are as follows:

I-1 = 1.5 in/hr. at 7 feet below existing grade
I-2 = 0.3 in/hr. at 8 feet below existing grade
I-3 = 1.5 in/hr. at 5 feet below existing grade

A factor of safety of at least 2 will need to be applied to these values per Orange County requirements. Based on these variable infiltration results, the subsurface conditions consisting of very dense sands and gravels with some fines and two of Ginter's previous infiltration testing consisting of low infiltration values we would not recommend infiltrating stormwater into the native subsurface soils. Additionally, it is very likely at deeper depths that the infiltration rates will be much lower as the subsurface soils will continue to get denser.</td></tr>
<tr><td>6</td><td>Would reduction of over pre-developed conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?</td><td></td><td>X</td></tr>
<tr><td colspan="4">Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible:
Project discharges to drainage channel that is not ephemeral.</td></tr>
<tr><td>7</td><td>Would an increase in infiltration over pre-developed conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?</td><td></td><td>X</td></tr>
<tr><td colspan="4">Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible:
Not anticipated as project's soil is not feasible for infiltration.</td></tr>
<tr><td colspan="4">Infiltration Screening Results (check box corresponding to result):</td></tr>
<tr><td>8</td><td>Is there substantial evidence that infiltration from the project would result in a significant increase in I&I to the sanitary sewer that cannot be sufficiently mitigated? (See Appendix XVII)
Provide narrative discussion and supporting evidence:
Project is not located within I&I impacted area per most recent TGD data.</td><td></td><td>X</td></tr>
<tr><td>9</td><td>If any answer from row 1-3 is yes: infiltration of any volume is not feasible within the DMA or equivalent.
Provide basis:</td><td colspan="2">1-3 are "no"</td></tr>
</table>

Table 2.7: Infiltration BMP Feasibility Worksheet

10	If any answer from row 4-7 is yes, infiltration is **permissible but is not presumed to be feasible for the entire DCV.** Criteria for designing biotreatment BMPs to achieve the maximum feasible infiltration and ET shall apply. Provide basis: Summarize findings of infeasibility screening	4 is "yes". However, geotechnical report advises against intentional infiltration.
11	If all answers to rows 1 through 11 are no, infiltration of the full DCV is potentially feasible, BMPs must be designed to infiltrate the full DCV to the maximum extent practicable.	Not Applicable

Worksheet J: Summary of Harvested Water Demand and Feasibility

1	What demands for harvested water exist in the tributary area (check all that apply):			
2	Toilet and urinal flushing		☒	
3	Landscape irrigation		☒	
4	Other:		☐	
5	What is the design capture storm depth? (Figure III.1)	d	0.85	inches
6	What is the project size?	A	7.44	ac
7	What is the acreage of impervious area?	IA	4.83	ac
	For projects with multiple types of demand (toilet flushing, irrigation demand, and/or other demand)			
8	What is the minimum use required for partial capture? (Table X.6)	N/A		gpd
9	What is the project estimated wet season total daily use (Section X.2)?	N/A		gpd
10	Is partial capture potentially feasible? (Line 9 > Line 8?)	N/A		
	For projects with only toilet flushing demand			
11	What is the minimum TUTIA for partial capture? (Table X.7)	502		users
12	What is the project estimated TUTIA?	28		users
13	Is partial capture potentially feasible? (Line 12 > Line 11?)	No		
	For projects with only irrigation demand			
14	What is the minimum irrigation area required based on conservation landscape design? (Table X.8)	4.58		ac
15	What is the proposed project irrigated area? (multiply conservation landscaping by 1; multiply active turf by 2)	2.34		ac
16	Is partial capture potentially feasible? (Line 15 > Line 14?)	No		

Provide supporting assumptions and citations for controlling demand calculation:
Item 11 – Per Table X.7, minim TUTIA ratio = 104 x 4.83 acres = **502 users**
Item 12 – Per Table X.1 Total use: Residents = 9.3 total use X 3 resident min = 28
Item 14 – Min. irrigation area for conservation landscape (K_L= 0.35) = 0.95 x 4.83 ac = **4.58 ac**
Item 15 – Proposed irrigated area = 2.34 ac x 1 = **2.34 ac** (parkway and designated landscape areas).

Notes:

V. Implementation, Maintenance and Inspection Responsibility for BMPs (O&M Plan)

Refer to the BMP inspection and maintenance responsibility matrix below. Inspection and maintenance records must be kept for a minimum of five years for inspection by the regulatory agencies.

The Owner shall be responsible the long-term funding, inspection and maintenance of all BMPs prescribed in this WQMP. Until transfer of all site responsibilities to the respective Owner/Operator, the project proponent shall be the interim responsible party.

Responsible Party Information (Local Contact Information)

Name: _____ Title: _____

Company: _____ Phone Number: _____

Inspection and maintenance activities, frequencies and responsibilities for the project's selected BMPs are provided in the following BMP matrix. Inspection and maintenance records must be kept for a minimum of five years for inspection by the regulatory agencies.

Table 8 Frequency Inspection Matrix

BMP	Responsible Party	*Maintenance Activity	*Inspection/ Maintenance Frequency
Source Control BMPs (Structural and Non-structural)			
N1 Education for Property Owners	Owner	Educational materials will be provided to the owner and periodically thereafter to inform them of their potential impacts to downstream water quality. Materials include those described in Section VII of this WQMP and provided in the Final WQMP.	Ongoing
N2 Activity Restrictions	Owner	The Owner will prescribe activity restrictions to protect surface water quality, through a lease or rental agreement, or other equally effective measure, for the property. Restrictions are anticipated to include (but not limited to) prohibiting vehicle washing onsite, littering and improper storing or disposal of materials.	Ongoing

BMP	Responsible Party	*Maintenance Activity	*Inspection/ Maintenance Frequency
N3 Common Area Landscape Management	Owner	Maintenance shall be consistent with City requirements, plus fertilizer and/or pesticide usages shall be consistent with County guidelines for use of fertilizers and pesticides (OC DAMP Section 5.5). Use of fertilizers and pesticides shall be prohibited within 48 hours prior to forecast rain events. Maintenance includes mowing, weeding, and debris removal on a monthly basis. Trimming, replanting and replacement of mulch shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets.	Monthly
N4 BMP Maintenance	Owner	Maintenance of BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP. Records of inspections and BMP maintenance shall be maintained by the responsible party and documented with the WQMP, and shall be available for review upon request.	Ongoing
N11 Common Area Litter Control	Owner	Litter patrol, violations investigation, reporting and other litter control activities shall be performed in conjunction with landscape maintenance activities. Litter collection and removal shall be performed on a weekly basis. Inspect pet waste station for adequate supply of waste bags and dispose of wastes as necessary.	Ongoing patrols, weekly (minimum) pick up and removal
N12 Employee Training	Owner	All employees and contractors of both facilities shall be trained on the potential impacts of their actions on water quality. Training shall be conducted upon hire and annually thereafter.	Upon hire and annually
N14 Common Area Catch Basin Inspection	Owner	Catch basin inlets, area drains, curb-and-gutter systems and other drainage systems shall be inspected prior to October 1st of each year and after large storm events. If necessary, drains shall be cleaned prior to any succeeding rain events. All facilities shall be inspected annually and maintained when debris is observed/ present.	Annually and as needed
N15 Street Sweeping Private Streets	Owner	Streets and parking areas must be vacuum-swept at minimum, on a bi-weekly basis.	Bi-weekly

BMP	Responsible Party	*Maintenance Activity	*Inspection/ Maintenance Frequency
S1 (SD-13) Storm Drain Stenciling	Owner	Storm drain stencils or signage prohibiting dumping and discharge of materials ("No Dumping – Drains to Ocean") shall be provided adjacent to each of the project's proposed inlets. The stencils shall be inspected and re-stenciled as needed to maintain legibility.	Annually
S4 (SD-12) Use Efficient Irrigation Systems and Landscape Design	Owner	In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting irrigation systems properly to eliminate overspray to hardscape areas, and to verify that smart controllers, irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns.	Monthly
S5 Protect Slopes and Channels	Owner	Inspect for adequate vegetation cover, vegetation health and signs of erosion. Remove and replaced dead/dying vegetation as needed. Repair any signs of erosion immediately.	Monthly
Hydrologic Source Control BMPs			
HSC-2 Impervious Area Dispersion	Owner	Inspect for standing water adjacent to walkways and that water infiltrates into underlying soil or evaporates completely. Inspection for plant health and replace as needed.	Monthly
Low Impact Development and Treatment BMPs			
BIO-7 Proprietary Biotreatment	Owner	Inspect unit for accumulated debris and sediment and plant health; remove trash from screening device and separation chamber; trim vegetation. Remove sediment from pre-chamber, replace pre-filter cartridge media and drain down filter media.	Annually
		Replace wetland media	Every 5 years

Regulatory Permits

There are no regulatory permits (agency) necessary for the development or maintenance of the site's BMPs.

Funding

Installation of the proposed BMPs shall be funded by the project developer, Milan REI X, LLC. Once all site maintenance responsibilities and ownership have been transferred to the ultimate owners of this project, the owner/ operator shall be the mechanism to ensure long-term funding, inspection and maintenance of all BMPs described in this WQMP.

OWNER SELF CERTIFICATION STATEMENT

As the owner representative of the "Milan REI X, LLC" Project for which a Water Quality Management Plan (WQMP) was approved by the City, I hereby certify under penalty of law that all Best Management Practices contained within the approved Project WQMP have been maintained and inspected in accordance with the schedule and frequency outlined in the approved WQMP Maintenance Table.

The maintenance activities and inspections conducted are shown in the attached table and have been performed by qualified and knowledgeable individuals. Structural Treatment BMPs have been inspected and certified by a licensed professional engineer.

To the best of my knowledge, the information submitted is true and accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and citations for violating water quality regulations.

Signed: _____

Name: _____

Title: _____

Company: _____

Address: _____

Telephone Number: _____

Date: _____

BMP Implementation Tracking Table

BMP	Activity	Completion Dates or Frequency	Initial
Source Control BMPs (Structural and Nonstructural)			
N1Education for Property Owners	Provide educational materials to tenants to inform them of their actions and potential impacts to downstream water quality.		
N2 Activity Restrictions	Prescribe activity restrictions to protect surface water quality, through a lease or rental agreement, or other equally effective measure, for the property. Restrictions are anticipated to include (but not limited to) prohibiting vehicle washing onsite, littering and improper storing or disposal of materials.		
N3 Common Area Landscape Management	Prohibit use of fertilizers and pesticides within 48 hours prior to forecast rain events. Conduct maintenance activities consisting of mowing, weeding, and debris removal on a monthly basis. Trim, replace, replant vegetation and replace mulch as-needed basis. Properly dispose trimmings, clippings, and other wastes off-site in accordance with local regulations. Ensure materials temporarily stockpiled during maintenance activities are placed away from water courses and drain inlets.		
N4 BMP Maintenance	Perform BMP maintenance in accordance with the frequency prescribed per applicable WQMP. Record and maintain records.		
N11 Common Area Litter Control	Conduct litter patrol, violation investigations and reporting in conjunction with landscaping maintenance activities. Collect and remove on a weekly basis (minimum). Ensure adequate supply of bags at pet waste stations and dispose of wastes as needed.		
N12 Employee Training	Provide training for employees and contractors regarding the potential impacts of their actions on water quality.		
N14 Common Area Catch Basin Inspection	Inspect catch basin inlets, area drains, curb-and-gutter systems and other drainage systems prior to October 1st of each year and after large storm events. If necessary, clean drains prior to any succeeding rain events. Inspect facilities annually and maintain when debris is observed/ present.		
N15 Street Sweeping Private Streets	Vacuum sweep all private streets and parking areas on a bi-weekly basis (at minimum).		

BMP	Activity	Completion Dates or Frequency	Initial
S1 (SD-13) Storm Drain Stenciling	Ensure storm drain stencils or signage prohibiting dumping and discharge of materials are provided adjacent to each of the project's inlets. Inspect for legibility and re-stencil ass needed to maintain legibility.		
S4 (SD-12) Use Efficient Irrigation Systems and Landscape Design	Verify that landscape design continues to function properly by adjusting irrigation systems properly to eliminate overspray to hardscape areas, and to verify that smart controllers, irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns.		
S5 Protect Slopes and Channels	Inspect for adequate vegetation cover, vegetation health and signs of erosion. Remove and replaced dead/dying vegetation as needed. Repair any signs of erosion immediately.		
Hydrology Source Control BMPs			
HSC-2 Impervious Area Dispersion	Inspect for standing water adjacent to walkways and that water infiltrates into underlying soil or evaporates completely. Inspection for plant health and replace as needed.		
Low Impact Development and Treatment BMPs			
BIO-7 Proprietary Biotreatment	Inspect unit for accumulated debris and sediment and plant health; remove trash from screening device and separation chamber; trim vegetation. Remove sediment from pre-chamber, replace pre-filter cartridge media and drain down filter media.		

* This sheet is to be submitted annually with the Owner Self Certification Statement.

** Structural Treatment BMPs should be certified by a Licensed Professional Engineer.

VI. Location Map, Site Plan, and BMP Details

The exhibits provided in this section are to illustrate the post construction BMPs prescribed within this WQMP. Drainage flow information of the proposed project, such as general surface flow lines, concrete or other surface drainage conveyances, storm drain facilities and drainage management areas are also depicted. All structural source control and treatment control BMPs are shown as well.

Exhibits

- Vicinity Map
- Final WQMP Site Plan

VII. Educational Materials

Education Materials			
Residential Material (http://www.h20c.org)	Check If Applicable	Business Material (http://www.h20c.org)	Check If Applicable
The Ocean Begins at Your Front Door	☒	Water Pollution and the Automotive Industry	☐
Tips for Home Improvement Projects	☒	Tips for Using Concrete and Mortar	☐
Tips for the Home Mechanic	☒	BMP Field Guide for Nurseries	☐
Tips for Horse Care	☒	Water Pollution and the Food Service Industry	☐
Proper Disposal of Household Hazardous Waste	☒	Other Material	Check If Attached
Tips to Prevent Irrigation Runoff	☒		
Tips for Landscape and Gardening	☒		☐
Tips for Pet Care	☒		☐
Proper Maintenance of Pools & Spas	☒		☐
Tips for Maintaining a Septic Tank System	☐		☐
Responsible Pest Control	☒		☐
Sewer Spill Response	☒		☐
Tips for Residential Pool, Landscape and Hardscape Drains	☒		☐
Tips for Projects Using Paint	☒		☐
	☐		☐
	☐		☐
	☐		☐
	☐		☐
	☐		☐

Appendix A:
Conditions of Approval
City Council Resolution No. 1118 dated November 13, 2018

RESOLUTION NO. 11118

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ORANGE APPROVING TENTATIVE TRACT MAP NO. 0048-18, MINOR SITE PLAN REVIEW NO. 0948-18, AND NEGATIVE DECLARATION NO. 1859-18, TO SUBDIVIDE A 7.44-ACRE SITE INTO SIX, 1-ACRE SINGLE-FAMILY RESIDENTIAL LOTS AT 6146 EAST SANTIAGO CANYON ROAD.

TENTATIVE TRACT MAP NO. 0048-18
MINOR SITE PLAN REVIEW NO. 0948-18
NEGATIVE DECLARATION NO. 1859-18

WHEREAS, the City Council has authority per Orange Municipal Code Section 16.12.010.C, Orange Municipal Code Table 17.08.020, and Orange Municipal Code Section 17.09.020A. to review and take action on Tentative Tract Map No. 0048-18, Minor Site Plan Review No. 0948-18, and Negative Declaration No. 1859-18 pertaining to the subdivision of a 7.44-acre site into six, 1 acre single-family residential lots on the property located at 6146 East Santiago Canyon Road; and

WHEREAS Tentative Tract Map No. 0048-18, Minor Site Plan Review No. 0948-18, and Negative Declaration No. 1859-18 were filed by the applicant in accordance with the provisions of the City of Orange Municipal Code; and

WHEREAS, Tentative Tract Map No. 0048-18, Minor Site Plan Review No. 0948-18, and Negative Declaration No. 1859-18 were processed in the time and manner prescribed by state and local law; and

WHEREAS, Negative Declaration No. 1859-18 was prepared to evaluate the physical environmental impacts of the project, in conformance with the provisions of the California Environmental Quality Act (CEQA) per State CEQA Guidelines Section 15070 and in conformance with the Local CEQA Guidelines. The Negative Declaration finds that the project will have less than significant impacts to the environment, with the implementation of standard conditions; and

WHEREAS, a Notice of Intent to Adopt a Negative Declaration was published and the Negative Declaration was made available for a 20 day public review and comment period from August 30, 2018, and ended on September 19, 2018, in compliance with Sections 15072 and 15105 of the State CEQA Guidelines; and

WHEREAS, affected City Departments have reviewed Tentative Tract Map No. 0048-18, Minor Site Plan Review No. 0948-18, and Negative Declaration No. 1859-18 and submitted conditions related to each Department's area of expertise; and

WHEREAS, the Planning Commission conducted one duly advertised public hearing on October 1, 2018, at which time interested persons had an opportunity to testify either in support of, or opposition to, Tentative Tract Map No. 0048-18, Minor Site Plan Review No. 0948-18, and Negative Declaration No. 1859-18; and

WHEREAS, the Planning Commission voted 3-2 to recommend that the City Council approve Tentative Tract Map No. 0048-18, Minor Site Plan Review No. 0948-18, and Negative Declaration No. 1859-18 to allow for the subdivision of a 7.44-acre site into six, 1 acre single-family residential lots on the property; and

WHEREAS, the City Council held a duly advertised public hearing on November 13, 2018, at which time interested persons had an opportunity to testify either in support or opposition to the proposal and for the purpose of considering the subdivision of a 7.44-acre site into six, 1 acre single-family residential lots upon property described in Attachment "A", which is incorporated herein by this reference.

NOW, THEREFORE, BE IT RESOLVED that the City Council approves Tentative Tract Map No. 0048-18, Minor Site Plan Review No. 0948-18, and Negative Declaration No. 1859-18 to subdivide a 7.44-acre site into six, 1 acre single-family residential lots on the property located at 6146 East Santiago Canyon Road based on the following findings:

SECTION 1 – FINDINGS

General Plan:

1. *The project must be consistent with the goals and policies stated within the City's General Plan.*

   The project achieves multiple goals of the General Plan. The project transforms an underutilized residentially zoned property temporarily used as an equestrian facility with a single family residential development that integrates with adjacent residential uses. The proposed project will contribute to the continuation of the community's history as an equestrian area through its 1 acre minimum lot sizes and the construction of equestrian trails linking the lots to the larger OPA trail network. The project also implements the objectives of the General Plan land use designation, by expanding the opportunities for residents to live within the equestrian community. The project supports the goals of the City's Housing Element by bringing forward housing that increases the inventory of housing and diversifying the housing types available in the community.

Tentative Tract Map:

1. *The requirements for the filing of subdivision maps shall be governed by the provisions of the Subdivision Map Act and the provisions of Title 16 of the Orange Municipal Code (OMC). All maps shall comply with the provisions of the Subdivision Map Act, the City Zoning Ordinance, Title 16 of the OMC, and any other ordinance, statute or law pertaining to the use, sale, leasing, or subdivision of land.*

The proposed Tentative Tract Map complies with the requirements of the Subdivision Map Act and Title 16, Subdivisions, of the Orange Municipal Code and all other resolutions and ordinances of this City. The Tentative Tract Map proposes to subdivide a 7.44-acre to create a six lot subdivision with lot sizes between 1.0 acres and 1.19 acres. The proposed subdivision will have local access (Street "A") from North Nicky Way and regional access from East Santiago Canyon Road. The six lots will have frontage along Street "A", which will be a private cul-de-sac. Grading for the proposed project includes the import of approximately 19,500 cubic yards of new clean soil. Additionally, the proposed project includes the improvement of North Nicky Way from a narrow, unstriped paved travel lane to a fully improved street with two 11-foot travel lanes, on-street parking, parkways, and sidewalks on both sides of the street. The proposed project will contribute to the continuation of the community's history as an equestrian area through the construction of equestrian trails along North Nicky Way and Santiago Canyon Road along the boundary of the property. The equestrian trails would be 12-feet wide and would conform to City of Orange standards. Site planning requirements related to area, improvements and design, floodwater drainage control, appropriate improved public roads, sanitary disposal facilities, water supply availability, public safety facilities and environmental protection have been addressed either via project design components shown on the proposed plans or through conditions of approval. Therefore, the project meets this finding.

Minor Site Plan:

1. *The project design is compatible with surrounding development and neighborhoods.*

   The project area is developed with a sand and gravel operation to the north, a church and a school to the east, single-family homes to the south and west. The proposed project will contribute to the continuation of the community's history as an equestrian area through its 1 acre minimum lot sizes and the construction of equestrian trails along North Nicky Way and Santiago Canyon Road along the boundary of the property to encourage a linkage between the project and surrounding uses and trails.

2. *The project conforms to City development standards and any applicable special design guidelines or specific plan requirements.*

   The proposed subdivision conforms to City development standards for residential districts. The streetscape enhancements that include an equestrian trail provide an appealing environment that is consistent with the quasi-rural context of the site. The new large lot development preserves the character and densities of the neighborhood.

   The project site is not subject to any City design guidelines, but is located within the Orange Park Acres Plan area. Per the Low Density – 1 Acre Minimum of the Orange Park Acres Plan, the proposed lots must be a minimum of 1 acre (43,560 square feet). Consequently, the proposed subdivision consists of lot sizes that are 1 acre or larger. Therefore, the proposed project is consistent with the Low Density – 1 Acre Minimum of the Orange Park Acres Plan.

3. *The project provides for safe and adequate vehicular and pedestrian circulation, both on- and off-site.*

   The proposed project incorporates streetscape improvements that reinforce the equestrian environment and quality of the equestrian experience in a manner that provides equestrian safety. The proposed project will contribute to the continuation of the community's history as an equestrian area through the construction of equestrian trails along North Nicky Way and Santiago Canyon Road along the boundary of the property. The equestrian trails would be 12-feet wide and would conform to City of Orange standards and will be maintained by the Orange Park Acres Association. The vehicular access point has been designed to ensure safe circulation conditions. With adoption of Conditions of Approval the proposed project provides for safe and adequate circulation.

4. *City services are available and adequate to serve the project.*

   As evaluated in Negative Declaration No. 1859-18, the proposed project will result in less than significant impacts to police, fire, recreation and or park services. The project incorporates design features that address Code requirements and building and infrastructure systems that maximize safety and ensure adequate utility services to the site. The applicant will be subject to payment of impact fees associated with schools, parks, libraries, sewer, and Sanitation District fees.

5. *The project has been designed to fully mitigate or substantially minimize adverse environmental effects.*

   The proposed project includes project design features that minimize potential adverse impacts to Transportation/Traffic, Air Quality, Cultural Resources, Tribal Cultural Resources, Geology/Soils, and Noise. There were no Mitigation Measures included in the Negative Declaration.

SECTION 2 – CONDITIONS OF APPROVAL

BE IT FURTHER RESOLVED that the following conditions are imposed with recommendation of approval:

General:

1. The project shall conform in substance and be maintained in general conformance with the tentative tract map and exhibits date labeled November 13, 2018 including any modifications required by conditions of approval, and as recommended for approval by the Planning Commission. Any future expansion in area or in the nature of the use approved by Tentative Tract Map No. 0048-18, Minor Site Plan Review No. 0948-18, and Negative Declaration No. 1859-18 shall require an application for a new or amended Tentative Tract Map and Site Plan Review.
2. These conditions shall be reprinted on the Final Tract Map prior to approval of the Final Tract Map.
3. Within two days of final approval of this project, the applicant shall deliver to the Planning Division a cashier's check payable to the Orange County Clerk in an amount required to fulfill the fee requirements of Fish and Game Code Section 711.4(d) (2) and the County

administrative fee, to enable the City to file the Notice of Determination required under Public Resources Code 21152 14 Cal. Code Regulations 15075. If it is determined that there will be no impact upon wildlife resources, the fee shall be as required based on the current fee schedule.

4. The applicant agrees to indemnify, hold harmless, and defend the City, its officers, agents and employees from any and all liability or claims that may be brought against the City arising out of its approval of this permit, save and except that caused by the City's active negligence. The City shall promptly notify the applicant of any such claim, action, or proceedings and shall cooperate fully in the defense.
5. The applicant shall comply with all federal, state, and local laws, including all City regulations. Violation of any of those laws in connection with the use may be cause for revocation of this permit.
6. Tentative Tract Map No. 0048-18, Minor Site Plan Review No. 0948-18, and Negative Declaration No. 1859-18 shall become void if not vested within two years from the date of approval. Time extensions may be granted for up to one year, pursuant to OMC Section 17.08.060.
7. Any modifications to the plans including, but not limited to, the landscaping and parking as a result of other Department requirements such as Building Codes, water quality, Fire, or Police shall be submitted for review and approval to the Community Development Director or designee. Should the modifications be considered substantial, the modifications shall be reviewed and approved by the Planning Commission.
8. Except as otherwise provided herein, this project is approved as a precise plan. After any application has been approved, if changes are proposed regarding the location or alteration of any use or structure, a changed plan may be submitted to the Community Development Director for approval. If the Community Development Director determines that the proposed change complies with the provisions and the spirit and intent of the approval action, and that the action would have been the same for the changed plan as for the approved plan, the Community Development Director may approve the changed plan without requiring a new public hearing.
9. The project approval includes certain fees and/or other exactions. Pursuant to Government Code Section 66020, these conditions or requirements constitute written notice of the fees and/or exactions. The applicant is hereby notified that the ninety (90) day protest period commencing from the date of approval of the project has begun. If the applicant fails to file a protest regarding these conditions or requirements, the applicant is legally barred from later challenging such exactions per Government Code Section 66020.
10. Building permits shall be obtained for all construction work, as required by the City of Orange, Community Development Department's Building Division. Failure to obtain the required building permits may be cause for revocation of this entitlement.
11. Prior to issuance of building permits for each parcel, the applicant shall pay all applicable development fees, including but not limited to: City sewer connection, Orange County Sanitation District Connection Fee, Transportation System Improvement Program, Fire Facility, Police Facility, Park Acquisition, Sanitation District, and School District, as required.

12. Grading operations shall be restricted to Monday through Friday between the hours of 7:30 AM and 5:00 PM, with limited grading as necessary permitted on Saturdays between the hours of 8:00 AM and 4:30 PM.

13. All other construction activities shall conform to the City's Noise Ordinance, OMC Section 8.24, and shall be limited to the hours between 7:00 a.m. and 8:00 p.m. Monday through Saturday. No construction activity will be permitted on Sundays and Federal holidays.

14. Plans submitted for building plan review shall comply with the California Fire Code as amended by the City and as frequently amended and in effect at the time of application for Building Permit.

15. Prior to the first building plan review the property owner/developer shall submit plans consistent with the Land Use Application requirements for required entitlements for the development of the individual lots to the Planning Division for review and approval through the proper entitlement process.

Community Services Department:

16. Prior to building permit issuance, landscaping plans for the project shall be designed to comply with the City's Water Efficient Landscape Guidelines as described in Section IX et al of the City of Orange Landscape Standards and Specifications.

17. Prior to grading permit issuance, a landscape plan shall be submitted, the landscape plan shall indicate the location of all exiting trees and indicate which trees will be relocated and/or removed. The proposed project will adhere to the City of Orange Municipal Code and will acquire a tree removal permit.

18. Prior to issuance of a Certificate of Occupancy for each parcel, all landscaping improvements shall be completed to the satisfaction of the Community Service Director and the Community Development Director.

19. Prior to the City accepting the proposed trail as a 'public" trail, the Orange Park Acres Association must be willing to accept the maintenance of the trail.

20. Prior to the issuance of a grading permit, the property owner/developer shall provide an equestrian trail connection from the proposed equestrian trail which terminates on the south end of Lot C to the existing equestrian trail located on the west side of Nicky Way. The equestrian trail connection shall include appropriate equestrian trail street intersection markings, signage and striping consistent with City Standards.

21. Prior to the issuance of a grading permit, the property owner/developer shall provide an equestrian trail connection from the proposed equestrian trail which terminates on the east end of Lot A to the existing equestrian trail located on the western end of the Salem Lutheran Campus. The equestrian trail connection shall be consistent with the City's Trails Master Plan.

22. Prior to City approval of the landscape plans, the applicant shall review the approved Water Quality Management Plan (WQMP) and ensure the proposed landscape plans are consistent with the project grading plans and show the proposed structural storm water treatment Best Management Practices incorporated into the project.

Fire Department:

23. Prior to grading permit issuance provide a Fire Master Plan for the development. Refer to the Orange City Fire Department's Fire Master Plan Guidelines and the California Fire Code (CFC) Chapter 5 for requirements relative to fire apparatus access roadways and water supply.

24. The following information relative to fire apparatus access roadways shall be included on the Fire Master Plan:

    a. Dead-end fire access roadways greater than 150 foot in length shall be provided with an approved fire apparatus turnaround, must meet the turning radii standards contained in the Fire Master Plan Guidelines and item c below. No parking will be permitted in cul-de-sac.

    b. Parking Restrictions - No parking is permitted on roadways that are narrower than 28 feet in width. Parking on one side is permitted on a roadway that is at least 28 feet but less than 36 feet in width. Parking on two sides is permitted on a roadway 36 feet or more in width. These restrictions apply to all roads serving as fire lanes, including those located in Hazardous Fire Areas. See Attachment 3 and include information in the Fire Master Plan.

    c. In areas where the fire access roadway has a change in direction, indicate compliance with the minimum turning radii of 20 foot inside and 50 foot outside. Show turning radii for ingress/egress access from Nicky Way into street "A" and parking restrictions to accommodate the dimensions.

    d. The fire access roadways shall be designed to support the imposed loads of the Orange Fire Department fire apparatus with a total load of 68,000 pounds. The fire apparatus is distributed as 46,000 pounds on the tandem rear axles and 22,000 pounds on the front axle. The fire access roadway shall be designed, constructed and maintained to provide all-weather driving capabilities.

    e. Provide a letter or statement, wet-stamped and signed by a registered engineer on the plans certifying that any new roadway meets the 68,000 pound all weather requirement.

25. Show the locations of all existing fire hydrants public in addition to the proposed fire hydrants:

    a. Show the required fire flow in accordance with the CFC Appendix B, Table B105.1 (2). A reduction in the required fire flow is allowed for buildings provided with an automatic fire sprinkler system as specified in NFPA 13D.

    b. The spacing and number of fire hydrants shall be in accordance with CFC Appendix C, Table C102.1, per required fire flow prior to reduction.

    c. Provide the available fire flow for the fire hydrants nearest to the proposed development fronting the street, to confirm the ability and compliance with the requirements of CFC Appendix B, Table B105.1 (2); report can be attained from Water Department, report must be dated within 12 months.

    d. Additional fire hydrants, at the cost of the developer, may be required after the requested information is reviewed for CFC compliance.

26. The proposed buildings are required to be protected by an automatic fire sprinkler system installed in accordance with CFC Chapter 9, as required by the City of Orange Ordinance 8-16. Note this on the plan.

27. Provide a letter or statement, wet-stamped and signed by a registered engineer on the plans certifying that any new roadway meets the 68,000 pound all-weather requirement.

28. Continue red curb marking to approximately 15' west of the last hydrant at the cul-de-sac in order to achieve continuous turn within cul-de-sac.

29. Largest structure shall be designed to the available fire flow of the new public fire hydrants.

Police Department:

30. Prior to the first building permit issuance, construction plans shall show that all structures shall comply with the requirements of Orange Municipal Code (OMC), Chapter 15.52 Building Security Standards, which relates to the use of specific hardware, doors, windows, lighting, etc. Architectural drawings shall include sections of the Ordinance that apply under "Security Notes". An "Approved Products List 1/17" of hardware, windows, etc. is available upon request.

31. Security and design measures that employ Defensible Space concepts shall be utilized in development and construction plans as described in the City of Orange Building Security Guidelines. These measures incorporate the concepts of Crime Prevention through Environmental Design (CPTED), which involves consideration such as placement and orientation of structures, access and visibility of common areas, placement of doors, windows, addressing and landscaping.

32. The City of Orange Building Security Standards (OMC Section 15.52) and Building Security Guidelines shall be utilized at the time homes are developed and will include requirements for doors, door hardware, lighting, addressing, landscaping, window, and construction site security.

33. At the time homes are developed all residential dwellings shall display a street number in a prominent location on the street side of the residence in such a position that the number is easily visible to approaching emergency vehicles. The numerals shall be no less than four inches in height and shall be of a contrasting color to the background to which they are attached.

34. Any new lighting on the premise shall be installed in such a way to direct, control, and screen the lighting to prevent off site light spillage onto adjoining properties and shall not be a nuisance to any point beyond the exterior boundaries of the property. Prior to issuance of a Certificate of Occupancy, the applicant shall contact the Orange Police Crime Prevention Bureau and set an appointment on-site to test all lighting to ensure it meets OMC standards.

Water Quality

35. Prior to the issuance of any grading permits the applicant shall submit a Priority Project WQMP for review and approval to the Public Works Department that:

    a. Prioritizes the use of Low Impact Development principles as follows: preserves natural features; minimizes runoff and reduces impervious surfaces; and utilizes infiltration of runoff as the method of pollutant treatment. Infiltration BMPs to be considered include the use of permeable materials such as concrete and concrete pavers, infiltration trenches, infiltration planters, and other infiltration BMPs as applicable,

b. Incorporates the applicable Routine Source and Structural Control and Low Impact BMPs as defined in the Model Water Quality Management Plan and Technical Guidance Document,

c. Maintains the hydrologic characteristics of the site by matching time of concentration, runoff, velocity, volume and hydrograph for a 2-year storm event,

d. Minimizes the potential increase in downstream erosion and avoids downstream impacts to physical structures, aquatic and riparian habitat,

e. Generally describes the long-term operation and maintenance requirements for structural and Treatment Control BMPs,

f. Identifies the entity or employees that will be responsible for long-term operation, maintenance, repair and or replacement of the structural and Treatment Control BMPs and the training that qualifies them to operate and maintain the BMPs,

g. Describes the mechanism for funding the long-term operation and maintenance of all structural and Treatment Control BMPs,

h. Includes a copy of the forms to be used in conducting maintenance and inspection activities,

i. Meets recordkeeping requirements (forms to be kept for 5 years).

j. Includes a copy of the form to be submitted annually by the project owner to the Public Works Department that certifies that the project's structural and treatment BMPs are being inspected and maintained in accordance with the project's WQMP.

36. Prior to the recordation of the final tract map, the applicant shall demonstrate the following to the Public Works Department:

a. That all structural and treatment control best management practices (BMPs) described in the Project WQMP have been constructed and installed in conformance with the approved plans and specifications,

b. That the applicant is prepared to implement all non- structural BMPs described in the Project WQMP,

c. That an adequate number of copies of the project's approved final Project WQMP are available for the future occupiers.

37. Prior to the recordation of the final tract map, the applicant shall demonstrate to the satisfaction of Public Works, that the preparer of the WQMP has reviewed the BMP maintenance requirements in Section V of the WQMP with the responsible person and that a copy of the WQMP has been provided to that person. A certification letter from the WQMP preparer may be used to satisfy this condition.

38. Prior to issuance of building permits, the applicant shall review the approved Water Quality Management Plan (WQMP) and grading plan to ensure the structure's downspouts or drainage outlet locations are consistent with those documents. Copies of the building or architectural plans specifically showing the downspouts and drainage outlets shall be submitted to the Public Works Department for review.

39. The project applicant shall maintain all structural, treatment and low impact development BMPs at the frequency specified in the approved WQMP. Upon transfer of ownership or management responsibilities for the project site, the applicant shall notify the City of Orange

Public Works Department of the new person(s) or entity responsible for maintenance of the BMPs.

40. For those projects with Covenants, Conditions and Restrictions (CC&Rs): Prior to recordation of the final map, a copy of the project's CC&Rs shall be provided to the Public Works Department for review and approval that includes requirements for maintenance and funding of the project's structural and treatment water quality best management practices as approved by the City in the project's WQMP.

41. Prior to City approval of the landscape plans, the applicant shall review the approved Water Quality Management Plan to ensure the proposed landscape plans are consistent with the project grading plans and that they show the proposed storm water infiltration devices and other treatment BMP's affecting landscaping areas. A copy of the proposed landscape plans shall be submitted to the Public Works Surface Water Quality Section for review and comments.

42. Prior to the issuance of a grading permit (including grubbing, clearing, surface mining or paving permits as appropriate) the applicant shall demonstrate that coverage has been obtained under the State's General Permit for Storm water Discharges Associated with Construction Activity (General Construction Permit) by providing a copy of the Notice of Intent (NOI) submitted to the State Water Resources Control Board and a copy of the subsequent notification of the issuance of a Waste Discharge Identification (WDID) Number or other proof of filing. A copy of the current SWPPP required by the General Permit shall be kept at the project site and be available for review by City representatives upon request.

Water Division

43. Water Division Standard Conditions shall apply to all water improvement plans submitted to Water Division for review and approval. Please contact Tuan Cao at (714) 288-2475 for water improvements plan preparation, submittal, and fee requirements.

44. Prior to approval of the grading plans, the shown proposed 8-inch water main shall connect to the exiting 18-inch water main in Santiago Canyon Road and not the existing 24-inch main.

45. Prior to approval of the grading plans, move the proposed 8-inch water line from east to west of proposed 8-inch sewer main and provide a minimum of 10-feet clearance horizontally and 1-foot vertically (above sewer main). Or move both the proposed sewer main and water main closer to the RCB.

46. Due to the high pressure in the system for this area (approximately 145 psi), it's required that a new pressure reducing station is installed at the SEC corner of Santiago Canyon Road and Nicky Way to lower the it down to the typical normal operation pressure of less than 120 psi.

47. Prior to approval of the grading plans, all proposed private lateral services including fire hydrant lateral service shall be installed after a City of Orange Water Division approved backflow device and an easement of minimum of three feet clear around the backflow device is approved.

48. Prior to recordation of the final tract map, the applicant shall submit improvement plans to the Water Division for review and approval for any new fire hydrants, domestic water services, fire services, landscape services, and any other proposed improvements or relocations affecting the public water system facilities.

49. Prior to recordation of the final tract map, the applicant shall be responsible for the installation and/or relocation of the proposed or existing public water system facilities to a location and of a design per the improvement plans approved by the Water Division.

50. Prior to recordation of the final tract map, the applicant shall be responsible for the installation of necessary fire hydrants and fire services as approved by the Fire Department and Water Division.

51. Prior to recordation of the final tract map, the Water Division shall approve the type and location of landscaping and fire service (detector check) device for proposed City services.

52. Prior to recordation of the final tract map, construction documents shall show that the installation of sewer mains in the vicinity of water mains is done per the Department of Public Works Water Division Standard No. 113 and will be approved by the Water Division.

53. Prior to recordation of the final tract map, construction documents shall show that a six foot minimum horizontal clearance and a one foot minimum vertical clearance would be maintained between City water mains, laterals, services, meters, fire hydrants and all other utilities except sewer. The Water Division shall review and approve the construction documents.

54. Prior to recordation of the final tract map, construction documents shall show that an eight-foot minimum clearance is provided between City water mains, laterals, services, meters, fire hydrants, signs, or trees or other substantial shrubs and plants as required by the Water Division. The Water Division shall review and approve the construction documents.

55. Prior to first building permit issuance, construction documents shall show that each building will be metered separately unless otherwise approved by the Water Division.

56. Prior to approval of a water improvement plan, the applicant shall satisfy all water main connection, plan check, and inspections charges as determined by the Water Division.

57. Prior to approval of the water improvement plan, the applicant shall satisfy all water construction bond requirements for the installation of the public water system improvements as determined by the Water Division.

58. At least fourteen calendar days prior to commencing construction, the applicant's civil engineer shall prepare and provide product material submittals consistent with the water improvement plans for all proposed public water system facilities to the Water Division per the City of Orange General Water Construction Notes for review and approval.

59. Prior to issuance of a certificate of occupancy, the applicant shall furnish and install individual pressure regulators on new services where the incoming pressure exceeds eighty-pounds per square inch.

60. Prior to the issuance of a certificate of occupancy, the applicant shall furnish two keys, key cards, and/or remote operated keys to the Water Division for locked entrances in order to provide necessary access to public water system facilities within the locked area, unless otherwise approved by the Water Division.

Subdivision:

61. The Final Tract Map shall be recorded within 24 months after tentative approval and satisfaction of all conditions of approval including the construction of all public and private

infrastructure or providing securities for the construction thereof. Show and identify all existing and proposed utilities (gas, electric, telephone, sewer, etc) along Nicky Way.

62. Minimum curb return radius is 32 feet for intersection with Santiago Canyon Road. All other local streets shall have a minimum curb return radius of 25 feet.
63. Prior to recordation of the final tract map Street "A" cul-de-sac turning radius subject to approval by the Fire Department.
64. Coordinate intersection improvements including utilit-compliant sidewalk access ramps and corner cut-off dedications at Santiago Canyon Road and Nicky Way with the proposed traffic signalization for The Trails as Santiago Creek.
65. Maintain a minimum 10-foot separation between proposed water line and sewer per OWD-113.
66. Prior to recordation of the final tract map all public utility lines (water, sewer, etc.) shall be underground and within street right-of-way/easements.
67. Proposed sewer main line shall be shortest possible connection to OCSD main line
68. Prior to recordation of the final tract map street improvements along Santiago Canyon Road and Nicky Way shall be per City Standard Plans. Street "A" shall be private.
69. Prior to recordation of the final tract map street lighting shall be required along the Santiago Canyon Road, and Nicky Way as part of the public improvements. Street lighting along Street A will be privately owned. Contact Mr. Jimmy Rocha at (714) 532-6477 for further details.
70. Prior to recordation of the final tract map "Street A" shall be a private street and should be labeled as a private street.
71. Prior to recordation of the final tract map the developer shall grant City easement for utility purposes over Street A.
72. Prior to recordation of the final tract map coordinate with Community Services the recreational trail dedications adjacent to the proposed tract including connectivity to the existing trail on the south side of Santiago Canyon Road east of the tract, and the crossing from the east side of Nicky Way to the existing trail on the west side.
73. Prior to recordation of the final tract map the sidewalk along the south side of Santiago Canyon Road shall have a 5-foot concrete walk and 3-foot parkway.
74. Sewer service will be tributary to the OCSD on Santiago Canyon Road, a sewer study should be provided along with a "Will Serve" letter from OCSD.
75. Sanitary sewer system connecting from the buildings to public mainline shall be private and maintained by the property owner.
76. Submit a grading plan in compliance with City standards for review and approval by the Public Works Director. All grading and improvements on the subject property shall be made in accordance with the Manual of Grading and Standard Plans and Specifications to the satisfaction of the Public Works Director. The applicant may be required to include Phased Erosion and Sediment Control Plans, Site Demolition Plan, and Utility Plan as parts of the grading.
77. A geotechnical report shall be required and accompany the grading plan review.

78. Submit a hydrology study per OCHM Methodology. Show that 100-year flood elevation level to confirm there is a one-foot freeboard to the building finished floor level.

79. Prior to recordation of the final tract map storm drain improvements shall be provided accordingly per hydrology study.

80. Prior to recordation of the final tract map show how surface runoff will be collected and conveyed from the proposed sloped areas on all lots specially Lots 3, 4, & 5.

81. Prior to recordation of the final tract map the proposed utilities, including water and sewer shall be public utilities.

82. No public utility shall be within any proposed lot/parcel.

83. Finished floor elevations shall have 1-foot freeboard above the 100-year flood elevation level.

84. Prior to recordation of the final tract map the project proponent shall complete all right-of-way/easement street/utilities/recreational dedications with Public Works Department.

85. Prior to recordation of the Final Map, monuments shall be set based on a field survey.

86. A monument bond deposit shall be required to insure completion of field survey.

87. The CC&R's shall be subject to a joint review by the Community Development Director, Public Works Director, and City Attorney. The applicant shall be required to pay for the review of the CC&R's by the City Attorney, Public Works Director and the Community Development Director at City's hourly billing rate prior to recordation of the Final Map.

88. The CC&R's or reciprocal access and drainage agreement shall be recorded prior to or at the same time as the first final map.

89. All work within public right-of-way and public utility easements will require Encroachment Permits, including sidewalk and driveway construction and utility main and lateral construction.

90. All public infrastructures, including street sections, sidewalks, driveway aprons, and utilities shall comply with City of Orange Standard Plans and Specifications or as approved by the Public Works City Engineer.

91. Utilities serving the development, such as electric, cable television, street lighting and communication shall be installed underground, completed and approved by the appropriate utility provider, prior to the issuance of a certificate of occupancy.

92. Prior to recordation of the final tract map ADA compliant sidewalk access ramps conforming to Public Works Engineering Standard Plan 121 shall be required at all intersections and pedestrian crossing within and adjacent to the tract.

93. The applicant shall remove unused driveway approaches and restored them to full height curb and gutter, including any sidewalk restoration at the driveway apron.

94. Driveway aprons shall conform to Public Works Standard Plan 115 for commercial driveway with ADA accessibility.

95. All private ways shall conform to Engineering Standard Plan 108.

96. All driveway approaches shall conform to ADA standard for wheelchair access conforming to Public Works Standard Plans 115 and 116.

97. The developer shall be required to upgrade existing sidewalks to meet current standard along Santiago Canyon Road and Nicky Way per City of Orange Engineering Standard Plan 118 [Case 2 with 5 feet of concrete sidewalk and 3 feet of parkway.

98. An unobstructed pedestrian access way of 5 feet width shall be maintained at all time for the sidewalk. The unobstructed access shall increase to 6 feet when there is no planting strip between the sidewalk and the street curb.

99. Provide adequate wheelchair accessibility around driveway aprons that do not conform to current ADA standards.

100. Cracked, uneven, or damaged public sidewalks, curbs and gutters along property frontages shall be repaired.

101. The developer shall be required to install street trees as required by City of Orange Public Works Department.

102. All landscaping shall include the installation of root barriers on the sidewalk side of trees, or where conditions warrant, the installation of Deep Root boxes as directed by the Community Services Department, prior to final map recordation.

103. The applicant shall pay a sewer in-lieu fee to City of Orange Department of Public Works to cover the fair-share cost of future upgrades to substandard or deficient sewer mains.

104. Prior to building permit issuance for each parcel, the applicant shall pay grading to City of Orange Department of Public Works Subdivision in accordance with their regulations and available options.

105. Prior to recordation of the final tract map sewer laterals serving each parcel shall be constructed as part of the sewer improvements. The sewer laterals from the property line connecting to the public mainline shall be private and maintained by the property owner.

106. Any private sewer system connecting directly to Orange County Sanitation District (OCSD) lines without using City of Orange sewer systems shall require a Permit from OCSD.

107. The contractor shall obtain a grading permit from the Public Works Department prior to start of any site grubbing or grading.

108. An approval by the City Council is required prior to import or export of soil exceeding 30,000 cubic yards. A dirt haul route shall be approved by the City Council and the travel path is subjected to pavement deterioration evaluation.

109. Any soil imported or exported shall require a Transportation Permit from Public Works Traffic Division, prior to issuance of a grading permit.

110. Upon submittal of a grading plan for plan check, the applicant shall submit a deposit to cover plan check and inspection services related to the grading activities, prior to grading permit issuance.

111. The grading plan shall detail all of the locations where retaining walls will be constructed. Geometric detail of retaining walls shall be shown on the grading plan, including material type, dimensions, backfill, and subdrains. A building permit is also required for retaining walls over 4 feet in height measured from the bottom of the footing to the top of the wall prior to construction. Structural details and design calculations shall be submitted as a separate document and will be reviewed and permitted by City Building Division, prior to issuance of a grading permit.

112. Prior to grading permit issuance, any grading outside of the owner's property boundary shall require the applicant to either obtain a temporary construction easements or permission by adjacent property owners in a form suitable to the Public Works Director.

113. Applicant shall show all sewer and storm drain lines on the Grading Plan. Other utility lines, such as water lines, may also be shown on Grading Plan for reference.

114. Applicant shall submit approved sewer capacity analysis and will serve letter.

115. Applicant shall show all structural BMPs for water quality purposes on the grading plan. Water quality features shown on the grading plan must match the WQMP.

116. Any direct storm water discharge into the Orange County Flood Control (OCFD) channels shall require a Permit from OCFD.

117. The property owner shall maintain in good condition, all on-site driveways where heavy-duty trucks would travel.

118. Prior to building foundation construction, a Certificate Letter of Line and Grade shall be submitted to the Public Works Construction Inspector demonstrating that the site grading and pad elevation are completed according to the grading plan.

119. Prior to issuance of building permits, the applicant shall submit an address number request, including an addressing plan, to the Public Works Department for review and approval.

120. Prior to the issuance of any grading permits the development shall provide rural road standards with minimum pavement sections, no curbs, gutters, or sidewalks.

121. Prior to the issuance of any grading permits the development shall not provide street lighting. Instead the development shall provide for low-level rural character lighting as part of the individual architecture style when submitting for building plan check.

ADOPTED this 13th day of November 2018.

Teresa E. Smith, Mayor, City of Orange

ATTEST:

Robert Zornado, Chief Clerk, City of Orange

STATE OF CALIFORNIA)
COUNTY OF ORANGE)
CITY OF ORANGE)

I, ROBERT ZORNADO, Chief Clerk of the City of Orange, California, do hereby certify that the foregoing Resolution was duly and regularly adopted by the City Council of the City of Orange at a regular meeting therefore held on the 13th day of November 2018, by the following vote:

AYES:	COUNCILMEMBERS:	Alvarez, Whitaker, Smith, Murphy, Nichols
NOES:	COUNCILMEMBERS:	None
ABSTAIN:	COUNCILMEMBERS:	None
ABSENT:	COUNCILMEMBERS:	None

Robert Zornado, Chief Clerk, City of Orange

Appendix B:
Educational Materials

POOL AND SPA DRAINAGE

Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is **not treated or cleaned** before entering our waterways and should never contain any pollutants. Many pools and spas are plumbed to drain directly to the sanitary sewer. If yours is not, you must take necessary steps before draining to landscaped areas or into the storm drain.

While the focus of this brochure is pools and spas, these requirements also apply to water features and fountains.

Who is H_2OC?

H_2OC is YOU. H_2OC is also a cooperative stormwater program which includes all 34 cities in Orange County, the County of Orange, and Orange County Flood Control District (OCFCD). Clean and healthy beaches, creeks, rivers, bays, wetlands, and ocean are important to Orange County. H_2OC provides resources to residents and businesses to encourage personal action and prevent polluted runoff from entering our waterways.

Join Us

Visit **h2oc.org** to learn more about runoff, water pollution, and how you can be the solution to runoff pollution and protect our water resources.

Contact

24-hour Pollution Reporting Hotline:
1-877-89-SPILL (1-877-897-7455)

24-hour Reporting Website:
myOCeServices.ocgov.com

For emergencies, dial 911

PROPER MAINTENANCE OF POOLS & SPAS TO PROTECT OUR WATERWAYS

H_2OC®
STORMWATER PROGRAM

PROPER DISPOSAL

When you cannot dispose of pool and spa water in the sanitary sewer, the release of dechlorinated pool and spa water to a landscaped area or in the storm drain system is allowed only if these parameters are met:

- ☑ Some cities may have ordinances that do not allow pool water disposal into a storm drain. Find your city's stormwater page here: h2oc.org/cities to check regulations.
- ☑ pH is between 6.5 and 8.5.
- ☑ Residual chlorine does not exceed 0.1 mg/L (parts per million).
- ☑ Water is clean and clear, free of any unusual coloration, dirt, or algae.
- ☑ There is no discharge of filter media or acid cleaning wastes.

Saltwater pools must be discharged to the sanitary sewer, landscaped areas, or other pervious surfaces that can accommodate the volume of water. Alternatively, they can be discharged directly to a naturally saline body of water.

Disposal Process

- When possible, discharge all water to the sanitary sewer.
- Monitor the drain hose to prevent leakage.
- Remove trash and debris in the flow path between the pool or spa and storm drain.
- Monitor the rate of flow to ensure that draining the pool or spa does not cause erosion or flooding.

PROPER MAINTENANCE

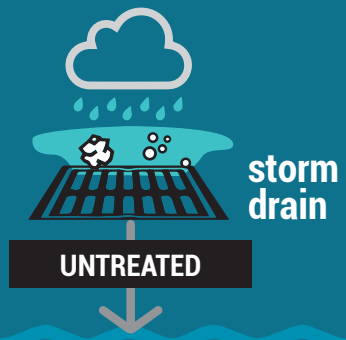
- To prevent vectors and algae do not allow dechlorinated water to stand for more than 72 hours.
- Clean your pool regularly, maintain consistent and adequate chlorine or sodium bromide levels, monitor pH levels, and maintain your filtration and circulation system.
- Rinse pool filters and diatomaceous earth filters in landscaped areas where water and debris can readily soak into the soil.
- When draining pools or rinsing filters to a landscaped area, cover any landscape drains to prevent water from reaching the storm drain system.
- Used diatomaceous earth should be tossed in with solid garbage. It should never be discharged into storm drains or any place where it may wash into streams, rivers, or the ocean.
- Store chemicals indoors.

HOW TO KNOW IF YOU ARE FOLLOWING THE STANDARDS

You can find out how much chlorine is in your water by using a pool testing kit. Before discharging, reduce chlorine to 0.1 mg/L by discontinuing its use for a few days, or by using dechlorinating chemicals purchased from a local pool supply company. Always follow the instructions that come with any products you use.

DOING YOUR PART

By following these requirements, you will make a significant contribution towards keeping pollutants out of Orange County's waterways. You can help protect organisms that are sensitive to pool chemicals and maintain the health of our environment.



OCEAN

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

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

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

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

For emergencies, dial 911.

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

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Tips for Projects Using Paint

Tips for Projects Using Paint

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

Purchasing Paint

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

Painting

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

Cleaning

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

Storing Paint

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

Alternatives to Disposal

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

Disposing of Paint

- Never put wet paint in the trash.

For water-based paint:

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

For oil-based paint:

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

Aerosol paint:

- Dispose of aerosol paint cans at a HHWCC.

Spills

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

PROJECT Pollution PREVENTION

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

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

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

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

Please do not mix your oil with other substances!

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

For information about the proper disposal of household hazardous waste, call the Household Waste Hotline at (714) 834-6752 or visit www.oclandfills.com.

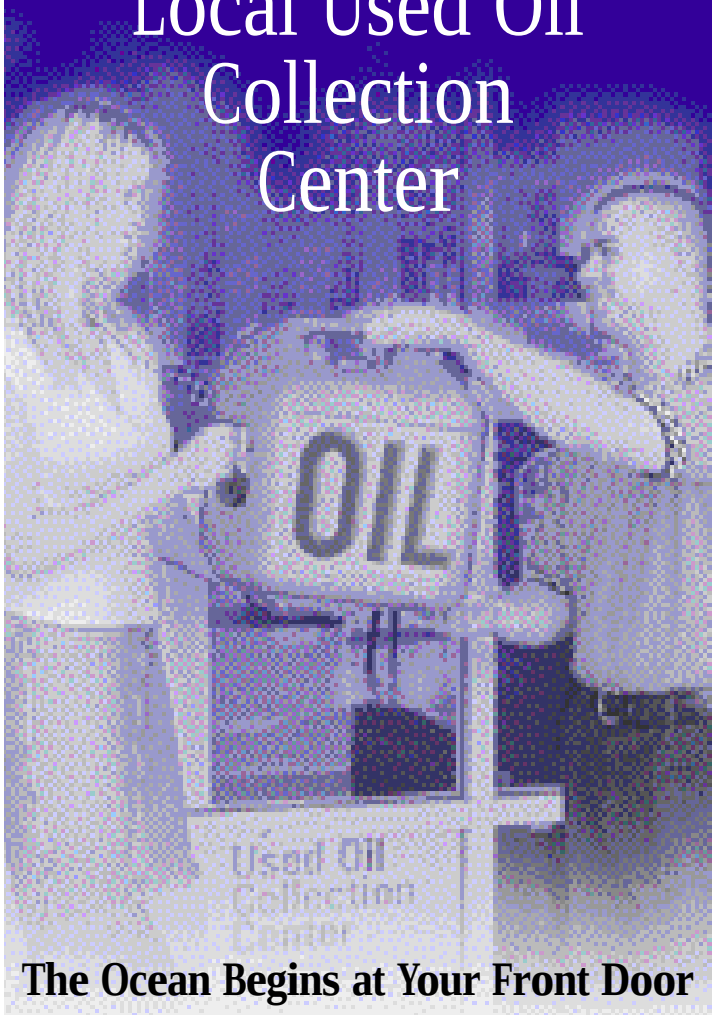
RECYCLE USED OIL

For additional information about the nearest oil recycling center, call the Used Oil Program at 1-800-CLEANUP or visit www.cleanup.org.

DTP113 Rev 8/03
printed on recycled paper

Help Prevent Ocean Pollution:

Recycle at Your Local Used Oil Collection Center



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

CENTRAL COUNTY

Used Oil Collection Centers

Balboa

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

Balboa Island

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

Corona Del Mar

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

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

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

Costa Mesa

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

Big O Tires #5571
3181 Harbor Blvd., Costa Mesa, CA 92626
(949)443-4155( )
CIWMB#: 30-C-04676

Big O Tires #694
322 E. 17th St., Costa Mesa, CA 92627
(949)642-4131( )
CIWMB#: 30-C-05811

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

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

EZ Lube Inc #15
3599 Harbor Blvd., Costa Mesa, CA 92626
(714)966-1647( )
CIWMB#: 30-C-03137

EZ Lube Inc #46
400 E 17th St., Costa Mesa, CA 92627
(714)556-1312( )
CIWMB#: 30-C-05779

EZ Lube Inc. #44
2248 Harbor Blvd., Costa Mesa, CA 92627
(714)556-1312( )
CIWMB#: 30-C-05737

Firestone Store #71T7
475 E 17th St., Costa Mesa, CA 92627
(949)646-2444( )
CIWMB#: 30-C-02120

Jiffy Lube #1969
300 E 17th St., Costa Mesa, CA 92627
(949)548-2505( )
CIWMB#: 30-C-05553

Jiffy Lube #1970
2175 Newport Blvd., Costa Mesa, CA 92627
(949)548-4150( )
CIWMB#: 30-C-05554

Jiffy Lube #607
2255 Fairview Rd., Costa Mesa, CA 92627
(949)650-5823( )
CIWMB#: 30-C-05551

Jiffy Lube #861
375 Bristol St., Costa Mesa, CA 92626
(714)557-5823( )
CIWMB#: 30-C-05552

Kragen Auto Parts #0725
1739 Superior Ave., Costa Mesa, CA 92627
(949)642-3384( )
CIWMB#: 30-C-02624

Kragen Auto Parts #0796
1175 Baker Blvd., Unit E, Costa Mesa, CA 92626
(714)662-2005( )
CIWMB#: 30-C-02664

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

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

Pep Boys #660
2946 Bristol St., Costa Mesa, CA 92626
(714)549-1533( )
CIWMB#: 30-C-03416

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

Scher Tire Inc #15 dba Goodyear Tire
1596 Newport Blvd., Costa Mesa, CA 92627
(949)548-9384( )
CIWMB#: 30-C-03034

Fountain Valley

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

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

Kragen Auto Parts #0734
9880 Warner Ave., Fountain Valley, CA 92708
(714)964-6427( )
CIWMB#: 30-C-02609

Kragen Auto Parts #1505
16147 Harbor Blvd., Fountain Valley, CA 92708
(714)531-8525( )
CIWMB#: 30-C-04125

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

Purrfect Auto Service #10
16780 Harbor Blvd., Fountain Valley, CA 92708
(714)839-3899( )
CIWMB#: 30-C-01380

Huntington Beach

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

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

Big O Tires #553
19411 Beach Blvd., Huntington Beach, CA 92648
(714)536-7571( )
CIWMB#: 30-C-00970

Econo Lube N' Tune #26
19961 Beach Blvd., Huntington Beach, CA 92648
(714)536-6519( )
CIWMB#: 30-C-06117

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

EZ Lube Inc #16
7361 Edinger Ave., Huntington Beach, CA 92647
(714)899-3600( )
CIWMB#: 30-C-03289

EZ Lube Inc. #79
9862 Adams St., Huntington Beach, CA 92647
(714)556-1312( )
CIWMB#: 30-C-06547

Firestone Store #71T5
16171 Beach Blvd., Huntington Beach, CA 92647
(714)847-6081( )
CIWMB#: 30-C-02118

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

Jiffy Lube #1857
8971 Warner Ave., Huntington Beach, CA 92647
(714)596-7213( )
CIWMB#: 30-C-05053

Kragen Auto Parts #1468
10072 Adams Ave., Huntington Beach, CA 92646
(714)593-6156( )
CIWMB#: 30-C-04284

Kragen Auto Parts #1511
7171 Warner Ave., Huntington Beach, CA 92647
(714)842-4531( )
CIWMB#: 30-C-04129

Kragen Auto Parts #1633
18888 Beach Blvd., Huntington Beach, CA 92648
(714)965-2353( )
CIWMB#: 30-C-02645

Oilmax 10 Minute Lube/Wash
9862 Adams Ave., Huntington Beach, CA 92646
(714)964-7110( )
CIWMB#: 30-C-03219

Pep Boys #799
19122 Brookhurst St., Huntington Beach, CA 92646
(714)964-0777( )
CIWMB#: 30-C-03439

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

R Kids Tire and Service #6
5062 Warner Ave., Huntington Beach, CA 92647
(714)846-1189( )
CIWMB#: 30-C-05691

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

USA Express Tire & Service Inc
7232 Edinger Ave., Huntington Beach, CA 92647
(714)842-0717( )
CIWMB#: 30-C-04429

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

Irvine

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

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

Jiffy Lube #1856 Irvine Spectrum
8777 Irvine Center Dr., Irvine, CA 92618
(949)753-0485( )
CIWMB#: 30-C-06094

Jiffy Lube #1988
3080 Main St., Irvine, CA 92614
(714)961-5491(27)
CIWMB#: 30-C-04450

Kragen Auto Parts #4174
15315 Culver Dr., Ste.#170, Irvine, CA 92604
(602)631-7115( )
CIWMB#: 30-C-06417

Newport Beach

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

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

Orange

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

Big O Tires #570
1825 E Katella Ave., Orange, CA 92867
(714)538-0016( )
CIWMB#: 30-C-00974

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

EZ Lube #74
3232 Chapman Ave. #E, Orange, CA 92869
(714)556-1312(106)
CIWMB#: 30-C-06627

Firestone Store #7185
1690 N Tustin Ave., Orange, CA 92867
(714)282-8144( )
CIWMB#: 30-C-0122

Jiffy Lube #1457
433 W. Katella Ave., Orange, CA 92867
(714)720-5757( )
CIWMB#: 30-C-06280

Kragen Auto Parts #1764
910 Tustin St., Orange, CA 92867
(714)771-3000( )
CIWMB#: 30-C-02625

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

Pep Boys #806
215 E Katella Ave., Orange, CA 92867
(714)997-1540( )
CIWMB#: 30-C-01759

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

Scher Tire #33
1821 E. Katella Ave., Orange, CA 92867
(909)343-3100( )
CIWMB#: 30-C-06324

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

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

Tony's Fuel and Towing
1650 W La Veta Ave., Orange, CA 92868
(714)953-7676( )
CIWMB#: 30-C-00868

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

Santa Ana

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

Archie's Tire & Towing
4518 Westminster Ave., Santa Ana, CA 92703
(714)636-4518( )
CIWMB#: 30-C-02058

AutoZone #3320
2007 S. Main St., Santa Ana, CA 92707
(901)495-7217( )
CIWMB#: 30-C-06508

AutoZone #5232
430 W 17th Santa Ana, CA 92706
(714)547-7003( )
CIWMB#: 30-C-04609

AutoZone #5538
1101 S Bristol Santa Ana, CA 92704
(714)241-0335( )
CIWMB#: 30-C-00829

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

Big O Tires #712
1302 E. 17th St., Santa Ana, CA 92705
(714)541-6811( )
CIWMB#: 30-C-05813

Firestone Store #7175
3733 S Bristol Santa Ana, CA 92704
(714)549-4015( )
CIWMB#: 30-C-01223

Firestone Store #71TA
101 S Main St., Santa Ana, CA 92701
(714)542-8857( )
CIWMB#: 30-C-02123

Firestone Store #71W6
2005 N Tustin Ave., Ste A, Santa Ana, CA 92705
(714)541-7977( )
CIWMB#: 30-C-03688

Guaranty Chevrolet Motors Inc.
711 E 17th St., Santa Ana, CA 92701
(714)973-1711(277)
CIWMB#: 30-C-06506

Jiffy Lube #1303
2025 N. Tustin Santa Ana, CA 92701
(714)720-5757( )
CIWMB#: 30-C-06283

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

Kragen Auto Parts #0736
1302 E 17th St., Santa Ana, CA 92705
(714)953-6061( )
CIWMB#: 30-C-02610

Kragen Auto Parts #1253
1400 W Edinger Ave., Santa Ana, CA 92704
(714)754-1432( )
CIWMB#: 30-C-02627

Kragen Auto Parts #1376
521 W 17th St., Santa Ana, CA 92706
(714)543-4492( )
CIWMB#: 30-C-03901

Kragen Auto Parts #1516
2337 S Bristol Ave., Santa Ana, CA 92704
(714)557-0787( )
CIWMB#: 30-C-04106

Kragen Auto Parts #1648
1015 S Main St., Santa Ana, CA 92701
(714)568-1570( )
CIWMB#: 30-C-05664

Pep Boys #609
120 E 1st St., Santa Ana, CA 92701
(714)547-7477( )
CIWMB#: 30-C-01738

Pep Boys #802
1107 S Harbor Blvd., Santa Ana, CA 92704
(714)775-0828( )
CIWMB#: 30-C-01739

Purrfect Auto Service
2519 S Main St., Santa Ana, CA 92707
(714)549-7900( )
CIWMB#: 30-C-02085

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

Scher Tire #28
1805 N Grand Ave., Santa Ana, CA 92705
(714)558-8644( )
CIWMB#: 30-C-03225

Tustin

Big O Tires #555
131 E 1st St., Tustin, CA 92780
(714)544-9431( )
CIWMB#: 30-C-00972

EZ Lube #42
12972 Newport Ave., Tustin, CA 92780
(714)556-1312( )
CIWMB#: 30-C-06408

Jiffy Lube #1406
3087 Edinger Ave., Tustin, CA 92780
(949)651-8814( )
CIWMB#: 30-C-03778

Kragen Auto Parts #1533
502 B E 1st St., Tustin, CA 92780
(714)544-9249( )
CIWMB#: 30-C-04128

Scher Tire Inc #17 dba Goodyear Tire
14511 Redhill Ave., Tustin, CA 92780
(714)832-6011( )
CIWMB#: 30-C-03035

Villa Park

Phil's Villa Park 76
17771 Santiago Blvd., Villa Park, CA 92861
(714)637-0854( )
CIWMB#: 30-C-06579

This information was provided by the County of Orange Integrated Waste Management Department and the California Integrated Waste Management Board (CIWMB).

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.

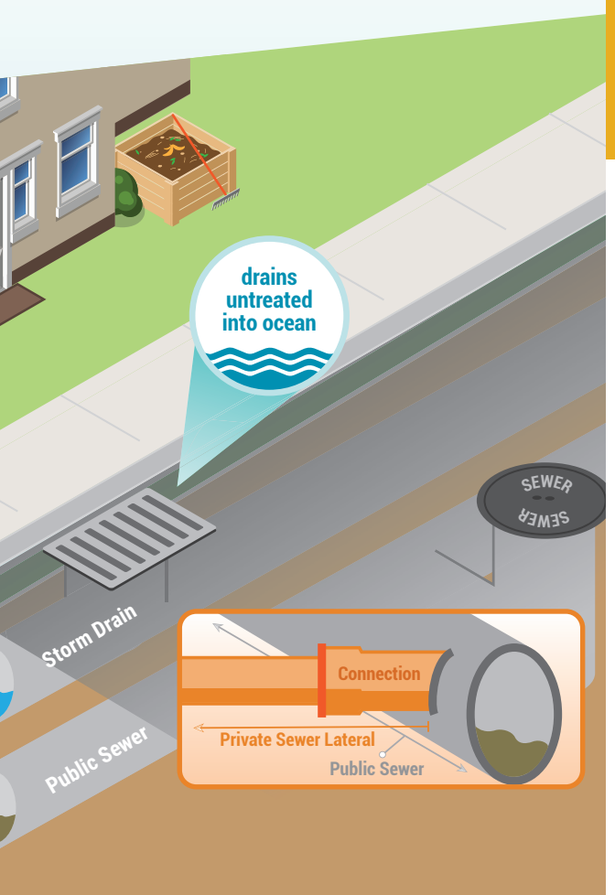
Empty pesticide containers should be triple rinsed prior to disposing of them in the trash.

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

PROJECT Pollution PREVENTION

Sewer System Maintenance

Property owners are responsible for maintaining their private laterals from the connection at the home or business to the connection with the public sewer; this can include areas under the sidewalk and the street. Inadequate maintenance of laterals can result in sewer backups and spills. Operation and maintenance of the local, public, and regional sewer lines, on the other hand, are the responsibility of the sewer agency. Visit the link inside for agency contact information.



Who is H_2OC?

H_2OC is YOU! H_2OC is also a cooperative stormwater program which includes all 34 cities in Orange County, the County of Orange, and Orange County Flood Control District (OCFCD). Clean and healthy beaches, creeks, rivers, bays, wetlands, and ocean are important to Orange County. H_2OC provides resources to residents and businesses to encourage personal action and prevent polluted runoff from entering our waterways.

Join Us

Visit **h2oc.org** to learn more about runoff, water pollution, and how you can be the solution to runoff pollution and protect our water resources!

Contact

24-hour Pollution Reporting Hotline:
1-877-89-SPILL (1-877-897-7455)

24-hour Reporting Website:
myOCeServices.ocgov.com

For emergencies, dial 911

HOW TO PREVENT & REPORT SEWAGE SPILLS

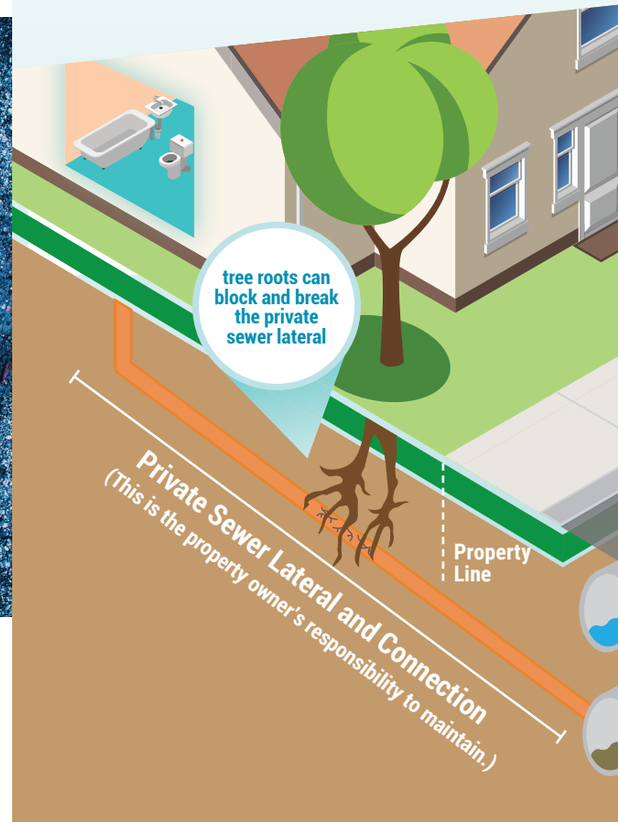
A PROPERTY OWNER'S GUIDE TO PRIVATE SEWER LATERALS

H_2OC STORMWATER PROGRAM

Developed in Collaboration with Orange County's Sewer Agencies

The Sanitary Sewer System

Every property with sewer service owns a private sewer line, also known as a "private lateral." The private lateral carries wastewater from indoor plumbing fixtures, like toilets, sinks, and dishwashers, to the public sewer line under the street. The sewer system transports wastewater to treatment plants before being released. It is important to maintain your private laterals to prevent sewage spills that can reach our storm drains. Unlike water in sanitary sewers, water that flows into storm drains is **not treated** before entering our waterways and should never contain sewage.



Backups and Sewage Spills

Sewage spills and backups occur when the wastewater being transported is blocked and overflows or leaks out of broken pipes inside or outside of your building. Once out of the pipe, the sewage can discharge to the curb, gutter, and storm drain system, which flows to local waterways. Sewage spills can cause health hazards, beach closures, damage to homes and businesses, and threaten the quality of our local waterways. As a property owner, if sewage from your property discharges to a gutter or storm drain, you may be subject to fines, penalties, or increased rates.

Common Causes

BLOCKAGES

Common causes of blockages include

- Flushing anything other than toilet paper, including: wipes (even those advertised as "flushable"), feminine products, rags, and other items.
- Fats, oils, and grease (FOG) can get into the private lateral from household drains, as well as from poorly maintained commercial grease traps and interceptors.
- Tree roots can find their way into cracked or broken sewer laterals and cause blockages.

STRUCTURAL PROBLEMS

Common structural problems include

- Broken/cracked pipes.
- Deteriorated, missing, or broken cleanout caps.
- Aging or undersized sewers.

Keep Your Private Laterals Functioning Properly

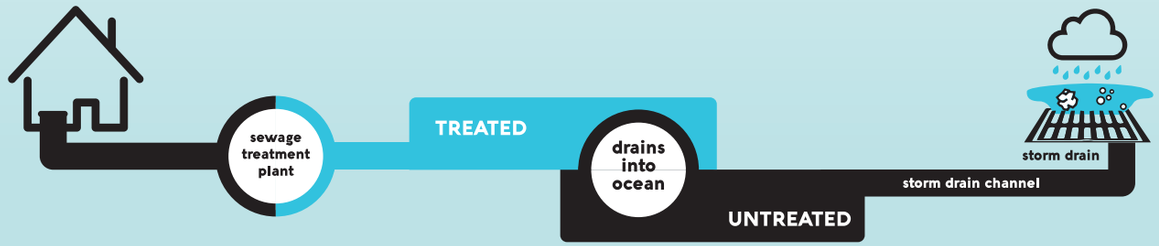
Prevent Blockages

Remember, **the drain is not a dump!**

- Only flush toilet paper down the toilet.
- Use a mesh sink strainer to catch food scraps before they go down the drain.
- Scrape food scraps into a designated food waste/organics receptacle before rinsing dishes and utensils in the sink.
- After cooking at home, let grease cool then pour or scrape it into a metal can. When the can is full, dispose of grease properly.
- For businesses, grease traps or interceptors must be serviced regularly. Have spill kits readily available for cleaning up spills.
- Do not plant trees or large shrubs above or within several feet of your sewer laterals.

Structural Maintenance

- Contact a licensed plumber to determine the optimal maintenance schedule.
- Perform periodic cleaning to eliminate grease, debris, and roots from private laterals.
- Repair or replace deteriorated or damaged private laterals as soon as possible.
- Install a backflow device to prevent sewage from ending up in your home or business.



Identify & Report Sewage Spills or Backups

Know the Signs

Sewage spills can cause damage to your property, the environment, and our local waterways. Look for potential signs of a spill, which may include:

- Drains are operating slower than normal and continuing to slow over time.
- Drains backup inside of buildings.
- Unusually wet or soggy ground in your yard that may be accompanied by odors.
- Leakage from sewer cleanouts, outside drains, or manhole lids.

Report Sewage Spills Immediately

- If you suspect a sewer backup or leak, contact a licensed plumber.
- If you observe a sewer spill from a cleanout or manhole, contact your sewer agency.
- Plumbers should contact the sewer agency prior to pushing roots from private sewer laterals to the sewer main.

Alternatively, you can contact the **24-Hour Pollution Reporting Hotline** by calling **1-877-89-SPILL (1-877-897-7455)** or visiting **myOCeServices.ocgov.com.**

Spill Control & Containment

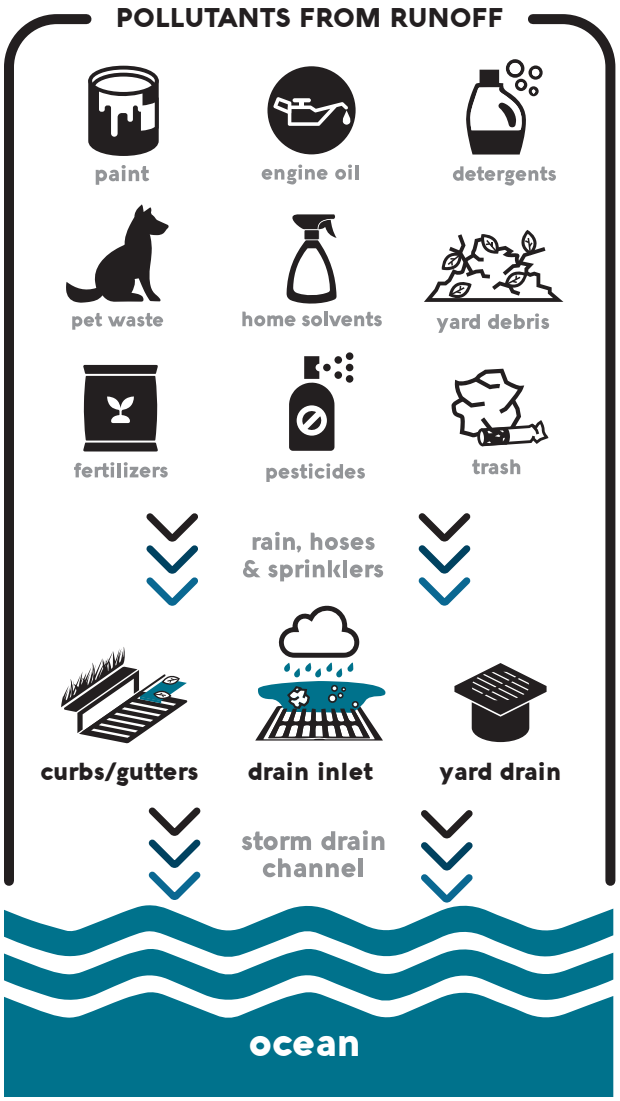
- Turn off main water supply or stop all water use.
- Have a plumbing professional clear the blockage and make necessary repairs.
- Keep people and pets away from the affected area.
- When safe, place sandbags or other material in the flow path of the spill to control, contain, and prevent sewage from entering the storm drain system.

Sewer overflow

Plumber making repairs on private lateral

What Common Pollutants are Found in Runoff?

Common runoff pollutants include trash, pet waste, yard debris, fertilizer, pesticides, engine oil, paint, home solvents, and detergents. Continue reading to learn how these pollutants affect our water resources and what you can do to help.



Who is H_2OC?

H_2OC is YOU! H_2OC is also a cooperative stormwater program which includes all 34 cities in Orange County, the County of Orange, and Orange County Flood Control District (OCFCD). Clean and healthy beaches, creeks, rivers, bays, wetlands, and ocean are important to Orange County. H_2OC provides resources to residents and businesses to encourage personal action and prevent polluted runoff from entering our waterways.

Join Us

Visit **h2oc.org** to learn more about runoff, water pollution, and how you can be the solution to runoff pollution and protect our water resources!

Contact

24-hour Pollution Reporting Hotline:
1-877-89-SPILL (1-877-897-7455)

24-hour Reporting Website:
myOCeServices.ocgov.com

For emergencies, dial 911

*For more information on household hazardous waste centers go to www.oclandfills.com/hazardous or call (714) 834-4000

**UCCE Master Gardeners: ucceocmghotline@ucanr.edu
mgorange.ucanr.edu/Gardening_Hotline/

YOU ARE THE SOLUTION TO RUNOFF POLLUTION

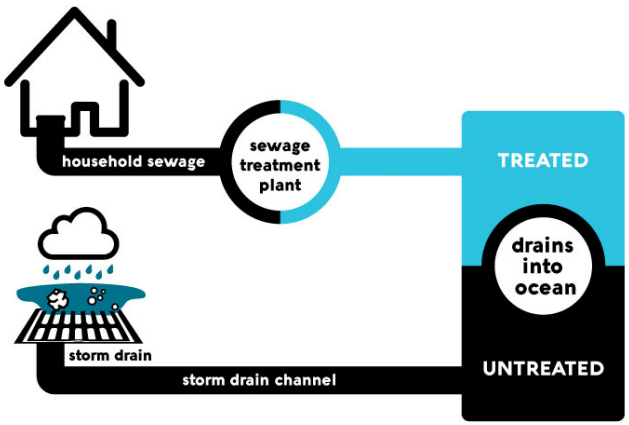
H_2OC STORMWATER PROGRAM

What is Runoff?

Runoff is water from rain and outdoor water use that drains from roofs, driveways, sidewalks, and other surfaces, which does not soak into the ground. As runoff flows over surfaces it will pick up and carry pollutants it encounters, many of which come from waste we produce or mishandle. In Orange County, runoff is captured by storm drains where it flows untreated to the ocean.

Water that flows into storm drains is NOT TREATED

Runoff from homes and businesses may contain pollutants that have harmful effects on downstream creeks, rivers, bays, and ocean. Unlike household sewage, this water is not treated and can negatively impact recreational use, wildlife habitat, and even human health.



TRASH

If trash such as cigarette butts, straws, cups, and other debris enter our waterways, it can create water flow problems and contaminate aquatic habitats. Always properly dispose of waste and recyclables and secure your trash can lid to prevent trash from being released into the environment.

ENGINE OIL

If engine oil enters our waterways, aquatic animals and plants can be negatively affected. It is important to repair leaking vehicles as soon as possible. Clean affected areas utilizing absorbents available at auto and home supply stores. Be sure to follow manufacturer's directions for proper use and disposal of absorbent. Used engine oil can be disposed at a Household Hazardous Waste Center (HHWC*) or where oil was purchased.

PET WASTE

Pet waste is a threat to human and environmental health because it contains harmful bacteria and pathogens. Being a responsible pet owner means picking up after your pet on walks and in your yard, especially before it rains.

YARD DEBRIS

If yard debris reaches local waterways, it can obstruct stormwater flow, clog storm drains, and cause other problems like flooding and erosion. Be sure to collect all debris when doing yard work and properly dispose of it in a green waste bin, or better yet, compost it.

FERTILIZER

If improperly applied, fertilizers can enter our waterways and cause ecological problems. For proper application, follow the manufacturer's instructions and stop applying fertilizers 48 hours before a forecasted rain event.

PESTICIDES

If pesticides, which include herbicides, insecticides, fungicides, and rodenticides, enter our waterways, they can be dangerous to human health and aquatic life. Be sure to limit pesticide use by using nonchemical methods or least-toxic pesticides whenever possible and contact the University of California Cooperative Extension (UCCE) Master Gardeners** with any questions. To properly apply pesticides, follow the manufacturer's instructions and stop applying 48 hours before a forecasted rain event.

PAINT

Paints, and related materials, contain a wide range of chemicals. These products should never be put in storm drains, sewers or septic systems. Instead, dispose of unused paint at your local HHWC*.

DETERGENTS

If phosphorus from detergents enters our waterways, it can cause ecological problems, including fish kills. Additionally, detergents can remove the protective mucous layer from fish, leaving them susceptible to disease. When using detergents for outdoor cleaning projects, do not allow wash water to reach the storm drain system.

HOME SOLVENTS

Many common household cleaning products contain harmful chemicals which are toxic and volatile. If not used and disposed of properly, these chemicals enter our waterways and pose a threat to both human and aquatic life. Always follow the manufacturer's instructions and dispose of the material at your local HHWC*.

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. Home improvement projects and work sites must be maintained to ensure that building materials 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 building materials into the ocean, so don't let them enter the storm drains. Follow these tips to help prevent water pollution.

The tips contained in this brochure provide useful information to help prevent water pollution while performing home improvement projects.

For more information, or to report a spill during normal business hours, please call the **City of Orange Public Works Department** at **(714) 532-6480** or visit **www.cityoforange.org.**

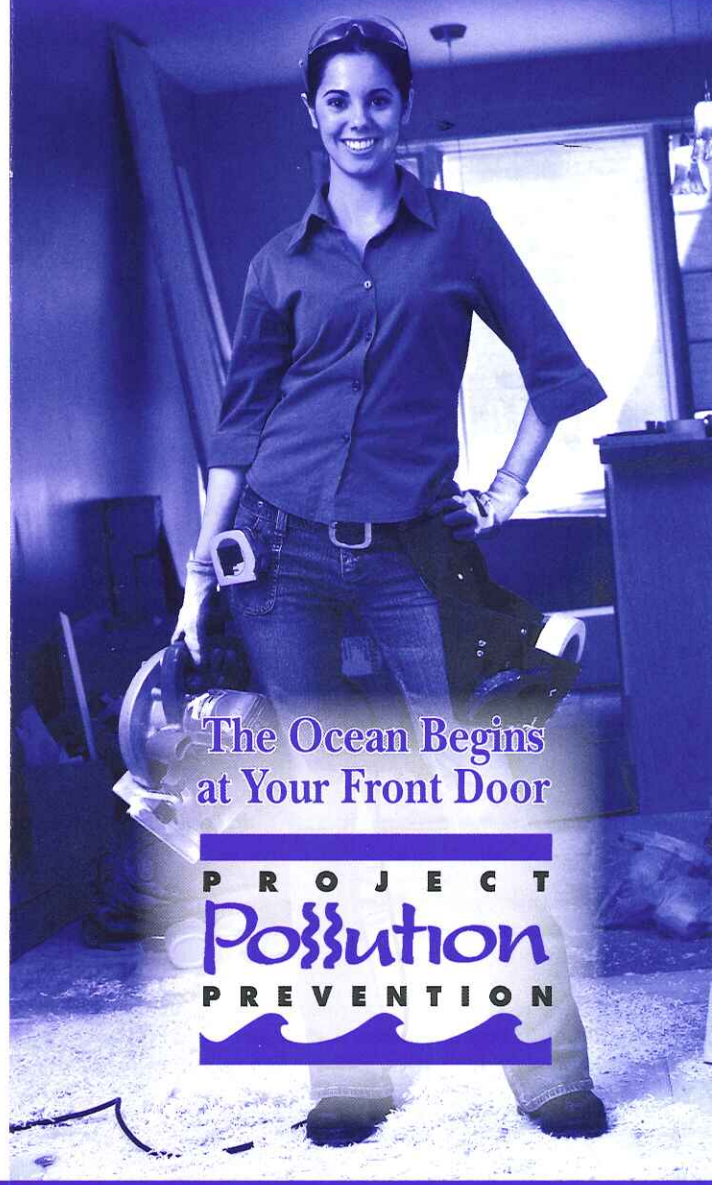
To report a spill after normal business hours, or on weekends, please call the **City of Orange 24-Hour Water Pollution Problem Reporting Hotline** at **(714) 538-1961.**

For emergencies, dial 911.

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Tips for Home Improvement Projects



Tips for Home Improvement Projects

Home improvement projects can cause significant damage to the environment. Whether you hire a contractor or work on the house yourself, it is important to follow these simple tips while renovating, remodeling or improving your home:

General Construction

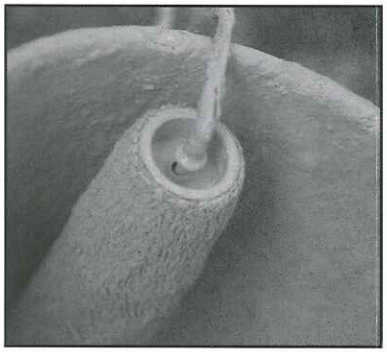
- Schedule projects for dry weather.
- Keep all construction debris away from the street, gutter and storm drain.
- Store materials under cover with temporary roofs or plastic sheets to eliminate or reduce the possibility that rainfall, runoff or wind will carry materials from the project site to the street, storm drain or adjacent properties.

Building Materials

- Never hose materials into a street, gutter or storm drain.
- Exposed piles of construction material should not be stored on the street or sidewalk.
- Minimize waste by ordering only the amount of materials needed to complete the job.
- Do not mix more fresh concrete than is needed for each project.
- Wash concrete mixers and equipment in a designated washout area where the water can flow into a containment area or onto dirt.
- Dispose of small amounts of dry excess materials in the trash. Powdery waste, such as dry concrete, must be properly contained within a box or bag prior to disposal.

Paint

- Measure the room or object to be painted, then buy only the amount needed.
- Place the lid on firmly and store the paint can upside-down in a dry location away from the elements.
- Tools such as brushes, buckets and rags should never be washed where excess water can drain into the street, gutter or storm drain. All tools should be rinsed in a sink connected to the sanitary sewer.
- When disposing of paint, never put wet paint in the trash.
- Dispose of water-based paint by removing the lid and letting it dry in the can. Large amounts must be taken to a Household Hazardous Waste Collection Center (HHWCC).



- Oil-based paint is a household hazardous waste. All leftover paint should be taken to a HHWCC.
- For HHWCC locations and hours, call **(714) 834-6752** or visit **www.oclandfills.com**.

Erosion Control

- Schedule grading and excavation projects for dry weather.
- When temporarily removing soil, pile it in a contained, covered area where it cannot spill into the street, or obtain the required temporary encroachment or street closure permit and follow the conditions instructed by the permit.
- When permanently removing large quantities of soil, a disposal location must be found prior to excavation. Numerous businesses are available to handle disposal needs. For disposal options, visit **www.ciwmb.ca.gov/SWIS**.
- Prevent erosion by planting fast-growing annual and perennial grasses. They will shield and bind the soil.

Recycle

- Construction and demolition material such as lumber, paper, cardboard, metals, masonry (bricks, concrete, etc.), carpet, plastic, pipes (plastic, metal and clay), drywall, rocks, dirt and green waste are all recyclable.

- For a listing of construction and demolition recycling locations in your area, visit **www.ciwmb.ca.gov/recycle.**

Spills

- Clean up spills immediately by using an absorbent material such as cat litter, then sweep it up and dispose of it in the trash.
- Immediately report spills that have entered the street, gutter or storm drain to the City of Orange Water Pollution Problem Reporting Hotline number listed on the back or visit **www.cityoforange.org** to fill out an incident reporting form.

PROJECT Pollution PREVENTION

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, not properly disposing of used oil is illegal and can lead to fines. If you pour or drain oil onto driveways, sidewalks or streets, it can be washed into the storm drain.

Help prevent water pollution by taking your used oil and oil filters to a used oil collection center. Most major automotive maintenance centers will accept up to five gallons of used motor oil at no cost. For a list of locations, please visit www.cleanup.org.

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

For information about the proper disposal of household hazardous waste, call the **Household Waste Hotline** at **1-877-89-SPILL (1-877-897-7455)** or visit **www.oclandfills.com.**

For additional information about the nearest oil recycling center, call the **Used Oil Program** at **1-800-CLEANUP** or visit **www.cleanup.org.**

RECYCLE USED OIL

emc/rev9/08

Help Prevent Ocean Pollution:

Tips for the Home Mechanic

PROJECT Pollution PREVENTION

The Ocean Begins at Your Front Door

Tips for the Home Mechanic

WORK SITE

- Locate the storm drains on or near your property. Do not allow used oil or any materials to flow into these drains.
- Examine your home for sources of pollution.
- Perform automotive projects under cover and in a controlled area to prevent stormwater runoff.
- Sweep or vacuum your automotive workspace regularly
- Use a damp mop to clean work areas. Never hose down surfaces into the street, gutter or storm drain.

- Pour mop water into a sink or toilet. Never dispose of water in a parking lot, street, gutter or storm drain.

PREVENT LEAKS AND SPILLS

- Keep absorbent materials such as rags and/or cat litter in the work area
- Empty drip pans into a labeled, seal container before they are full
- Wipe up any spills or repair leaks as they happen. Don't let them sit.
- Place large pans under any wrecked cars until all fluids are drained.
- Promptly dispose of collected fluids into a hazardous waste drum or deliver them to an oil recycling center. Used oil recycling locations can be found at http://www.ochealthinfo.com/regulatory/usedoil.htm

CLEANING SPILLS

- Clean up spills immediately by using absorbent material such as rags, cat litter or sand. If the material spilled is hazardous, dispose of the rag, litter or sand in the same manner as hazardous waste. If the material spill is non-hazardous, dispose of it in the trash.

- Immediately report spills that have entered the street, gutter or storm drain to the County's 24-Hour Water Pollution Problem Reporting Hotline at 1-877-89-SPILL (1-877-897-7455) or visit www.ocwatersheds.com to fill out an incident report.
- Report emergencies to 911.

VEHICLE FLUID MANAGEMENT

- Vehicle fluids are hazardous waste and must be stored and disposed of in accordance with all local, state and federal laws.
- Designate an area to drain vehicle fluids away from storm drains and sanitary drains.
- When possible, drain vehicle fluids indoors or within covered areas, and only over floors that are constructed of a non-porous material such as concrete. Asphalt and dirt floors absorb spilled or leaked fluids, making the cleanup extremely difficult.

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. Horse waste and care products can be washed into the storm drains that flow to the ocean. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never put animal waste or products into the ocean, so don't let them enter the storm drains. Follow these easy tips to help prevent water pollution while grooming or feeding horses, or constructing a stable.

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

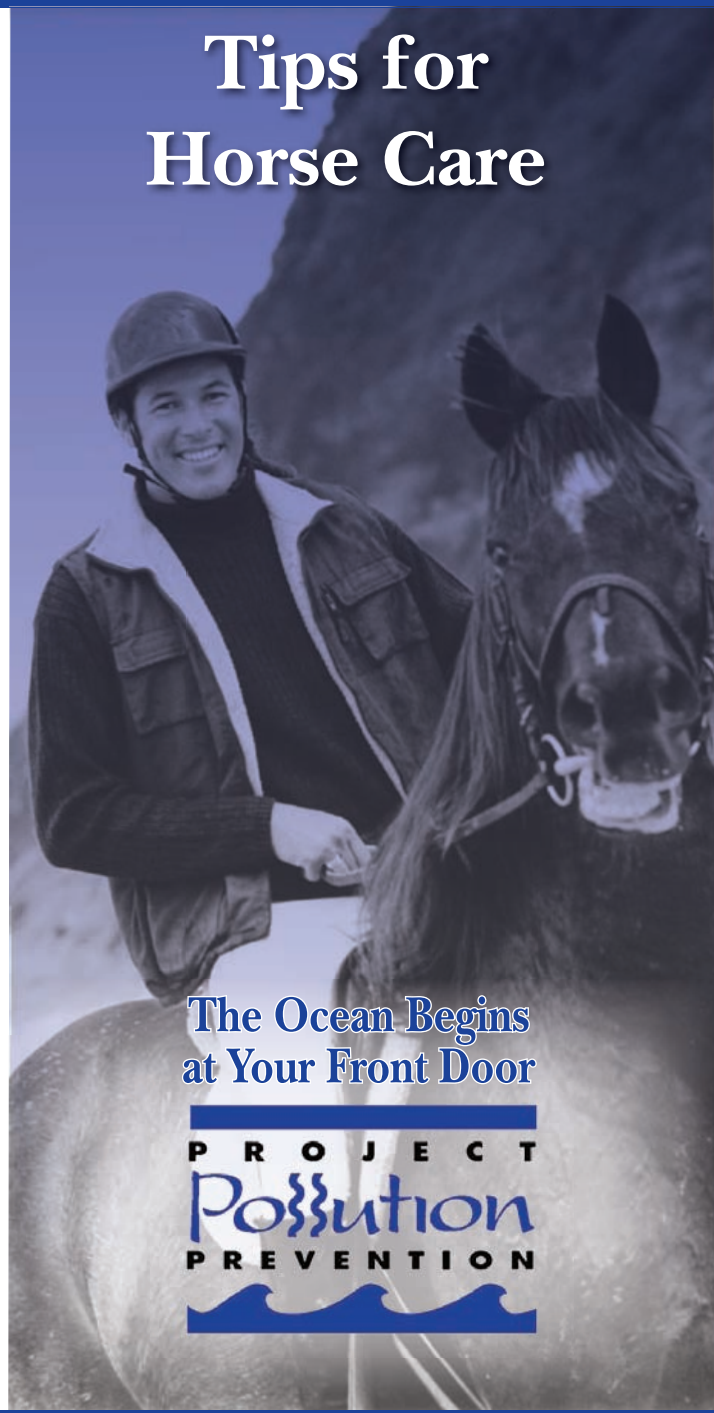
To report a spill, call the **Orange County 24-Hour Water Pollution Reporting Hotline 1-877-89-SPILL** (1-877-897-7455).

For emergencies, dial 911.

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

Help Prevent Ocean Pollution:

Tips for Horse Care



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Tips for Horse Care

Never allow horse waste or care products to enter the street or storm drain.

Grooming

- Use less-toxic alternatives for grooming. Even biodegradable products can be harmful to humans, marine life and the environment. Follow instructions on the products and clean up spills.

- When washing horses, either allow washwater to seep into the ground or wash in an area that is routed to the sanitary sewer. Do not let washwater enter the storm drain or any bodies of water.

- Conserve water by using a spray nozzle with an automatic shut-off. Turn off the water or kink the hose when not in use.

Pasture Management

- Horse holding areas should be swept or shoveled at least once per day. Never hose down these areas! The wastes could end up in a stream or storm drain.

- Paddocks should be cleaned at least twice per week during the rainy season, and once per week the rest of the year.

Grazing

- Establish healthy and vigorous pastures with at least three inches of leafy material.

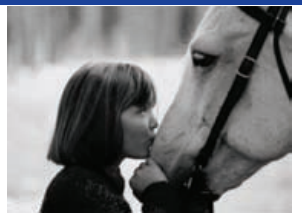
- During heavy rainfall, consider indoor feeding, a practice that keeps manure under a roof and away from runoff.

Collection and Storage

- Store animal waste in a sturdy, seepage-free unit that is enclosed or under cover.

- Line waste pits or trenches with an impermeable layer.

- Do not store manure on-site for more than one week.



Use and Disposal

- Compost soiled bedding and manure. See http://compostingcouncil.org for more information.

- Donate composted material to local greenhouses, nurseries and botanical parks.

- Transport manure to topsoil companies or composting centers.

Facility Design

- If you are constructing or re-building a stable, have your engineer check the County's website at www.ocwatersheds.com for information about facility design.

PROJECT Pollution PREVENTION

THE PROBLEM WITH HOUSEHOLD HAZARDOUS WASTE

Clean beaches and healthy creeks, rivers, bays, wetlands, and ocean are important to Orange County. However, when household hazardous waste is not disposed of properly, it can seep into our groundwater or wash into our storm drains and flow untreated to our waterways. Once in the water, these pollutants are not only dangerous for our local wildlife but can be harmful to human health.

Learn How to Properly Dispose of Household Hazardous Waste in Orange County

Who is H_2OC?

H_2OC is YOU. H_2OC is also a cooperative stormwater program which includes all 34 cities in Orange County, the County of Orange, and Orange County Flood Control District (OCFCD). Clean and healthy beaches, creeks, rivers, bays, wetlands, and ocean are important to Orange County. H_2OC provides resources to residents and businesses to encourage personal action and prevent polluted runoff from entering our waterways.

Join Us

Visit **h2oc.org** to learn more about runoff, water pollution, and how you can be the solution to runoff pollution and protect our water resources.

Contact

24-hour Pollution Reporting Hotline:
1-877-89-SPILL (1-877-897-7455)

24-hour Reporting Website:
myOCeServices.ocgov.com

For emergencies, dial 911

*Additional HHW services may be available through your city.

PROPER DISPOSAL OF HOUSEHOLD HAZARDOUS WASTE

TO PROTECT OUR WATERWAYS

H_2OC STORMWATER PROGRAM

POLLUTION PREVENTION

Any household product that is flammable, corrosive, toxic, or can explode under certain circumstances is considered to be household hazardous waste (HHW). Though we may not think of things like paint, oil, pesticides, electronics, batteries, or household cleaners as hazardous, their chemical composition makes them a potential danger to our safety and our waterways.

Disposal of HHW down the drain, on the ground, into storm drains, or in the trash is illegal and unsafe. Proper disposal of HHW is actually easy. Simply drop off at a Household Hazardous Waste Collection Center (HHWCC) for free disposal and recycling. There are four primary* HHWCCs in Orange County:

Anaheim:..... 1071 N. Blue Gum St

Huntington Beach: ..... 17121 Nichols St

Irvine:..... 6411 Oak Canyon

San Juan Capistrano:..... 32250 La Pata Ave

Centers are typically closed on rainy days and major holidays. For more information, call (714) 834-6752, visit oclandfills.com/household-hazardous-waste, or scan the QR code below.

Disposal Tips

- ✓ Use all of the product and discard the container.
- ✓ Consider non-toxic alternatives if possible.
- ✓ Only dispose of HHW at a Household Hazardous Waste Collection Center (HHWCC).
- ✓ Keep your waste in its original container. This will ensure that the container being used is safe and accepted by your HHWCC.
- ✓ Never mix different types of waste as it is potentially dangerous, and will not be accepted by your HHWCC.
- ✓ Place a lid on your container and ensure that it is intact. Cracked or leaking containers will not be accepted at your HHWCC.
- ✓ If the original container is not clearly labeled, mark it with the type of waste. For example, for pesticide sprays, write "pesticide."
- ✓ Place your HHW in a box or tub when transporting it to the HHWCC so it does not spill in your vehicle.

To report illegal dumping of household hazardous waste, call 1-800-69-TOXIC (1-800-698-6942).

Common Household Hazardous Wastes

- Adhesives
- All forms of electronic waste including computers and microwaves
- Automotive products (antifreeze, motor oil, fluids)
- Batteries
- Cleaners
- Drain openers
- Fertilizers
- Fluorescent lamps
- Fungicides/wood preservatives
- Grease and rust solvents
- Household cleaning products
- Medical needles and sharps
- Medications
- Mercury-containing lamps
- Mercury (thermometers & thermostats)
- Paint and paint products
- Pesticides
- Pool & spa chemicals
- Propane (camping & BBQ)
- Televisions & monitors (CRTs, flatscreens)
- Wood and metal cleaners and polishes

Some centers also have a "Materials Exchange Program" that lets you take partially used home, garden, and automobile products free of charge.

Update Your Irrigation System and Landscape

Switch to Rotating Sprinkler Nozzles: Consider replacing your sprinkler heads with rotating sprinkler nozzles. Rotating nozzles water more uniformly and efficiently, significantly reducing your outdoor water use. Check with your local water agency for available rebates on rotating nozzles, irrigation controllers, and other water efficient devices.

Get Smart: Consider using smart irrigation controllers. Smart irrigation controllers have internal clocks as well as sensors that will turn off the sprinklers in response to environmental changes. If it is raining, too windy, or too cold, the smart irrigation controller will automatically shut off the sprinklers.

Drip don't Douse: Drip irrigation systems prevent runoff from carrying pollutants into the storm drain by watering only the targeted plants using low volumes of water.

Reduce the Need: Replace water "thirsty" plants and grass types with water efficient natives or OC Garden Friendly plants to save water and reduce the need for pesticides and fertilizer. Please see the California Friendly® Landscape Maintenance Guide produced by the Metropolitan Water District of Southern California** and associated Southern California Water Agencies for more information.

Group Plants: When adding to or redesigning your landscaping, plants that require similar watering needs can be planted together. Grouping plants with similar watering needs helps prevent unnecessary watering.

Who is H_2OC?

H_2OC is YOU! H_2OC is also a cooperative stormwater program which includes all 34 cities in Orange County, the County of Orange, and Orange County Flood Control District (OCFCD). Clean and healthy beaches, creeks, rivers, bays, wetlands, and ocean are important to Orange County. H_2OC provides resources to residents and businesses to encourage personal action and prevent polluted runoff from entering our waterways.

Join Us

Visit **h2oc.org** to learn more about runoff, water pollution, and how you can be the solution to runoff pollution and protect our water resources!

Contact

24-hour Pollution Reporting Hotline:
1-877-89-SPILL (1-877-897-7455)

24-hour Reporting Website:
myOCeServices.ocgov.com

For emergencies, dial 911

*__University of California Master Gardeners of Orange County__
ucceocmghotline@ucanr.edu mgorange.ucanr.edu/Gardening_Hotline/

**__Visit bewaterwise.com to learn more__

OVERWATERING IS OUT

TIPS TO PREVENT IRRIGATION RUNOFF

H_2OC® STORMWATER PROGRAM

What is Irrigation Runoff and How Does it Lead to Pollution?

Irrigation runoff is water flowing off landscaped areas, which can carry pollutants to our storm drains and waterways. It is usually the result of landscape overwatering, and mismanaged irrigation systems. Runoff can carry pesticides, fertilizers, pet waste, and other pollutants into our storm drains, which flow untreated to the ocean. Explore the tips below to find out how to prevent irrigation runoff.

RUN YOUR SYSTEM

Run and observe your irrigation system through its entire cycle seasonally (twice a year) to look for leaks, misaligned sprinkler heads, and areas of ponding and/or runoff.

WATER AT SUNRISE

Watering early in the morning before sunrise will reduce water loss due to evaporation. Wind also tends to die down in the early morning, so the water will irrigate the lawn as intended.

WATER BY PLANT TYPE AND SEASON

Different types of grass and plants have differing water needs. This also changes throughout the year, with cooler months typically requiring less water than warmer months. Ask your landscape maintenance provider or contact the University of California Cooperative Extension Master Gardeners* for questions regarding landscape watering needs.

HAND WATER PLANTS

Garden hoses with automatic shutoff nozzles can use less water than sprinkler irrigation systems. Hand watering also ensures only those areas that need water get it and prevents irrigation runoff. An easy alternative to sprinklers, hand watering can help keep our waterways clean!

Know Your Irrigation System and Landscape:

PROPER AIM

Adjust the direction of your sprinkler heads so water does not spray on sidewalks, driveways or roads. By simply adjusting the direction of your sprinklers, you can save water, prevent irrigation runoff, and keep your landscape healthy.

FIX LEAKS

Broken or leaky sprinklers can waste thousands of gallons of water per month and significantly increase the amount of runoff from your yard. Repairing sprinklers can prevent runoff from entering our waterways and save you money.

LEAST TOXIC FIRST

Limit pesticide use by using nonchemical methods, integrated pest management, or least-toxic pesticides whenever possible. Contact the University of California Cooperative Extension Master Gardeners* for alternative suggestions and related guidance.

CYCLE AND SOAK

Running multiple, shorter cycles with an hour break in between allows the water to infiltrate into the ground so it does not run off.

RAIN SKIP

Adjusting your watering schedule when it rains prevents unnecessary watering that can lead to runoff. Keep an eye on the weather forecast and skip your normal watering schedule before, during, and after a rain to help keep our waterways clean and your landscaping looking its best.

SET A TIMER

Use an irrigation timer to minimize runoff and maximize water absorption. Water districts often provide irrigation schedules to determine the best water scheme for your yard. Contact your water provider for a weekly irrigation schedule.

GIVE IT 48 HOURS

Prevent fertilizers and pesticides from entering our waterways by not watering your lawn 48 hours after application and stopping application 48 hours before a forecasted rain event.

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.

The tips contained in this brochure provide useful information to help prevent water pollution while landscaping or gardening.

Additional detailed information is available from the **UCCE Master Gardener Hotline: (714) 708-1646**

To report a spill during normal business hours, please call the **City of Orange Public Works Department** at **(714) 532-6480** or visit **www.cityoforange.org.**

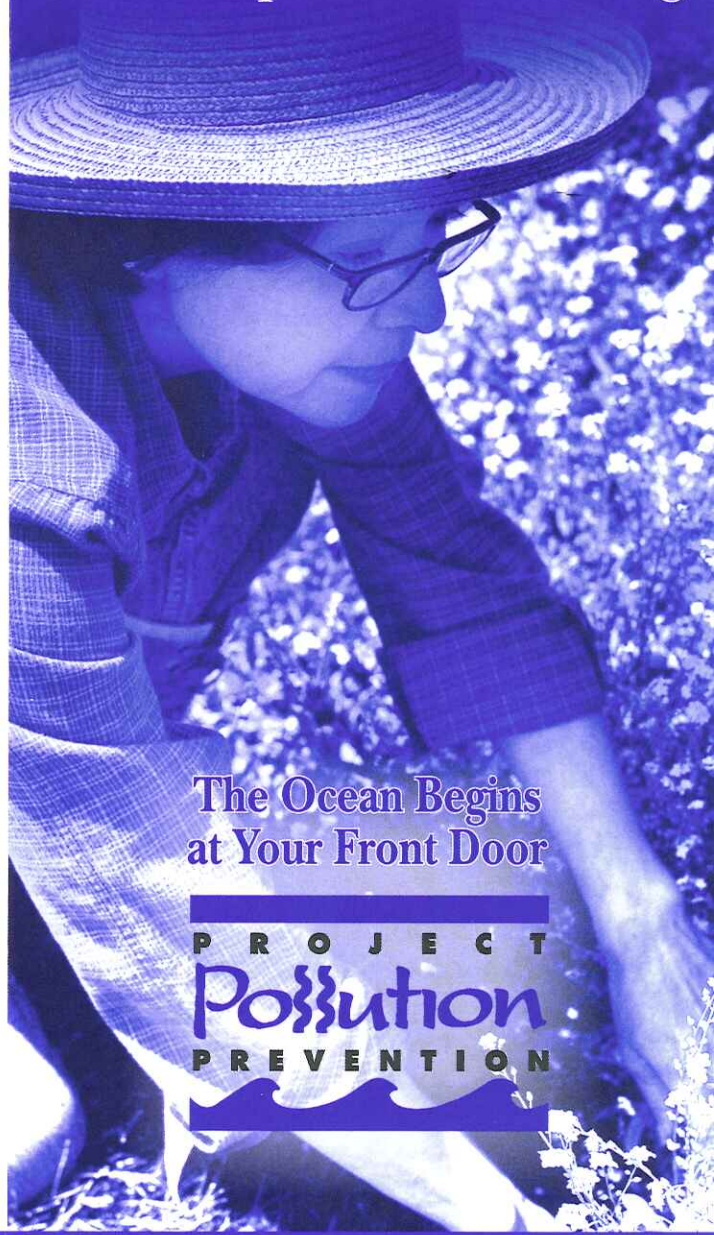
To report a spill after normal business hours, or on weekends, please call the **City of Orange 24-Hour Water Pollution Problem Reporting Hotline** at **(714) 538-1961.**

For emergencies, dial 911.

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.

- Use slow-release fertilizers to minimize leaching, and use organic fertilizers.

- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.

- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.

- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains. Dispose of empty containers in the trash.

- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting. For more information, visit **www.ipm.ucdavis.edu**.

- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.

- Take unwanted pesticides to a Household Hazardous Waste Collection Center to be recycled. Locations are provided below.

Household Hazardous Waste Collection Centers

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

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

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

You would never put pet waste or pet care 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 **(714) 567-6363**
or visit
www.ocwatersheds.com

To report a spill,
call the
Orange County 24-Hour Water Pollution Problem Reporting Hotline
at **(714) 567-6363**.

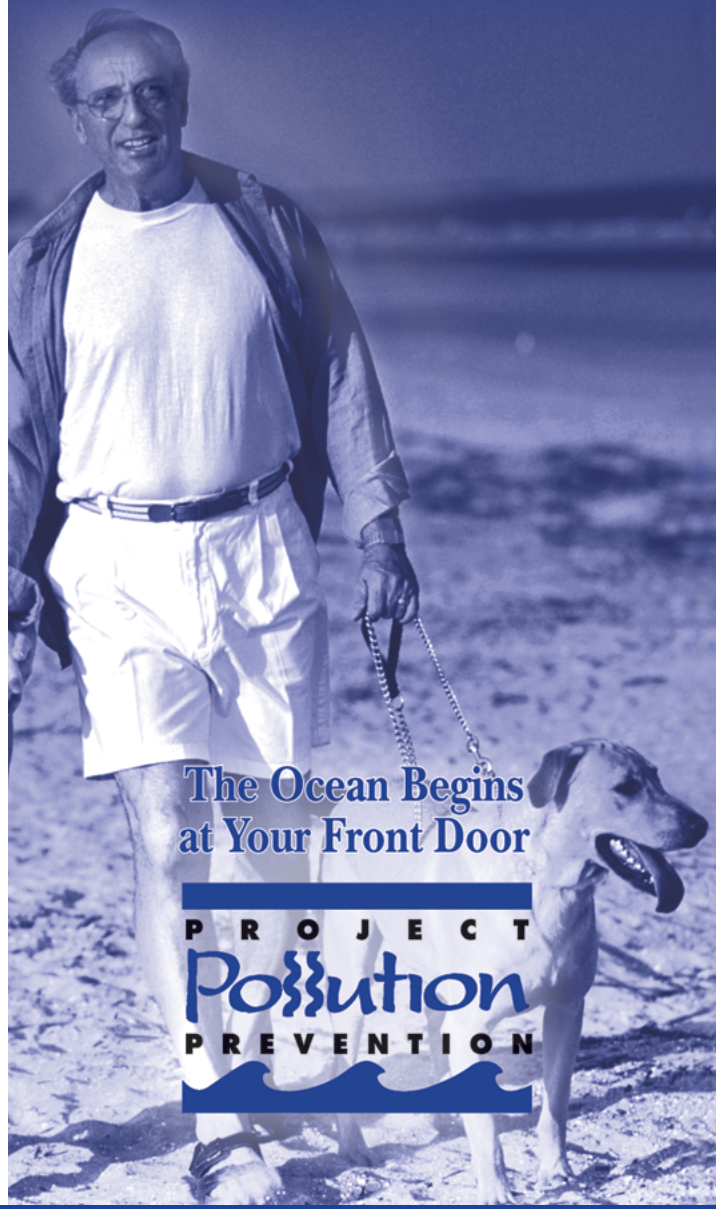
For emergencies, dial 911.

The tips contained in this brochure provide useful information to help prevent water pollution while caring for your pet. 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 Pet Care



Tips for Pet Care

Never let any pet care products or washwater run off your yard and into the street, gutter or storm drain.

Washing Your Pets

Even biodegradable soaps and shampoos can be harmful to marine life and the environment.

- If possible, bathe your pets indoors using less-toxic shampoos or have your pet professionally groomed. Follow instructions on the products and clean up spills.

- If you bathe your pet outside, wash it on your lawn or another absorbent/ permeable surface to keep the washwater from running into the street, gutter or storm drain.

Flea Control

- Consider using oral or topical flea control products.

- If you use flea control products such as shampoos, sprays or collars, make sure to dispose of any unused products at a Household Hazardous Waste Collection Center. For location information, call **(714) 834-6752**.

Why You Should Pick Up After Your Pet

It's the law! Every city has an ordinance requiring you to pick up after your pet. Besides being a nuisance, pet waste can lead to water pollution, even if you live inland. During rainfall, pet waste left outdoors can wash into storm drains. This waste flows directly into our waterways and the ocean where it can harm human health, marine life and the environment.

As it decomposes, pet waste demands a high level of oxygen from water. This decomposition can contribute to killing marine life by reducing the amount of dissolved oxygen available to them.

Have fun with your pets, but please be a responsible pet owner by taking care of them and the environment.

- Take a bag with you on walks to pick up after your pet.

- Dispose of the waste in the trash or in a toilet.

PROJECT Pollution PREVENTION

Appendix C:
BMP Details

BIO-7: Proprietary Biotreatment

Proprietary biotreatment devices are devices that are manufactured to mimic natural systems such as bioretention areas by incorporating plants, soil, and microbes engineered to provide treatment at higher flow rates or volumes and with smaller footprints than their natural counterparts. Incoming flows are typically filtered through a planting media (mulch, compost, soil, plants, microbes, etc.) and either infiltrated or collected by an underdrain and delivered to the storm water conveyance system. Tree box filters are an increasingly common type of proprietary biotreatment device that are installed at curb level and filled with a bioretention type soil. For low to moderate flows they operate similarly to bioretention systems and are bypassed during high flows. Tree box filters are highly adaptable solutions that can be used in all types of development and in all types of soils but are especially applicable to dense urban parking lots, street, and roadways.

Also known as:

- *Catch basin planter box*
- *Bioretention vault*
- *Tree box filter*

Proprietary biotreatment
Source: http://www.americastusa.com /index.php/filterra/

Feasibility Screening Considerations

- Proprietary biotreatment devices that are unlined may cause incidental infiltration. Therefore, an evaluation of site conditions should be conducted to evaluate whether the BMP should include an impermeable liner to avoid infiltration into the subsurface.

Opportunity Criteria

- Drainage areas of 0.25 to 1.0 acres.
- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Proprietary biotreatment facilities may also be applied in parking lot islands, traffic circles, road shoulders, and road medians.
- Must not adversely affect the level of flood protection provided by the drainage system.

OC-Specific Design Criteria and Considerations

☐ Frequent maintenance and the use of screens and grates to keep trash out may decrease the likelihood of clogging and prevent obstruction and bypass of incoming flows.

☐ Consult proprietors for specific criteria concerning the design and performance.

☐ Proprietary biotreatment may include specific media to address pollutants of concern. However, for proprietary device to be considered a biotreatment device the media must be capable of supporting rigorous growth of vegetation.

☐ Proprietary systems must be acceptable to the reviewing agency. Reviewing agencies shall have the discretion to request performance information. Reviewing agencies shall have the discretion to deny the use of a proprietary BMP on the grounds of performance, maintenance considerations, or other relevant factors.

☐ In right of way areas, plant selection should not impair traffic lines of site. Local jurisdictions may also limit plant selection in keeping with landscaping themes.

Computing Sizing Criteria for Proprietary Biotreatment Device

- Proprietary biotreatment devices can be volume based or flow-based BMPs.
- Volume-based proprietary devices should be sized using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** or the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs described in **Appendix III.3.2**.
- The required design flowrate for flow-based proprietary devices should be computed using the Capture Efficiency Method for Flow-based BMPs described in **Appendix III.3.3)**.

In South Orange County, the provided ponding plus pore volume must be checked to demonstrate that it is greater than 0.75 of the remaining DCV that this BMP is designed to address. Many propretary biotreatment BMPs will not be able to meet the definition of "biofiltration" that applies in South Orange County. See Section III.7 and Worksheet SOC-1.

Additional References for Design Guidance

- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4: **http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850**
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 9: **http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf**
- Santa Barbara BMP Guidance Manual, Chapter 6: **http://www.santabarbaraca.gov/NR/rdonlyres/91D1FA75-C185-491E-A882-49EE17789DF8/0/Manual_071008_Final.pdf**

Appendix D:
BMP Maintenance Information

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Non-Structural Source Control BMPs			
Yes	**N1. Education for Property Owners, Tenants and Occupants** Educational materials will be provided to the owner and periodically thereafter to inform them of their potential impacts to downstream water quality. Materials include those described in Section VII of this WQMP and provided in the Final WQMP.	At lease or rental agreement signing	Owner
Yes	**N2. Activity Restrictions** The Owner will prescribe activity restrictions to protect surface water quality, through a lease or rental agreement, or other equally effective measure, for the property. Restrictions are anticipated to include (but not limited to) prohibiting vehicle washing onsite, littering and improper storing or disposal of materials.	Ongoing	Owner

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**N3. Common Area Landscape Management** Maintenance shall be consistent with City requirements, plus fertilizer and/or pesticide usages shall be consistent with County guidelines for use of fertilizers and pesticides (OC DAMP Section 5.5). Prohibit use of fertilizers and pesticides within 48 hours prior to forecast rain event. 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. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets.	Monthly	Owner
Yes	**N4. BMP Maintenance** Maintenance of BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP. Records of inspections and BMP maintenance shall be maintained by the responsible party and documented with the WQMP, and shall be available for review upon request.	Ongoing, as prescribed per WQMP.	Owner
No	**N5. Title 22 CCR Compliance** Not applicable to residential projects.		
No	**N6. Local Water Quality Permit Compliance** Not applicable. No local water quality permits are required for the operation of the project.		
No	**N7. Spill Contingency Plan** Not applicable to residential projects.		

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
No	**N8. Underground Storage Tank Compliance** Not applicable. None onsite.		
No	**N9. Hazardous Materials Disclosure Compliance** Not in project scope.		
No	**N10. Uniform Fire Code Implementation** Not in project scope.		
Yes	**N11. Common Area Litter Control** Litter patrol, violations investigation, reporting and other litter control activities shall be performed in conjunction with landscape maintenance activities. Litter collection and removal shall be performed on a weekly basis. Inspect pet waste station for adequate supply of waste bags and dispose of wastes as necessary.	Ongoing patrols. Weekly (minimum) pick up and removal.	Owner
Yes	**N12. Employee Training** All employees and contractors of both facilities shall be trained on the potential impacts of their actions on water quality. Training shall be conducted upon hire and annually thereafter.	Training upon hire and annually thereafter	Owner
No	**N13. Housekeeping of Loading Docks** Not applicable. No loading docks onsite.		

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**N14. Common Area Catch Basin Inspection** Catch basin inlets, area drains, curb-and-gutter systems and other drainage systems shall be inspected prior to October 1st of each year and after large storm events. If necessary, drains shall be cleaned prior to any succeeding rain events. All facilities shall be inspected annually and maintained when debris is observed/ present.	Annually and as needed	Owner
Yes	**N15. Street Sweeping Private Streets and Parking Lots** Private streets and parking areas shall be vacuum-swept at minimum on a monthly basis.	Bi-weekly	Owner
	Structural Source Control BMPs		
Yes	**S1. Provide Storm Drain System Stenciling and Signage** Storm drain stencils or signage prohibiting dumping and discharge of materials ("No Dumping – Drains to Ocean") shall be provided adjacent to each of the project's proposed inlets. The stencils shall be inspected and re-stenciled as needed to maintain legibility.	Annually	Owner
No	**S2. Design Outdoor Hazardous Material Storage Areas to Reduce Pollutant Introduction** Not applicable. No outdoor storage of hazardous materials onsite.		
No	**S3. Design Trash Enclosures to Reduce Pollutant Introduction** Not applicable for single-family residential projects.		

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
Yes	**S4. Use Efficient Irrigation Systems and Landscape Design** In conjunction with routine maintenance activities, verify that landscape design and irrigation system continues to function properly by adjusting sensors and timers 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, day or night time temperatures based on system specifications and local climate patterns.	Monthly	Owner
No	**S5. Protect Slopes and Channels** Inspect for adequate vegetation cover, vegetation health and signs of erosion. Remove and replaced dead/dying vegetation as needed. Repair any signs of erosion immediately.	Monthly	Owner
No	**S6. Loading Dock Areas** Not applicable. No loading docks onsite.		
No	**S7. Maintenance Bays and Docks** Not applicable. No maintenance bays onsite.		
No	**S8. Vehicle Wash Areas** Not applicable. Not vehicle wash areas onsite.		
No	**S9. Outdoor Processing Areas** Not applicable. No outdoor processing onsite.		
No	**S10. Equipment Wash Areas** Not applicable. No equipment wash areas onsite.		
No	**S11. Fueling Areas** Not applicable. No fueling areas onsite.		

BMP Applicable? Yes/No	BMP Name and BMP Implementation, Maintenance and Inspection Procedures	Implementation, Maintenance, and Inspection Frequency and Schedule	Person or Entity with Operation & Maintenance Responsibility
No	**S12. Site Design and Landscape Planning (Hillside Landscaping)** Site not considered hillside development		
No	**S13. Wash Water Controls for Food Preparation Areas** Not applicable. No restaurant facilities onsite.		
No	**S14. Community Car Wash Racks** Not applicable. No community car wash areas onsite.		
Hydrologic Source Control BMPs			
Hydrologic Source Control #1 **HSC-2. Impervious Area Dispersion** – Inspect dispersion area for signs of scouring, standing water, saturated conditions and dead/dying vegetation. Repair and replace as necessary. Mow/trim dispersion area as needed.		Monthly	Owner/ Operator
Low Impact Development and Treatment BMPs			
BIO-7 Proprietary Biotreatment – Inspect unit for accumulated debris and sediment and plant health; remove trash from screening device and separation chamber; trim vegetation. Remove sediment from pre-chamber, replace pre-filter cartridge media and drain down filter media. Replace wetland media.		Monthly As needed based on visual inspection of plants/ media and based on spill/ contamination occurrence. Every 7-10 years	Owner/ Operator

Appendix E:
Project Geotechnical References

PRELIMINARY ENGINEERING GEOLOGIC/GEOTECHNICAL ENGINEERING INVESTIGATION AND GRADING PLAN REVIEW FOR THE MARA BRANDMAN ARENA SITE TTM#17847 NEAR SANTIAGO CANYON ROAD, CITY OF ORANGE, CALIFORNIA

Prepared for: Milan Capital Management, Inc.
888 S. Disneyland Dr., Suite 101
Anaheim, CA 92802

Prepared by: GINTER & ASSOCIATES, INC.
27631 DURAZNO
MISSION VIEJO, CA 92692

Project #172-03 ***April 4, 2022***

GINTER & ASSOCIATES, INC.

27631 DURAZNO
MISSION VIEJO, CA 92692
OFC (949) 581-2363 CELL (714) 478-1167

Milan Capital Management, Inc.
888 S. Disneyland Dr., Suite 101
Anaheim, CA 92802

April 4, 2022
Project No.: 172-03

Attn: Mr. Chris Nichelson, President
Mr. Bret Bernard, AICP
Director of Planning and Development

Gentlemen:

In accordance with your request, we are providing the Preliminary Geotechnical Investigation and Grading Plan Review report for TT#17847, south of Santiago Canyon Road in the city of Orange. This report is suitable for submission to the City of Orange in conjunction with the rough grading plans prepared by Hunsaker & Associates Irvine, Inc. for their revew and eventural issuance of a rough grading permit.

The data, analyses and conclusions presented herein indicate that the project is feasible and acceptable from a geotechnical standpoint provided the recommendations of this report are adhered to during and after construction.

We appreciated the opportunity to provide our services and if you have any questions or require additional information, please contact the undersigned.

Respectfully submitted,

Dave Ginter

Table of Contents

1.0 Introduction 3
1.1 Purpose: 3
1.2 Site Location and General Description: 3
1.3 Proposed Development: 5
2.0 Regional Geology 5
2.1 Geomorphic Setting: 5
2.2 Regional Geologic Setting: 5
2.3 Tectonic Setting: 6
3.0 Site Geology Conditions 7
3.1 Stratigraphic Framework: 7
3.2 Surficial Deposits: 7
3.2.1 Artificial Fill (Af) 7
3.2.2 Older Alluvium (Qoa-1) 7
4.0 Geotechnical Considerations 8
4.1 Soil Properties: 8
4.2 Expansive Soils: 8
4.3 Slope Stability: 8
5.0 Seismic Design Considerations 8
6.0 Grading Recommendations 9
6.1 Site Preparation: 9
6.2 Removals: 9
6.3 Compacted Fill Recommendations: 10
6.4 Slope Construction: 10
6.5 Earthwork Observation and Testing: 10
7.0 Soil Properties 11
7.1 Expansion Index: 11
7.2 Sulfate Content: 11
7.3 Corrosive Soils: 11
7.4 Bulking/Shrinking Factors: 11
8.0 Preliminary Recommendations for Foundation Design 12
9.0 Additional Grading Recommendations 15
9.1 Utility Trench Backfill: 15
9.2 Site Drainage: 15
9.3 Slope Planting, Irrigation and Maintenance: 15
10.0 Infiltration Opportunities 16
11.0 Conclusions 16
12.0 Limitations 17

GINTER & ASSOCIATES, INC.

27631 DURAZNO
MISSION VIEJO, CA 92692
OFC (949) 581-2363 CELL (714) 478-1167

Subject: **Preliminary Engineering Geologic/Geotechnical Engineering Investigation and Grading Plan Review for the Mara Brandman Arena Site TTM 17847 near Santiago Canyon Road, City of Orange, California**

References: **See attached List of Selected References**

1.0 Introduction

1.1 Purpose:

This report has been prepared to provide a preliminary engineering geologic and geotechnical engineering evaluation and grading plan review for the Mara Brandman Arena site near Santiago Canyon Road in the City of Orange.

This document presents the data and analysis regarding the topography; geology; the nature, distribution and physical and chemical properties of existing soils; field investigation; recommendations and statements regarding the proposed grading and effects on stability of adjacent properties and preliminary recommendations for foundation design.

1.2 Site Location and General Description:

The subject site encompasses approximately 7.2 acres and is crudely rectangular in shape with an irregular diagonal property line on its easter edge. The site is situated south of E. Santiago Canyon Road, between Orange Park Boulevard and N. Nicky Way, in north-central Orange County in the city of Orange (*Figure 1*).

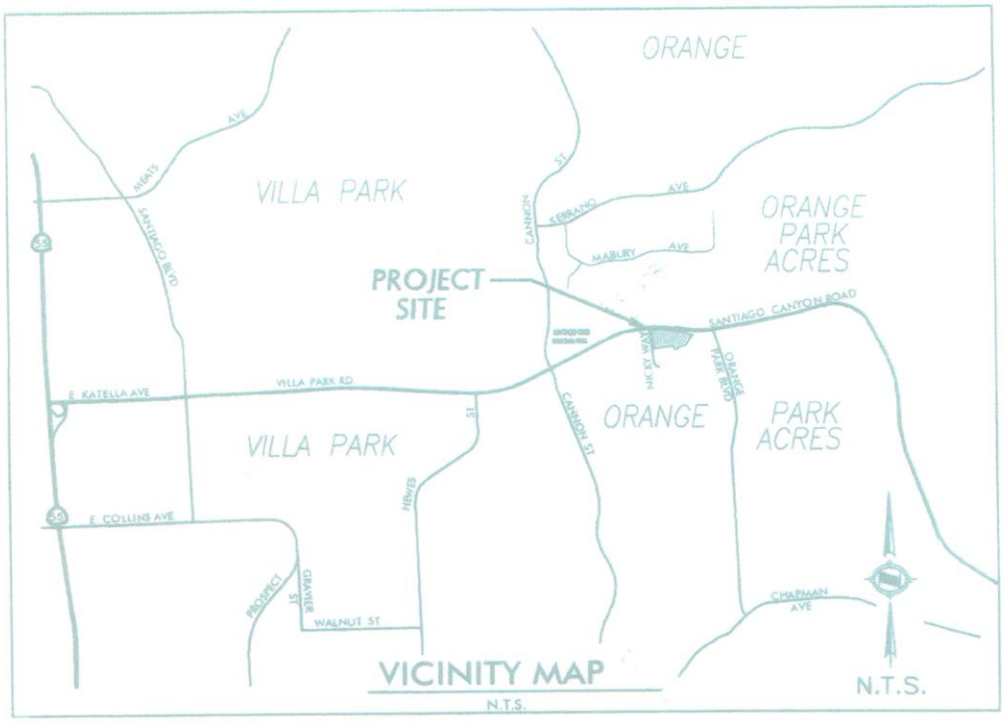


Figure 1
SITE
LOCATION MAP

PROJECT NO.
172 - 03
DATE
April 4, 2022

Topography within the site is of low relief and ranges in elevation from approximately 399± ft. in the northwest to 440± ft. at the eastern property line.

The site is currently occupied by a fruit stand, with attendant outbuildings and a parking lot, located on the northwest corner, empty field in the southwest and central portions and equestrian facilities, including various corrals, barn and an arena, in the eastern portion of the property. The site was used as a citrus orchard in the past.

1.3 Proposed Development:

The proposed Rough Grading Plan was prepared by Hunsaker & Associates Irvine, Inc. dated March 3, 2022 at a scale of 1"=40'

This plan portrays six pads with a cul-de-sac.

2.0 Regional Geology

2.1 Geomorphic Setting:

Regionally, the site is situated in the northeastern portion of the Peninsular Ranges Geomorphic Province at an average elevation of 400± feet m.s.l. (mean sea level) and subjacent to the Santa Ana Mountains, which rise to the east to more than 3,000 feet m.s.l., Santiago Creek, which transgresses approximately 1,000 feet north of the site and the Santa Ana River, situated a few miles north, is currently active in transporting sediments and forming coalescing alluvial fans resulting in a broad surface which slopes away from the hills toward the Pacific Ocean to the southwest.

The site lies within an old alluvial plain designated on our Geologic Map (*Figure 2*) as terrace deposits (Qoa.1). This terrace, is traceable as a paired surface upstream and downstream from the site. Regional mapping (Schoellhamer et al., 1981) shows that remnants of at least four fluvial terraces border Santiago Creek in this area. These terraces are all underlain by fluvial gravels laid down by ancestral channels of Santiago Creek and bear lithologies and clast sizes comparable to the gravels that underlay the subject site and which are exposed in present floodplain quarries downstream.

2.2 Regional Geologic Setting:

The subject site is located in the northern portion of the Peninsular Ranges physiographic province and near the northern terminus of the Santa Ana Mountains, which reflect the northwest-trending signature of this province in southern California. The Peninsular Ranges (Jahns, 1954) extended from southern California and down the length of the Baja California peninsula for 900 miles (1500 km.). The ranges are characterized by basement complexes of mid-Jurassic to mid-Cretaceous age mildly metamorphosed sedimentary and volcanic rocks (Schoellhamer et al., 1981) which are intruded by quartz plutonites and

gabbros of the southern California batholithic. These basement complexes are overlain locally by Upper Cretaceous and Tertiary sedimentary rocks. These rocks have been offset during the past three million years or more by predominantly northwest-trending right-slip faults and some of these faults are active today, including the Whittier-Elsinore, San Jacinto and Newport-Inglewood faults (Crowell, 1974).

The structure of the northern Santa Ana Mountains is dominated by two plunging anticlinoriums-a broad north-plunging anticlinal structure that underlines the main mountain mass and which is truncated at the northeast by the Whittier fault and a northwest-trending anticlinorium that underlies the southwest flank and plunges northwest beneath the Los Angeles basin as the Anaheim nose. Based on the work by Schoellhamer et al. (1981), the generalized structure south of Santiago Creek near the subject site is dominated by northwest-striking beds, fold axes and faults with bisecting northeast-trending faults. In contrast, north of Santiago Creek, the generalized structure is dominated by east/west-trending beds, fold axes and faults with some northwest and northeast-trending antithetic fault systems.

The surficial deposits blanketing the bedrock units consist of alluvium along Santiago Creek. The older alluvium has been subdivided on the basis of their respective altitude above the stream into four numbered units (Qoa-1 through Qoa-4) by Schoellhamer et al. (1981). These deposits generally consist of pebbles, cobbles and boulders in a clayey red sand and silt matrix.

2.3 Tectonic Setting:

The site's location in the northern Peninsular Ranges near the southeastern margin of the Los Angeles Basin is associated with a complex tectonic regime of this portion of southern California. Historical analyses of the structural geology of southern California have been strongly influenced by the pronounced regional patterns provided by the San Andreas Fault and other major regional faults, including the San Jacinto, Whittier/Elsinore and Newport-Inglewood faults.

Wright (1991) and other workers indicate that the northwestward flow of the Pacific Plate mantle is now driving the collision between the Peninsular Ranges block and the Sierra-Great Valley provinces of the North American plate. The "Pasadena" deformation produced the major uplift and shortening of the Transverse Ranges province which began in mid-Pleistocene time (3.5 Ma) and still is continuing (Woodford et al., 1954) This deformation involves northwestward under-thrusting of the Peninsular Ranges blocks beneath the blocks of the Transverse Ranges. Wright and other (1991) indicate that within the mantle, Pacific Plate (northwestward motion) extends into the Mojave Desert area and viscous drag against the edge of the North America plate produces right slip on northwest-striking faults of the Peninsular Ranges.

Such tectonic activity has produced the present day geologic structure within and in the environs of the site consisting of several faulted blocks and folds. The significant faults within and near the site include the Peralta Hills thrust fault (Fife et al., 1973) and the El Modeno Fault. The El Modeno Fault has been inferred to transgress the subject site according to Schoellhamer et al., (1981). However, it is shown by Schoellhamer to be limited to bedrock of pre-Quaternary age and is not shown to offset Quaternary alluvium.

A fault investigation study by Ginter and Shlemon (1991) for the subject site concluded that the El Modeno Fault is not present in the area where it is inferred to be by Schoellhamer et al. (1981) and that if it were present at this location, it would be Pre-Holocene in age based on age dating by Dr. Shlemon, Soil Stratigrapher, and therefore "inactive". In the absence of identifiable fault features in the vicinity of the El Modeno's inferred trace location, it does not appear that the "El Moeno Fault" crosses the property.

The geologic field mapping and subsurface investigations north of the subject site have not revealed any evidence for the El Modeno Fault or other faults within the site's boundary.

3.0 Site Geology Conditions

3.1 Stratigraphic Framework:

The geologic units present within the site can be characterized as generally well indurated and consolidated Tertiary Age bedrock overlain by surficial deposits consisting of Pleistocene/Holocene Age alluvial terrace gravels, sands and silts.

3.2 Surficial Deposits:

3.2.1 Artificial Fill (Af)

Various portions of the site have been disturbed and infilled with undocumented and non-engineered fills, generally derived locally, which consist of silty to gravelly sand with cobbles, and boulders.

Trenches excavated for this report indicate thin agricultural fills (less than 3 feet) over much of the site, with a localized deeper fill (approximately 5.5 feet) in the vicinity of Trench T-6

3.2.2 Older Alluvium (Qoa-1)

The older alluvium, which has been designated by this firm after Schoellhamer et al., occurs along the northern and southern flanks of Santiago Creek as a slightly elevated alluvial terrace deposit consisting of similar lithologic and soil engineering characteristics as the young alluvium (Qya). Onsite, this unit is characterized bybrown to reddish brown sand, gravelly sand with cobble to boulder size larger fraction (comprised predominantly of basaltic volcanic rocks with lesser granitic and metamorphic rocks). It is generally matrix supported with localized clast supported lenses.

The thickness of this unit along Santiago Canyon Road is on the order of 70 (seventy) ft.±. This unit is suitable bearing material for the compacted fill associated with future uses.

4.0 Geotechnical Considerations

This report addresses various geotechnical engineering factors which should be considered during the design and grading of the proposed plan, including the suitability of soils for future uses. The plan is considered feasible provided the geologic and geotechnical engineering issues are taken into consideration in the design and construction of the plan and appropriate measures, as recommended herein, are implemented.

4.1 Soil Properties:

In general, the site consists of alluvial terrace deposits underlain by bedrock units. The alluvial terrace gravels designated as Qoa.1 are well consolidated and suitable for the support of engineered fills for future uses.

4.2 Expansive Soils:

The onsite soils in the upper 5 feet generally exhibit low expansion potential (from laboratory data). As a reasonably conservative approach the finished grade material (after over-excavation and re-compaction) should be assumed to have medium expansion potential.

4.3 Slope Stability:

The proposed plan includes fill slopes constructed at a slope ration of 2:1 (horizontal/vertical) to maximum heights of 12 feet±. Due to the skin cut/fill condition of the proposed slope in the NE and eastern perimeter, a drained stabilization fill is recommended, as shown in Section 1-1'.

5.0 Seismic Design Considerations

Based on the subsurface conditions, the site classification of the project site may be characterized as "Stiff Soils" with Site Class D. Corresponding seismic design parameter for this site classification and the site location (Latitude: 33.813194; Longitude: -117.786969) were determined based on general ground motion analyses in accordance with Section 1613.5 of the CBC. These parameters are summarized below:

Categorization / Coefficient	Design Value
Site Class	D
Mapped MCE Spectral Acceleration for Short (0.2 Second) Period, S_S	1.497 g
Mapped MCE Spectral Acceleration for a 1-Second Period, S_1	0.532 g
Short Period (0.2 Second) Site Coefficient, F_a	1.2
Long Period (1 Second) Site Coefficient, F_v	1.5
Adjusted Spectral Response Acceleration at 0.2-Second Period, S_{MS}	1.796 g
Adjusted Spectral Response Acceleration at 1-Second Period, S_{M1}	0.798 g
Design (5% damped) Spectral Response Acceleration for Short (0.2 Second) Period, S_{DS}	1.197 g
Design (5% damped) Spectral Response Acceleration for a 1-Second Period, S_{D1}	0.532 g
Maximum Considered Earthquake-Geometric Mean, PGA_M	0.748 g

6.0 Grading Recommendations

6.1 Site Preparation:

Prior to grading operations, all vegetation should be removed and wasted off-site.

6.2 Removals:

Based on the test pit logs, our observations and laboratory analyses show the upper 3.0 ft.± in general, will require removal and replacement with compacted engineered fill. Deeper removals may be encountered locally, such as in the vicinity of Test Pit T6.

6.3 Compacted Fill Recommendations:

The excavated on-site soils are suitable for use as compacted fill. The fill materials to be used as compacted engineered fill should be free of organics, debris, deleterious materials and rocks over 8 inches in maximum dimension. The compacted engineered fill must be approved by the Project Geotechnical Engineer and/or Engineering Geologist prior to use.

If imported soils are required, prior to delivery they should be evaluated by the Project Geotechnical Engineer for suitability. Import soils should be free of trash, debris or other deleterious materials. All import soils should have engineering characteristics similar to the on-site soils.

After approval of the overexcavation and prior to placement of any compacted engineered fill materials, the exposed removal bottoms should be scarified to a minimum of six (6) inches. The area should then be moisture-conditioned approximately 1 to 2 percentage points above the optimum moisture content and compacted to a minimum of 90% of the applicable maximum density.

Fill materials should be spread in thin lifts, moisture-conditioned to 1 to 2 percentage points over optimum moisture content and compacted to a minimum of 90% of the laboratory maximum dry density in accordance with ASTM Test Method D-1557. Each lift should be treated in a like manner until the desired finish grades are achieved. The grading contractor should have suitable and sufficient compaction equipment in operation to achieve the required compaction.

6.4 Slope Construction:

Fill should be properly benched into firm terrace deposits during grading. Typical benching should include 4-foot verticals exposing approved competent material.

Where possible, fill slopes should be constructed by overfilling a minimum of 3 horizontal feet and then trimming back to expose the dense inner core of the slope surface.

Seeding and planting of slopes should proceed as rapidly as possible to achieve a well-established and deep-rooted vegetal cover, requiring minimal watering.

6.5 Earthwork Observation and Testing:

a) The site preparation, over-excavation, and earthwork should be performed under the observation and testing of a representative of the Project Geotechnical Engineer or Project Geologist.
b) The fill should be tested at the time of placement to verify that the required compaction is achieved.

c) The fill compaction should be determined in the field by the Sand Cone Method (ASTM D 1556) or the Nuclear Gauge Method (ASTM D 2216), or other test method approved by the Project Geotechnical Engineer.
d) During grading, an adequate number of field density tests should be performed using approved test procedures in order to determine compliance of earthwork to the project requirements. The frequency of field density testing should be in accordance with the recommendations of the Project Geotechnical Engineer.
e) Quality control testing performed to determine the acceptability of the fill compaction should be based on the laboratory maximum dry density and optimum moisture determined in accordance with ASTM: D 1557 test procedure.
f) Any surface or subsurface obstructions, or questionable materials encountered during grading should be brought immediately to the attention of the Project Geotechnical Engineer. Deeper excavations may be required, should unstable soils be encountered locally, as determined by the Project Geotechnical Engineer and/or Project Geologist.

7.0 Soil Properties

7.1 Expansion Index:

A representative bulk soil sample was tested for expansion potential following the ASTM 4829 Test Procedure. The test result exhibits expansion index of 25 (Low). Based on our experience with projects in the general area of the site, we recommend medium soil expansion should be considered for designs

7.2 Sulfate Content:

Sulfate testing should be performed at completion of pad grading.

7.3 Corrosive Soils:

Similarly, corrosivity testing should be performed at finish grade.

7.4 Bulking/Shrinking Factors:

We anticipate the terrace deposits to shrink on the order of 3-5% when used as compacted engineered fill. These values are deemed appropriate for estimating purposes and may be used in an effort to balance earthwork quantities.

8.0 Preliminary Recommendations for Foundation Design

Presented below are preliminary geotechnical criteria for design of building foundations, based on a reasonably conservative assumption of medium soil expansion potential for the on-site soils:

Option 1 - Conventional Footing

Allowable Bearing Pressure (1)	=	1,500 psf
Minimum Footing Depth (2)	=	24 inches
Minimum Footing Width	=	Continuous: 12 inches
		Isolated: 24 inches
Passive Soil Pressure (3)	=	250 psf/ft.
Friction Coefficient	=	0.35 (ultimate)
Minimum Footing Reinforcement	=	Four No. 4 bars, 2 each at top and bottom

(1) The above value may be increased 250 lbs./sq.ft. for each additional foot exceeding the minimum embedment depth and/or width, subject to a maximum of 2,500 psf. Allowable bearing pressures may be increased by one-third for short term loading due to wind or seismic forces.

(2) Footing depth is from lowest adjacent finished soil grade. Footings should be deepened, as necessary, to provide setback distance from adjacent slope in conformance with CBC criteria.

(3) Value applies to level soil condition, and is subject to a maximum of 2000 psf.

Option 2 – Post-Tensioned Foundation

If post-tensioned slab/footing system is selected for the subject project, the design may be based on the geotechnical criteria shown below for medium soil expansion potential. These are based on the guidelines presented in the PTI, Third Edition design manual.

Thornthwaite Moisture Index	=	-20	
Equilibrium Suction	=	3.6	
Edge Lift Moisture Variation Distance, e_m	=	5.1	Ft.
Edge Lift, y_m	=	1.1	In.
Center Lift Moisture Variation Distance, e_m	=	9.0	Ft.
Center Lift, y_m	=	0.47	In.

Minimum Footing Depth (Exterior)	=	18 Inches below adjacent grade or 12 Inches below crushed rock layer whichever is deeper

The above foundation criteria are based on soil expansion consideration only. Foundation design should consider anticipated post-construction settlements, as appropriate.

Foundation design details such as slab thickness, concrete strength, reinforcements, etc. should be established by the Project Structural Engineer considering medium soil expansion and settlement potential provided below.

Settlement

Total static and differential post-construction settlements for footings designed and constructed in accordance with the criteria given below and supporting loads not exceeding the typical loadings for residential construction (column and wall loads on the order of 30 kips and 3 kips/lineal foot, respectively) are not anticipated to exceed the values shown below. The settlement estimates should be confirmed based on review of the foundation plans.

Structures should be designed for the following post-construction settlements:

- Total settlement = 1 inch
- Differential settlement = ¾-inch (*)

(*) Between similarly loaded column footings and for continuous footings and slabs over a distance of approximately 30 feet.

General Remarks

(i) Footing depths should not be allowed to be affected adversely, such as through erosion softening, digging, landscaping, etc.

(ii) Where foundations encroach closer than five (5) feet horizontally from the flow line of drainage swales, the footing should be deepened sufficiently to maintain the required embedment depth below the adjacent flow line.

(iii) Foundation details such as concrete strength, reinforcements, etc. should be established by the Project Structural Engineer, considering the loading and medium soil expansion potential. The footing and slab reinforcements recommended in this report are minimum requirements. More restrictive criteria based on structural design considerations or Code requirements shall govern.

(iv) Foundation excavations should be observed and approved by the Project Geotechnical Engineer prior to the placement of reinforcement or concrete. Forming of footing excavations may be required. Excavations should be free of slough and debris and thoroughly moisture conditioned prior to placing concrete.

(v) Excavated material from footing and utility trenches should not be placed in slab-on-grade areas unless properly compacted and tested.

Moisture/Water Vapor Retarder for Concrete Slab-on-Grade

In order to reduce the potential for moisture/water vapor migration up through the slab and possibly affecting floor covering, a moisture/vapor retarder is recommended under concrete floor slab-on-grade. The moisture barrier should be properly installed, lapped and sealed in accordance with the manufacturer's specifications. Punctures and rips should be repaired prior to placement of sand.

As a minimum, this moisture/water vapor retarder should consist of 10-mil thick polyethylene ("Visqueen"), lapped and sealed, and placed mid-height within a 4-inch coarse sand layer. This moisture/water vapor retarder should be installed in accordance with manufacturer's specifications.

The following recommendations are based on the tentative guidelines by the American Concrete Institute (ACI, April 2001) to reduce the potential moisture/water vapor intrusion in concrete slab-on-grade. Based on our review of available literature, it appears that the ACI procedure would be more effective to help reduce potential moisture/water vapor migration up through concrete slab-on-grade.

Recommendations based on the ACI guidelines are presented below:

- The moisture/water vapor retarder should consist of high strength polyethylene membrane and should meet or exceed the ASTM: E-1745-97 Class C material requirements for water vapor permeance, tensile strength and puncture resistance. The vapor retarder should consist of "Moistop Plus" (Fortifiber Building Products Systems) or "Vapor Block" VB 15 (Americover, Inc.), or approved equal. The vapor retarder should be underlain by a capillary break comprised of minimum 4 inches thick pea gravel layer. The gravel layer should be placed and compacted on approved soil sub-grade.

- The membrane should be placed on approved gravel layer and properly lapped and sealed. Membranes intersecting utility pipes, sewer lines, ducts or drains must be properly wrapped around the penetrations and sealed. All punctures and rips in the membrane should be repaired prior to placement of concrete, following manufacturer's recommendations. The vapor retarder should be installed in general accordance with the procedures outlined in ASTM: E-1643, and in conformance with the installation procedures recommended by the manufacturer.

- To minimize slab curling, a low slump concrete (low shrinkage mix design) should be used for the slab construction, as determined by the Project Structural Engineer.

The moisture/water vapor protection for concrete slab-on-grade should be selected based on cost and construction considerations, and considering potential future problems resulting from improper and uncontrolled landscape irrigation practices. Regardless of the moisture/water vapor retarder option selected, it should be emphasized that proper control of irrigation and landscape water adjacent to the structure is of paramount importance.

9.0 Additional Grading Recommendations

9.1 Utility Trench Backfill:

Bedding material should consist of imported materials exhibiting a sand equivalent (S.E.) of 30 or greater. The onsite materials are considered suitable for trench backfill, provided they are free of organic materials and oversized rocks.

9.2 Site Drainage:

It is important that proper drainage be maintained at the subject site both during and after construction of the planned improvements. Surface drainage should be directed away from structures, and their appurtenances to approved drainage facilities. Ponding of water should be avoided. Adequate area drainage systems should be installed in planter areas and within flatwork areas, as required. The ground immediately adjacent to the foundation shall be sloped away from the building at a slope of not less 5-percent for a minimum distance of 10 feet measured perpendicular to the face of the wall. If physical obstructions or lot lines prohibit 10 feet of horizontal distance, a 5-percent slope shall be provided to an approved alternative method of diverting water away from the foundation. Swales used for this purpose shall be sloped a minimum of 2 percent where located within 10 feet of the building foundation. Impervious surfaces within 10 feet of the building foundation shall be sloped at minimum of 2 percent away from the building.
Irrigation activities should be closely monitored to prevent saturation of site soils. Over-irrigation should be avoided to prevent seepage/water migration beneath floor slabs/foundations or to adjacent lots.

9.3 Slope Planting, Irrigation and Maintenance:

General guidelines for slope planting, irrigation and maintenance are shown below:

a) Slope planting should consist of appropriate drought resistant vegetation as recommended by the Landscape Architect. Landscaping of slopes should be completed as soon as possible and properly maintained.

b) The property owner is responsible for proper irrigation and for maintenance and repair of installed irrigation systems. Leaks should be repaired immediately. Sprinklers should be adjusted to provide maximum coverage with a minimum of water usage and overlap. Over-watering with consequent excessive runoff and ground saturation must be avoided.

c) If automatic sprinkler systems are installed, their use must be adjusted to account for natural rainfall conditions.

d) All interceptor ditches, drainage terraces, down-drains, and any other drainage devices that have been installed must be maintained and cleaned.

e) If rodent activity is present, the property owner must undertake a program for the elimination of burrowing animals. This must be an ongoing program in order to promote slope stability.

f) Water must not be allowed to flow over the constructed or natural slopes. This may require the construction of berms or ditches along the top of slopes, if such devices are not in place.

10.0 Infiltration Opportunities

Our firm has performed five field infiltration tests at different locations (IP-1 through IP-5) using double-ring infiltrometer. The approximate locations of the field infiltration tests are shown in the attached Figure 2. The tests were performed at approximately 5 feet below existing grades. The tests were performed by driving two circular rings (a smaller inner ring and a larger outer ring) into the ground several inches, filling both the outer and inner rings with water several times and measuring the water level in the inner ring versus time. The readings continued until a relatively constant rate of drop was observed. Infiltration rates for the five tests are presented below:

Test Location	Test Date	Depth Below Existing Grade	Infiltration Rate
IP-1	2/10/2015	5 feet	0.5 in / hr
IP-2	2/10/2015	5 feet	4.0 in / hr
IP-3	2/10/2015	5 feet	4.0 in / hr
IP-4	2/11/2015	5 feet	3.0 in / hr
IP-5	2/11/2015	5 feet	0.5 in / hr

The project Civil Engineer should review these results to determine the feasibility and infiltration design in accordance with the WQMP guidelines and protocol. Upon completion of the Infiltration Device design, the geotechnical consultant should review the locations and elevations of these to determine their effect on the proposed structures of the development

11.0 Conclusions

It is the opinion of this firm that, from a geotechnical standpoint, the site development plan is adequate for the intended purposes, provided the recommendations provided herein are closely adhered to.

The proposed plan will not adversely affect the stability on adjacent properties, nor will the existing conditions of adjacent properties affect the stability of the subject site from a geotechnical standpoint.

This report is intended to satisfy the requirements of the City of Orange, Department of Public Works Engineering Division's Manual of Grading section2.4 (pg. 12) for obtaining a grading permit.

The specifications and recommendations contained herein are in concert with the standards and practice of the industry and have been utilized by the undersigned and other firms for similar projects in the area. From a geotechnical standpoint, these procedures, specification and recommendations are suitable and acceptable for their intended use.

12.0 Limitations

This report has been prepared for the exclusive use of Milan Capital Management, Inc. and their design consultants relative to the design and construction of the proposed plan. This report is not intended for other parties, and it may not contain sufficient information for other purposes. The recommendations presented herein are intended to provide a safe working environment.

The Owner or Owner Representative should make sure that the information and preliminary recommendations presented in this report are brought to the attention of the Project Architect and Project Engineer and incorporated into the project plans.

The findings contained in this report are based upon our evaluation and interpretation of the information obtained from limited borings and/or test pits and the results of the laboratory testing and engineering analysis. The opinions and recommendations provided were based on the assumption that the geotechnical conditions, which exist across the site, are similar to those observed in the test excavations. The condition and characteristics of the sub-surface materials at locations and depths other than those excavated and observed may be different and no representations are made as to their quality and engineering properties. Should any conditions encountered during construction differ from those described herein, this office should be contacted immediately for evaluation of the actual conditions and for appropriate recommendations prior to continuation of work.

The findings and recommendations presented herein were obtained in accordance with currently accepted professional engineering principles and practice in the field of geologic and geotechnical engineering and reflect our best professional judgment. We make no other warranty, either express or implied.

This report is subject to review by the controlling authorities. If you have any questions or require additional information, please contact the undersigned.

{Signatures on following page}

Respectfully submitted,
GINTER & ASSOCIATES, INC.

By:_____
Dave Ginter R.G., C.E.G.
Principal Engineering Geologist/President

By:_____
Vela "Ganesh" Ganeshwara, P.E., G.E.
Consulting Geotechnical Engineer

REFERENCES

Bryant, M.E. and Fife, D.L., 1982, The Peralta Hills Fault, A Transverse Ranges Structure in The Northern Santa Ana Mountains, Southern California in Geology and Mineral Wealth of the Transverse Ranges; South Coast Geological Society Special Publication

Crowell, J.C., 1974, Origin of Late Cenozoic Basins in Southern California in W.R. Dickinson, ed., Tectonics and Sedimentation; SEPM Special Publication 22, pp. 190-204

Fuscoe Engineering, Inc., 2011, Rio Santiago, Hydrological Assessment Report, City of Orange, dated October 7, 2011

Geomatrix Consultants, Inc., 1996, Geotechncial Observation and Testing Report for the Sully-Miller Construction Company site, Santiago Canyon Road, Orange, CA dated March 11, 1996

_____, 1998, Groundwater Characterization Report for the Former Underground Fuel Storage Tanks Area and Request for Closure, Sully-Miller Construction Company Facility, Santiago Canyon Road, Orange, California; report dated April 15, 1998

_____, 1998, Geotechnical Feasibility Study, Sully-Miller Contracting Company Facility, Santiago Canyon Road, Orange, California; report dated September 2, 1998

Ginter & Associates, Inc., 2020 Revised Preliminary Geotechnical Investigation and Grading Plan Review TT#18163, South of Mabury Avenue and North of Santiago Creek, City of Orange, CA

_____,2012, Infiltration Opportunities, Constraints and Recommendations for Water Quality Treatment Purposes, Rio Santiago Development Site, City of Orange, California; report dated February 27, 2012

Ginter, D.H. and Shlemon, R.J., 1991, Location and Activity of the El Modeno Fault in Orange County: Another Southern California Enigma in The Geological Society of America, Cordilleran Section, 87th Annual Meeting Abstracts

Goldman, H.B., 1968, Sand and Gravel in California, an Inventory of Deposits in California Division of Mines and Geology Bulletin 180-C

Hart, E.W., 1973, revised 1997, Fault Rupture Hazard Zones in California in California Division of Mines and Geology Special Publication 42

Hauksson, E. and Jones, L.M., 1989, The 1987 Whittier Narrows Earthquake Sequence in Los Angeles, Southern California: Seismological and Tectonic Analysis in Journal of Geophysical Research, Vol. 94, pp. 9569-9589

Johns, R.H., 1954, Geology of Southern California in California Division of Mines and Geology Bulletin 170

Jennings, C.W., 1994, Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions in California Division of Mines and Geology Map No. 6

Moore & Taber, 1981, Geotechnical Investigation, Handy Creek Storm Channel, Orange County, California

_____, 1983, Supplementary Fill Investigation, Handy Creek Storm Channel, Orange County, California

Morton, P.K. and Miller, R.B., 1981, Geologic Map of Orange County, California, Showing Mines and Mineral Deposits in California Division of Mines and Geology, Bulletin 294, Pl.1

Neblett & Associates, Inc., 2000, Preliminary Geologic/Geotechnical Investigation and 100-Sale Tentative Grading Plan Review for EIR, Sully-Miller Site, City of Orange, California

Schoellhamer, J.E., Vedder, J.G., Yerkes, R.F. and Kinney, D.M., 1981 Geology of the Northern Santa Ana Mountains, California in U.S. Geological Survey Professional Paper 420-D, p. 109, 4 pls.

Woodford, A.O., Schoellhamer, J.E., Vedder, J.G. and Yerkes, R.F., 1954, Geology of the Los Angeles Basin in R.H. Johns, ed., Geology of Southern California in CDMG Bulletin 170, pp. 65-81

WQMP, Model Technical Guidance Document Appendix VII-Infiltration Rate Evaluation Protocol and Factory of Safety Recommendations; Appendix VIII-Groundwater-related Infiltration Feasibility Criteria

Wright, T.L., 1991, Structural Geology and Tectonic Evolution of the Los Angeles Basin, California in Active Margin Basins, AAPG Memoir 52

Yerkes, R.F. 1957, Volcanic Rocks of the El Modeno Area, Orange County, California in USGS Prof. Paper 274-L, p. 24

Youd, T. Leslie, et al., 1997, Liquefaction Resistance of Soils, Summary Report from the NCEER Workshop on Evaluation of Liquation Resistance of Soils; pp 1-57

Ziony, J.I., and Jones, L.M., 1989, Map Showing Late Quaternary Faults and 1978-1984 Seismicity of the Los Angeles Region, California in USGS Misc. Field Studies Map MF-1964

Ziony, J.I., ed., 1985, Evaluating Earthquake Hazards in the Los Angeles Region-An Earth Science Prospective in USGS Prof. Paper 1360

Appendix F:
Hydrology Information
(Hydromodification Evaluation)

```
************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                        Analysis prepared by:

                        HUNSAKER & ASSOCIATES
                              Irvine,Inc
                    Planning * Engineering * Surveying
         Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* TRACT 17847                                                           *
* EXISTING HYDROLOGY CONDITION                                          *
* 2-Year Storm                                                           *
 ************************************************************************

  FILE NAME: 17847EX2.DAT
  TIME/DATE OF STUDY: 12:19 05/18/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.01
  *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   25.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0313 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)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1028.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.00  DOWNSTREAM(FEET) =    403.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   22.589
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.953
  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.)
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        4.44      0.30     1.000    46   22.59
  NATURAL FAIR COVER
  "OPEN BRUSH"               A        3.56      0.40     1.000    28   22.59
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.38
  TOTAL AREA(ACRES) =      8.00   PEAK FLOW RATE(CFS) =      4.38
```

```
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        8.0  TC(MIN.) =     22.59
  EFFECTIVE AREA(ACRES) =      8.00  AREA-AVERAGED Fm(INCH/HR)=  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)    =       4.38
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                       Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************ DESCRIPTION OF STUDY ************************
* TRACT 17847                                                         *
* PROPOSED HYDROLOGY CONDITION                                        *
* 2-Year Storm                                                        *
 **********************************************************************

  FILE NAME: 17847PR2.DAT
  TIME/DATE OF STUDY: 12:42 05/18/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.01
  *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   25.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0313 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)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   310.00
  ELEVATION DATA: UPSTREAM(FEET) =    437.00  DOWNSTREAM(FEET) =    403.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.265
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.827
  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.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          B        1.10      0.30     0.800    36    7.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA RUNOFF(CFS) =      1.57
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      1.57

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

```
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  403.60  DOWNSTREAM ELEVATION(FEET) =  399.34
  STREET LENGTH(FEET) =   570.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 26.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  16.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   12.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   4.18   Tc(MIN.) =   11.45
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.407
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "1 DWELLING/ACRE"          B        1.25      0.30     0.800    36
  RESIDENTIAL
  "1 DWELLING/ACRE"          A        1.87      0.40     0.800    17
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.36
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA AREA(ACRES) =    3.12      SUBAREA RUNOFF(CFS) =    3.14
  EFFECTIVE AREA(ACRES) =      4.22    AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  0.80
  TOTAL AREA(ACRES) =        4.2        PEAK FLOW RATE(CFS) =       4.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.84
  FLOW VELOCITY(FEET/SEC.) =  2.46   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.84  DOWNSTREAM(FEET) =   390.84
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.20
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.30
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   718.00
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    399.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.565
```

```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.399
  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.)
  RESIDENTIAL
  "1 DWELLING/ACRE"          B        1.76      0.30     0.800    36   11.56
  RESIDENTIAL
  "1 DWELLING/ACRE"          A        0.66      0.40     0.800    17   11.56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.33
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.800
  SUBAREA RUNOFF(CFS) =      2.48
  TOTAL AREA(ACRES) =      2.42   PEAK FLOW RATE(CFS) =      2.48

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   392.90  DOWNSTREAM(FEET) =   390.90
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.82
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     748.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   432.00
  ELEVATION DATA: UPSTREAM(FEET) =    399.75  DOWNSTREAM(FEET) =    398.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.086
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.433
  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                 A        0.50      0.40     0.100    17   11.09
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.63
  TOTAL AREA(ACRES) =      0.50   PEAK FLOW RATE(CFS) =      0.63

****************************************************************************
  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) =   432.00
  ELEVATION DATA: UPSTREAM(FEET) =    399.75  DOWNSTREAM(FEET) =    398.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.086
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.433
  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                 A        0.31      0.40     0.100    17   11.09
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.39
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      0.39

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

```
 FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   895.00
 ELEVATION DATA: UPSTREAM(FEET) =    437.00  DOWNSTREAM(FEET) =    399.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   26.665
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.866
 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.)
 NATURAL GOOD COVER
 "WOODLAND,GRASS"            B        0.33      0.30     1.000    38   26.67
 NATURAL GOOD COVER
 "WOODLAND,GRASS"            A        0.22      0.40     1.000    17   26.67
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      0.26
 TOTAL AREA(ACRES) =      0.55   PEAK FLOW RATE(CFS) =      0.26
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        0.6  TC(MIN.) =     26.67
 EFFECTIVE AREA(ACRES) =      0.55  AREA-AVERAGED Fm(INCH/HR)=  0.34
 AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap = 1.000
 PEAK FLOW RATE(CFS)   =       0.26
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```