

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

**Project Name:**

TOC - 17332 Irvine Boulevard, Tustin, CA 92780

**Prepared for:**

**The Olson Company  
2075 Harbor Boulevard  
Cypress, CA 90630  
(562) 596-4770**

**Prepared by:**

**Advanced Civil Group, Inc.**

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**(949) 391-7772**

**Prepared on:**

**4/27/2026**

### **Project Owner's Certification**

|                                                                 |                |                     |                 |
|-----------------------------------------------------------------|----------------|---------------------|-----------------|
| Permit/Application No.                                          |                | Grading Permit No.  |                 |
| Tract/Parcel Map No.                                            | VTTM No. 19483 | Building Permit No. |                 |
| CUP, SUP, and/or APN (Specify Lot Numbers if Portions of Tract) |                |                     | APN: 401-512-01 |

This Water Quality Management Plan (WQMP) has been prepared for The Olson Company by Advanced Civil Group, Inc. The WQMP is intended to comply with the requirements of the local NPDES Stormwater Program requiring the preparation of the plan.

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

|               |                                                        |      |  |
|---------------|--------------------------------------------------------|------|--|
| <b>Owner:</b> |                                                        |      |  |
| Title         | The Olson Company / Attn: Mike McBride, Vice President |      |  |
| Company       | The Olson Company                                      |      |  |
| Address       | 5275 Orange Ave, Cypress, CA 90630                     |      |  |
| Email         | mmcbride@theolsonco.com                                |      |  |
| Telephone #   | (714) 229-6720                                         |      |  |
| Signature     |                                                        | Date |  |

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## Attachments

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| <b>Attachment B.....</b>    | <b>O &amp; M Plan</b>        |

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

Provide discretionary permit and water quality information. Refer to Section 2.1 in the *Technical Guidance Document (TGD)* available from the Orange County Stormwater Program ([ocwatersheds.com](http://ocwatersheds.com)).

| Project Information                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Permit/ Application No.                                                                         | Tract/Parcel Map No. VTTM No. 19483                                                                                                                                                                                                                                                                                                                                                                                             |
| Additional Information/<br>Comments:                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Water Quality Conditions                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Water Quality<br>Conditions<br>(list verbatim)                                                  | To be completed once conditions of approval are issued.                                                                                                                                                                                                                                                                                                                                                                         |
| Watershed-Based Plan Conditions                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Provide applicable<br>conditions from watershed -<br>based plans including<br>WIHMPs and TMDLS. | <p>The WIHMP applicable to the project area watershed is the Newport Bay / San Diego Creek watershed WIHMP.</p> <p>New development projects that create 10,000 square feet or more of impervious surface. This category includes commercial, industrial, residential housing subdivisions, mixed-use, public projects on private or public property that falls under the planning and building authority of the Permittees.</p> |

## Section II Project Description

### II.1 Project Description

| Description of Proposed Project               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Development Category<br>(Verbatim from WQMP): | <u>Priority Project</u><br><br>All significant redevelopment projects, where significant redevelopment is defined as the addition or replacement of 5,000 or more square feet of impervious surface on an already developed site. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of the facility, or emergency redevelopment activity required to protect public health and safety. If the redevelopment results in the addition or replacement of less than 50 percent of the impervious area on-site and the existing development was not subject to WQMP requirement, the numeric sizing criteria discussed in Section 7.II-2.0 only applies to the addition or replacement area. If the addition or replacement accounts for 50 percent or more of the impervious area, the Project WQMP requirements apply to the entire development.                                                                                                                                                                               |                          |
| Project Area (ft <sup>2</sup> ): _____        | Number of Dwelling Units: 15 Units                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | SIC Code: Not Applicable |
| Narrative Project Description:                | <p>.Under proposed conditions, the 0.996 acre commercial site will be redeveloped for residential use and plans to consist of 15 townhomes in four duplex buildings and seven detached single-family buildings. An associated interior private driveway, common area landscaping, perimeter walls, and underground utilities are proposed.</p> <p>Landscaped areas are both common – open space maintained by HOA – and private yards maintained by homeowner.</p> <p>There will not be any residential features that are of particular water quality concern proposed for the project. The project will not include swimming pools, trash enclosures, outdoor storage areas, or recreational facilities of note.</p> <p>The proposed project does not include any right-of-ways that will incorporate green street design to address water quality, as the LID BMPs proposed for the project site meet or exceed the benefits of what green streets would otherwise achieve.</p> <p>The proposed project is not eligible for any Water Quality Credits for Alternative Compliance, as the project site is able to satisfy water</p> |                          |

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |                          |            |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------|------------|
|                                  | <p>quality requirements through the implementation of LID BMPs.</p> <p>The project is located within the Newport Bay / San Diego Creek watershed WIHMP.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |                          |            |
| Project Area                     | Pervious                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            | Impervious               |            |
|                                  | Area<br>(acres or sq ft)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Percentage | Area<br>(acres or sq ft) | Percentage |
| Pre-Project Conditions           | 4,811 sq ft                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 11%        | 38,563 sq ft             | 89%        |
| Post-Project Conditions          | 18,949 sq ft                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 44%        | 24,425 sq ft             | 56%        |
| Drainage<br>Patterns/Connections | <p>Drainage Patterns:</p> <p>Site drains to a single inlet located in the east side of the site. Runoff is conveyed to a subsurface infiltration gallery located beneath the main private drive on the east side of the project. Emergency overflow discharges to Mountain View Drive curb and gutter into the City MS4 system.</p> <p>Narrative:</p> <p>The project consists of redevelopment of a previously developed 0.996-acre site with fifteen condominium units in four duplex buildings, seven single-family detached buildings, associated private drive aisle, driveways, landscaping, underground utilities, and stormwater infiltration improvements. The project reduces overall impervious area compared to existing conditions.</p> |            |                          |            |

## II.2 Potential Stormwater Pollutants

| Pollutants of Concern |                                                                                              |                                     |
|-----------------------|----------------------------------------------------------------------------------------------|-------------------------------------|
| Pollutant             | <p>Circle One:</p> <p>E=Expected to be of concern</p> <p>N=Not Expected to be of concern</p> | Additional Information and Comments |

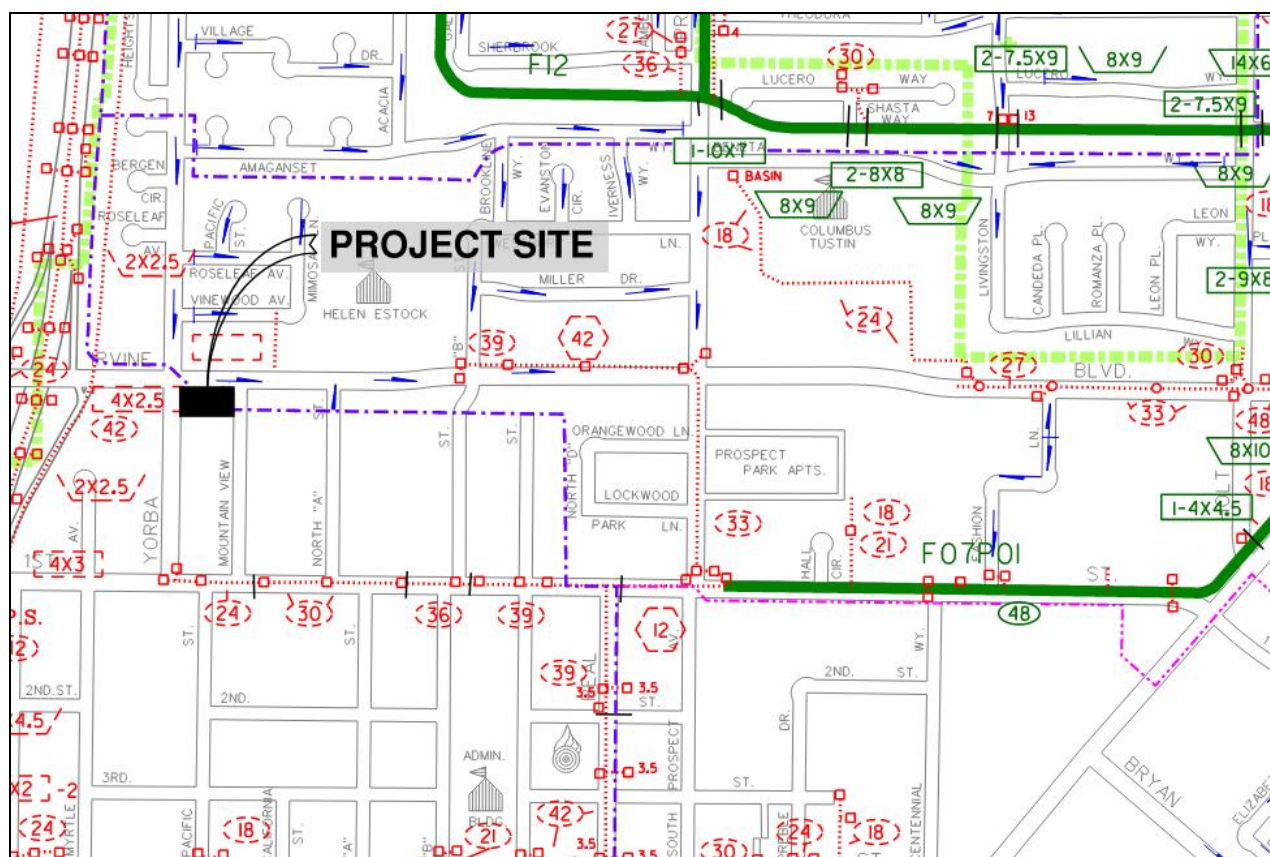
|                            |   |   |                         |
|----------------------------|---|---|-------------------------|
| Suspended-Solid/ Sediment  | E | N | Residential Development |
| Nutrients                  | E | N | Residential Development |
| Heavy Metals               | E | N |                         |
| Pathogens (Bacteria/Virus) | E | N |                         |
| Pesticides                 | E | N | Residential Development |
| Oil and Grease             | E | N | Residential Development |
| Toxic Organic Compounds    | E | N |                         |
| Trash and Debris           | E | N | Residential Development |

## II.3 Hydrologic Conditions of Concern

☒ No – Show map

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

The project is not susceptible to hydromodification impacts because all downstream receiving waters, are considered stabilized. See map provided below, where the project site is clearly outside of the area of susceptibility shaded in blue line hatch. Therefore, there are no HCOC's for the project.



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

In the post-development condition, the proposed project will maintain existing drainage patterns. The site's runoff is collected in curb gutters and area drain inlets and conveyed in a easterly direction towards the project low point. The single on-site storm drain inlet in the east collects the runoff and conveys LID flows through the underground storage and infiltration system under the east portion of the project drive. High flows, flow through the underground storage and infiltration and drain into the Mountain View curb and gutter and into the City MS4 system.

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

A Homeowners Association (HOA) will be formed upon project completion. The HOA will be responsible for inspecting and maintaining all BMPs prescribed for VTTM No. 19483 at 17332 Irvine Boulevard. Until an HOA is formally established, The Olson Company shall assume all BMP maintenance and inspection responsibilities for the proposed project. Inspection and maintenance responsibilities are outlined in Section V of this report. No infrastructure will be transferred to any public agencies.

## Section III Site Description

### III.1 Physical Setting

|                                  |                                      |
|----------------------------------|--------------------------------------|
| Planning Area/<br>Community Name |                                      |
| Location/ Address                | 17332 Irvine Blvd                    |
|                                  | Tustin, CA 92780                     |
| Land Use                         | Single-Family and Duplex Residential |
| Zoning                           | PR (Professional)                    |
| Acreage                          | 43,374 sf (0.996 ac)                 |
| Predominant Soil Type            | Hydrologic Soil Type C               |

### III.2 Site Characteristics

|                                  |                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Precipitation Zone               | Zone 3 / Design Depth: 0.85 inches                                                                                                                                                                                                                                                                                                                                                                                           |
| Topography                       | Not located within a potential landslide area, according to Figure XVI-2c of the TGD. The project site is relatively flat with a slight grade down in the east direction.                                                                                                                                                                                                                                                    |
| Drainage<br>Patterns/Connections | <p>Drainage Patterns:</p> <p>Site drains to a single inlet located in the east side of the site. Runoff is conveyed to a subsurface infiltration gallery located beneath the main private drive on the east side of the project. Emergency overflow discharges to Mountain View Drive curb and gutter into the City MS4 system.</p> <p>Narrative:</p> <p>The project consists of redevelopment of a previously developed</p> |

|                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                        | 0.996-acre site with fifteen condominium units in four duplex buildings, seven single-family detached buildings, associated private drive aisle, driveways, landscaping, underground utilities, and stormwater infiltration improvements. The project reduces overall impervious area compared to existing conditions.                                                                                                                                                                                                                                                                                                                                                            |
| <i>Soil Type, Geology, and Infiltration Properties</i> | <p>As indicated by the Soil Map in the TGD, the project site is located in an area characterized by HSG C soils.</p> <p>Predominant Soil Type:<br/>Sand (SP)</p> <p>Infiltration Rate:<br/>2.5 inch per hour (per geotechnical investigation)</p> <p>Based on the subsurface exploration and percolation testing at the site, the use of shallow chamber system is considered feasible. Preliminary analyses indicate that shallow chamber systems could likely provide a “measured” infiltration rate of 2.5 in./hr. and empty within 48 hours. An appropriate factor of safety should be applied to these flow rates as required by the appropriate governmental authority.</p> |

### ***Site Characteristics (continued)***

|                                                           |                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Hydrogeologic (Groundwater) Conditions</i>             | Ground water was not encountered during the subsurface exploration to a depth of 41.5’ below the existing surface. Shallow infiltration is considered to be feasible.                                                                                                          |
| <i>Geotechnical Conditions (relevant to infiltration)</i> | Ground water is more than 41.5’ below the existing surface. Additionally, according to the Geotracker website, the project site does not have any LUST cleanup sites within the project’s vicinity. No soil contamination concerns are located within 250 feet of the project. |
| <i>Off-Site Drainage</i>                                  | There is no off-site drainage run-on.                                                                                                                                                                                                                                          |
| <i>Utility and Infrastructure Information</i>             | There are no existing subsurface utilities that will impact the location of LIDBMPs on-site. Any existing utilities will be removed and/or replaced.                                                                                                                           |

### III.3 Watershed Description

|                                                                    |                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Receiving Waters                                                   | <ul style="list-style-type: none"><li>• San Diego Creek</li><li>• Upper Newport Bay</li><li>• Pacific Ocean</li></ul>                                                                                                                                                 |
| 303(d) Listed Impairments                                          | <ul style="list-style-type: none"><li>• San Diego Creek: Nutrients; Sediment; Indicator Bacteria; Toxicity; and Metals</li><li>• Upper Newport Bay: Nutrients; Sediment; Indicator Bacteria; Toxicity; Metals and Eutrophication</li></ul>                            |
| Applicable TMDLs                                                   | <ul style="list-style-type: none"><li>• San Diego Creek: Nutrients; Sediment; Bacteria; and Toxicity</li><li>• Upper Newport Bay: Nutrients; Sediment; Bacteria; Toxicity</li></ul>                                                                                   |
| Pollutants of Concern for the Project                              | Expected pollutants from attached residential developments include sediment, nutrients, pathogens, pesticides, oil & grease, and trash. Based on the 303(d) listed impairments and TMDLs for the project's receiving waters, the pollutants of concern are pathogens. |
| Environmentally Sensitive and Special Biological Significant Areas | There are no ESA's or ASBS within the projects vicinity.                                                                                                                                                                                                              |

## Section IV Best Management Practices (BMPs)

### IV. 1 Project Performance Criteria

|                                                                                                                                                                                                                      |                |                              |                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------------------|----------------------------------------|
| Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implementing LID on regional or sub-regional basis? |                | YES <input type="checkbox"/> | NO <input checked="" type="checkbox"/> |
| If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.                                                                                                                              | Not Applicable |                              |                                        |

## Project Performance Criteria (continued)

|                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP) | As explained in Section II.3 of this report, the proposed project is not located within an area that is hydromodification susceptible. All downstream receiving waters are considered stabilized. Therefore, HCOCs do not exist for the proposed project.                                                                                                                                                                                                                                                                                                                                |
| List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)                                       | <p>Infiltrate, harvest and use, evapotranspire, or biotreat/biofilter, the 85<sup>th</sup> percentile, 24-hour storm event (Design Capture Volume) or Design Flowrate. LID BMPs must be designed to retain, on-site, (infiltrate, harvest and use, or evapotranspire) storm water runoff up to 80 percent average annual capture efficiency or treat the Design Flowrate.</p> <p>The proposed project will use underground storage and infiltration to infiltrate the Design Capture.</p>                                                                                                |
| List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP)                     | If it is not feasible to meet LID performance criteria through retention and/or biotreatment provided on-site or at a sub-regional/regional scale, then treatment control BMPs shall be provided on-site or offsite prior to discharge to waters of the US. Sizing of treatment control BMP(s) shall be based on either the unmet volume after claiming applicable water quality credits, if appropriate. Treatment control BMPs are not required, since the DCV will be infiltrated.                                                                                                    |
| Calculate LID design storm capture volume for Project.                                                         | $DCV = C \times i \times A$ <p>Where:</p> <p>DCV = design capture volume (cubic feet)<br/> <math>C = \text{runoff coefficient} = (0.75 \times imp + 0.15)</math><br/> <math>imp = \text{impervious fraction of drainage area (ranges from 0 to 1)}</math><br/> <math>i = \text{design intensity (inches)}</math><br/> <math>A = \text{tributary area (acres)}</math><br/> <math>C = 0.15 + (0.75 \times 0.56) = 0.57</math><br/> <math>D85 = 0.85 \text{ inches}</math><br/> <math>DCV = (0.85/12) \times 0.57 \times 43,374</math><br/> <math>DCV = 1,749 \text{ cubic feet}</math></p> |

## IV.2. SITE DESIGN AND DRAINAGE PLAN

### Minimize Impervious Area

Hardscape is minimized on the property where imperviousness is 56%. Also, infiltration BMPs will be implemented for the project to offset the site's imperviousness.

### Preserve Existing Drainage Patterns

Existing drainage patterns will be preserved as indicated. The site will drain in a easterly direction as in existing conditions.

### Disconnect Impervious Areas

Area drain inlets are located within landscape areas. As such, building roof drains will drain to landscaping before collecting into the area drains.

### Landscape Design

Drought tolerant plants will be utilized in the project's landscape design

The design capture volume for the DMA is summarized in the table below. It has been derived utilizing the "Simple Design Flowrate Sizing Method" in accordance with the TGD. Actual BMP sizing requirements, drawdown, depths, and other design details specific to the structural BMP are provided in Section IV.3.2 below. The location of the DMA and associated LID and treatment BMP are identified on the exhibits in Section VI. Additional calculations and TGD Worksheets are provided in Attachment A.

| DRAINAGE MANAGEMENT AREAS (DMA's) |                              |        |                                                        |
|-----------------------------------|------------------------------|--------|--------------------------------------------------------|
| DMA ID                            | Tributary Drainage Area (ac) | % Imp. | Tributary LID BMP's                                    |
| 1                                 | 0.996 ac                     | 56%    | Contech StormTech MC-7200<br>Volume = 2,000 cubic feet |

### IV.3 LID BMP SELECTION AND PROJECT CONFORMANCE ANALYSIS

Low Impact Development (LID) BMPs are required in addition to site design measures and source controls to reduce pollutants in storm water discharges. LID BMPs are engineered facilities that are designed to retain or biotreat runoff on the project site. The 4th Term MS4 Storm Water Permit (Order R9-2009-0009) requires the evaluation and use of LID features using the following hierarchy of treatment: infiltration, evapotranspiration, harvest/reuse, and biotreatment.

It has been determined through onsite infiltration testing that infiltration is feasible for the proposed project and will be used as the highest hierarchy of treatment. Specific details are provided in the following sub-sections.

#### IV.3.1 Hydrologic Source Controls

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

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

No HSCs are proposed for the project site. The Design Capture Volume will be addressed through infiltration, as discussed below.

### IV.3.2 Infiltration BMPs

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

| Name                              | Included?                           |
|-----------------------------------|-------------------------------------|
| Bioretention without underdrains  | <input type="checkbox"/>            |
| Rain gardens                      | <input type="checkbox"/>            |
| Porous landscaping                | <input type="checkbox"/>            |
| Infiltration planters             | <input type="checkbox"/>            |
| Retention swales                  | <input type="checkbox"/>            |
| Infiltration trenches             | <input type="checkbox"/>            |
| Infiltration basins               | <input type="checkbox"/>            |
| Drywells                          | <input type="checkbox"/>            |
| Subsurface infiltration galleries | <input checked="" type="checkbox"/> |
| French drains                     | <input type="checkbox"/>            |
| Permeable asphalt                 | <input type="checkbox"/>            |
| Permeable concrete                | <input type="checkbox"/>            |
| Permeable concrete pavers         | <input type="checkbox"/>            |
| Other:                            | <input type="checkbox"/>            |
| Other:                            | <input type="checkbox"/>            |

As noted above, infiltration is feasible for the full LID Design Storm Capture Volume. An underground storage and infiltration system will be implemented that meets the infiltration requirements detailed below.

$$DCV = C \times i \times A$$

Where:

DCV = design capture volume (cubic feet)

C = runoff coefficient =  $(0.75 \times \text{imp} + 0.15)$

imp = impervious fraction of drainage area (ranges from 0 to 1)

i = design intensity (inches)

A = tributary area (acres)

$$C = 0.15 + (0.75 \times 0.56) = 0.57$$

$$D85 = 0.55 \text{ inches}$$

$$DCV = (0.55/12) \times 0.57 \times 43,374$$

$$DCV = 1,749 \text{ cubic feet}$$

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

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

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

NOT APPLICABLE

#### IV.3.4 Biotreatment BMPs

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

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

NOT APPLICABLE

#### IV.3.5 Hydromodification Control BMPs

Describe hydromodification control BMPs. See Section 5 TGD. Include sections for selection, suitability, sizing, and infeasibility, as applicable. Detail compliance with Prior Conditions of Approval.

#### Hydromodification Control BMPs

| BMP Name | BMP Description |
|----------|-----------------|
|          |                 |
|          |                 |
|          |                 |
|          |                 |
|          |                 |
|          |                 |
|          |                 |
|          |                 |
|          |                 |

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

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

| Regional/Sub-Regional LID BMPs |
|--------------------------------|
| NOT APPLICABLE                 |

#### IV.3.7 Treatment Control BMPs

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

| Treatment Control BMPs |                 |
|------------------------|-----------------|
| BMP Name               | BMP Description |
|                        |                 |
|                        |                 |
|                        |                 |
|                        |                 |
|                        |                 |
|                        |                 |
|                        |                 |
|                        |                 |
|                        |                 |

### IV.3.8 Non-structural Source Control BMPs

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

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

#### N1, Education for Property Owners, Tenants and Occupants

Educational materials related to urban runoff can be provided to homeowners (via project owner or HOA) and employees to reduce pollutants from reaching the storm drain system. Examples of environmental awareness materials include, but are not limited to: guidelines for landscaping and gardening, tips for pet care, vehicle cleaning, and proper disposal of household hazardous waste.

**N2, Activity Restrictions**

Activity restrictions can be developed to restrict activities that have the potential to create adverse impacts on water quality. Activities include but are not limited to: the handling and disposal of contaminants, trash management and litter control, irrigation and landscaping practices, vehicle and equipment cleaning, fertilizer applications and household waste management practices.

**N3, Common Area Landscape Management**

Common area landscape management will include minimizing fertilizer and pesticide application, use of slow-release fertilizers, maintenance activities, providing education to homeowners (via project owner and/or HOA), and providing education and training for employees on management of landscape materials and storm water management. Maintenance shall be conducted on a monthly basis at a minimum.

**N4, BMP Maintenance**

In accordance with the City LIP and OC DAMP, the project owners and/or HOA of the site will be responsible for the implementation and maintenance of each applicable non-structural BMP, as well as scheduling inspections and maintenance of all applicable structural BMP facilities through its landscape contractor and any other necessary maintenance contractors for the project site. In addition, the project owner will be required to verify treatment control BMP implementation and ongoing maintenance through inspection, self-certification, or other equally effective measure. The certification shall verify that, at a minimum, the inspection and maintenance of all structural BMPs has occurred prior to the start of the rainy season, and in accordance with frequencies outlined in the WQMP prepared for the project. Maintenance frequencies are identified in Section V and shall be implemented upon completion of the project.

**N11, Common Area Litter Control**

Regular litter control for the entire project area shall be performed including trash pick-up on a weekly basis, and sweeping of littered common areas, as performed by the maintenance crew. In addition, pet waste receptacles will be provided throughout the project site where applicable. Proper signage regarding litter will be posted on or near trash receptacles and trash bins will have lids if not covered by canopy.

**N12, Employee Training**

Employees of the owner and/or HOA, as well as any contractors of the aforementioned entities will require training to ensure that employees are aware of activities that may result in pollutants reaching the storm drain. Training shall be conducted on an annual basis to ensure proper maintenance activities and daily activities are occurring.

**N14, Common Area Catch Basin Inspection**

Employees of the owner and/or HOA, as well as any contractors of the aforementioned entities will require training to ensure that employees are aware of activities that may result in pollutants reaching the storm drain. Training shall be conducted on an annual basis to ensure proper maintenance activities and daily activities are occurring.

**N15, Street Sweeping Private Streets and Parking Lots**

Street sweeping of all impervious streets and parking lots performed at a frequency that reduces or prevents sediment and debris from entering receiving waters, monthly at a minimum, and prior to the rainy season.

**IV.3.9 Structural Source Control BMPs**

The table below indicates all BMPs to be incorporated in the project. For those designated as not applicable (N/A), a brief explanation why is provided.

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

**S1/SD-13, Provide storm drain system stenciling and signage**

Storm drain stenciling or signage on all catch basins with the highly visible source control message “No Dumping Drains to Ocean”. This includes catch basins and grate inlets near pedestrian areas or drive aisles. Stencils shall be inspected annually and replaced as needed.

**S4/SD-12, Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control**

Installing and maintaining efficient irrigation systems designed to minimize water by eliminating overspray to hardscape areas, and setting irrigation timing and cycle lengths in accordance with water demands, given time of year, weather, and day and night temperatures. Where feasible, includes incorporation of native tolerant species for landscaping, protection of slopes and efficient irrigation. May be used in conjunction with educational materials to homeowners as well as activity restrictions.

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

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

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

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

|                                                                                                                                     |                                                              |                                                                                             |                                                                                                                                                                                                                                                |                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses. | <input type="checkbox"/> Developments in a city center area. | <input type="checkbox"/> Developments in historic districts or historic preservation areas. | <input type="checkbox"/> Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories. | <input type="checkbox"/> In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas. |
| Calculation of Water Quality Credits<br>(if applicable)                                                                             |                                                              |                                                                                             |                                                                                                                                                                                                                                                |                                                                                                                                                                                 |

#### **IV.4.2 Alternative Compliance Plan Information**

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

## Section V Inspection/Maintenance Responsibility for BMPs

It has been determined that The Olson Company shall assume all BMP inspection and maintenance responsibilities for the VTTM No. 19483 project.

|               |                                                                      |
|---------------|----------------------------------------------------------------------|
| Contact Name: | Mike McBride                                                         |
| Title:        | VP, Operational Planning                                             |
| Company:      | The Olson Company                                                    |
| Address:      | 3010 Old Ranch Parkway, Suite 100<br>Seal Beach, CA 90740            |
| Phone:        | (562) 682-7422                                                       |
| Email:        | <a href="mailto:mmcbride@theolsonco.com">mmcbride@theolsonco.com</a> |

Should the maintenance responsibility be transferred at any time during the operational life of VTTM No. 19483, such as when an HOA or POA is formed for a project, a formal notice of transfer shall be submitted to the City of Tustin at the time responsibility of the property subject to this WQMP is transferred. The transfer of responsibility shall be incorporated into this WQMP as an amendment.

The Owner shall verify BMP implementation and ongoing maintenance through inspection, self-certification, survey, or other equally effective measure. The certification shall verify that, at a minimum, the inspection and maintenance of all structural BMPs including inspection and performance of any required maintenance in the late summer / early fall, prior to the start of the rainy season. A form that may be used to record implementation, maintenance, and inspection of BMPs is included in Attachment C. The O&M Plan will be recorded in the Orange County Clerk-Recorder's Office prior to close-out of grading/building permits.

The City of Tustin may conduct verifications to assure that implementation and appropriate maintenance of structural and non-structural BMPs prescribed within this WQMP is taking place at the project site. The Owner shall retain operations, inspections and maintenance records of these BMPs and they will be made available to the City upon request. All records must be maintained for at least five (5) years after the recorded inspection date for the lifetime of the project.

Long term funding for operations and maintenance of BMPs will be generated through HOA fees. Until an HOA is established, the Owner will provide funding for O&M. CC&Rs specifying BMP maintenance requirements of the HOA and annual HOA BMP Inspection and Maintenance budget will be finalized and submitted to the City for final review.

| <b>BMP Inspection/Maintenance</b>                    |                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                         |
|------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>BMP</b>                                           | <b>Reponsible Party(s)</b> | <b>Inspection/ Maintenance Activities Required</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Minimum Frequency of Activities</b>                                                                                                                                                  |
| Contech StormTech MC-7200                            | Owner/ HOA                 | See Attachment C for manufacturer's O&M Manual.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All post construction BMPs shall be inspected and serviced before the start of the rainy season (Oct. 1 <sup>st</sup> ) and after the end of each rainy season (Apr. 30 <sup>th</sup> ) |
| Education for Property Owners, Tenants and Occupants | Owner/ HOA                 | Educational materials will be provided to homeowners upon occupancy (see Attachment B).                                                                                                                                                                                                                                                                                                                                                                                                                                               | Annually                                                                                                                                                                                |
| Activity Restrictions                                | Owner/ HOA                 | Activity and use restrictions will be developed and enforced by the Owner/ HOA through CC&Rs.                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ongoing                                                                                                                                                                                 |
| Common Area Landscape Management                     | Owner/ HOA                 | Maintenance shall be consistent with City requirements, plus fertilizer and/or pesticide usage shall be consistent with City of Tustin LIP Section 5. 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 | Monthly                                                                                                                                                                                 |

|                                                  |            |                                                                                                                                                                                                                                                                                            |                                                      |
|--------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
|                                                  |            | water courses and drain inlets.                                                                                                                                                                                                                                                            |                                                      |
| BMP Maintenance                                  | Owner/ HOA | 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 Owner/HOA and documented with the WQMP, and shall be available for review upon request.             | Ongoing                                              |
| Common Area Litter Control                       | Owner/ HOA | Litter patrol, violations investigation, reporting and other litter control activities shall be performed in conjunction with maintenance activities. Litter collection and removal shall be performed on a weekly basis.                                                                  | Weekly                                               |
| Employee Training                                | Owner/ HOA | The Owner shall educate all new employees/managers on storm water pollution prevention, particularly good housekeeping practices, prior to the start of the rainy season (October 1). Refresher courses shall be conducted annually. Materials that may be used are attached to this WQMP. | Annually                                             |
| Common Area Catch Basin Inspection               | Owner/ HOA | Private catch basin inlets, area drains, swales, curb-and-gutter systems and other drainage systems shall be inspected after each storm event and, when debris is present, cleaned prior to the storm season by October 1st each year.                                                     | After each storm event and Annually prior to Oct 1st |
| Street Sweeping Private Streets and Parking Lots | Owner/ HOA | Private streets and drive aisles must be swept quarterly, including prior to the start of the rainy season (October 1 <sup>st</sup> ).                                                                                                                                                     | Quarterly                                            |

|                                                                                                                |               |                                                                                                                                                                                                                                                                                                                                                                                                              |          |
|----------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Provide storm drain system stenciling and signage                                                              | Owner/<br>HOA | Private storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1st each year. Those determined to be illegible will be re-stenciled as soon as possible.                                                                                                                                                                                  | Annually |
| Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control | Owner/<br>HOA | In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, day or nighttime temperatures based on system specifications and local climate patterns. | Monthly  |

Any waste generated from maintenance activities will be disposed of properly. Wash water and other waste from maintenance activities is not to be discharged or disposed of into the storm drain system. Clippings from landscape maintenance (i.e. prunings) will be collected and disposed of properly off-site, and will not be washed into the streets, local area drains/conveyances, or catch basin inlets.

The rainy season for the project area begins on October 1<sup>st</sup>. All proposed devices must be serviced prior to this date each year.

The estimated cost for installation of the Contech StormTech MC-7200 system is about \$35,000. The annual maintenance cost is expected to be \$2,500 per year.

No sitting water allowed for more than 48 hours in order to prevent vector growth.

## **Section VI Site Plan and Drainage Plan**

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

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, and storm drain facilities are also depicted. All structural source control BMPs are shown as well. Include a site plan and drainage plan sheet set containing the following minimum information:

- VI.1.1 Vicinity Map**
- VI.1.2 Preliminary Site Plan**
- VI.1.3 Concept Grading Plan**
- VI.1.4 WQMP Site Plan**
- VI.1.5 Contech StormTech MC-7200 Systems**

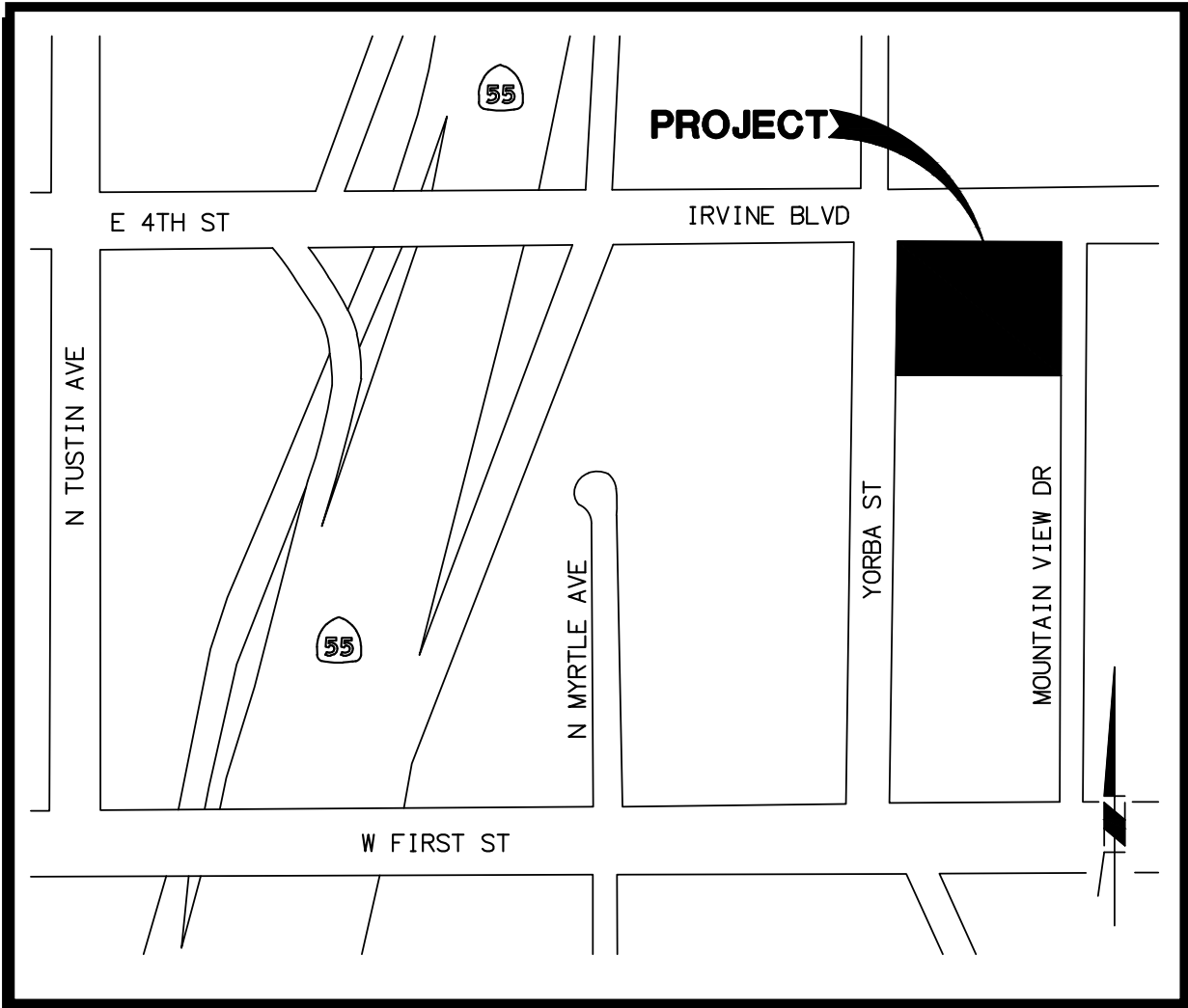
## Section VII Educational Materials

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

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

|                                                           |                                     |  |                          |
|-----------------------------------------------------------|-------------------------------------|--|--------------------------|
| Tips for Residential Pool, Landscape and Hardscape Drains | <input type="checkbox"/>            |  | <input type="checkbox"/> |
| Tips for Projects Using Paint                             | <input checked="" type="checkbox"/> |  | <input type="checkbox"/> |

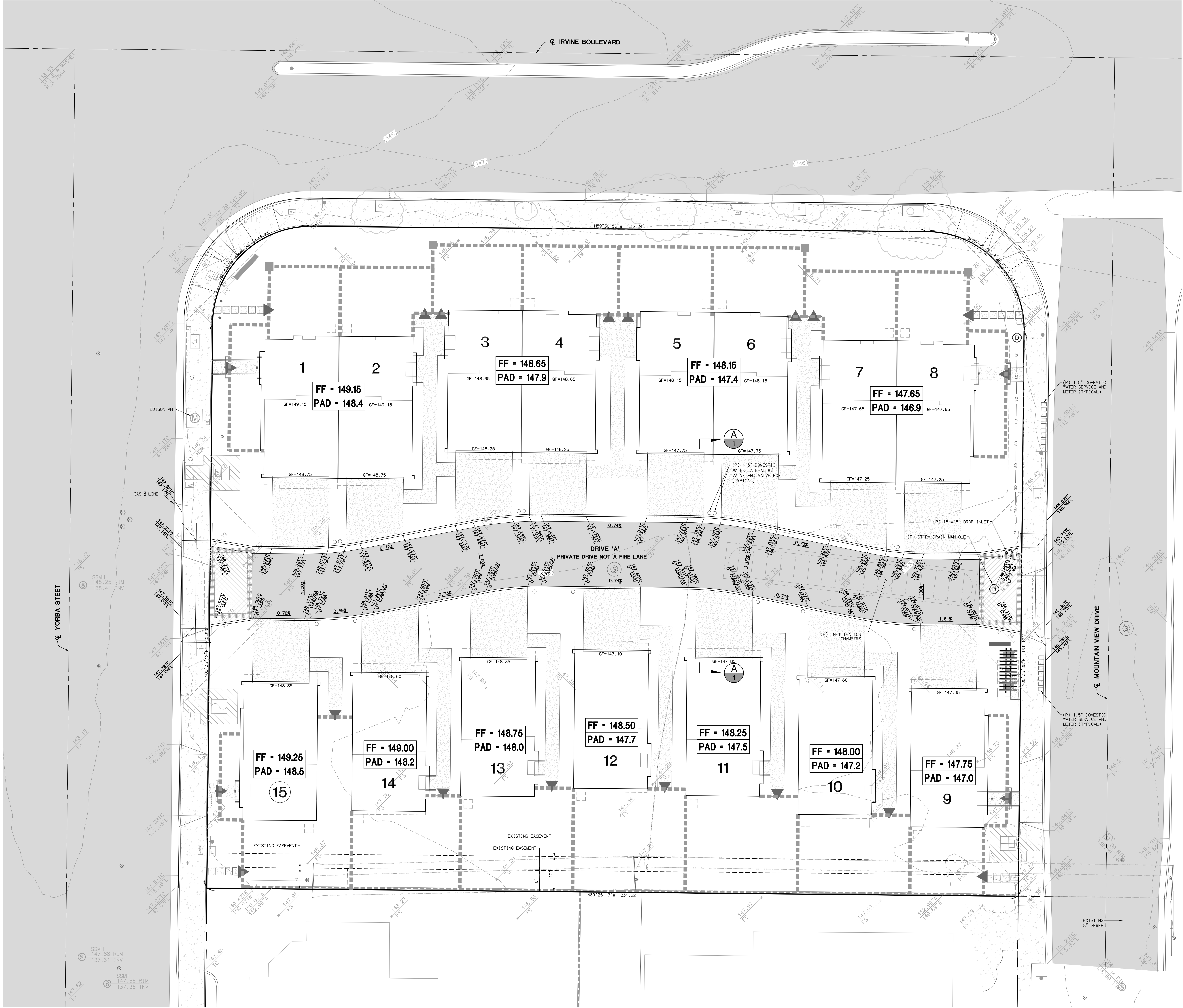
# **SITE PLAN AND DRAINAGE PLAN**



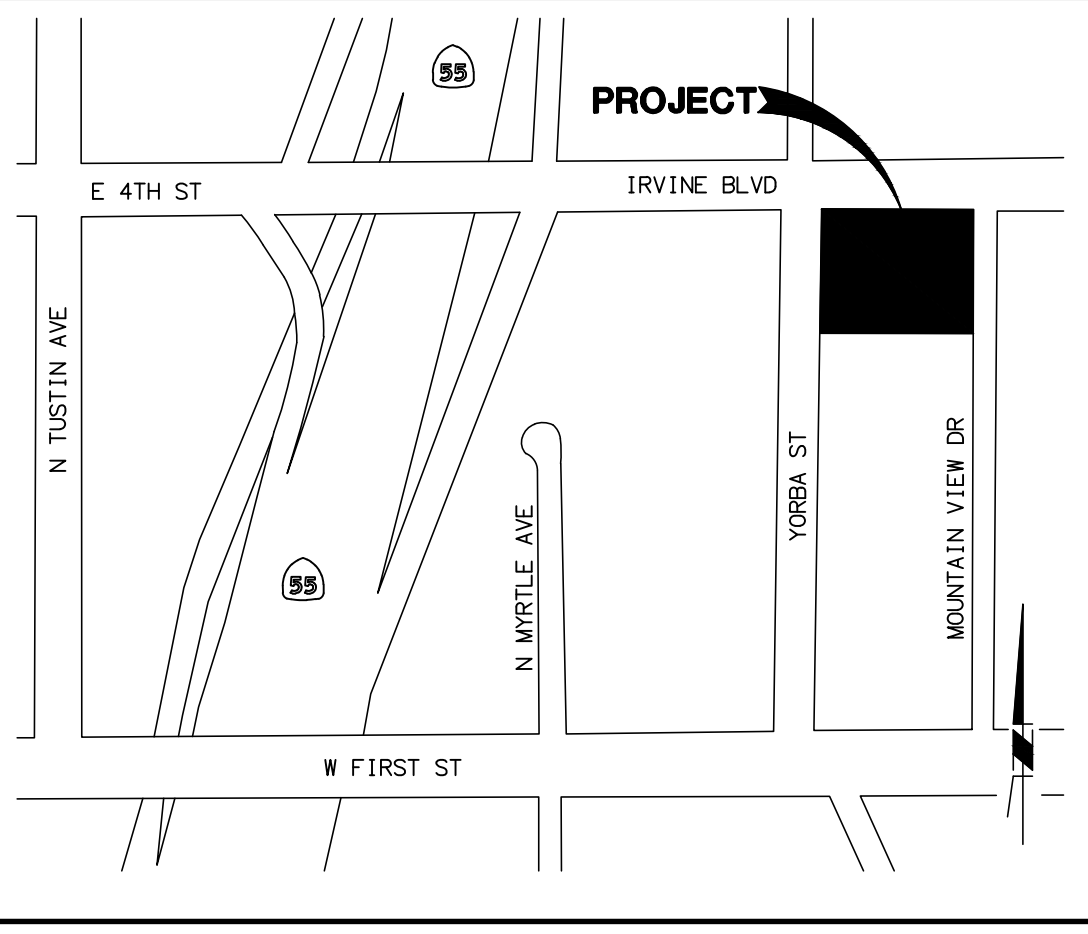
**VICINITY MAP**  
NOT TO SCALE



VESTING TENTATIVE TRACT MAP NO. 19483  
CONCEPTUAL GRADING PLAN

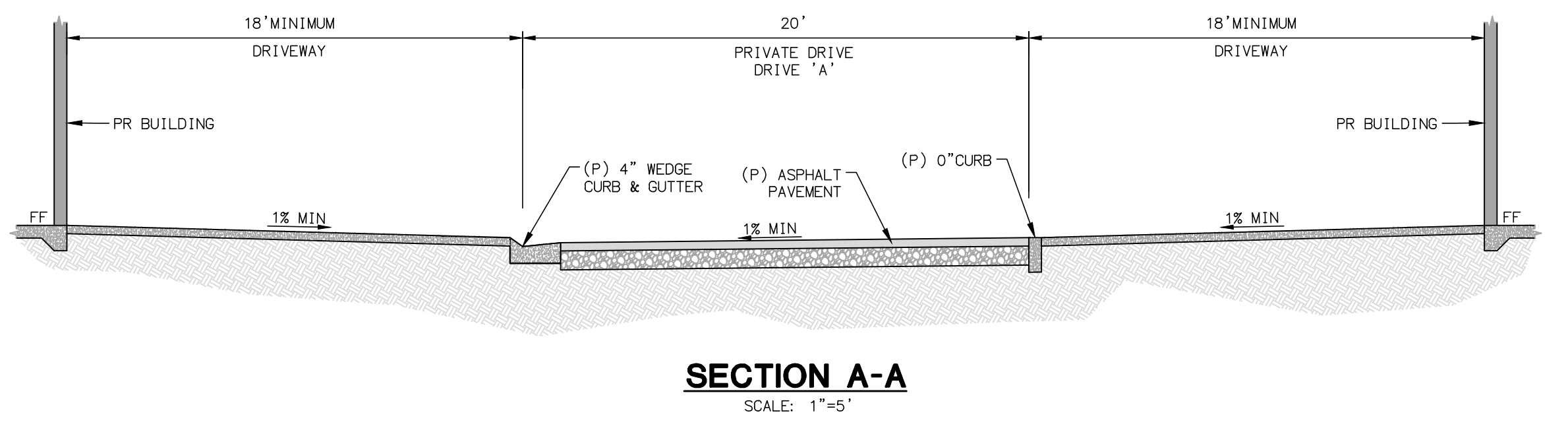


- LEGEND**
- EX PALM TREE
  - EX TREE
  - EX SEWER MANHOLE
  - EX SEWER CLEANOUT
  - EX STREET LIGHT
  - EX UTILITY BOX
  - EX STORM DRAIN MANHOLE
  - EX CATCH BASIN
  - EX POWER POLE
  - EX TRAFFIC LIGHT
  - EX UNDERGROUND UTILITY VAULT
  - EX IRRIGATION METER
  - EX ELECTRICAL METER
  - EX WATER VALVE COVER
  - EX MANHOLE
  - EX STREET SIGN
  - EX BOLLARD
  - EX MINOR CATCH BASIN
  - EX TRANSFORMER
  - EX FIRE WATER STRUCTURE
  - EX GAS STRUCTURE
  - EX GAS VALVE
  - EX PROPERTY BOUNDARY
  - EX STREET CENTERLINE
  - EX PROPERTY LINE
  - EX EASEMENT
  - EX MAJOR CONTOUR
  - EX MINOR CONTOUR
  - EX POWER LINE
  - EX DOMESTIC WATER LINE
  - EX FIRE WATER LINE
  - EX RECYCLED WATER LINE
  - EX STORM DRAIN LINE
  - EX OVERHEAD ELECTRIC
  - EX GAS LINE
  - EX UNDERGROUND ELECTRIC
  - EX IRON FENCE
  - EX CHAIN LINK FENCE
  - EX WOOD FENCE
  - EX CURB AND GUTTER
  - EX SWALE
  - EX STRIPING
  - EX SLOPE
  - EX CONCRETE
  - EX STRUCTURE FOOTPRINT
  - PR SEWER LINE
  - PR DOMESTIC WATER LINE
  - PR FIRE WATER LINE
  - PR RECYCLED WATER LINE
  - PR STORM DRAIN LINE
  - PR WALL
  - PR CURB AND GUTTER
  - PR SWALE
  - PR SLOPE
  - PR MAJOR CONTOUR
  - PR MINOR CONTOUR



**ABBREVIATIONS**

|     |                   |     |                         |
|-----|-------------------|-----|-------------------------|
| BS  | BOTTOM OF STEP    | PR  | PROPERTY LINE           |
| D   | DELTA             | R   | RADIUS                  |
| EX  | EXISTING          | TC  | TOP OF CURB             |
| FG  | FINISHED GRADE    | TO  | TOP OF GRADE            |
| FL  | FLOW LINE         | TS  | TOP OF STEP             |
| FS  | FINISHED SURFACE  | TW  | TOP OF RETAINING        |
| FF  | FINISHED FLOOR    | TM  | TOP OF MOUNTAIN         |
| INV | INVERT            | TF  | TOP OF FOOTING          |
| MIN | MINIMUM           | TYP | TYPICAL                 |
| N   | NOT TO SCALE      | ADA | AMERICAN DISABILITY ACT |
| NIS | NOT TO SCALE      |     |                         |
| O/E | OVERHEAD ELECTRIC |     |                         |



**DEVELOPER:**  
THE OLSON COMPANY  
3020 OLD RANCH PARKWAY, SUITE 100  
SANTA ANA, CA 92704

**ASSESSOR PARCEL NUMBER:**  
APN: 401-512-01

**PROPERTY ADDRESS:**  
17332 IRVINE BLVD.  
TUSTIN, CA 92780

**PROPOSED LOT AREA:**  
NET

**DENSITY CALCULATIONS:**  
PROPOSED DENSITY: 15 UNITS  
NET AREA: 43,374 SF (0.996 AC)  
PROPOSED DENSITY: 15 DU/AC

**LEGAL DESCRIPTION:**  
REAL PROPERTY IN THE CITY OF TUSTIN, COUNTY OF ORANGE, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:  
LOTS 16 AND 17 OF TRACT NO. 5311, AS SHOWN ON A MAP RECORDED IN BOOK 200, PAGES 4 AND 5 OF MISCELLANEOUS MAPS, RECORDS OF ORANGE COUNTY, CALIFORNIA.  
APN: 401-512-01

**GENERAL NOTES:**  
1. EXISTING LAND USE: COMMERCIAL USE  
2. PROPOSED LAND USE: SINGLE-FAMILY AND MULTI-FAMILY RESIDENTIAL  
3. EXISTING ZONING: PR (PROFESSIONAL)  
4. WATER SERVICE PROVIDED BY: CITY OF TUSTIN  
5. SEWER SERVICE PROVIDED BY: EAST ORANGE COUNTY WATER DISTRICT (ECOWD)  
6. ELECTRICAL SERVICE PROVIDED BY: SOUTHERN CALIFORNIA Edison  
7. GAS SERVICE PROVIDED BY: Socal GAS CO.  
8. TELEPHONE SERVICE PROVIDED BY: FRONTIER  
9. CABLE TELEVISION PROVIDED BY: FRONTIER  
10. TRASH AND RECYCLING: WASTE MANAGEMENT OF ORANGE COUNTY  
11. PROJECT IS WITHIN TUSTIN UNIFIED SCHOOL DISTRICT  
12. ALL LOTS SHALL BE HOMEOWNER MAINTAINED  
13. NO KNOWN ACTIVE FAULTS ARE KNOWN TO PROJECT THROUGH THE SITE NOR DOES THE SITE LIE WITHIN THE BOUNDARIES OF AN "EARTHQUAKE FAULT ZONE" AS DEFINED BY THE STATE OF CALIFORNIA IN THE ALBUQUERQUE EARTHQUAKE FAULT ZONING ACT  
14. PROPERTY IS LOCATED WITHIN FLOOD ZONE "X" PER FIRM PANEL 0609020271J EFFECTIVE 04/12/2009  
15. ASSESSOR'S PARCEL NUMBER: 401-512-01

**EARTHWORK ESTIMATES**  
CUT = 1,800 CYDS  
FILL = 1,800 CYDS  
EXPORT = 0 CYDS  
\* QUANTITIES SHOWN ARE ESTIMATES AND SHOULD BE VERIFIED DURING FINAL ENGINEERING DESIGN



| REVISIONS |      | NO. | DESCRIPTIONS |
|-----------|------|-----|--------------|
| BY        | DATE |     |              |
|           |      |     |              |
|           |      |     |              |
|           |      |     |              |
|           |      |     |              |
|           |      |     |              |
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|           |      |     |              |
|           |      |     |              |

**BENCHMARK:**  
D.C.S. VERTICAL CONTROL BM 54-334-06  
DESCRIPTION:  
FOUND 4" OCS ALUMINUM BENCHMARK DISK STAMPED "54-334-06", SET IN THE NORTHWEST CORNER OF A 15.0 FT. BY 4.5 FT. CONCRETE CATCH BASIN.  
ELEV: 144.66'

**BASIS OF BEARING:**  
THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN D.C.S. LAZARUS INDIAN CA 92677 (666) 338-5778 PHONE (666) 338-5778 FAX (666) 338-5778 WWW.ADVANCEDCIVILGROUP.COM  
FILED IN THE OFFICE OF THE ORANGE COUNTY SURVEYOR.

OWNER BY: PSA  
DESIGNED BY: PSA  
CHECKED BY: PSA  
APPROVED BY: PSA

30251 GOLDEN LANTERN  
SUITE 1, PMB 251  
LAJUNIA INDIAN CA 92677  
(666) 338-5778 PHONE  
(666) 338-5778 FAX  
WWW.ADVANCEDCIVILGROUP.COM

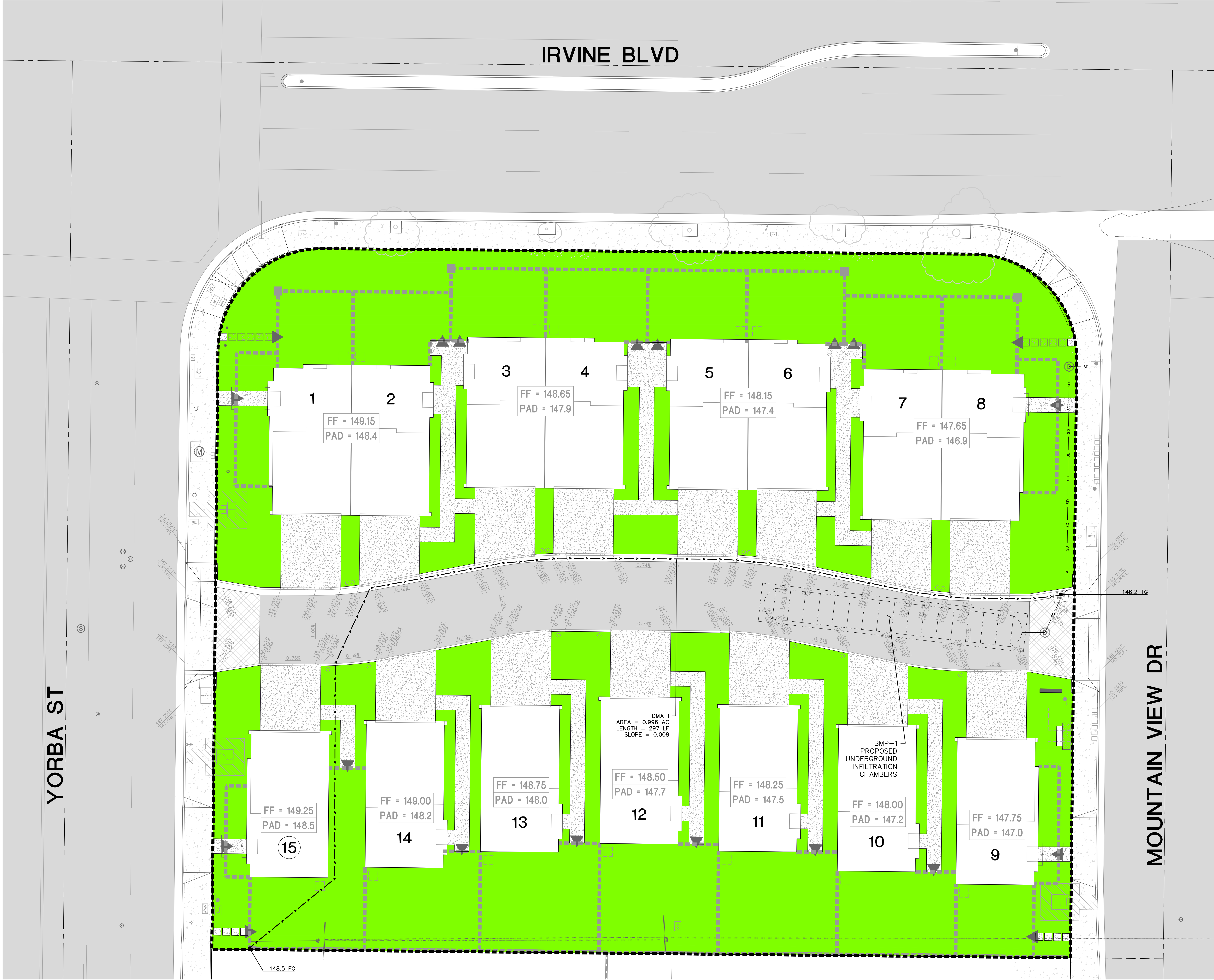
DATE: 4/27/2026  
R.C.E. NO. 68725

**VTTM NO. 19483**  
**CONCEPTUAL GRADING PLAN**  
**17332 IRVINE BOULEVARD**  
**TUSTIN, CA 92780**  
**THE OLSON COMPANY**

SHEET NO. 2 of 7  
**GR**

WQMP SITE PLAN

17332 IRVINE BLVD  
TUSTIN, CA 92780



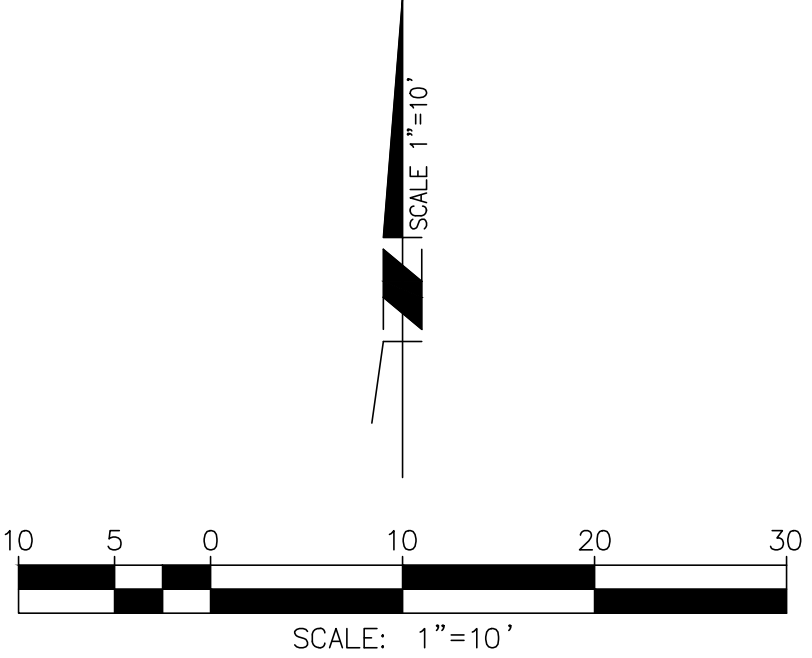
DMA INFORMATION:  
DMA 1 43,374 SF (0.996 AC)

BMP INFORMATION:  
BMP 1 - UNDERGROUND INFILTRATION 2,000 CF

AREA INFORMATION:  
PERMEABLE AREA = 18,949 SF 44%  
IMPERMEABLE AREA = 24,425 SF 56%  
TOTAL AREA = 43,374 SF (0.996 AC)

LEGEND:  
FLOW PATH  
DRAINAGE AREA  
PERMEABLE AREA

PROPERTY ADDRESS:  
17332 IRVINE BLVD  
TUSTIN, CA 92780



ADVANCED CIVIL GROUP  
30291 GOLDEN LANTERN  
SUITE E, PMB 201  
LAGUNA HILLS, CA 92653  
(866) 338-5778 PHONE  
WWW.ADVANCEDCIVILGROUP.C



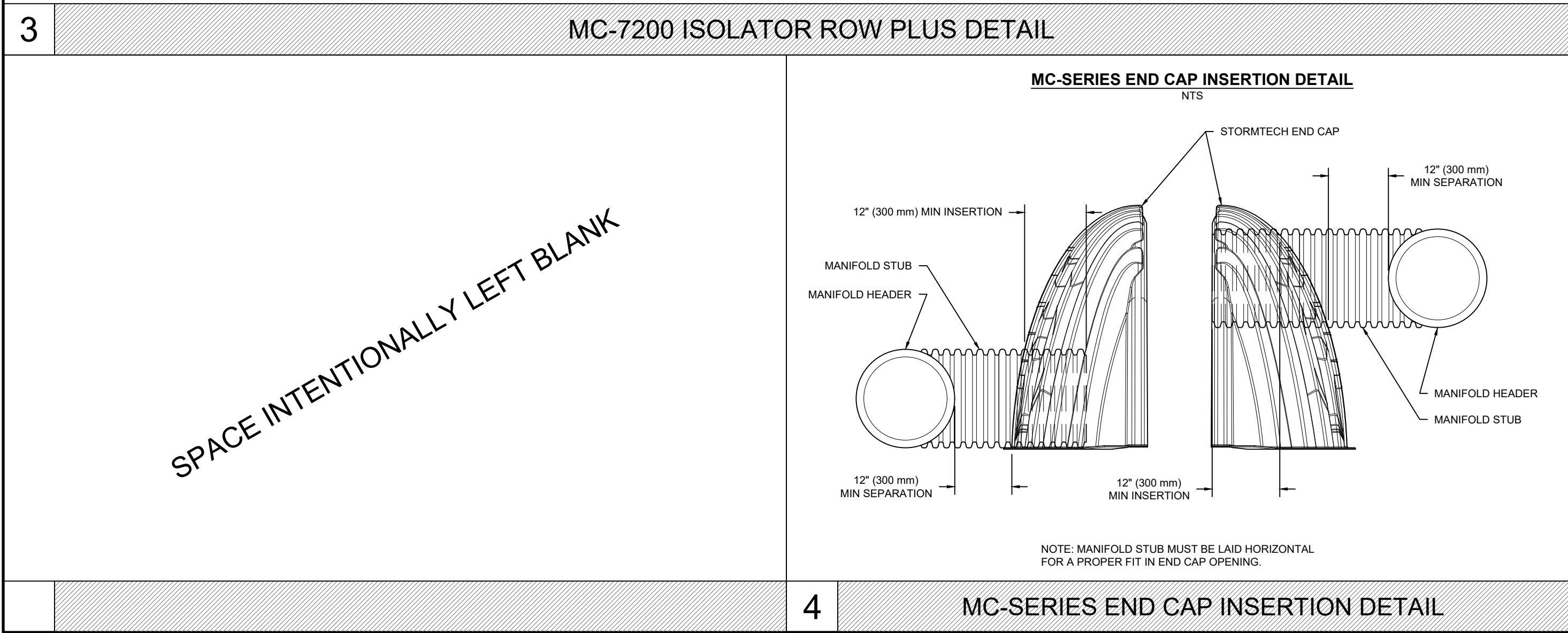
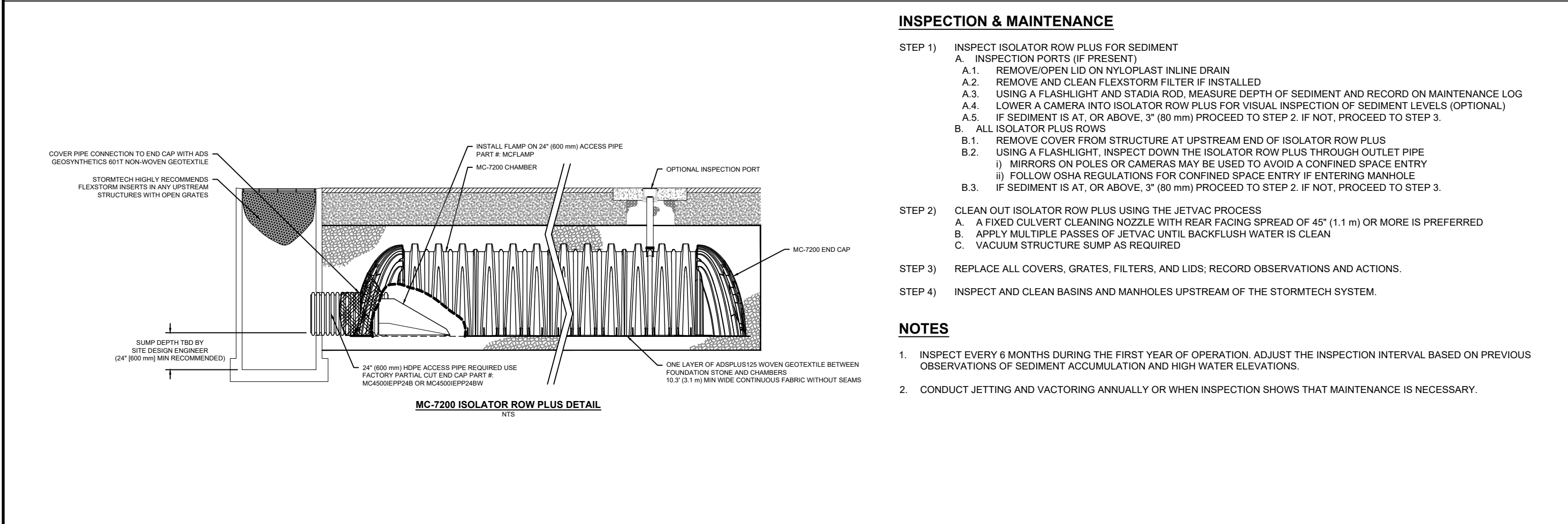
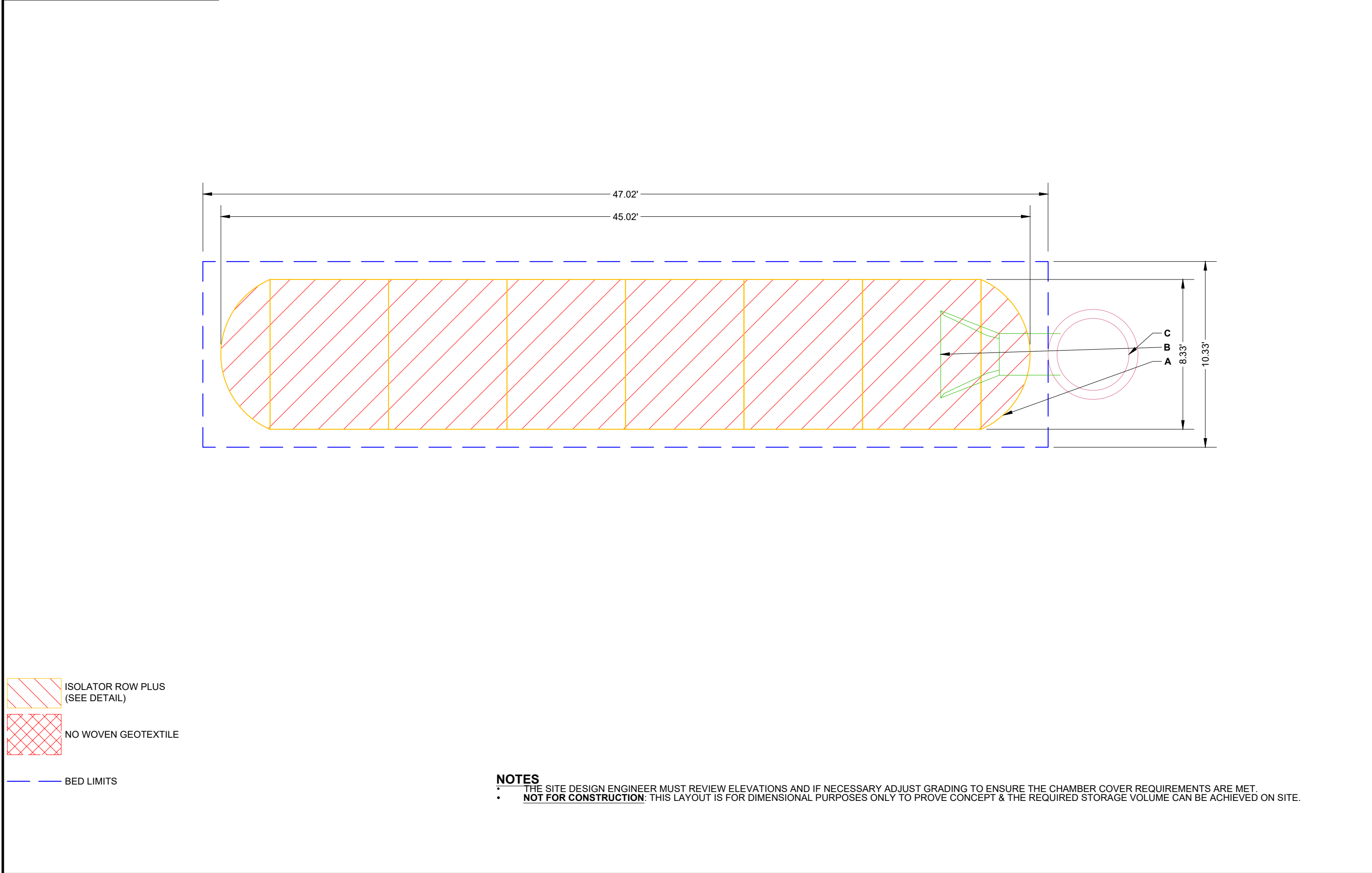
WQMP SITE PLAN  
17332 IRVINE BLVD  
TUSTIN, CA 92780

DRAWN BY:  
RSA  
DESIGNED BY:  
RSA  
CHECKED BY:  
RSA  
APPROVED BY:  
RSA  
DATE:  
4/29/2026  
REVISIONS:

PROJECT NUMBER:  
106836

SHEET NO.  
WQMP

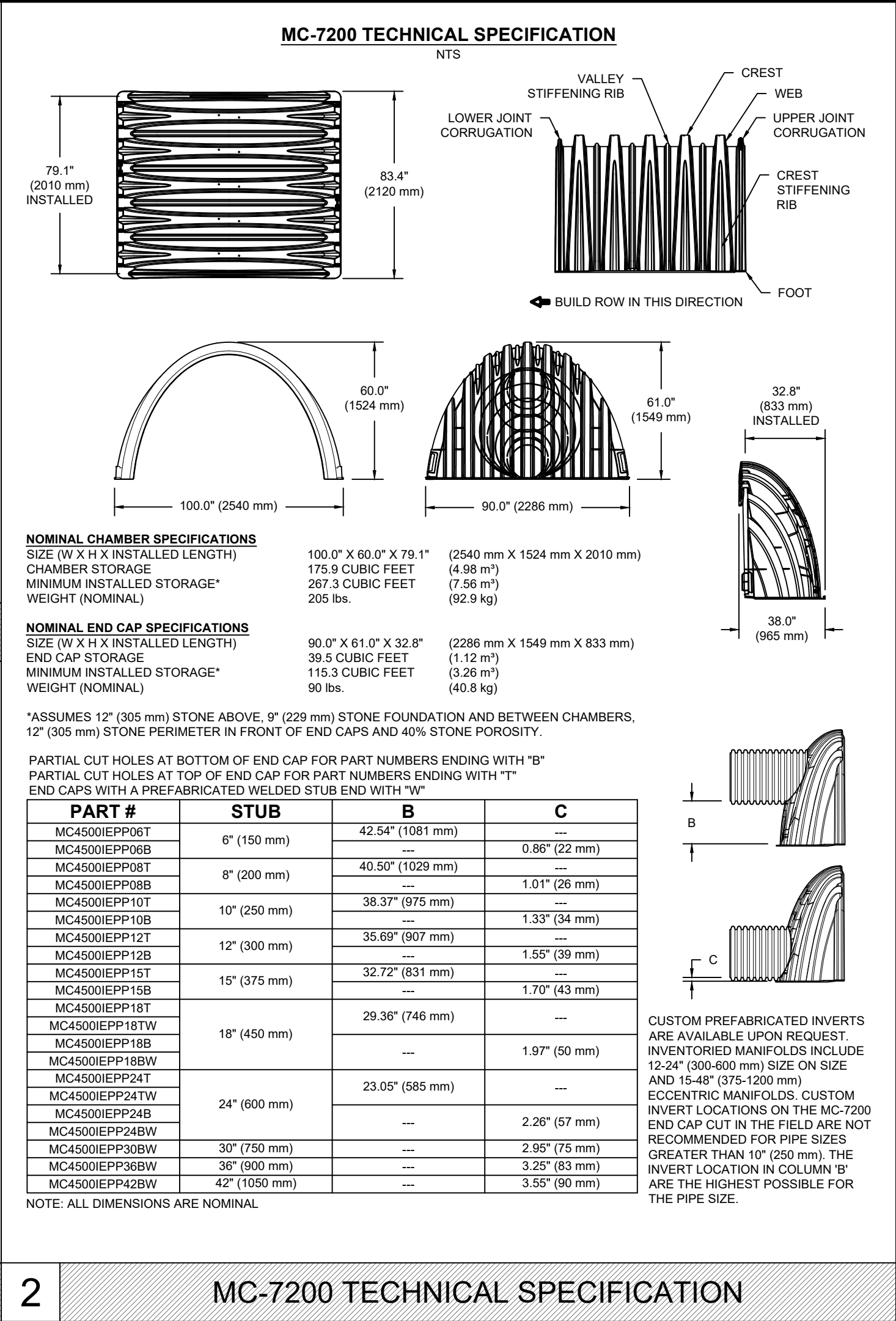
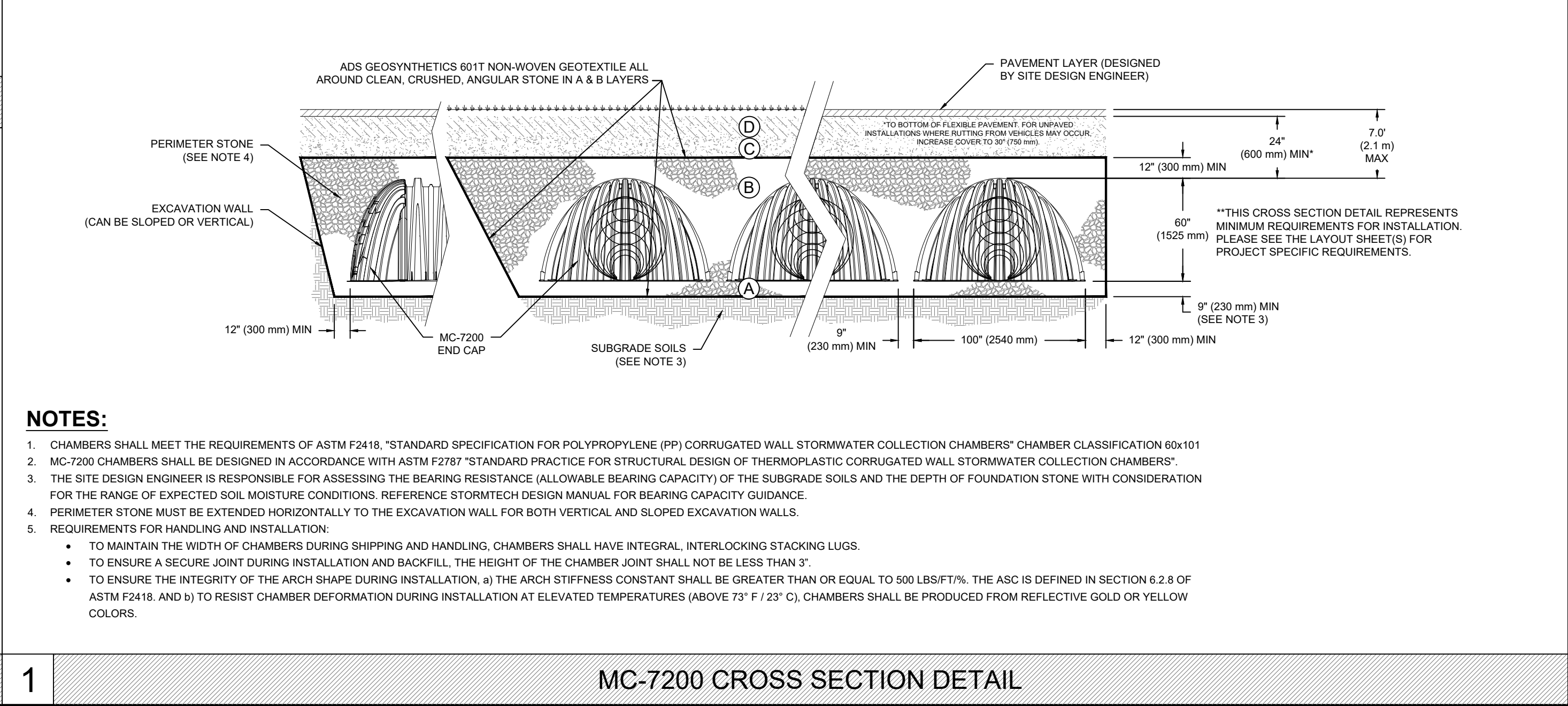
| PROPOSED LAYOUT |                              |       | CONCEPTUAL ELEVATIONS                                     |      | PART TYPE |  | ITEM ON LAYOUT | DESCRIPTION |  | *INVERT ABOVE BASE OF CHAMBER |  |
|-----------------|------------------------------|-------|-----------------------------------------------------------|------|-----------|--|----------------|-------------|--|-------------------------------|--|
| 6               | STORMTECH MC-7200 CHAMBERS   | 13.00 | MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):        | 8.52 |           |  |                |             |  |                               |  |
| 2               | STORMTECH MC-7200 END CAPS   | 8.52  | MINIMUM ALLOWABLE GRADE (UNPAVED WITH TR&F):              | 8.52 |           |  |                |             |  |                               |  |
| 12              | STONE ABOVE (in)             | 8.00  | MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):             | 8.00 |           |  |                |             |  |                               |  |
| 12              | STONE BELOW (in)             | 8.00  | MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT): | 8.00 |           |  |                |             |  |                               |  |
| 40              | STONE VOID                   | 8.00  | MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):      | 8.00 |           |  |                |             |  |                               |  |
| 2041            | INSTALLED SYSTEM VOLUME (CF) | 7.00  | TOP OF STONE                                              | 6.00 |           |  |                |             |  |                               |  |
|                 | (PERIMETER STONE INCLUDED)   | 6.10  | TOP OF MC-7200 CHAMBER                                    | 6.10 |           |  |                |             |  |                               |  |
|                 | (COVER STONE INCLUDED)       | 6.10  | 24" ISOLATOR ROW PLUS INVERT:                             | 6.10 |           |  |                |             |  |                               |  |
| 486             | SYSTEM AREA (SF)             | 1.00  | BOTTOM OF MC-7200 CHAMBER:                                | 1.00 |           |  |                |             |  |                               |  |
| 114.7           | SYSTEM PERIMETER (ft)        | 0.00  | BOTTOM OF STONE:                                          | 0.00 |           |  |                |             |  |                               |  |



| ACCEPTABLE FILL MATERIALS: STORMTECH MC-7200 CHAMBER SYSTEMS |                                                                                                                                                                                                                  |                                                                                                                                                              |                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MATERIAL LOCATION                                            | DESCRIPTION                                                                                                                                                                                                      | AASHTO MATERIAL CLASSIFICATIONS                                                                                                                              | COMPACTION / DENSITY REQUIREMENT                                                                                                                                                                                                                      |
| D                                                            | <b>FINAL FILL:</b> FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER  | ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.                                              | N/A                                                                                                                                                                                                                                                   |
| C                                                            | <b>INITIAL FILL:</b> FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER. | GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE.<br>OR<br>MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER. | BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. |
| B                                                            | <b>EMBEDMENT STONE:</b> FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.                                                                                              | CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE <sup>1</sup>                                                                                              | NO COMPACTION REQUIRED.                                                                                                                                                                                                                               |
| A                                                            | <b>FOUNDATION STONE:</b> FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.                                                                                                           | CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE <sup>1</sup>                                                                                              | PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. <sup>2,3</sup>                                                                                                                                                                                       |

PLEASE NOTE:

- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
- STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERSAGES WITH A VIBRATORY COMPACTOR.
- WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
- ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
- WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 'RECYCLED CONCRETE STRUCTURAL BACKFILL'.



|                              |                 |              |
|------------------------------|-----------------|--------------|
| DATE: 04/30/2026             | PROJECT #:      | NOT TO SCALE |
| DRAWN: SA                    | CHECKED: N/A    | REV:         |
| VTTM 19483                   | TUSTIN, CA, USA |              |
| StormTech®<br>Chamber System | www.ADSpipe.COM |              |
| SHEET                        | 1 OF 1          |              |

## User Inputs

|                               |                   |
|-------------------------------|-------------------|
| Chamber Model:                | MC-7200           |
| Outlet Control Structure:     | No                |
| Project Name:                 | VTTM 19483        |
| Engineer:                     | Steve Austin      |
| Project Location:             | California        |
| Measurement Type:             | Imperial          |
| Required Storage Volume:      | 1800 cubic ft.    |
| Stone Porosity:               | 40%               |
| Stone Foundation Depth:       | 12 in.            |
| Stone Above Chambers:         | 12 in.            |
| Design Constraint Dimensions: | (20 ft. x 60 ft.) |

## Results

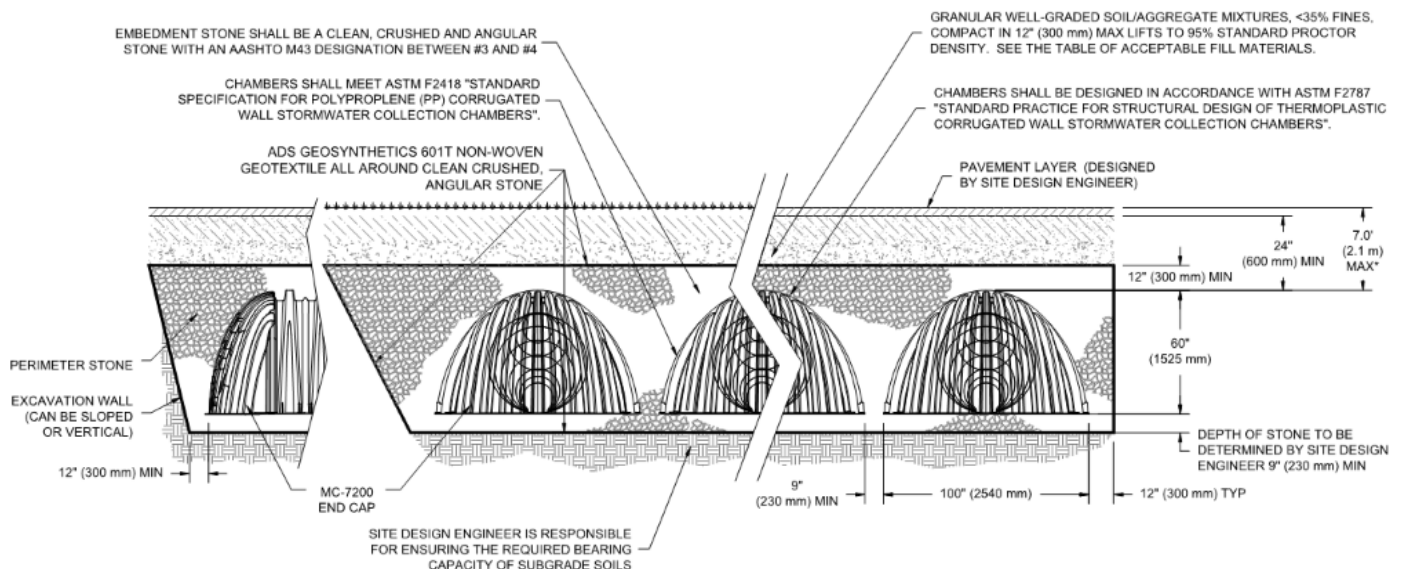
### System Volume and Bed Size

|                              |                   |
|------------------------------|-------------------|
| Installed Storage Volume:    | 2041.05 cubic ft. |
| Storage Volume Per Chamber:  | 175.90 cubic ft.  |
| Number Of Chambers Required: | 6                 |
| Number Of End Caps Required: | 2                 |
| Chamber Rows:                | 1                 |
| Maximum Length:              | 47.02 ft.         |
| Maximum Width:               | 10.33 ft.         |
| Approx. Bed Size Required:   | 485.84 square ft. |
| Average Cover Over Chambers: | N/A .             |

### System Components

#### Amount Of Stone Required

|                                                     |                  |
|-----------------------------------------------------|------------------|
| (0% Overage):                                       | 84 cubic yards   |
| (Cubic yard to ton factor:1.4):                     | 117.52 tons      |
| Volume Of Excavation (Not Including Fill):          | 126 cubic yards  |
| Total Non-woven Geotextile Required:                | 237 square yards |
| Woven Geotextile Required (excluding Isolator Row): | 0 square yards   |
| Woven Geotextile Required (Isolator Row):           | 106 square yards |
| Total Woven Geotextile Required:                    | 106 square yards |
| Impervious Liner Required:                          | 0 square yards   |



\*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

# **EDUCATIONAL MATERIALS**

# 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<sub>2</sub>OC?

H<sub>2</sub>OC is YOU! H<sub>2</sub>OC is also a cooperative stormwater program which includes all 34 cities in Orange County, the County of Orange, and Orange County Flood Control District. Clean and healthy beaches, creeks, rivers, bays, wetlands, and ocean are important to Orange County. H<sub>2</sub>OC provides resources to residents and businesses to prevent water pollution and encourage personal action by working with communities to prevent polluted runoff from entering our waterways. Join us at [H2OC.org](http://H2OC.org) to learn more about how you can protect local waterways and be the solution to runoff pollution!

## Visit

[H2OC.org](http://H2OC.org) to learn more about runoff, water pollution, and what you can do to protect our water resources!

## Contact

24-Hour Pollution Reporting Hotline:  
(877) 89-SPILL (77455)

24-Hour Reporting Website:  
[myOCeServices.ocgov.com](http://myOCeServices.ocgov.com)

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

\*\*UCCE Master Gardeners: [ucceocmghotline@ucanr.edu](mailto:ucceocmghotline@ucanr.edu)  
[mgorange.ucanr.edu/Gardening\\_Hotline/](http://mgorange.ucanr.edu/Gardening_Hotline/)

# YOU ARE THE SOLUTION TO RUNOFF POLLUTION



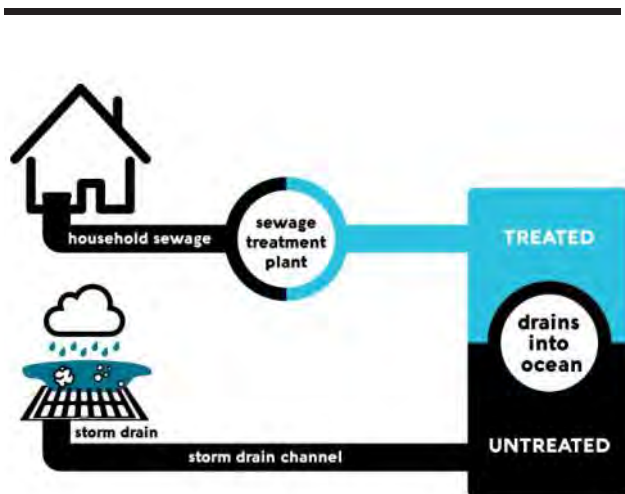
**H<sub>2</sub>OC**  
STORMWATER PROGRAM

# 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.



### 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.



### 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 of at a Household Hazardous Waste Center (HHWC\*) or where oil was purchased.



### 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\*.



**C**lean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, if we are not careful, our daily activities can lead directly to water pollution problems. Water that drains through your watershed can pick up pollutants which are then transported to our waterways and beautiful ocean.

You can prevent water pollution by taking personal action and by working with members of your watershed community to prevent urban runoff from entering your waterway.

For more information,  
please call the  
**Orange County Stormwater Program**  
at **1.877.89.SPILL**  
or visit  
**[www.ocwatersheds.com](http://www.ocwatersheds.com)**

To report a spill,  
call the  
**Orange County 24-Hour  
Water Pollution Problem  
Reporting Hotline**  
at **1.877.89.SPILL.**

**For emergencies, dial 911.**

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



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## Help Prevent Ocean Pollution: Tips For Protecting Your Watershed



The Ocean Begins  
at Your Front Door



# Tips for Protecting Your Watershed

## My Watershed. Our Ocean.

**Water + shed**, noun: A region of land within which water flows down into a specified water body, such as a river, lake, sea, or ocean; a drainage basin or catchment basin.

Orange County is comprised of 11 major watersheds into which most of our water flows, connecting all of Orange County to the Pacific Ocean.



As water from rain (stormwater) or sprinklers and hoses (urban runoff) runs down your driveway and into your neighborhood streets, sidewalks

and gutters, it flows into storm drains that lead to waterways within your watershed. The waterways from other cities merge as they make their way through our watersheds until all the runoff water in Orange County meets at the Pacific Ocean. The water that reaches our ocean is not pure. As it flows through the watershed, it picks up pollutants such as litter, cigarette butts, fertilizer, pesticides, pet waste, motor oil and lawn clippings. Unlike water that enters the sewer (from sinks and toilets), water that enters the storm drain is not treated before it flows, ultimately, to the ocean.

Water quality can be improved by "Adopting Your Watershed." Through this effort, we are challenging citizens and



organizations to join the Orange County Stormwater Program and others who are working to protect and restore our creeks, rivers, bays and ocean.

### There are many opportunities to get involved:

- Appreciate your watershed - explore the creeks, trails and ocean and make observations about its conditions. If you see anything abnormal (such as dead fish, oil spills, leaking barrels, and other pollution) contact the Orange County 24-hour water pollution problem reporting hotline at 1.877.89.SPILL to report the problem.
- Research your watershed. Learn about what watershed you live in by visiting [www.ocwatersheds.com](http://www.ocwatersheds.com).
- Find a watershed organization in your community and volunteer to help. If there are no active groups, consider starting your own.
- Visit EPA's Adopt Your Watershed's Catalog of Watershed Groups at [www.epa.gov/adopt](http://www.epa.gov/adopt) to locate groups in your community.
- Organize or join in a creek, river, bay or ocean cleanup event such as Coastal & Inner Coastal Cleanup Day that takes place the 3rd Saturday of every September. For more information visit [www.coast4u.org](http://www.coast4u.org).

### Follow these simple tips to protect the water quality of your watershed:

- Sweep up debris and dispose of it in the trash. Do not hose down driveways or sidewalks into the street or gutter.
- Use dry cleanup methods such as cat litter to absorb spills and sweep up residue.
- Set your irrigation systems to reflect seasonal water needs or use weather-based controllers. Inspect for runoff regularly.
- Cover trashcans securely.
- Take hazardous waste to a household hazardous waste collection center. (For example, paint, batteries and petroleum products)
- Pick up after your pet.
- Follow application and disposal directions for pesticides and fertilizers.
- If you wash your car at home, wash it on your lawn or divert the runoff onto a landscaped area. Consider taking your car to a commercial car wash, where the water is reclaimed or recycled.
- Keep your car well maintained.
- Never pour oil or antifreeze in the street, gutter or storm drain.



*Do your part to prevent water pollution in our creeks, rivers, bays and ocean.*



Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, not properly disposing of household hazardous waste can lead to water pollution. Batteries, electronics, paint, oil, gardening chemicals, cleaners and other hazardous materials cannot be thrown in the trash. They also must never be poured or thrown into yards, sidewalks, driveways, gutters or streets. Rain or other water could wash the materials into the storm drain and eventually into our waterways and the ocean. In addition, hazardous waste must not be poured in the sanitary sewers (sinks and toilets).

***NEVER DISPOSE  
OF HOUSEHOLD  
HAZARDOUS  
WASTE IN THE  
TRASH, STREET,  
GUTTER,  
STORM DRAIN  
OR SEWER.***

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

**To Report Illegal Dumping of  
Household Hazardous Waste  
call 1-800-69-TOXIC**

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

**For emergencies, dial 911.**



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Help Prevent Ocean Pollution:

## Proper Disposal of Household Hazardous Waste



**The Ocean Begins at  
Your Front Door**



**ORANGE COUNTY**

# Pollution Prevention

Leftover household products that contain corrosive, toxic, ignitable, or reactive

*WHEN POSSIBLE,  
USE  
NON-HAZARDOUS  
OR  
LESS-HAZARDOUS  
PRODUCTS.*

ingredients are considered to be “household hazardous waste” or “HHW.” HHW can be found throughout your home, including the bathroom, kitchen, laundry room and garage.

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 them off at a Household Hazardous Waste Collection Center (HHWCC) for free disposal and recycling. Many materials including anti-freeze, latex-based paint, motor oil and batteries can be recycled. Some centers have a “Stop & Swap” program that lets you take partially used home, garden, and automobile products free of charge. There are four 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 open Tuesday-Saturday, 9 a.m.-3 p.m. Centers are closed on rainy days and major holidays. For more information, call (714) 834-6752 or visit [www.oclandfills.com](http://www.oclandfills.com).

## *Common household hazardous wastes*

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

- Television & monitors (CRTs, flatscreens)

## *Tips for household hazardous waste*

- Never dispose of HHW in the trash, street, gutter, storm drain or sewer.
- Keep these materials in closed, labeled containers and store materials indoors or under a cover.
- When possible, use non-hazardous products.
- Reuse products whenever possible or share with family and friends.
- Purchase only as much of a product as you'll need. Empty containers may be disposed of in the trash.
- HHW can be harmful to humans, pets and the environment. Report emergencies to 911.



# The Pollution Solution

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

## 1 Pesticides and Fertilizer

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



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

## 2 Dirt and Sediment

- Pollution:** Dirt or sediment can impede the flow of the stormwater and negatively impact stream habitat as it travels through waterways and deposits downstream. Pollutants can attach to sediment, which can then be transported through our waterways.
- Solution:** Protect dirt stockpiles by covering them with tarps or secure plastic sheets to prevent wind or rain from allowing dirt or sediment to enter the storm drain system.

## 3 Metals

- Pollution:** Metals and other toxins present in car wash water can harm important plankton, which forms the base of the aquatic food chain.
- Solution:** Take your car to a commercial car wash where the wash water is captured and treated at a local wastewater treatment plant.



**DID YOU KNOW?**

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

## 4 Pet Waste

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

- Solution:** Pick up after your pets!

## 5 Trash and Debris

- Pollution:** Trash and debris can enter waterways by wind, littering and careless maintenance of trash receptacles. Street sweeping collects some of this trash; however, much of what isn't captured ends up in our storm drain system where it flows untreated out to the ocean.
- Solution:** Don't litter and make sure trash containers are properly covered. It is far more expensive to clean up the litter and trash that ends up in our waterways than it is to prevent it in the first place. Come out to one of Orange County's many locations for Coastal and Inner-Coastal Cleanup Day, which is held in September.



## 6 Motor Oil / Vehicle Fluids

- Pollution:** Oil and petroleum products from our vehicles are toxic to people, wildlife and plants.
- Solution:** Fix any leaks from your vehicle and keep the maintenance up on your car. Use absorbent material such as cat litter on oil spills, then sweep it up and dispose of it in the trash. Recycle used motor oil at a local Household Hazardous Waste Collection Center.



## A TEAM EFFORT

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

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

## Thank you for making water protection a priority!

For more information, please visit

Orange County  
Stormwater Program  
[www.ocwatersheds.com/publiced/](http://www.ocwatersheds.com/publiced/)

Municipal Water District  
of Orange County  
[www.mwdoc.com](http://www.mwdoc.com)

University of California  
Master Gardeners of  
Orange County  
[www.uccemg.com](http://www.uccemg.com)

UC Cooperative Extension  
OC Water Quality and  
Water Resources  
[www.ucanr.org/sites/urbanwatermgmt/](http://www.ucanr.org/sites/urbanwatermgmt/)



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

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

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



## Homeowners Guide for Sustainable Water Use

Low Impact Development, Water Conservation  
& Pollution Prevention



## The Ocean Begins at Your Front Door



# RUNOFF, RAINWATER AND REUSE

## Where Does Water Runoff Go?

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

## Water Conservation

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

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

## What is Low Impact Development (LID)?

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

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



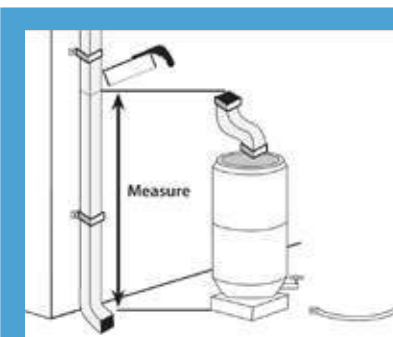
Permeable pavement allows water runoff to infiltrate through the soil and prevents most pollutants from reaching the storm drain system.

## OPTIONS FOR RAINWATER HARVESTING AND REUSE

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

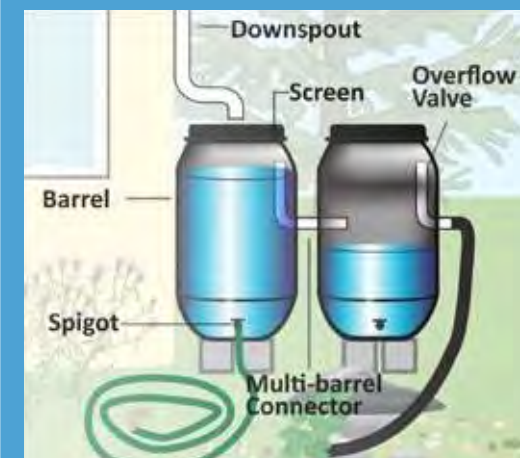
### Downspout Disconnection/Redirection

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



### Rain Barrels

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



### Rain Gardens

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

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



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

## OTHER WATER CONSERVATION AND POLLUTION PREVENTION TECHNIQUES

### Native Vegetation and Maintenance

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

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

### Weed Free Yards

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



### Soil Amendments

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

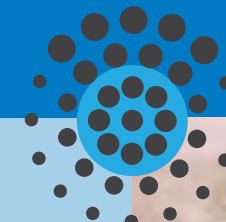
## IRRIGATE EFFICIENTLY

### Smart Irrigation Controllers

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

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

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



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

**C**lean 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](http://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](http://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](http://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](http://www.cleanup.org).



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Help Prevent Ocean Pollution:

## Tips for the Home Mechanic



**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](http://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.





***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](http://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](http://www.watersheds.com).

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

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printed on recycled paper



Help Prevent Ocean Pollution:

## Recycle at Your Local Used Oil Collection Center



**The Ocean Begins at Your Front Door**



**NORTH COUNTY**

# Used Oil Collection Centers

|                                                                                                                                                      |                                                                                                                                                             |                                                                                                                                     |                                                                                                                                     |                                                                                                                                                                   |                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Anaheim</b><br><b>All Seasons Tire and Auto Center, Inc.</b><br>817 S Brookhurst St., Anaheim, CA 92804<br>(714)772-6090( )<br>CIWMB#: 30-C-03177 | <b>Kragen Auto Parts #1582</b><br>3420 W Lincoln Ave., Anaheim, CA 92801<br>(714)828-7977( )<br>CIWMB#: 30-C-04103                                          | <b>Cypress</b><br><b>AutoZone #5521</b><br>5471 Lincoln Ave., Cypress, CA 90630<br>(714)995-4644( )<br>CIWMB#: 30-C-00836           | <b>Kragen Auto Parts #4133</b><br>904 W Orangethorpe Ave., Fullerton, CA 92832<br>(714)526-3570( )<br>CIWMB#: 30-C-06256            | <b>Firestone Store #2736</b><br>1071 S Beach Blvd., La Habra, CA 90631<br>(562)681-1731( )<br>CIWMB#: 30-C-01169                                                  | <b>USA 10 Minute Oil Change</b><br>8100 Lampson Ave., Stanton, CA 92841<br>(714)373-4432( )<br>CIWMB#: 30-C-05909                       |
| <b>AutoZone #3317</b><br>423 N Anaheim Blvd., Anaheim, CA 92805<br>(714)776-0787( )<br>CIWMB#: 30-C-05263                                            | <b>Pep Boys #613</b><br>10912 Katella Ave., Anaheim, CA 92804<br>(714)838-0863( )<br>CIWMB#: 30-C-01756                                                     | <b>Big O Tires</b><br>6052 Cerritos Ave., Cypress, CA 90630<br>(714)826-6334( )<br>CIWMB#: 30-C-04245                               | <b>Pep Boys #642</b><br>1530 S Harbor Blvd., Fullerton, CA 92832<br>(714)870-0700( )<br>CIWMB#: 30-C-01755                          | <b>Kragen Auto Parts #1569</b><br>1621 W Whittier Blvd., La Habra, CA 90631<br>(562)905-2538( )<br>CIWMB#: 30-C-04076                                             | <b>Westminster</b><br><b>AutoZone #5543</b><br>6611 Westminster Blvd., Westminster, CA 92683<br>(714)898-2898( )<br>CIWMB#: 30-C-04964  |
| <b>AutoZone #5226</b><br>2145 W Lincoln Ave., Anaheim, CA 92801<br>(714)533-6599( )<br>CIWMB#: 30-C-04604                                            | <b>Pep Boys #663</b><br>3030 W Lincoln Anaheim, CA 92801<br>(714)826-4810( )<br>CIWMB#: 30-C-03417                                                          | <b>Econo Lube N' Tune #213</b><br>5497 Cerritos Ave., Cypress, CA 90630<br>(714)761-0456( )<br>CIWMB#: 30-C-06240                   | <b>Sunnyside 76 Car Care Center</b><br>2701 N Brea Blvd., Fullerton, CA 92835<br>(714)256-0773( )<br>CIWMB#: 30-C-01381             | <b>Pep Boys #997</b><br>125 W Imperial Hwy., La Habra, CA 90631<br>(714)447-0601( )<br>CIWMB#: 30-C-04026                                                         | <b>AutoZone #5544</b><br>8481 Westminster Blvd., Westminster, CA 92683<br>(714)891-3511( )<br>CIWMB#: 30-C-04966                        |
| <b>Bedard Automotive</b><br>3601 E Miraloma Ave., Anaheim, CA 92806<br>(714)528-1380( )<br>CIWMB#: 30-C-02205                                        | <b>Pep Boys #809</b><br>8205 E Santa Ana Cyn Rd., Anaheim, CA 92808<br>(714)974-0105( )<br>CIWMB#: 30-C-03443                                               | <b>Jiffy Lube #851</b><br>4942 Lincoln Ave., Cypress, CA 90630<br>(626)965-9689( )<br>CIWMB#: 30-C-06182                            | <b>Garden Grove</b><br><b>76 Pro Lube Plus</b><br>9001 Trask Ave., Garden Grove, CA 92844<br>(714)393-0590( )<br>CIWMB#: 30-C-05276 | <b>SpeedDee Oil Change &amp; Tune-Up</b><br>1580 W Imperial Hwy., La Habra, CA 90631<br>(562)697-3513( )                                                          | <b>City of Westminster Corporate Yard</b><br>14381 Olive St., Westminster, CA 92683<br>(714)895-2876(292 )<br>CIWMB#: 30-C-02008        |
| <b>Classic Chevrolet</b><br>1001 Weir Canyon Rd., Anaheim, CA 92807<br>(714)283-5400( )<br>CIWMB#: 30-C-05223                                        | <b>Pick Your Part</b><br>1235 S Beach Blvd., Anaheim, CA 92804<br>(714)527-1645( )<br>CIWMB#: 30-C-03744                                                    | <b>M &amp; N Coastline Auto &amp; Tire Service</b><br>4005 Ball Rd., Cypress, CA 90630<br>(714)826-1001( )<br>CIWMB#: 30-C-04387    | <b>AutoZone #5527</b><br>13190 Harbor Blvd., Garden Grove, CA 92843<br>(714)636-5665( )<br>CIWMB#: 30-C-04760                       | <b>Los Alamitos</b><br><b>Jiffy Lube #1740</b><br>3311 Katella Ave., Los Alamitos, CA 90720<br>(562)596-1827( )<br>CIWMB#: 30-C-03529                             | <b>Honda World</b><br>13600 Beach Blvd., Westminster, CA 92683<br>(714)890-8900( )<br>CIWMB#: 30-C-03639                                |
| <b>Econo Lube N' Tune #4</b><br>3201 W Lincoln Ave., Anaheim, CA 92801<br>(714)821-0128( )<br>CIWMB#: 30-C-01485                                     | <b>PK Auto Performance</b><br>3106 W. Lincoln Ave., Anaheim, CA 92801<br>(714)826-2141( )<br>CIWMB#: 30-C-05628                                             | <b>Masterlube #103</b><br>5904 Lincoln Cypress, CA 90630<br>(714)826-2323( )<br>CIWMB#: 30-C-01071                                  | <b>David Murray Shell</b><br>12571 Vly View St., Garden Grove, CA 92845<br>(714)898-0170( )<br>CIWMB#: 30-C-00547                   | <b>Midway City</b><br><b>Bolsa Transmission</b><br>8331 Bolsa Ave., Midway City, CA 92655<br>(714)799-6158( )<br>CIWMB#: 30-C-05768                               | <b>Jiffy Lube #1579</b><br>6011 Westminster Blvd., Westminster, CA 92683<br>(714)899-2727( )<br>CIWMB#: 30-C-02745                      |
| <b>EZ Lube Inc - Savi Ranch #43</b><br>985 N Weir Canyon Rd., Anaheim, CA 92807<br>(714)556-1312( )<br>CIWMB#: 30-C-06011                            | <b>Quick Change Lube and Oil</b><br>2731 W Lincoln Ave., Anaheim, CA 92801<br>(714)821-4464( )<br>CIWMB#: 30-C-04363                                        | <b>Masterlube #104</b><br>5971 Ball Rd., Cypress, CA 90630<br>(714)220-1555( )<br>CIWMB#: 30-C-04682                                | <b>Express Lube &amp; Wash</b><br>18081 Lampson Ave., Garden Grove, CA 92841<br>(909)316-8261( )<br>CIWMB#: 30-C-06544              | <b>Placentia</b><br><b>Advanced Auto &amp; Diesel</b><br>144 S Bradford Placentia, CA 92870<br>(714)996-8222( )<br>CIWMB#: 30-C-06242                             | <b>John's Brake &amp; Auto Repair</b><br>13050 Hoover St., Westminster, CA 92683<br>(714)379-2088( )<br>CIWMB#: 30-C-05617              |
| <b>Firestone Store #71C7</b><br>1200 S Magnolia Ave., Anaheim, CA 92804<br>(949)598-5520( )<br>CIWMB#: 30-C-05743                                    | <b>Saturn of Anaheim</b><br>1380 S Auto Center Dr., Anaheim, CA 92806<br>(714)648-2444( )<br>CIWMB#: 30-C-06332                                             | <b>Metric Motors of Cypress</b><br>6042 Cerritos Ave., Cypress, CA 90630<br>(714)821-4702( )<br>CIWMB#: 30-C-05157                  | <b>Firestone Store #7180</b><br>10081 Chapman Ave., Garden Grove, CA 92840<br>(714)530-4630( )<br>CIWMB#: 30-C-01224                | <b>Castner's Auto Service</b><br>214 S. Bradford Ave., Placentia, CA 92870<br>(714)528-1311( )<br>CIWMB#: 30-C-06452                                              | <b>Kragen Auto Parts #0762</b><br>6562 Westminster Blvd., Westminster, CA 92683<br>(714)898-0810( )<br>CIWMB#: 30-C-02590               |
| <b>Great Western Lube Express</b><br>125 N Brookhurst St., Anaheim, CA 92801<br>(714)254-1300( )<br>CIWMB#: 30-C-05542                               | <b>Sun Tech Auto Service</b><br>105 S State College Blvd., Anaheim, CA 92806<br>(714)956-1389( )<br>CIWMB#: 30-C-06455                                      | <b>Fullerton</b><br><b>AutoZone #2898</b><br>146 N. Raymond Ave., Fullerton, CA 92831<br>(714)870-9772( )<br>CIWMB#: 30-C-04488     | <b>Firestone Store #71W3</b><br>13961 Brookhurst St., Garden Grove, CA 92843<br>(714)590-2741( )<br>CIWMB#: 30-C-03690              | <b>Econo Lube N' Tune</b><br>100 W Chapman Ave., Placentia, CA 92870<br>(714)524-0424( )<br>CIWMB#: 30-C-06454                                                    | <b>Midway City Sanitary District</b><br>14451 Cedarwood St., Westminster, CA 92683<br>(714)970-8933( )<br>CIWMB#: 30-C-01626            |
| <b>HR Pro Auto Service Center</b><br>3180 W Lincoln Ave., Anaheim, CA 92801<br>(714)761-4343( )<br>CIWMB#: 30-C-05927                                | <b>Vonic Truck Services</b><br>515 S Rose St., Anaheim, CA 92805<br>(714)533-3333( )<br>CIWMB#: 30-C-01142                                                  | <b>AutoZone #5522</b><br>1801 Orangethorpe W. Fullerton, CA 92833<br>(714)870-8286( )<br>CIWMB#: 30-C-06062                         | <b>Jiffy Lube #1991</b><br>13970 Harbor Blvd., Garden Grove, CA 92843<br>(714)554-0610( )<br>CIWMB#: 30-C-05400                     | <b>Fairway Ford</b><br>1350 E Yorba Linda Blvd., Placentia, CA 92870<br>(714)524-1200( )<br>CIWMB#: 30-C-01863                                                    | <b>Pep Boys #653</b><br>15221 Beach Blvd., Westminster, CA 92683<br>(714)893-8544( )<br>CIWMB#: 30-C-03415                              |
| <b>Ira Newman Automotive Services</b><br>1507 N State College Blvd., Anaheim, CA 92806<br>(714)635-2392( )<br>CIWMB#: 30-C-01482                     | <b>Anaheim Hills</b><br><b>Anaheim Hills Car Wash &amp; Lube</b><br>5810 E La Palma Ave., Anaheim Hills, CA 92807<br>(714)777-6605( )<br>CIWMB#: 30-C-01387 | <b>AutoZone #5523</b><br>102 N Euclid Fullerton, CA 92832<br>(714)870-8286( )<br>CIWMB#: 30-C-04755                                 | <b>Kragen Auto Parts #1251</b><br>13933 N Harbor Blvd., Garden Grove, CA 92843<br>(714)554-3780( )<br>CIWMB#: 30-C-02663            | <b>Seal Beach</b><br><b>M &amp; N Coastline Auto &amp; Tire Service</b><br>12239 Seal Beach Blvd., Seal Beach, CA 90740<br>(714)826-1001( )<br>CIWMB#: 30-C-04433 | <b>Yorba Linda</b><br><b>AutoZone #5545</b><br>18528 Yorba Linda Blvd., Yorba Linda, CA 92886<br>(714)970-8933( )<br>CIWMB#: 30-C-04971 |
| <b>Jiffy Lube #1028</b><br>2400 W Ball Rd., Anaheim, CA 92804<br>(714)761-5211( )<br>CIWMB#: 30-C-00870                                              | <b>Brea</b><br><b>Firestone Store #27A9</b><br>891 E Imperial Hwy., Brea, CA 92821<br>(714)529-8404( )<br>CIWMB#: 30-C-01221                                | <b>EZ Lube #17</b><br>4002 N Harbor Blvd., Fullerton, CA 92835<br>(714)871-9980( )<br>CIWMB#: 30-C-03741                            | <b>Kragen Auto Parts #1555</b><br>9851 Chapman Ave., Garden Grove, CA 92841<br>(714)741-8030( )<br>CIWMB#: 30-C-04079               | <b>Seal Beach Chevron</b><br>12541 Seal Beach Blvd., Seal Beach, CA 90740<br>(949)495-0774(14 )<br>CIWMB#: 30-C-06425                                             | <b>Econo Lube N' Tune</b><br>22270 La Palma Ave., Yorba Linda, CA 92887<br>(714)692-8394( )<br>CIWMB#: 30-C-06513                       |
| <b>Jiffy Lube #1903</b><br>2505 E Lincoln Ave., Anaheim, CA 92806<br>(714)772-4000( )<br>CIWMB#: 30-C-05511                                          | <b>Oil Can Henry's</b><br>230 N Brea Blvd., Brea, CA 92821<br>(714)990-1900( )<br>CIWMB#: 30-C-04273                                                        | <b>Firestone Store #27EH</b><br>1933 N Placentia Ave., Fullerton, CA 92831<br>(714)993-7100( )<br>CIWMB#: 30-C-02122                | <b>Nissan of Garden Grove</b><br>9670 Trask Ave., Garden Grove, CA 92884<br>(714)537-0900( )<br>CIWMB#: 30-C-06553                  | <b>Stanton</b><br><b>AutoZone #2806</b><br>11320 Beach Blvd., Stanton, CA 90680<br>(714)895-7665( )<br>CIWMB#: 30-C-04563                                         | <b>EZ Lube Inc. #41</b><br>17511 Yorba Linda Blvd., Yorba Linda, CA 92886<br>(714)556-1312( )<br>CIWMB#: 30-C-05739                     |
| <b>Jiffy Lube #2340</b><br>2181 W Lincoln Ave., Anaheim, CA 92801<br>(714)533-1000( )<br>CIWMB#: 30-C-04647                                          | <b>Buena Park</b><br><b>Firestone Store #71F7</b><br>6011 Orangethorpe Buena Park, CA 90620<br>(714)670-7912( )<br>CIWMB#: 30-C-01218                       | <b>Fox Service Center</b><br>1018 W Orangethorpe Fullerton, CA 92833<br>(714)879-1430( )<br>CIWMB#: 30-C-02318                      | <b>Toyota of Garden Grove</b><br>9444 Trask Ave., Garden Grove, CA 92844<br>(714)895-5595( )<br>CIWMB#: 30-C-06555                  | <b>Joe's Auto Clinic</b><br>11763 Beach Blvd., Stanton, CA 90680<br>(714)891-7715( )<br>CIWMB#: 30-C-03253                                                        | <b>Firestone Store #27T3</b><br>18500 Yorba Linda Blvd., Yorba Linda, CA 92886<br>(714)779-1966( )<br>CIWMB#: 30-C-01222                |
| <b>Kragen Auto Parts #1303</b><br>1088 N State College Blvd., Anaheim, CA 92806<br>(714)956-7351( )<br>CIWMB#: 30-C-03438                            | <b>Firestone Store #71T8</b><br>8600 Beach Blvd., Buena Park, CA 90620<br>(714)827-5300( )<br>CIWMB#: 30-C-02121                                            | <b>Fullerton College Automotive Technology</b><br>321 E Chapman Ave., Fullerton, CA 92832<br>(714)992-7275( )<br>CIWMB#: 30-C-03165 | <b>Burch Ford</b><br>201 N Harbor Blvd., La Habra, CA 90631<br>(562)691-3225( )<br>CIWMB#: 30-C-04784                               | <b>Kragen Auto Parts #1742</b><br>11951 Beach Blvd., Stanton, CA 90680<br>(714)799-7574( )<br>CIWMB#: 30-C-05231                                                  | <b>Jiffy Lube #1532</b><br>16751 Yorba Linda Blvd., Yorba Linda, CA 92886<br>(714)528-2800( )<br>CIWMB#: 30-C-03777                     |
| <b>Kragen Auto Parts #1399</b><br>2245 W Ball Rd., Anaheim, CA 92804<br>(714)490-1274( )<br>CIWMB#: 30-C-04094                                       | <b>Kragen Auto Parts #1204</b><br>5303 Beach Blvd., Buena Park, CA 90621<br>(714)994-1320( )<br>CIWMB#: 30-C-02623                                          | <b>Kragen Auto Parts #0731</b><br>2978 Yorba Linda Fullerton, CA 92831<br>(714)996-4780( )<br>CIWMB#: 30-C-02628                    |                                                                                                                                     | <b>Scher Tire #20</b><br>7000 Katella Ave., Stanton, CA 90680<br>(714)892-9924( )<br>CIWMB#: 30-C-05907                                                           | <b>Mike Schultz Import Service</b><br>4832 Eureka Ave., Yorba Linda, CA 92886<br>(714)528-4411( )<br>CIWMB#: 30-C-04313                 |

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



**C**lean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. 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.

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 performing home improvement projects. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.



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## Help Prevent Ocean Pollution: Tips for Home Improvement Projects

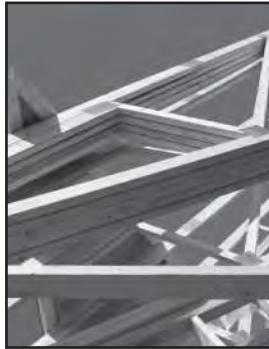


# Tips for Home Improvement Projects

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. Call your local trash hauler for weight and size limits.

## 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.oilandfills.com](http://www.oilandfills.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](http://www.ciwmb.ca.gov/SWIS).
- Prevent erosion by planting fast-growing annual and perennial grasses. They will shield and bind the soil.

## Recycle

- Use a construction and demolition recycling company to recycle lumber, paper, cardboard, metals, masonry (bricks, concrete, etc.), carpet, plastic, pipes (plastic, metal and clay), drywall, rocks, dirt and green waste.
- For a listing of construction and demolition recycling locations in your area, visit [www.ciwmb.ca.gov/recycle](http://www.ciwmb.ca.gov/recycle).



## 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 County's 24-Hour Water Pollution Problem Reporting Hotline at 1-877-897-7455 or visit [www.ocwatersheds.com](http://www.ocwatersheds.com) to fill out an incident reporting form.



**C**lean 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)  
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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.



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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 1-877-897-7455 or visit [www.oclandfills.com](http://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 1-877-897-7455 or visit [www.ocwatersheds.com](http://www.ocwatersheds.com) to fill out an incident reporting form.

# Sewage Spill Regulatory Requirements

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

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

## Orange County Stormwater Program

24 Hour Water Pollution Reporting Hotline

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

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

## Orange County Health Care Agency Environmental Health

(714) 433-6419

**California Health and Safety Code**, Sections 5410-5416

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

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

(951) 782-4130

(858) 467-2952

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

## California Office of Emergency Services

(800) 852-7550

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

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



# Sewage Spill Reference Guide

## Your Responsibilities as a Private Property Owner

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



**Orange County  
Sanitation District**



Health Care Agency  
Environmental Health



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

This brochure was designed courtesy of the Orange County Sanitation District (OCSd).  
For additional information, call (714) 962-2411, or visit their website at [www.ocsd.com](http://www.ocsd.com)

# What is a Sewage Spill?

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

## Common Causes of Sewage Spills

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

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

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

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

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

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

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

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

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

Overflowing  
cleanout pipe  
located on  
private property



## You Could Be Liable

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

## What to Look For

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

Look for:

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

## Caution

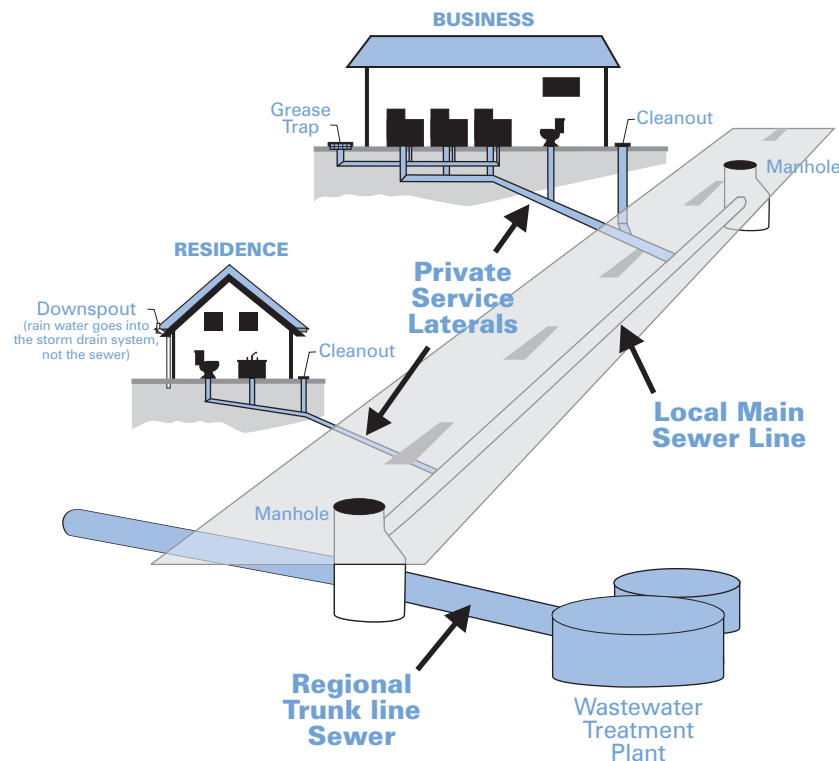
Keep people and pets away from the affected area. Untreated sewage has high levels of disease-causing viruses and bacteria. Call your local health care agency listed on the back for more information.

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

## How a Sewer System Works

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

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



### How You Can Prevent Sewage Spills

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



## Preventing Grease Blockages

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

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

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

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

## Orange County Agency Responsibilities

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

### You Could Be Liable for Not Protecting the Environment

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

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

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



## Report Sewage Spills!

### City Sewer/Public Works Departments

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

### Public Sewer/Water Districts

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

### Other Agencies

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



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

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

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

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

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

**For emergencies, dial 911.**

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



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Help Prevent Ocean Pollution:

## Tips for Landscape & Gardening



The Ocean Begins  
at Your Front Door



# Tips for Landscape & Gardening

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

## *General Landscaping Tips*

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.
- Plant native vegetation to reduce the amount of water, fertilizers, and pesticide applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.



## *Garden & Lawn Maintenance*

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro spray systems. Periodically inspect and fix leaks and misdirected sprinklers.

- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.



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



- Rinse empty pesticide containers and re-use rinse water as you would use the

product. Do not dump rinse water down storm drains. Dispose of empty containers in the trash.

- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting. For more information, visit [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu).
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Hazardous Waste Collection Center to be recycled. Locations are provided below.

## Household Hazardous Waste Collection Centers

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

For more information, call (714) 834-6752 or visit [www.oclandfills.com](http://www.oclandfills.com)



For More Information, please  
visit the Orange County  
Stormwater Program website at  
[www.ocwatersheds.com](http://www.ocwatersheds.com)

To report a spill,  
Call the Orange County 24-hour  
Water Pollution Problem  
Reporting Hotline  
1-877-89-SPILL (1-877-897-7455)  
(For emergencies, dial 911)

The tips contained in this brochure provide useful  
information about how you can keep excess  
runoff from carrying pollutants to the storm drain  
system. Please visit the Orange County Stormwater  
Program at [www.ocwatersheds.com/Publiced](http://www.ocwatersheds.com/Publiced) for  
more resources. Other important resources include:

Municipal Water District of Orange County  
[www.mwdoc.com](http://www.mwdoc.com)

University of California Master Gardeners of  
Orange County  
[www.uccemg.com](http://www.uccemg.com)

UC Cooperative Extension / OC Water Quality &  
Water Resources  
[www.ucanr.org/sites/urbanwatermgmt/](http://www.ucanr.org/sites/urbanwatermgmt/)



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Help Prevent Ocean Pollution:

## Tips to Prevent Overwatering

The Ocean Begins at  
Your Front Door



# Tips to Prevent Overwatering

## What is Overwatering?

Overwatering is the use of irrigation in exceedance of the water demand of a landscaped area.

In Orange County, 60-70% of water used by residents and businesses goes to irrigation and other outdoor uses. By utilizing water resources more efficiently, more potable water may be available for other uses and will not cause urban runoff.



## How Does Overwatering Lead to Pollution?

Even during the hottest summer months, you can often see water runoff going into our storm drains and into our waterways. This runoff is usually the result of overwatering of lawns. The water carries trash, motor oil, pet waste and other pollutants into our storm drains, which flow untreated to the ocean. Water runoff both pollutes our waterways and wastes water.

**IT'S THE LAW!** If you live in Southern Orange County, runoff from landscape irrigation that enters the street and catch basins is prohibited. Please contact your city for more information about what you can do to prevent overwatering and urban runoff.

## Lawn Watering Needs

- During the fall and winter months, your lawn needs far less water than during the summer. Adjust sprinkler controls to water less during winter months.
- If your blades of grass spring up after you step on them, they are adequately watered.
- If your grass is a vibrant green and is not pale, it is receiving enough water. If your lawn becomes less verdant, it may need nutrients and not water. If possible, seek assistance from a gardening professional.
- Overwatering during fall and winter months can saturate soils and lead to lawn disease.

## When is the Best Time to Water?

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

## How do I Irrigate Most Efficiently?

- 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 water pollution from runoff and keep your lawn healthy.
- 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 (e.g. Irvine Ranch Water District Always Water Smart weekly irrigation schedules).
- 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 control sprinklers will automatically shut off.
- Consider replacing your sprinkler heads with rotating sprinkler nozzles. Rotating nozzles water more uniformly and efficiently, reducing your outdoor water use by up to 30%.
- Check with your local water agency for available rebates on irrigation controllers and other water efficient devices.
- Water by hand. Instead of using sprinklers, consider watering your yard by hand. Hand-watering ensures that all plants get the proper amount of water and you will prevent any water runoff, which carries pollutants into our waterways and wastes water.
- Fix leaks. Nationwide, households waste one trillion gallons of water a year to leaks. If your



garden hose is leaking, replace the nylon or rubber hose washer and ensure a tight connection. Fix broken sprinklers immediately.

## Be Careful With Pesticides and Fertilizer

- Never apply pesticides or fertilizer when rain is predicted within the next 48 hours.
- 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.
- Utilize least toxic alternatives to pesticides to manage lawn and garden pests where possible. Pesticides are transported via runoff to waterways and can be harmful to aquatic organisms. Visit [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu) for more information about pest management practices.



## Native Vegetation and Maintenance

- "California Friendly" plants or native vegetation can significantly reduce water use. These plants often require far less fertilizers and pesticides, which are two significant pollutants found in Orange County waterways. Replacing water "thirsty" plants and grass types with water efficient natives is a great way to save water and reduce the need for potentially harmful pesticides and fertilizer.
- Please see the California Friendly Garden Guide produced by the Metropolitan Water District of Southern California and associated Southern California Water Agencies for a catalog of California friendly plants and other garden resources at [www.bewaterwise.com/Gardensoft](http://www.bewaterwise.com/Gardensoft).





**C**lean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. 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 **1-877-89-SPILL** (1-877-897-7455)  
or visit  
**www.ocwatersheds.com**

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

**For emergencies, dial 911.**

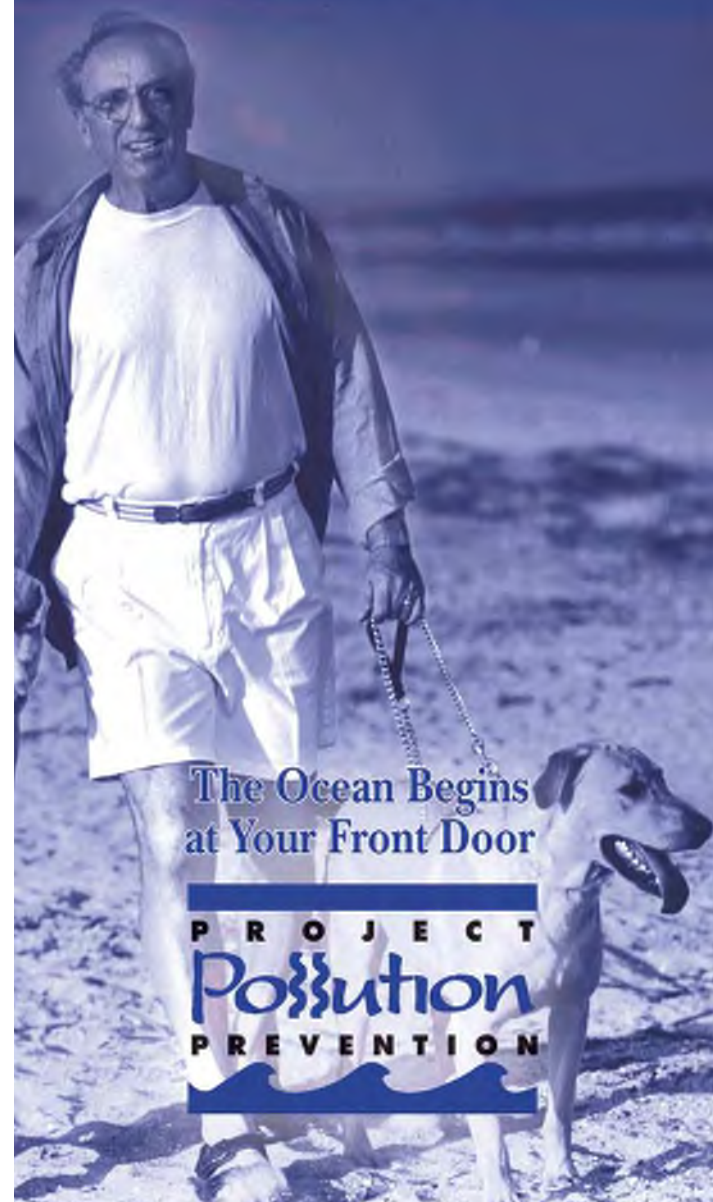
The tips contained in this brochure provide useful information to help prevent water pollution while caring for your pet. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.



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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.

# **GEOTECH REPORT**



November 20, 2025

J.N.: 3374.00

Mr. Brian Cunningham  
The Olson Company  
3010 Old Ranch Parkway, Suite 100  
Seal Beach, California 90740

**Subject: Preliminary Geotechnical Investigation, Proposed Multi-Family Residential Development, 17332 Irvine Boulevard, Tustin, California**

Dear Mr. Cunningham,

Pursuant to your request, *Albus & Associates, Inc.* is pleased to present to you our preliminary geotechnical investigation report for the proposed development at the subject site. This report presents the results of our aerial photo and literature review, subsurface exploration, laboratory testing, and engineering analyses. Conclusions and recommendations pertaining to the proposed site development are also presented herein based on the findings of our work.

We appreciate this opportunity to be of service to you. If you should have any questions regarding the contents of this report, please do not hesitate to call.

Sincerely,

***ALBUS & ASSOCIATES, INC.***

A handwritten signature in blue ink, appearing to read "Daniel Albus", is written over a horizontal line.

Daniel Albus  
Project Engineer

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Figure 1 - Site Location Map

Plate 1 - Geotechnical Map

## APPENDICES

### APPENDIX A - EXPLORATION LOGS

Plates A-0 through A-5

### APPENDIX B - LABORATORY TEST RESULTS

Table B-1 – Summary of Laboratory Test Results

Plates B-1 through B-3– Grain Size Distribution Plots

Plate B-4 – Direct Shear Plot

## **1.0 INTRODUCTION**

### **1.1 PURPOSE AND SCOPE**

The purposes of our preliminary geotechnical investigation were to evaluate geotechnical conditions within the project area and to provide conclusions and recommendations relevant to the design and construction of the proposed improvements at the subject site. The scope of this investigation included the following:

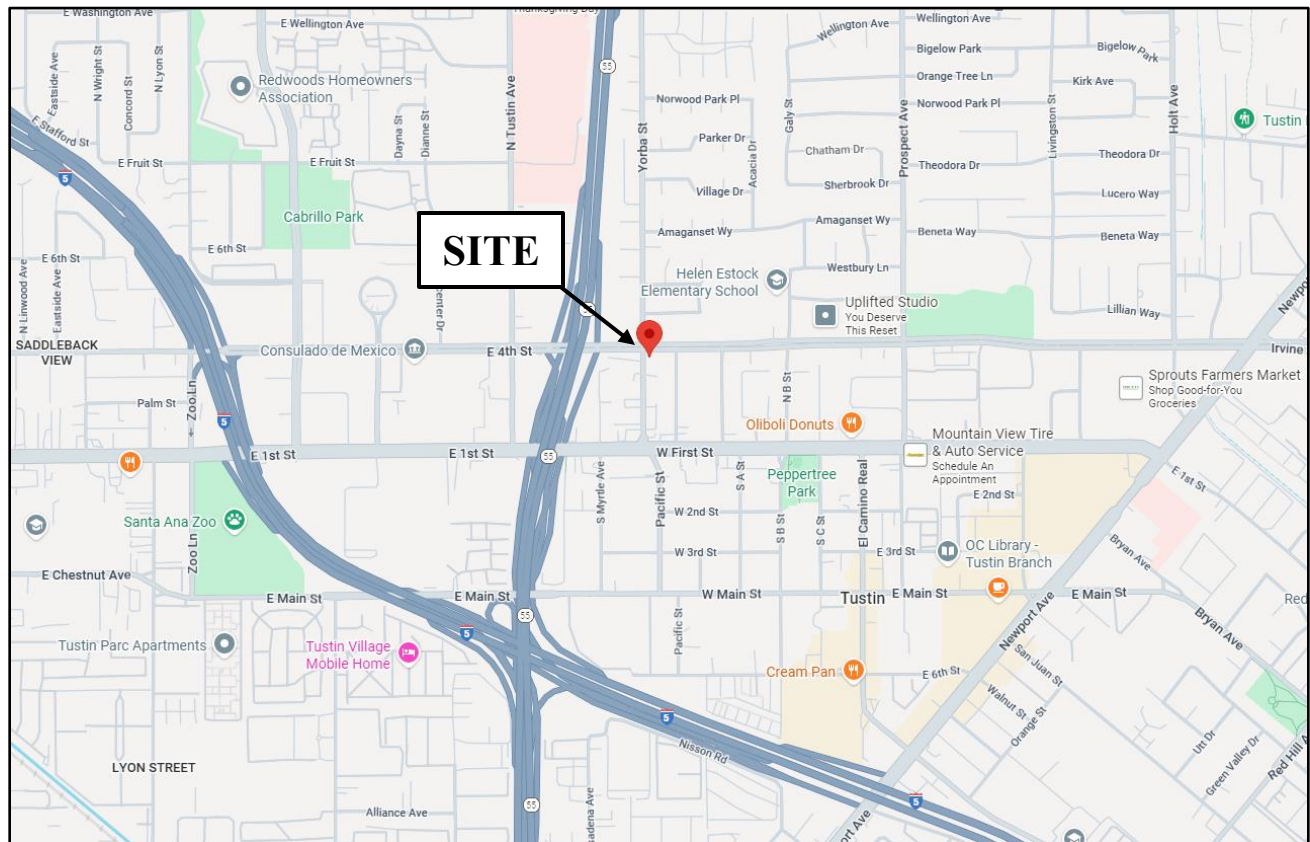
- Review of the historical aerial photographs
- Review of published geologic and seismic data for the site and surrounding area
- Exploratory drilling and soil sampling
- Laboratory testing of selected soil samples
- Engineering analyses of data obtained from our review, exploration, and laboratory testing
- Evaluation of site seismicity, liquefaction potential, and settlement potential
- Preparation of this report

### **1.2 SITE LOCATION AND DESCRIPTION**

The site is located at 17332 Irvine Boulevard in the city of Tustin, California. The property is bordered by Irvine Boulevard to the north, Yorba Street to the west, Mountain View Drive to the east, and residential properties to the south. The location of the site and its relationship to the surrounding areas are shown in Figure 1, Site Location Map.

The site consists of one rectangularly-shaped property containing approximately 1 acre of land in total. The site is relatively flat, with elevations ranging from 146 to 148 feet above mean sea level (based on Google Earth). Site drainage appears to be directed as sheet flow generally to the east.

The site is occupied by a large commercial building occupying the northern half of the site. The remainder of the site is covered in asphalt driveways and parking bays associated with the building. Light vegetation and moderate size trees are also present onsite within scattered planter spaces. A masonry block wall is present along the south property line. Other improvements are present in association with the existing building.



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**FIGURE 1 - SITE LOCATION MAP**

**Proposed Multi-Family Residential Development  
17332 Irvine Boulevard, Tustin, California**

NOT TO SCALE

### 1.3 PROPOSED DEVELOPMENT

Based on the conceptual site plan provided by ktgy, we understand that the proposed development will likely consist of 15 three-story residential townhomes at-grade. Associated interior driveways, parking, underground utilities, and decorative hardscape and landscape areas are also anticipated. No structural plans were available for our review at this time.

No grading or structural plans were available for review at the time of this report. However, we anticipate grading will entail some minor cuts and fills of the site achieve future surface configuration, and we expect future foundation loads will be moderate.

## **2.0 INVESTIGATION**

### **2.1 RESEARCH**

Review of the Geologic Map of Orange County by Morton (1981) suggests the site is underlain by Younger Alluvium (Qya). Older Alluvium (Qoa) has been mapped relatively close to the site to the north and northeast. The Qoa may be present at depth below the stie.

Historical imagery shows that the site was covered by mature citrus trees as early as 1946 and Irvine Boulevard was not present. By 1963, Irvine Boulevard is present and the site is still occupied by fruit trees. By 1965, the site has been cleared of the trees are rough graded. By 1972, the site has been developed into it's current configuration.

### **2.2 SUBSURFACE EXPLORATION**

Subsurface exploration for this investigation was conducted on November 6, 2025, that consisted of advancing three (3) soil borings to approximate depths of 11.5 to 51.5 feet below the existing ground surface (bgs). The borings were drilled using a truck-mounted, continuous flight, hollow-stem-auger drill rig. A representative of Albus & Associates, Inc., was present to log the exploratory borings. Visual and tactile identifications were made of the materials encountered, and their descriptions are presented in the Exploration Logs in Appendix A. The approximate locations of the exploratory excavations completed by this firm are shown on the enclosed Geotechnical Map, Plate 1.

Bulk, relatively undisturbed and Standard Penetration Test (SPT) samples were obtained at selected depths within the exploratory borings for subsequent laboratory testing. A California split-spoon soil sampler with a 3-inch O.D., 2.5-inch I.D., lined with brass rings, was used to gather soil samples. SPT samples were obtained from the boring using a standard, unlined SPT soil sampler. During each sampling interval, the sampler was driven 18 inches with successive drops of a 140-pound automatic hammer falling 30 inches. The number of blows required to advance the sampler was recorded for each six inches of advancement. The total blow count for the lower 12 inches of advancement per soil sample is recorded on the exploration log. Samples were placed in sealed containers or plastic bags and transported to our laboratory for analysis. The borings were backfilled with auger cuttings upon completion of sampling and capped with cold-patch asphalt.

Two additional borings (P-1 and P-2) were drilled adjacent to boring B-1 for percolation testing. A brief summary of our findings are presented below in Section 5.7.

### **2.3 LABORATORY TESTING**

Selected samples obtained from our subsurface exploration were tested in our soil laboratory. Testing consisted of in-situ moisture content and dry density, maximum dry density and optimum moisture content, soluble sulfate, expansion index, direct shear, grain-size distribution analysis, pH, chloride content, and minimum resistivity. Descriptions of laboratory test criteria and test results are presented in Appendix B.

### **3.0 SUBSURFACE CONDITIONS**

#### **3.1 SOIL CONDITIONS**

Descriptions of the earth materials encountered during our investigation are summarized below and are presented in detail on the Exploration Logs presented in Appendix A.

From our exploration of the site, we found artificial fills (Af) to be generally 4 feet thick within all the borings. The fill encountered onsite is likely a result of past site development. These materials consisted of gray to red brown sands and silty sands that were loose, dry to moist and fine-grained. Localized, deeper fills may be present onsite in the form of utility trenches or from past grading activities.

Younger Alluvium (Qal) was encountered underlying the artificial fill and extended to a depth of 16 feet. The alluvium typically consisted of fine to coarse-grained sands that became gravelly below a depth of 10 feet. The younger alluvial soils were light reddish brown, typically loose to medium dense, and moist.

Below the Younger Alluvium, soils believed to be Older Alluvium (Qoal) were encountered between the depths of 16 feet and to the maximum depth explored of 41.5 feet. These materials consisted of silty fine sand to 30 feet then became a sandy silt with a trace clay. The older alluvium was reddish brown, medium dense/stiff, and moist. These materials were believed to be older alluvium primarily based on the deeper red coloring ( increased oxidation) and textural features along with the general mapping of older alluvial soils exposed in other nearby areas.

#### **3.2 GROUNDWATER**

Groundwater was not encountered during this firm's subsurface exploration to a depth of 41.5 feet. Estimating from data in CDMG Special Report 012, the historic high groundwater for the subject site is mapped at a depth of about 50 feet.

#### **3.3 FAULTING**

Based on our review of the referenced publications and seismic data, no active faults are known to project through or immediately adjacent to the subject sites and the sites do not lie within an "Earthquake Fault Zone" as defined by the State of California in Earthquake Fault Zoning Act. Table 3.1 presents a summary of known seismically active faults within 10 miles of the sites based on the 2008 USGS National Seismic Hazard Maps.

**TABLE 3.1**  
**Summary of Faults**

| <b>Name</b>              | <b>Dist.<br/>(miles)</b> | <b>Slip Rate<br/>(mm/yr.)</b> | <b>Preferred<br/>Dip<br/>(degrees)</b> | <b>Slip Sense</b> | <b>Rupture<br/>Top<br/>(km)</b> | <b>Fault<br/>Length<br/>(km)</b> |
|--------------------------|--------------------------|-------------------------------|----------------------------------------|-------------------|---------------------------------|----------------------------------|
| <u>San Joaquin Hills</u> | 4.09                     | 0.5                           | 23                                     | Thrust            | 2                               | 27                               |

## 4.0 ANALYSES

### 4.1 SEISMICITY

2022 CBC requires seismic parameters in accordance with ASCE 7-16 and supplements 1, 2, and 3. Unless noted otherwise, all section numbers cited in the following refer to the sections in ASCE 7-16.

Per Section 20.3, the project site was designated as Site Class D. We used the OSHPD seismic hazard tool to obtain the basic mapped acceleration parameters, including short periods ( $S_S$ ) and 1-second period ( $S_1$ )  $MCE_R$  Spectral Response Accelerations.

Section 11.4.8 and supplement 3 require site-specific ground hazard analysis for structures on Site Class D with  $S_1$  greater than or equal to 0.2. Based on the mapped values of  $S_S$  and  $S_1$  the project site falls within this category, requiring site-specific hazard analysis in accordance with Section 21.2. However, “A ground motion hazard analysis is not required for structures where the value of the parameter  $S_{M1}$  determined by Eq. (11.4-2) is increased by 50% for all applications of  $S_{M1}$  in the Standard. The resulting value of the parameter  $S_{D1}$  determined by Eq. (11.4-4) shall be used for all applications of  $S_{D1}$  in this Standard.” Assuming this exception is met for this project, a ground motion hazard analysis is not required and mapped seismic values can be used. Should this exception not be met, a ground motion hazard analysis is required to determine the Design response spectra for the proposed structures at this site. Both mapped and site-specific seismic design parameters are provided in this report, as presented in Section 6.2. Details of a ground motion hazard analysis are explained below.

According to Section 21.2.3 (Supplement 1), the site-specific Risk Targeted Maximum Considered Earthquake ( $MCE_R$ ) spectral response acceleration at any period is the lesser of the probabilistic and the deterministic response accelerations, subject to the exception specified in the same section. The probabilistic response spectrum was developed using the computer program OpenSHA (Field et al., 2013), which implements Method 1 as described in Section 21.2.1.1. Fault Models 3.1 and 3.2 from the Third Uniform California Earthquake Rupture Forecast (UCERF3) were used as the earthquake rupture forecast models for the PSHA. In addition to known fault sources, background seismicity was also included in the PSHA. The ground motion Prediction Equations (GMPEs) selected for use in this analysis are those developed for the Pacific Earthquake Engineering Research Center (PEER) Next Generation Attenuation (NGA) West 2 project. Four GMPEs - Abrahamson et al. (2014), Boore et al. (2014), Campbell and Bozorgnia (2014), and Chiou and Youngs (2014) were used to perform the analysis.

In accordance with Section 21.2.2 (Supplement 1), the deterministic spectral response acceleration at each period was calculated as the 84th percentile, 5% damped response acceleration, using NGA-West2 GMPE Worksheet. For this, information from at least three causative faults with the greatest contribution per deaggregation analysis were used and the larger acceleration spectrum among these was selected as the deterministic response spectrum. The deterministic spectrum was adjusted per requirements in Section 21.2.2 (Supplement 1) where applicable. Both probabilistic and deterministic spectra were subjected to the maximum direction scale factors specified in Section 21.2 to produce the maximum acceleration spectra.

Design response spectrum was developed by subjecting the site-specific  $MCE_R$  response spectrum to the provisions outlined in Section 21.3. This process included comparison with 80% code-based design spectrum determined in accordance with Section 11.4.6. The short period and long period site coefficients ( $F_a$  and  $F_v$ , respectively) were determined per Section 21.3 in conjunction with Table 11.4-1. Site-specific design acceleration parameters ( $S_{MS}$ ,  $S_{M1}$ ,  $S_{DS}$ , and  $S_{D1}$ ) were calculated according to Section 21.4.

Per Section 11.2 (definitions on Page 79 of ASCE7-16) for evaluation of liquefaction, lateral spreading, seismic settlements, and other soil-related issues, Maximum Considered Earthquake Geometric Mean ( $MCE_G$ ) peak ground acceleration  $PGA_M$  shall be used. The site-specific  $PGA_M$  is calculated per Section 21.5.3, as the lesser of the probabilistic  $PGA_M$  (Section 21.5.1) and deterministic  $PGA_M$  (Section 21.5.2), but no less than 80% site modified peak ground acceleration,  $PGA_M$ , obtained from OSHPD seismic hazard tool. According to Section 21.5.3 of ASCE 7, either mapped or site-specific  $PGA_M$  may be used for soil related analysis. For this investigation, a mapped  $PGA_M$  of 0.85 was incorporated into the analysis.

## **4.2 STATIC SETTLEMENT**

Analyses were performed for the potential settlement of the underlying soils encountered during our investigation. The site is underlain predominantly by coarse-grained materials. As such, analyses of settlement were based on the elastic method using estimated moduli correlated from  $N_{60}$  blow counts. Two analyses were performed to evaluate settlement of the structures. The first model was based on a conventional shallow strip footing 1.5 feet wide and a wall load of 3 k/ft. The second model was based on a conventional square footing with 3 feet width and a column load of 30 kips. Both models yielded a total settlement of less than 0.5 inches.

## **5.0 CONCLUSIONS**

### **5.1 FEASIBILITY OF PROPOSED DEVELOPMENT**

From a geotechnical point of view, the proposed site development is considered feasible, provided the recommendations presented in this report are incorporated into the design and construction of the project. Furthermore, it is also our opinion that the proposed development will not adversely impact the stability of adjoining properties. Key issues that could have significant fiscal impacts on the geotechnical aspects of the proposed site development are discussed in the following sections of this report.

## **5.2 GEOLOGIC HAZARDS**

### **5.2.1 Ground Rupture**

No known active faults are known to project through the subject sites nor do the sites lie within the boundaries of an "Earthquake Fault Zone" as defined by the State of California in the Alquist-Priolo Earthquake Fault Zoning Act. The closest known active fault is the San Joaquin Hills fault, located approximately 4.09 miles away. Therefore, the potential for ground rupture due to an earthquake beneath the sites is considered relatively low.

### **5.2.2 Ground Shaking**

The site is situated in a seismically active area that has historically been affected by generally moderate to occasionally high levels of ground motion. The site lies in relatively close proximity to several seismically active faults; therefore, during the life of the proposed improvements, the property will probably experience similar moderate to occasionally high ground shaking from these fault zones, as well as some background shaking from other seismically active areas of the Southern California region. Design and construction in accordance with the current California Building Code (CBC) requirements is anticipated to address the issues related to potential ground shaking.

### **5.2.3 Landsliding**

Geologic hazards associated with landsliding are not anticipated at the site since the site is relatively level. Additionally, the site is not located in a state designated landslide zone.

### **5.2.4 Liquefaction**

Engineering research of soil liquefaction potential (Youd, et al., 2001) indicates that generally three basic factors must exist concurrently in order for liquefaction to occur. These factors include:

- A source of ground shaking, such as an earthquake, capable of generating soil mass distortions.
- A relatively loose silty and/or sandy soil.
- A relative shallow groundwater table (within approximately 50 feet below ground surface) or completely saturated soil conditions that will allow positive pore pressure generation.

The site is **not** located within a State-designated potentially liquefiable zone, as identified by the California Geological Survey (CGS). Additionally, groundwater was not encountered to the maximum depth explored of 41.5 feet and expected to be present below a depth of 50 feet. As a result, the potential for liquefaction to occur beneath the site is considered very low.

## **5.3 STATIC SETTLEMENT**

Analyses were performed to evaluate the potential for static settlement of the underlying alluvium. Provided site grading is performed in accordance with the recommendations provided herein and based on the anticipated relatively light foundation loads, total and differential static settlement is not anticipated to exceed 1 inch and ½-inch over 30 feet, respectively, for the proposed residential structure. The estimated magnitudes of static settlements are considered within tolerable limits for the proposed structure.

#### 5.4 EXCAVATION AND MATERIAL CHARACTERISTICS

Onsite earth materials are anticipated to be relatively easy to excavate with conventional heavy earthmoving equipment. The site earth materials are generally considered suitable for reuse as fill provided they are cleared of deleterious debris and oversized rocks (greater than 4 inches in greatest dimension). If encountered, portions of concrete debris and asphalt can likely be reduced in size (4" minus) and incorporated within fill soils during earthwork operations.

Temporary construction slopes will be required to complete removal of unsuitable soils and for construction of underground utilities. Site materials are typically coarse-grained and will be prone to caving. Such excavations will require laybacks where they are surcharged or where they exceed 3 feet in height. Specific recommendations for temporary slopes are provided in Section 6.1.7.

Most of the near-surface soils are below optimum moisture content. As such, the addition of water to these materials will be required during placement and compaction as engineered fills.

#### 5.5 SHRINKAGE AND SUBSIDENCE

Volumetric changes in earth quantities will occur when excavated onsite soil materials are replaced as properly compacted fill. Based on our experience with similar types of earth materials, we estimate that the existing soils will shrink approximately 8 to 13 percent when removed and replaced as compacted fill. Subsidence due to reprocessing of removal bottoms is anticipated to be on the order of 0.1 feet.

The estimates of shrinkage and subsidence are intended as an aid for project engineers in determining earthwork quantities. However, these estimates should be used with some caution since they are not absolute values. Contingencies should be made to balancing earthwork quantities based on actual swelling and bulkage that occurs during the grading process.

#### 5.6 SOIL EXPANSION

Based on our laboratory test results and the USCS visual manual classification, the near-surface soils are generally anticipated to possess a **Very Low** expansion potential. As such, special requirements as set forth in CBC Chapter 18 regarding expansive soils are not required. Additional testing for soil expansion will be required prior to construction of foundations and other concrete work to confirm these conditions.

#### 5.7 PERCOLATION CHARACTERISTICS

Site materials are predominantly coarse-grained and provide good characteristics for infiltration of storm water. The site can utilize either a shallow chamber system or a dry well system. A chamber set at a depth of 10 feet is expected to provide a design infiltration rate of about 2.5 in/hr. The estimated design capture volume (DCV) is about 2,600 cf. Therefore, a typical system could consist of about 65 lineal feet of StormTech MC-4500 chamber set at a depth of 10 feet. As an alternative, the system could consist of a single dry well with a supplemental storage system having a capacity of about 500 cf. A more detailed design can be provided once specific hydrology information is provided by the civil engineer. Detailed results of the percolation testing can be provided in a separate report.

## **6.0 RECOMMENDATIONS**

### **6.1 EARTHWORK**

#### **6.1.1 General Earthwork and Grading Specifications**

All earthwork and grading should be performed in accordance with applicable requirements of Cal/OSHA, applicable specifications of the Grading Codes of the City of Tustin, California in addition to the recommendations presented herein.

#### **6.1.2 Pre-Grade Meeting and Geotechnical Observation**

Prior to commencement of grading, we recommend a meeting be held between the developer, City Inspector, grading contractor, civil engineer, and geotechnical consultant to discuss the proposed grading and construction logistics. We also recommend a geotechnical consultant be retained to provide soil engineering and engineering geologic services during site grading and foundation construction. This is to observe compliance with the design specifications and recommendations and to allow for design changes in the event that subsurface conditions differ from those anticipated. If conditions are encountered that appear to be different than those indicated in this report, the project geotechnical consultant should be notified immediately. Design and construction revisions may be required.

#### **6.1.3 Site Clearing**

Areas to be graded should be cleared of vegetation, existing asphalt, underground improvements to be abandoned and deleterious materials. Existing underground utility lines within the project area that will be protected in place and that fall within a 1 to 1 (H:V) plane projected down from the edges of footings may be subject to surcharge loads. Under such conditions, this office should be made aware of these conditions for evaluation of potential surcharging. Supplemental recommendations may be required to protect such improvements in place.

The project geotechnical consultant should be notified at the appropriate times to provide observation services during clearing operations to verify compliance with the above recommendations. Voids created by clearing and excavation should be left open for observation by the geotechnical consultant. Should any unusual soil conditions or subsurface structures be encountered during site clearing or grading that are not described or anticipated herein, these conditions should be brought to the immediate attention of the project geotechnical consultant for corrective recommendations as needed.

Temporary construction equipment (office trailers, power poles, etc.) should be positioned to allow adequate room for clearing and recommended ground preparation to be performed for proposed structures, pavements, and hardscapes.

#### **6.1.4 Ground Preparation**

In general, the existing artificial fill is considered unsuitable for support of the proposed development. These unsuitable soils are estimated to be 3-4 feet thick. These materials should be removed and replaced as engineered compacted fills below proposed residential structures, retaining walls, and pavement.

Removals should extend a minimum distance of 5 feet beyond the residential foundations. The removals should extend at least 2 feet beyond the edges of pavement and wall footings where feasible. The actual depth of removal should be determined by the geotechnical consultant during grading.

In addition to general removal of unsuitable soils, the existing soils should be over-excavated to a minimum depth of at least 1 foot below the bottom of footings for residential structures supported by conventional spread footings.

Where removals are limited by existing structures, protected trees or property lines, special considerations may be required in the construction of affected improvements. Under such conditions, specific recommendations should be provided by this firm.

All removal excavations should be evaluated by the geotechnical consultant during grading to confirm the exposed conditions are as anticipated and to provide supplemental recommendations if required.

The grading contractor should take appropriate measures when excavating adjacent any existing improvements to remain in-place to avoid disturbing or compromising support of existing structures.

Following removals and overexcavation, the exposed grade should first be scarified to a depth of 6 inches, brought to at least the optimum moisture content, and then compacted to at least 90 percent of the laboratory standard (ASTM D 1557).

#### **6.1.5 Fill Placement**

Materials excavated from the site may be reused as fill provided they are free of deleterious materials and particles greater than 4 inches in maximum dimension (oversized materials). Asphaltic and concrete debris generated during site demolition or encountered within the existing fill can be incorporated within new fill soils during earthwork operations provided they are reduced to no more than 4 inches in maximum dimension. Such materials should be mixed thoroughly with fill soils to prevent nesting. All fill should be placed in lifts no greater than 8 inches in loose thickness, moisture conditioned to at least the optimum moisture content, then compacted in place to at least 90 percent of the laboratory standard. Each lift should be treated in a similar manner. Subsequent lifts should not be placed until the project geotechnical consultant has approved the preceding lift.

#### **6.1.6 Import Materials**

If import materials are required to achieve the proposed finish grades, the proposed import soils should have an Expansion Index (EI, ASTM D 4829) less than 21 and possess negligible soluble sulfate concentrations. Import sources should be indicated to the geotechnical consultant prior to hauling the materials to the site so that appropriate testing and evaluation of the fill materials can be performed in advance.

#### **6.1.7 Temporary Excavations**

Temporary construction slopes and trench excavations may be cut vertically up to a height of 3 feet provided that no surcharging of the excavations is present. Temporary excavations greater than 3 feet in height but no more than 10 feet should be laid back to a 1.5:1 (H:V) or flatter or shored to mitigate the potential for instability. Specific recommendations should be provided by this office if excavations will be surcharged.

Excavations should not be left open for prolonged periods of time. The project geotechnical consultant should observe all temporary cuts to confirm anticipated conditions and to provide alternate recommendations if conditions dictate. All excavations should conform to the requirements of Cal/OSHA.

## 6.2 SEISMIC DESIGN PARAMETERS

### 6.2.1 Mapped Seismic Design Parameters

For the design of the project in accordance with Chapter 16 of the 2022 CBC, the mapped seismic parameters may be taken as presented in the tables below.

**TABLE 6.1**  
**2022 CBC Mapped Seismic Design Parameters**

| Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Value |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Site Class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | D     |
| Mapped $MCE_R$ Spectral Response Acceleration, short periods, $S_S$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1.289 |
| Mapped $MCE_R$ Spectral Response Acceleration, at 1-second period, $S_1$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.46  |
| Site Coefficient, $F_a$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1     |
| Site Coefficient, $F_v$ *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1.84  |
| Adjusted $MCE_R$ Spectral Response Acceleration, short periods, $S_{MS}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1.289 |
| Adjusted $MCE_R$ Spectral Response Acceleration, at 1-second period, $S_{M1}$ *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.270 |
| Design Spectral Response Acceleration, short periods, $S_{DS}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.859 |
| Design Spectral Response Acceleration, at 1-second period, $S_{D1}$ *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.846 |
| Long-Period Transition Period, $T_L$ (sec.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 8     |
| Seismic Design Category for Risk Categories I-IV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | II    |
| $MCE_R$ = Risk-Targeted Maximum Considered Earthquake                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |
| *According to Section 11.4.8 in ASCE 7-16 and supplement 3, “a ground motion hazard analysis shall be performed in accordance with Section 21.2 for the following structures on Site Class D site with $S_1$ greater than or equal to 0.2.” However, “A ground motion hazard analysis is not required for structures where the value of the parameter $S_{M1}$ determined by Eq. (11.4-2) is increased by 50% for all applications of $S_{M1}$ in the Standard. The resulting value of the parameter $S_{D1}$ determined by Eq. (11.4-4) shall be used for all applications of $S_{D1}$ in this Standard.” Should this exception not be met, the site-specific seismic design parameters provided in the next section should be used. |       |

### 6.2.2 Site-Specific Seismic Design Parameters

In addition to the Code Spectra parameters presented in Table 6.1, we have performed a site-specific ground motion hazard analysis in accordance with Chapter 21 of ASCE 7-16 to obtain site-specific seismic design acceleration parameters, the risk-targeted maximum considered earthquake response spectrum, and the design earthquake response spectrum. The site-specific seismic design parameters are presented below.

**TABLE 6.2**  
**2022 CBC Site-Specific Seismic Design Parameters**

| Parameter                                                                 | Value |
|---------------------------------------------------------------------------|-------|
| Site Class                                                                | D     |
| Site Coefficient, $F_a$                                                   | 1.0   |
| Site Coefficient, $F_v$                                                   | 2.5   |
| Adjusted MCE Spectral Response Acceleration, short periods, $S_{MS}$      | 1.031 |
| Adjusted MCE Spectral Response Acceleration, at 1-second period, $S_{M1}$ | 0.920 |
| Design Spectral Response Acceleration, short periods, $S_{DS}$            | 0.687 |
| Design Spectral Response Acceleration, at 1-second period, $S_{D1}$       | 0.613 |
| MCE = Maximum Considered Earthquake                                       |       |

## 6.3 CONVENTIONAL FOUNDATION DESIGN

### 6.3.1 General

The following design parameters are provided to assist the project structural engineer to design foundations for structures at the site. These design parameters are based on typical site materials encountered during subsurface exploration and are provided for preliminary design and estimating purposes. The project geotechnical consultant should provide final design parameters following observation and testing of site materials during grading. Depending on actual materials encountered during site grading, the design parameters presented herein may require modification.

### 6.3.2 Soil Expansion

The recommendations presented herein are based on soils with a **Very Low** expansion potential. Following site grading, additional testing of site soils should be performed by the project geotechnical consultant to confirm the basis of these recommendations. If site soils with higher expansion potentials are encountered or imported to the site, the recommendations contained herein may require modification.

### 6.3.3 Static and Seismic Settlement

Based on anticipated foundation loads and provided that the recommendations for ground preparation in this report are followed, total and differential static settlement are anticipated to be less than 1 inch and ½ inch over 30 feet, respectively. These values are considered within tolerable limits of proposed structures and site improvements. Design of the structures should consider these maximum anticipated settlements.

### 6.3.4 Allowable Bearing Value

Foundations may utilize a bearing value of 2,000 pounds per square foot (psf) for continuous and pad footings a minimum width of 12 inches and founded at a minimum depth of 12 inches below the lowest adjacent grade. This value may be increased by 250 psf and 1,000 psf for each additional foot in width and depth, respectively, up to a maximum value of 3,000 psf. Recommended allowable bearing values include both dead and live loads and may be increased by one-third for wind and seismic forces.

### **6.3.5 Lateral Resistance**

A passive earth pressure of 200 pounds per square foot per foot of depth (psf/ft) up to a maximum value of 1,000 pounds per square foot (psf) may be used to determine lateral bearing for footings. This value may be increased by one-third when designing for wind and seismic forces. A coefficient of friction of 0.37 times the dead load forces may also be used between concrete and the supporting soils to determine lateral sliding resistance. No increase in the coefficient of friction should be used when designing for wind and seismic forces.

The above values are based on footings placed directly against compacted fill or competent native soils. In the case where footing sides are formed, all backfill against the footings should be compacted to at least 90 percent of the laboratory standard.

### **6.3.6 Footing and Slab on Grade**

Exterior and interior building footings should be founded at a minimum depth of 12 inches and 12 inches, respectively, below the lowest adjacent grade. All continuous footings should be reinforced with a minimum of two No. 4 bars, one top and one bottom. The structural engineer may require different reinforcement and should dictate if greater than the recommendations provided herein.

Interior isolated pad footings should be a minimum of 24 inches square and founded at minimum depths of 12 inches below the lowest adjacent final grade. Exterior isolated pad footings intended for support of patio covers or similar construction should be a minimum of 24 inches square and founded at a minimum depth of 12 inches below the lowest adjacent final grade.

Interior concrete slabs constructed on grade should be a nominal 4 inches thick and should be reinforced with No. 3 bars spaced 30 inches on center, each way. Care should be taken to ensure the placement of reinforcement at mid-slab height. The structural engineer may recommend a greater slab thickness and reinforcement based on proposed use and loading conditions and such recommendations should govern if greater than the recommendations presented herein.

Concrete floor slabs in areas to receive carpet, tile, or other moisture sensitive coverings should be underlain with a minimum of 10-mil moisture vapor retarder conforming to ASTM E 1745, Class A. The membrane should be properly lapped, sealed, and underlain with at least 2 inches of sand having a SE no less than 30. One inch of this sand may be placed over the membrane to aid in the curing of the concrete. This vapor retarder system is anticipated to be suitable for most flooring finishes that can accommodate some vapor emissions. However, this system may emit more than 4 pounds of water per 1000 sq. ft. and therefore, may not be suitable for all flooring finishes. Additional steps should be taken if such vapor emission levels are too high for anticipated flooring finishes.

Special consideration should be given to slabs in areas to receive ceramic tile or other rigid, crack-sensitive floor coverings. Design and construction of such areas should mitigate hairline cracking as recommended by the structural engineer.

Garage floor slabs should have a minimum thickness of 4 inches and should be reinforced in a similar manner as living floor slabs. Garage floor slabs should also be poured separately from adjacent wall footings with a positive separation maintained with 3/8-inch minimum felt expansion joint materials and provided with saw cuts or cold joints at a maximum spacing of 15 feet in each direction.

Consideration should be given to providing a vapor retarder below the garage slab to mitigate the potential for effervescence on the slab surface.

Block-outs should be provided around interior columns to permit relative movement and mitigate distress to the floor slabs due to differential settlement that will occur between column footings and adjacent floor subgrade soils as loads are applied.

Prior to placing concrete, subgrade soils below slab-on-grade areas should be thoroughly moistened to provide a moisture content of at least 100 percent of the optimum moisture content to a depth of 12 inches.

### **6.3.7 Foundation Observations**

Foundation excavation should be observed by the project geotechnical consultant to verify that they have been excavated into competent bearing soils and to the minimum embedment recommended above. These observations should be performed prior to placement of forms or reinforcement. The excavations should be trimmed neat, level and square. Loose, sloughed or moisture-softened materials and debris should be removed prior to placing concrete.

## **6.4 RETAINING AND SCREENING WALLS**

### **6.4.1 General**

The following preliminary design and construction recommendations are provided for general retaining and screen walls supported by engineered compacted fill or competent native soils. Final wall designs specific to the site development should be provided for review once completed. The structural engineer and architect should provide appropriate recommendations for sealing at all joints and applying moisture-proofing material on the back of the walls.

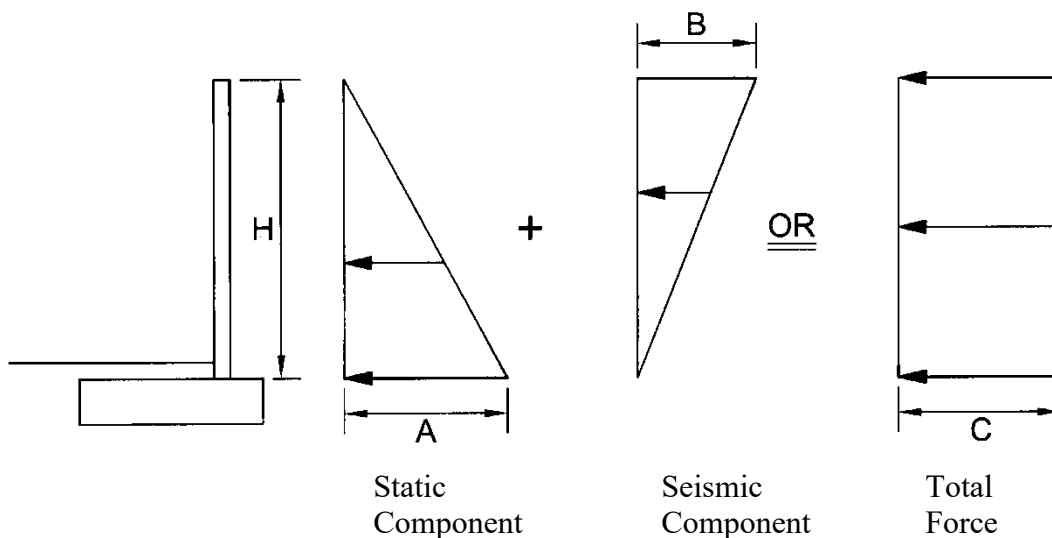
### **6.4.2 Allowable Bearing Value and Lateral Resistance**

Design of retaining and screen walls may utilize the bearing and lateral resistance values provided in Section 6.3.4 and 6.3.5. The passive earth pressure for walls along property lines, where lateral removals are likely restricted, should be reduced by 25%.

### **6.4.3 Active Earth Pressures**

Static and seismic earth pressures for level and 2:1 (H:V) backfill conditions are provided in Table 6.3. Seismic earth pressures provided herein are based on the method provided by Seed & Whitman (1970) using a peak ground acceleration (PGA) of 0.386g for 10% probability of exceedance in 50 years. As indicated in Section 1807.2.2 of the 2022 CBC, retaining walls supporting 6 feet of backfill or less are not required to be designed for seismic earth pressures. The values provided in the following table do not consider hydrostatic pressure. Retaining walls should also be designed to support adjacent surcharge loads imposed by other nearby footings or traffic loads in addition to the earth pressure.

TABLE 6.3

**SEISMIC EARTH PRESSURES****Pressure Diagram**

**Pressure Values**  
**Walls Up To 10 Feet High**

| Value                                                                                                                                                                                                                                                                                                                                                                             | Backfill Condition |             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------|
|                                                                                                                                                                                                                                                                                                                                                                                   | Level              | 2H:1V Slope |
| <b>A</b>                                                                                                                                                                                                                                                                                                                                                                          | 34H                | 55H         |
| <b>B</b>                                                                                                                                                                                                                                                                                                                                                                          | 12H                | 12H         |
| <b>C</b>                                                                                                                                                                                                                                                                                                                                                                          | 23H                | 34H         |
| Note:<br>H is in feet and resulting pressure is in psf. Design may utilize either the sum of the static component and the seismic component force diagrams or the total force diagram above. SEAOSC has suggested using a load factor of 1.7 for the static component and 1.0 for the seismic component. The actual load factors should be determined by the structural engineer. |                    |             |

**6.4.4 Drainage and Moisture-Proofing**

Retaining walls should be constructed with a perforated pipe and gravel subdrain to prevent entrapment of water in the backfill. The perforated pipe should consist of 4-inch-diameter, ABS SDR-35 or PVC Schedule 40 with the perforations laid down. The pipe should be embedded in  $\frac{3}{4}$ - to  $1\frac{1}{2}$ -inch open-graded gravel wrapped in filter fabric. The gravel should be at least one foot wide and extend at least one foot up the wall above the footing and drainage outlet. Drainage gravel and piping should not be placed below outlets and weepholes. Filter fabric should consist of Mirafi 140N, or equal. Outlet pipes should be directed to positive drainage devices.

The use of weepholes may be considered in locations where aesthetic issues from potential nuisance water are not a concern. Weepholes should be 2 inches in diameter and provided at least every 6 feet on center. Where weepholes are used, perforated pipe may be omitted from the gravel subdrain.

Retaining walls supporting backfill should also be coated with a moisture-proofing compound or covered with such material to inhibit infiltration of moisture through the walls. Moisture-proofing material should cover any portion of the back of wall that will be in contact with soil and should lap over and onto the top of footing. A drainage panel should be provided between the soil backfill and water proofing. The panel should extend from the top of the backdrain gravel up to within 12 inches of finish grade. The top of footing should be finished smooth with a trowel to inhibit the infiltration of water through the wall. The project structural engineer should provide specific recommendations for moisture-proofing, water stops, and joint details.

#### **6.4.5 Foundation Observations**

Footing excavations should be observed by the project geotechnical consultant to verify that they have been excavated into competent bearing soils and to the minimum embedment recommended herein. These observations should be performed prior to placement of forms or reinforcement. The excavations should be trimmed neat, level and square. Loose, sloughed or moisture-softened materials and debris should be removed prior to placing concrete.

### **6.5 EXTERIOR FLATWORK**

Concrete sidewalks, patios, and similar flatwork should be a nominal 4 inches thick and provided with saw cuts or expansion joints at spacing no greater than 15 feet in each direction. Special jointing details should be provided in areas of block-outs, notches, or other irregularities to avoid cracking at points of high stress.

Drainage from flatwork areas should be directed to local area drains and/or other appropriate collection devices designed to carry runoff water to the street or other approved drainage structures. The concrete flatwork should also be sloped at a minimum gradient of 0.5 percent away from building foundations and retaining walls.

Subgrade soils below flatwork should be thoroughly moistened to at least 100 percent of the optimum moisture content to a depth of 12 inches. Flooding or ponding of the subgrade is not recommended. Moistening should be accomplished by lightly spraying the area just prior to pouring concrete. The geotechnical consultant should observe and verify the density and moisture content of subgrade soils prior to pouring concrete to ensure that the required compaction and pre-moistening recommendations have been met.

### **6.6 CONCRETE MIX DESIGN**

Laboratory testing of near-surface soils for soluble sulfate content indicates soluble sulfate concentration of 0.000%. We recommend following the procedures provided in ACI 318, Section 19.3, Table 19.3.1.1 for **S0** sulfate exposure. Upon completion of rough grading, an evaluation of as-graded conditions and further laboratory testing should be completed for the site to confirm or modify the recommendations provided in this section.

## 6.7 PRELIMINARY PAVEMENT DESIGN

### 6.7.1 Preliminary Pavement Structural Sections

Based on the soil conditions present at the site and an estimated traffic index, preliminary pavement sections are provided in the table below. An assumed “R-value” of 35 was used for the near-surface soil in this preliminary pavement design. The sections provided below are for planning purposes only and should be re-evaluated subsequent to site grading. Final pavement sections should be based on actual R-value testing of in-place soils and analysis of anticipated traffic.

**TABLE 6.4**  
**PRELIMINARY PAVEMENT STRUCTURAL SECTIONS**

| Location             | Traffic Index | AC (inches) | Concrete Pavers (mm) | PCC (inches) | AB (inches) |
|----------------------|---------------|-------------|----------------------|--------------|-------------|
| Entry Way and Drives | 5.0           | 3.0         | --                   | --           | 5.0         |
|                      |               | 4.0         |                      |              | 4.0         |
|                      |               | --          | --                   | 6.0          | --          |
|                      |               | --          | 80.0                 | --           | 6.0         |
| Parking Stalls       | --            | 3.0         | --                   | --           | 4.0         |

### 6.7.2 Subgrade Preparation

Prior to placement of paving elements, subgrade soils should be scarified 6 inches, moisture-conditioned to above the optimum moisture content then compacted to at least 90 percent of the maximum dry density determined in accordance with ASTM D1557. Areas observed to pump or yield under vehicle traffic should be removed and replaced with firm and unyielding engineered compacted soil or aggregate base materials.

### 6.7.3 Aggregate Base

Aggregate base materials should be Crushed Aggregate Base or Crushed Miscellaneous Base conforming to Section 200-2 of the Standard Specification for Public Works Construction (Greenbook) or Class 2 Aggregate Base conforming to the Caltrans' Standard Specifications. The materials should be moisture conditioned to slightly over the optimum moisture content then compacted to at least 95 percent of ASTM D 1557.

### 6.7.4 Asphaltic Concrete

Paving asphalt should be PG 64-10 conforming to the requirements of Section 203-1 of the Greenbook. Asphalt concrete materials should conform to Section 203-6 and construction should conform to Section 302 of the Greenbook.

### 6.7.5 Concrete Paver

Concrete pavers should conform to the requirements of ASTM C 936. Construction of the pavers, including bedding sand, should follow manufacturer's specifications. Typical thickness of bedding sand is about 1 inch. The gradation of bedding sand should meet the requirement in Table 6.5.

**TABLE 6.5**  
**Gradation for Sand Bedding**

| Sieve Size      | Percent Passing |
|-----------------|-----------------|
| $\frac{3}{8}$ " | 100             |
| <b>No. 4</b>    | 95 - 100        |
| <b>No. 8</b>    | 80 - 100        |
| <b>No. 16</b>   | 50 - 85         |
| <b>No. 30</b>   | 25 - 60         |
| <b>No. 50</b>   | 5 - 30          |
| <b>No. 100</b>  | 0 - 10          |
| <b>No. 200</b>  | 0 - 1           |

### 6.7.6 Portland Cement Concrete

Portland cement concrete used to construct concrete paving should conform to Section 201 of the Greenbook and should have a minimum compressive strength of 3,250 pounds per square inch (psi) at 28 days. Reinforcement and jointing of concrete pavement sections should be designed according to the minimum recommendations provided by the Portland Cement Association (PCA). For rigid pavement, transverse and longitudinal contraction joints should be provided at spacing no greater than 15 feet. Score joints may be constructed by saw cutting to a depth of  $\frac{1}{4}$  of the slab thickness. Expansion/cold joints may be used in lieu of score joints. Such joints should be properly sealed. Where traffic will traverse over cold joints without keyways or dowels or edges of concrete paving, the edges should be thickened by 20% of the design thickness toward the edge over a horizontal distance of 5 feet.

## 6.8 POST GRADING CONSIDERATIONS

### 6.8.1 Site Drainage and Irrigation

The ground immediately adjacent to foundations should be provided with positive drainage away from the structures in accordance with 2022 CBC, Section 1804.4. However, the slope of the ground surface may be reduced to 2% based on climatic and soil conditions. No rain or excess water should be allowed to pond against structures such as walls, foundations, flatwork, etc.

Excessive irrigation water can be detrimental to the performance of the proposed site development. Water applied in excess of the needs of vegetation will tend to percolate into the ground. Such percolation can lead to nuisance seepage and shallow perched groundwater. Seepage can form on slope faces, on the faces of retaining walls, in streets, or other low-lying areas. These conditions could lead to adverse effects such as the formation of stagnant water that breeds insects, distress or damage of trees, surface erosion, slope instability, discoloration and salt buildup on wall faces, and premature failure of pavement. Excessive watering can also lead to elevated vapor emissions within buildings that can damage flooring finishes or lead to mold growth inside the home.

Key factors that can help mitigate the potential for adverse effects of overwatering include the judicious use of water for irrigation, use of irrigation systems that are appropriate for the type of vegetation and geometric configuration of the planted area, the use of soil amendments to enhance moisture retention, use of low-water demand vegetation, regular use of appropriate fertilizers, and

seasonal adjustments of irrigation systems to match the water requirements of vegetation. Specific recommendations should be provided by a landscape architect or other knowledgeable professional.

### 6.8.2 Utility Trenches

Trench excavations should be constructed in accordance with the recommendations contained in Section 6.1.7 of this report. Trench excavations must also conform to the requirements of Cal/OSHA.

Trench backfill materials and compaction criteria should conform to the requirements of the local municipalities. As a minimum, utility trench backfill should be compacted to at least 90 percent of the laboratory standard. Materials placed within the pipe zone (6 inches below and 12 inches above the pipe) should consist of particles no greater than  $\frac{3}{4}$  inches and have a SE of at least 30. The materials within the pipe zone should be moisture-conditioned and compacted by hand-operated compaction equipment. Above the pipe zone ( $>1$  foot above pipe), the backfill may consist of general fill materials. Trench backfill should be moisture-conditioned to slightly over the optimum moisture content, placed in lifts no greater than 12 inches in thickness, and then mechanically compacted with appropriate equipment to at least 90 percent of the laboratory standard. For trenches with sloped walls, backfill material should be placed in lifts no greater than 8 inches in loose thickness, and then compacted by rolling with a sheepsfoot roller or similar equipment. The project geotechnical consultant should perform density testing along with probing to verify that adequate compaction has been achieved.

Within shallow trenches (less than 18 inches deep) where pipes may be damaged by heavy compaction equipment, imported clean sand having a SE of 30 or greater may be utilized. The sand should be placed in the trench, thoroughly watered, and then compacted with a vibratory compactor. For utility trenches located below a 1:1 (H:V) plane projecting downward from the outside edge of the adjacent footing base or crossing footing trenches, concrete or slurry should be used as trench backfill.

## 6.9 PLAN REVIEW AND CONSTRUCTION SERVICES

We recommend *Albus & Associates, Inc.* be engaged to review any future development plans, including civil plans (grading plans), foundation plans, and proposed structural loads, prior to construction. This is to verify that the assumptions of this report are valid and that the preliminary conclusions and recommendations contained in this report have been properly interpreted and are incorporated into the project plans and specifications. If we are not provided the opportunity to review these documents, we take no responsibility for misinterpretation of our preliminary conclusions and recommendations.

We recommend that a geotechnical consultant be retained to provide soil engineering services during construction of the project. These services are to observe compliance with the design, specifications or recommendations, and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

If the project plans change significantly from the assumed development described herein, the project geotechnical consultant should review our preliminary design recommendations and their applicability to the revised construction. If conditions are encountered during construction that appear to be different than those indicated in this report or subsequent design reports, the project geotechnical consultant should be notified immediately. Design and construction revisions may be required.

## 7.0 LIMITATIONS

This report is based on the proposed development and geotechnical data as described herein. The materials encountered on the project site and utilized in our laboratory testing for this investigation are believed representative of the total project area, and the conclusions and recommendations contained in this report are presented on that basis. However, soil and bedrock materials can vary in characteristics between points of exploration, both laterally and vertically, and those variations could affect the conclusions and recommendations contained herein. As such, observation and testing by a geotechnical consultant during the grading and construction phases of the project are essential to confirming the basis of this report.

This report has been prepared consistently with that level of care being provided by other professionals providing similar services at the same locale and time period. The contents of this report are professional opinions and as such, are not to be considered a guaranty or warranty.

This report should be reviewed and updated after a period of one year or if the site ownership or project concept changes from that described herein.

This report has been prepared for the exclusive use of **The Olson Company** and their project consultants in the planning and design of the proposed development. This report has not been prepared for use by parties or projects other than those named or described herein. This report may not contain sufficient information for other parties or other purposes.

This report is subject to review by the controlling governmental agency.

Respectfully submitted,

**ALBUS & ASSOCIATES, INC.**



David E. Albus  
Principal Engineer  
GE 2455



Daniel Albus  
Senior Project Engineer

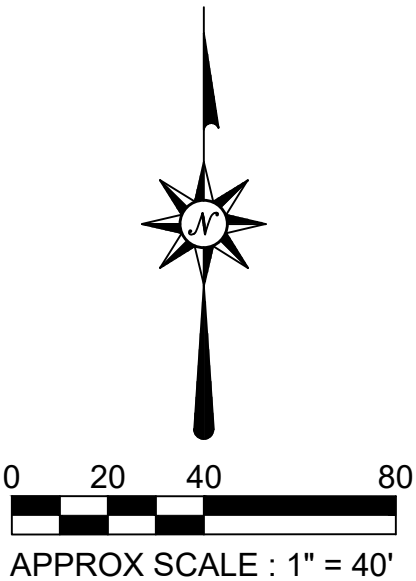
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**EXPLANATION**

(Locations Approximate)

-  - Exploratory Boring
-  - Percolation Testing

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Base Provided By Land Development Consultants



**GEOTECHNICAL MAP**

Job No.: 3374.00 | Date: 11/20/2025 | Plate: 1

**APPENDIX A**  
**EXPLORATION LOGS**

## Field Identification Sheet



Light gray



Gray



Dark gray



Gray Brown



Light brown



Brown



Dark Brown



Olive brown



Olive



Yellow



Yellowish brown



Yellowish red



Red



Reddish Brown



Tan

### Description Order:

Description, Color, Moisture, Density, Grain Size, Additional Description

### Description      %      Example

|       |       |                 |
|-------|-------|-----------------|
|       | 0-5   | Sand            |
| trace | 5-15  | Sand trace Silt |
| with  | 15-30 | Sand with Silt  |
|       | 30+   | Silty Sand      |

### More Examples

Sand with Silt trace Clay

Sand trace Silt and Clay

Sand with Silt and Clay

Gravelly Sand with Silt trace Clay

Silty Clay with Sand trace Gravel

### Moisture

|            |                    |
|------------|--------------------|
| Dry        | absence of water   |
| Damp       | below optimum      |
| Moist      | near optimum       |
| Very Moist | above optimum      |
| Wet        | free water visible |

### Density (Navfac)

| Coarse grained soils | SPT   | CA    |
|----------------------|-------|-------|
| Very Loose           | 0-3   | 0-5   |
| Loose                | 3-8   | 5-13  |
| Medium Dense         | 8-14  | 13-22 |
| Dense                | 14-25 | 22-40 |
| Very Dense           | 25>   | 40>   |

### Fine grained soils

|              |       |       |
|--------------|-------|-------|
| Very Soft    | 2<    | 0-3   |
| Soft         | 2-4   | 3-6   |
| Medium Stiff | 4-8   | 6-13  |
| Stiff        | 8-15  | 13-24 |
| Very Stiff   | 15-30 | 24-48 |
| Hard         | 30>   | 48>   |

### Grain Size

| Description | Sieve Size    | Approx. Size           |
|-------------|---------------|------------------------|
| Boulders    | >12"          | Larger than basketball |
| Cobbles     | 3-12"         | Fist to basketball     |
| Gravel      | coarse 3/4-3" | Thumb to Fist          |
|             | fine #4-3/4"  | Pea to Thumb           |
| Sand        | coarse #10-4  | Rock Salt to Pea       |
|             | medium #40-10 | Sugar to Rock Salt     |
|             | fine #200-40  | Flour to Sugar         |
| Fines       | Pass #200     | Smaller than Flour     |

### Additional Description (ie. roots, pinhole pores, debris, etc.)

Trace 5%

Moderate 15%

Abundant 30%



| EXPLORATION LOG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                |         |  |          |              |           |     |                |            |        |          |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------|---------|--|----------|--------------|-----------|-----|----------------|------------|--------|----------|-----|
| JOB NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       | CLIENT/PROJECT |         |  |          |              | DAY       |     | DATE           |            |        |          |     |
| LOCATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                |         |  | LATITUDE |              | LONGITUDE |     | ELEVATION      |            |        |          |     |
| LOGGED BY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                | DRILLER |  |          | DRILL METHOD |           |     | DRIVING WEIGHT |            |        |          |     |
| DEPTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | LITHO | DESCRIPTION    |         |  |          |              | H2O       | COR | BAG            | BLOW COUNT | MC (%) | DD (pcf) | LAB |
| <div> <div>EXPLANATION</div> <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>5</div> <div>6</div> <div>7</div> <div>8</div> <div>9</div> <div>10</div> <div>11</div> <div>12</div> <div>13</div> <div>14</div> <div>15</div> <div>16</div> <div>17</div> <div>18</div> <div>19</div> <div>20</div> <div>21</div> <div>22</div> <div>23</div> <div>24</div> </div> <div> <div> <div>Solid lines separate geologic units and/or material types</div> <div>Dashed lines indicate unknown depth of geologic unit change or material type change.</div> <div> <div>Solid rectangle in Core column represents California Split Spoon sampler (2.5-in. ID, 3-in. OD).</div> <div>Double triangle in core column represents SPT sampler.</div> <div>Vertical lines in core column represents Shelby sampler.</div> <div> <div>Solid rectangle in Bulk column represents large bag sample.</div> <div>Other Laboratory Tests:</div> <div>Max = Maximum Dry Density/Optimum Moisture Content</div> <div>EI = Expansion Index</div> <div>SO<sub>4</sub> = Soluble Sulfate Content</div> <div>DSR = Direct Shear, Remolded</div> <div>DS = Direct Shear, Undisturbed</div> <div>SA = Sieve Analysis (1" through #200 sieve)</div> <div>Hydro = Particle Size Analysis (SA with Hydrometer)</div> <div>200 = Percent Passing #200 Sieve</div> <div>Consol = Consolidation</div> <div>SE = Sand Equivalent</div> <div>Rval = R-Value</div> <div>ATT = Atterberg Limits</div> </div> </div> </div> </div> </div> |       |                |         |  |          |              |           |     |                |            |        |          |     |

## EXPLORATION LOG B-1

| JOB NO.<br>3374.00                         |       | CLIENT/PROJECT<br>The Olson Company                                                               |                        |  |                                   |     | DAY<br>Thursday         |                                   | DATE<br>2025-11-06 |           |             |       |
|--------------------------------------------|-------|---------------------------------------------------------------------------------------------------|------------------------|--|-----------------------------------|-----|-------------------------|-----------------------------------|--------------------|-----------|-------------|-------|
| LOCATION<br>17332 Irvine Boulevard, Tustin |       |                                                                                                   |                        |  | LATITUDE<br>33.74782              |     | LONGITUDE<br>-117.82939 |                                   | ELEVATION<br>146.5 |           |             |       |
| LOGGED BY<br>ddalbus                       |       |                                                                                                   | DRILLER<br>2R Drilling |  | DRILL METHOD<br>Hollow-Stem Auger |     |                         | DRIVING WEIGHT<br>140 lbs / 30 in |                    |           |             |       |
| DEPTH                                      | LITHO | DESCRIPTION                                                                                       |                        |  |                                   | H2O | COR                     | BAG                               | BLOW<br>COUNT      | MC<br>(%) | DD<br>(pcf) | LAB   |
|                                            |       | asphalt                                                                                           |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 1                                          |       | <u>Artificial Fills (Af)</u>                                                                      |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 2                                          |       | Sand (SP): light gray, dry to damp, loose, fine to medium-grained                                 |                        |  |                                   |     |                         |                                   | 10                 | 2.8       | 107.7       |       |
| 3                                          |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 4                                          |       | <u>Younger Alluvium (Qya)</u>                                                                     |                        |  |                                   |     |                         |                                   | 12                 | 2.2       | 107.6       |       |
| 5                                          |       | Sand (SP): light reddish brown, moist, loose, fine to coarse-grained                              |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 6                                          |       | @ 6 ft, medium dense                                                                              |                        |  |                                   |     |                         |                                   | 17                 | 3.2       | 98.7        |       |
| 7                                          |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 8                                          |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 9                                          |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 10                                         |       | Gravelly Sand (SP): light reddish brown, moist, medium dense , fine to coarse-grained, river rock |                        |  |                                   |     |                         |                                   | 36                 | 1.7       | 119.1       | sa    |
| 11                                         |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 12                                         |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 13                                         |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 14                                         |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 15                                         |       | @ 15 ft, loose                                                                                    |                        |  |                                   |     |                         |                                   | 5                  |           |             |       |
| 16                                         |       | <u>Older Alluvium (Qoa)</u>                                                                       |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 17                                         |       | Silty Sand (SM): reddish brown, moist, medium dense, fine-grained                                 |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 18                                         |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 19                                         |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 20                                         |       |                                                                                                   |                        |  |                                   |     |                         |                                   | 8                  |           |             | sa    |
| 21                                         |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             | hydro |
| 22                                         |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 23                                         |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |
| 24                                         |       |                                                                                                   |                        |  |                                   |     |                         |                                   |                    |           |             |       |



## EXPLORATION LOG B-1

|                                            |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
|--------------------------------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------|-----------------------------------|-------------------------|-----------------------------------|--------------------|------------|--------|----------|-----|
| JOB NO.<br>3374.00                         |       | CLIENT/PROJECT<br>The Olson Company                                                                                                                                                                                                                                                                 |                        |                      |                                   | DAY<br>Thursday         |                                   | DATE<br>2025-11-06 |            |        |          |     |
| LOCATION<br>17332 Irvine Boulevard, Tustin |       |                                                                                                                                                                                                                                                                                                     |                        | LATITUDE<br>33.74782 |                                   | LONGITUDE<br>-117.82939 |                                   | ELEVATION<br>146.5 |            |        |          |     |
| LOGGED BY<br>ddalbus                       |       |                                                                                                                                                                                                                                                                                                     | DRILLER<br>2R Drilling |                      | DRILL METHOD<br>Hollow-Stem Auger |                         | DRIVING WEIGHT<br>140 lbs / 30 in |                    |            |        |          |     |
| DEPTH                                      | LITHO | DESCRIPTION                                                                                                                                                                                                                                                                                         |                        |                      |                                   | H2O                     | COR                               | BAG                | BLOW COUNT | MC (%) | DD (pcf) | LAB |
| 26                                         |       | <p><b>Older Alluvium (Qoa)</b><br/>Silty Sand (SM): reddish brown, moist, medium dense, fine-grained</p> <p>Sandy Silt trace Clay (ML): reddish brown, moist, stiff, fine grained</p> <p>@ 35 ft, very stiff</p> <p>No Recovery, rock fragments</p> <p>Total Depth 41.5 feet<br/>No Groundwater</p> |                        |                      |                                   |                         |                                   |                    | 10         |        |          |     |
| 27                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 28                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 29                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 30                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 31                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 32                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 33                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 34                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 35                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 36                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 37                                         |       |                                                                                                                                                                                                                                                                                                     |                        | 9                    |                                   |                         |                                   |                    |            |        |          |     |
| 38                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 39                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 40                                         |       |                                                                                                                                                                                                                                                                                                     |                        | 80/                  |                                   | no                      |                                   |                    |            |        |          |     |
| 41                                         |       |                                                                                                                                                                                                                                                                                                     |                        | 11"                  |                                   | recover                 |                                   |                    |            |        |          |     |
| 42                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 43                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 44                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 45                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 46                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 47                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 48                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |
| 49                                         |       |                                                                                                                                                                                                                                                                                                     |                        |                      |                                   |                         |                                   |                    |            |        |          |     |

## EXPLORATION LOG B-2

|                                            |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
|--------------------------------------------|-------|-------------------------------------------------------------------------------------------------|------------------------|----------------------|-----------------------------------|-------------------------|-----------------------------------|--------------------|---------------|-----------|-------------|--------|
| JOB NO.<br>3374.00                         |       | CLIENT/PROJECT<br>The Olson Company                                                             |                        |                      |                                   | DAY<br>Thursday         |                                   | DATE<br>2025-11-06 |               |           |             |        |
| LOCATION<br>17332 Irvine Boulevard, Tustin |       |                                                                                                 |                        | LATITUDE<br>33.74762 |                                   | LONGITUDE<br>-117.82972 |                                   | ELEVATION<br>146.4 |               |           |             |        |
| LOGGED BY<br>ddalbus                       |       |                                                                                                 | DRILLER<br>2R Drilling |                      | DRILL METHOD<br>Hollow-Stem Auger |                         | DRIVING WEIGHT<br>140 lbs / 30 in |                    |               |           |             |        |
| DEPTH                                      | LITHO | DESCRIPTION                                                                                     |                        |                      |                                   | H2O                     | COR                               | BAG                | BLOW<br>COUNT | MC<br>(%) | DD<br>(pcf) | LAB    |
|                                            |       | asphalt                                                                                         |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 1                                          |       | <u>Artificial Fills (Af)</u>                                                                    |                        |                      |                                   |                         |                                   |                    |               |           |             | max    |
| 2                                          |       | Sand (SP): light gray, dry, medium dense , fine to medium-grained                               |                        |                      |                                   |                         |                                   |                    | 17            | 2.4       | 109.5       | ei so4 |
| 3                                          |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             | 200    |
| 4                                          |       | <u>Younger Alluvium (Qya)</u>                                                                   |                        |                      |                                   |                         |                                   |                    | 14            | 2.1       | 107.3       | ph     |
| 5                                          |       | Sand trace Gravel (SP): light reddish brown, moist, loose, fine to medium-grained, trace gravel |                        |                      |                                   |                         |                                   |                    |               |           |             | resist |
| 6                                          |       | @ 6 ft, medium dense, coarse-grained                                                            |                        |                      |                                   |                         |                                   |                    | 26            | 3.2       | 102.3       | ch     |
| 7                                          |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 8                                          |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 9                                          |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 10                                         |       | @ 10 ft, river rock                                                                             |                        |                      |                                   |                         |                                   |                    | 36            | 4.1       | 116.4       |        |
| 11                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 12                                         |       | Total Depth 11.5 feet                                                                           |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 13                                         |       | No Groundwater                                                                                  |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 14                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 15                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 16                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 17                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 18                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 19                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 20                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 21                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 22                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 23                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |
| 24                                         |       |                                                                                                 |                        |                      |                                   |                         |                                   |                    |               |           |             |        |

## EXPLORATION LOG B-3

|                                            |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
|--------------------------------------------|-------|-----------------------------------------------------------------------------------|------------------------|----------------------|-----------------------------------|-------------------------|-----------------------------------|--------------------|---------------|-----------|-------------|------------|
| JOB NO.<br>3374.00                         |       | CLIENT/PROJECT<br>The Olson Company                                               |                        |                      |                                   | DAY<br>Thursday         |                                   | DATE<br>2025-11-06 |               |           |             |            |
| LOCATION<br>17332 Irvine Boulevard, Tustin |       |                                                                                   |                        | LATITUDE<br>33.74771 |                                   | LONGITUDE<br>-117.82995 |                                   | ELEVATION<br>147   |               |           |             |            |
| LOGGED BY<br>ddalbus                       |       |                                                                                   | DRILLER<br>2R Drilling |                      | DRILL METHOD<br>Hollow-Stem Auger |                         | DRIVING WEIGHT<br>140 lbs / 30 in |                    |               |           |             |            |
| DEPTH                                      | LITHO | DESCRIPTION                                                                       |                        |                      |                                   | H2O                     | COR                               | BAG                | BLOW<br>COUNT | MC<br>(%) | DD<br>(pcf) | LAB        |
|                                            |       | asphalt                                                                           |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 1                                          |       | Artificial Fills (Af)                                                             |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 2                                          |       | Silty Sand (SM): reddish brown, moist, medium dense, fine-grained                 |                        |                      |                                   |                         |                                   |                    | 23            | 6.9       | 116         |            |
| 3                                          |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 4                                          |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 5                                          |       | Younger Alluvium (Qya)                                                            |                        |                      |                                   |                         |                                   |                    | 13            | 4.4       | 102.6       |            |
| 6                                          |       | Sand trace Gravel (SP): light reddish brown, moist, loose, fine to coarse-grained |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 7                                          |       | @ 6 ft, coarse-grained                                                            |                        |                      |                                   |                         |                                   |                    | 13            | 3.4       | 98.6        |            |
| 8                                          |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 9                                          |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 10                                         |       | @ 10 ft, river rock                                                               |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 11                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             | no recover |
| 12                                         |       | Total Depth 11.5 feet                                                             |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 13                                         |       | No Groundwater                                                                    |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 14                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 15                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 16                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 17                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 18                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 19                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 20                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 21                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 22                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 23                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |
| 24                                         |       |                                                                                   |                        |                      |                                   |                         |                                   |                    |               |           |             |            |

**APPENDIX B**

**LABORATORY TEST RESULTS**

## **LABORATORY TESTING PROGRAM**

### **Soil Classification**

Soils encountered within the exploratory borings were initially classified in the field in general accordance with the visual-manual procedures of the Unified Soil Classification System (ASTM D 2487). The samples were re-examined in the laboratory and classifications reviewed and then revised where appropriate. The assigned group symbols are presented on the Exploration Logs provided in Appendix A.

### **In Situ Moisture and Density**

Moisture content and unit dry density of in-place soil materials were determined in representative strata. Test data are summarized in the Boring Logs, Appendix A.

### **Maximum Dry Density and Optimum Moisture Content**

Maximum dry density and optimum moisture content were performed on representative samples of the site materials obtained from our field explorations. The test was performed in accordance with ASTM D 1557. Pertinent test values are given in Table B.

### **Expansion Potential**

An Expansion Index test was performed on a selected sample in accordance with ASTM D 4829. The test result and expansion potential are presented in Table B.

### **Soluble Sulfate Content**

Chemical analysis is being performed on selected samples to determine soluble sulfate content. The test was performed in accordance with California Test Method No. 417.

### **Particle-Size Analyses**

Particle-size analyses were performed on selected samples in accordance with ASTM D 422. The results are presented graphically on the attached Plates B-1 through B-3.

### **Hydrometer**

Hydrometer analyses were performed on representative samples of site materials in accordance with ASTM D 7928. The results are presented graphically on the attached Plates B-2 and B-3.

### **Direct Shear**

Direct shear testing was performed for a selected soil sample remolded to 90 percent of the maximum dry density. This test was performed in general accordance with ASTM D3080. Three specimens were prepared for the test. The test specimens were artificially saturated, and then sheared under varied normal loads at a constant rate. The results are graphically presented on Plate B-4.

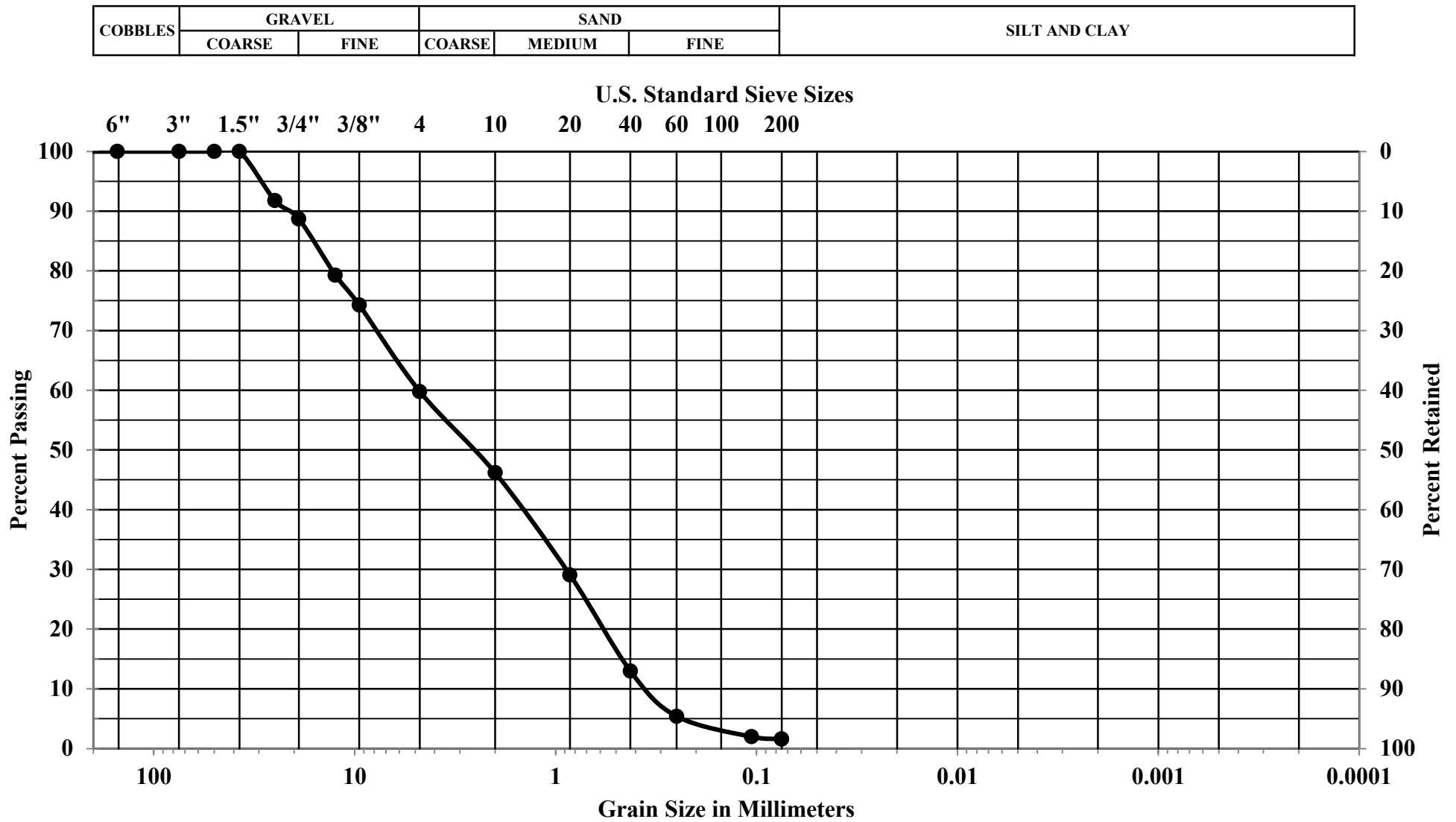
### **Corrosion Analysis**

Select samples were tested for minimum resistivity, chloride, pH in accordance with California Test Method 643. Results of these tests are provided in Table B.

**TABLE B**  
**SUMMARY OF LABORATORY TEST RESULTS**

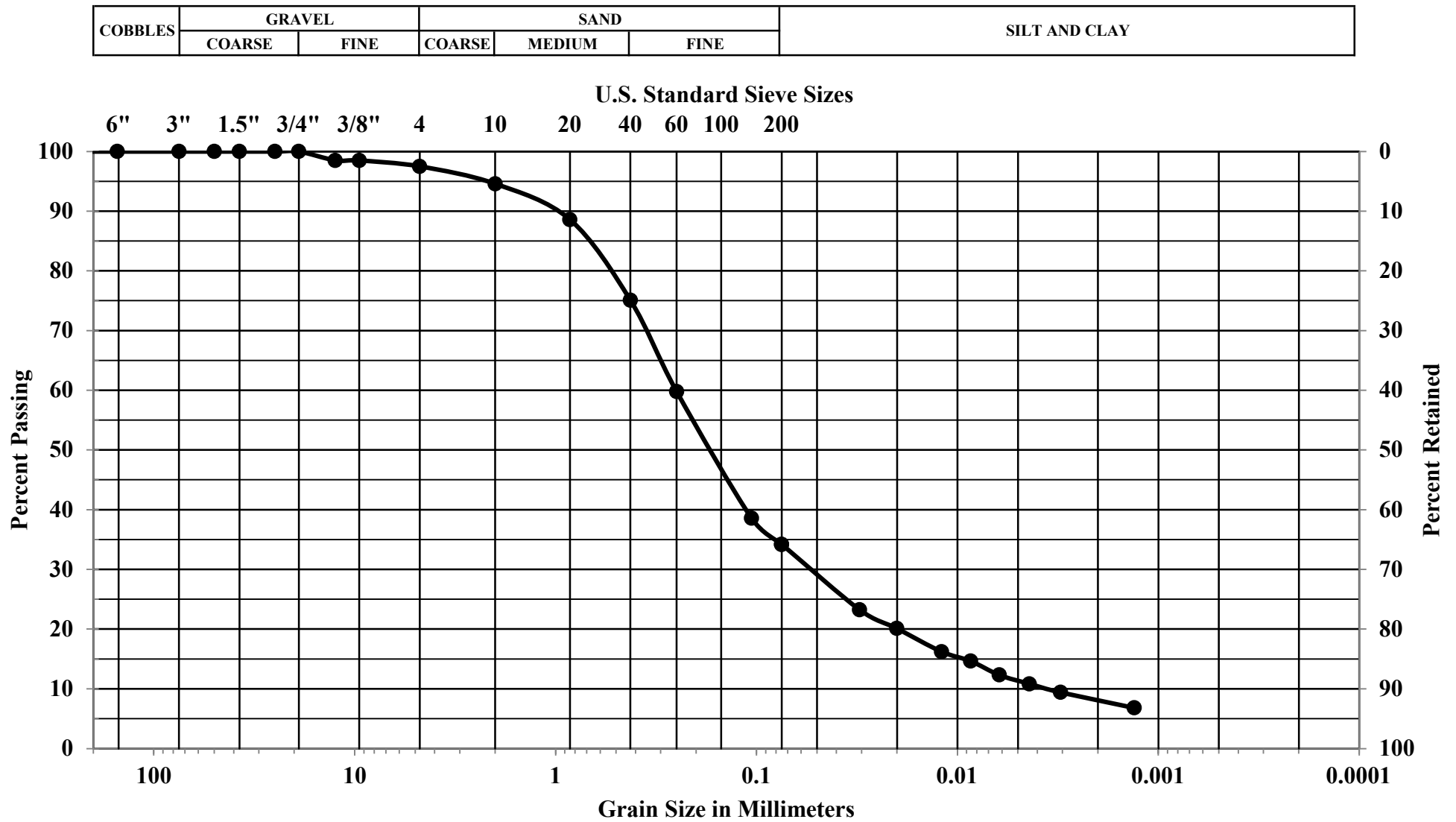
| Boring No. | Sample Depth (ft) | Soil Description | Test Results                  |          |
|------------|-------------------|------------------|-------------------------------|----------|
| B-2        | 0-5               | Sand (SP)        | Maximum Dry Density (pcf):    | 129.3    |
|            |                   |                  | Optimum Moisture Content (%): | 9        |
|            |                   |                  | Expansion Index:              | 0        |
|            |                   |                  | Expansion Potential:          | Very Low |
|            |                   |                  | Soluble Sulfate Content (%):  | 0.000    |
|            |                   |                  | Sulfate Exposure:             | S0       |
|            |                   |                  | pH:                           | 7.07     |
|            |                   |                  | Minimum Resistivity (ohm-cm): | 6,000    |
|            |                   |                  | Chloride (ppm):               | 35       |

# GRAIN SIZE DISTRIBUTION



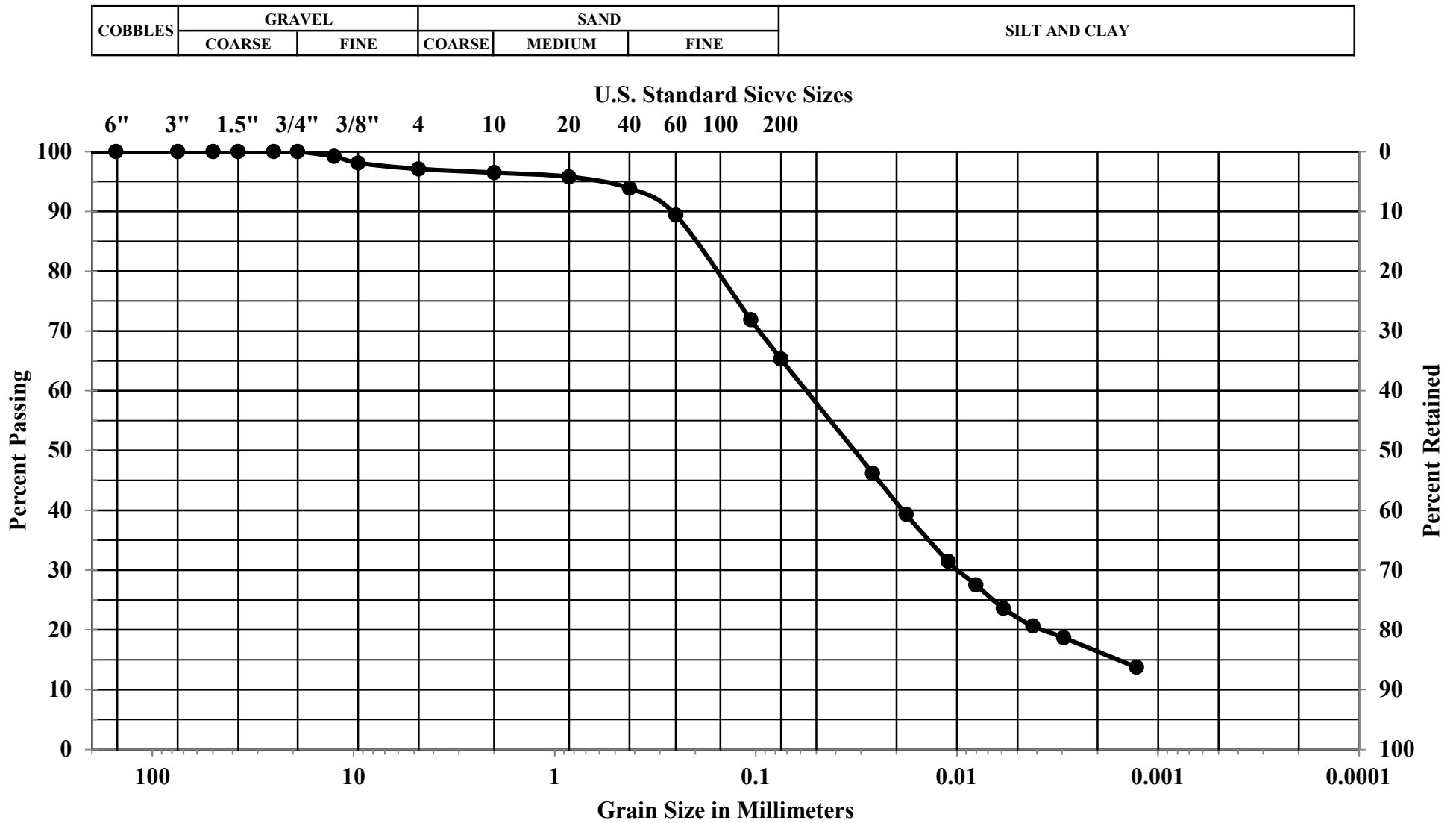
| Job Number | Location | Depth | Description        |
|------------|----------|-------|--------------------|
| 3374.00    | B-1      | 10    | Gravelly Sand (SW) |

# GRAIN SIZE DISTRIBUTION

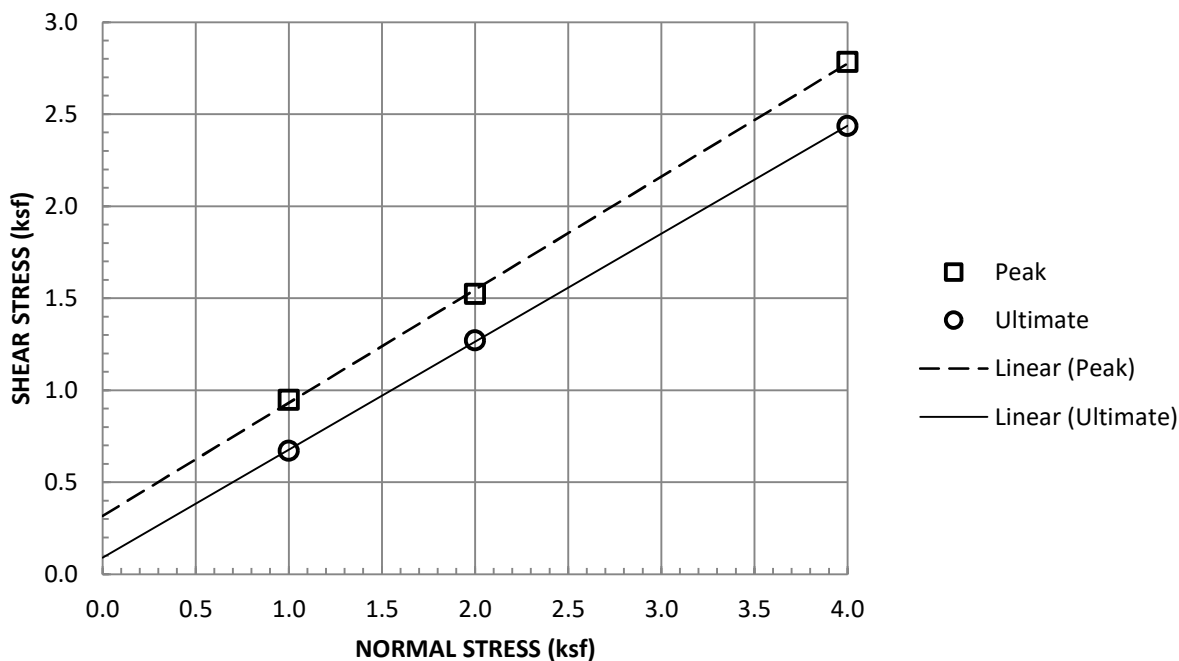
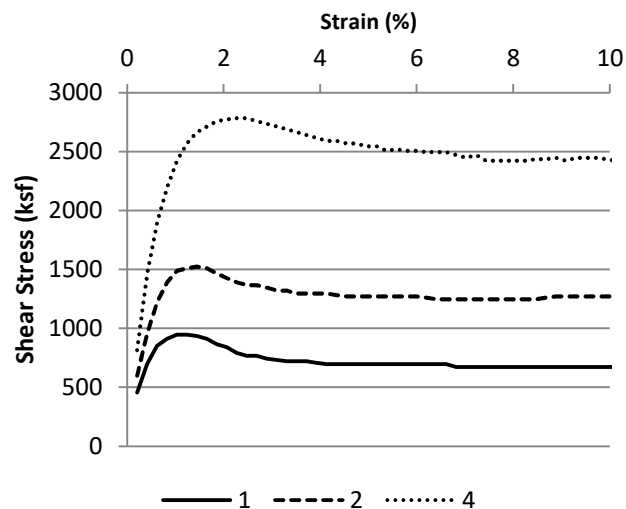
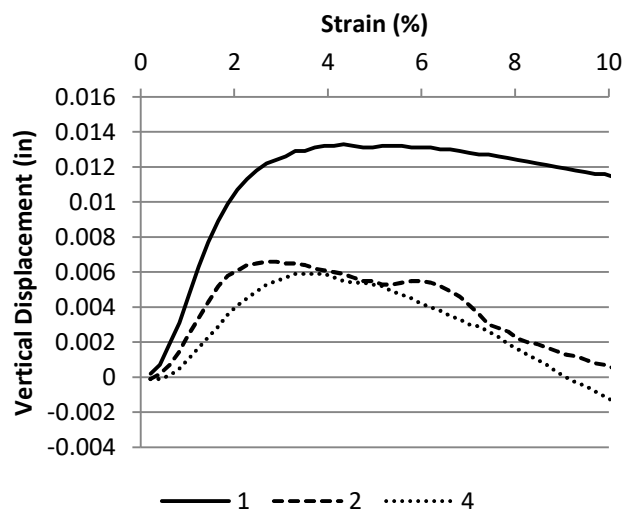


| Job Number | Location | Depth | Description     |
|------------|----------|-------|-----------------|
| 3374.00    | B-1      | 20    | Silty Sand (SM) |

# GRAIN SIZE DISTRIBUTION



## DIRECT SHEAR



|                              |                                         |       |       |
|------------------------------|-----------------------------------------|-------|-------|
| Sample Type:                 | Remolded to 90% of 129.3 pcf, Saturated |       |       |
| Normal Stress (ksf)          | 1                                       | 2     | 4     |
| Peak Shear Stress (ksf)      | 0.948                                   | 1.524 | 2.784 |
| Peak Displacement (in)       | 0.013                                   | 0.007 | 0.006 |
| Ultimate Shear Stress (ksf)  | 0.672                                   | 1.272 | 2.436 |
| Ultimate Displacement (in)   | 0.25                                    | 0.25  | 0.25  |
| Initial Dry Density (pcf)    | 116.3                                   | 116.2 | 116.3 |
| Initial Moisture Content (%) | 9                                       | 9     | 9     |
| Final Moisture Content (%)   | 13.7                                    | 13.9  | 13.6  |
| Strain Rate (in/min)         | 0.01                                    |       |       |

| Job Number | Location | Depth | Description |
|------------|----------|-------|-------------|
| 3374.00    | B-2      | 0-5   | Sand (SP)   |