Appendix I Preliminary WQMP

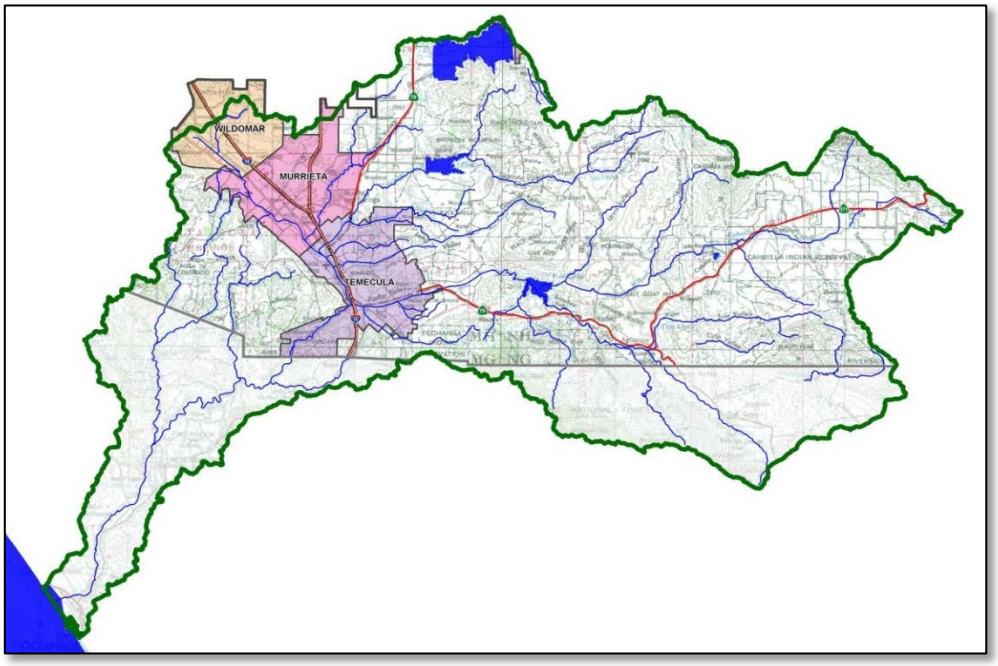
Appendix

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County Project Specific Water Quality Management Plan

A Template for preparing Project Specific WQMPs for Priority Development Projects only for use in the ***unincorporated portions of Riverside County*** *located within the* ***Santa Margarita Region***.

Project Title: Temecula Valley Charter School
Development No: Public Use Permit 230001
Design Review/Case No: Public Use Permit 230001
BMP$_i$ (Latitude, Longitude): Subsurface Storage System: 33 36' 4.45", 117 4' 58.71";
Modular Wetland System Biofiltration: 33 36' 6.51", 117 5'



☒ **Preliminary**
☐ **Final**

Original Date Prepared: August 14, 2024

Revision Date(s): January 21, 2025

Based on 2018 WQMP, prepared for Compliance with Regional Board Order No. **R9-2013-0001** *as amended by Order No.* **R9-2015-0001** *and Order No.* **R9-2015-0100**

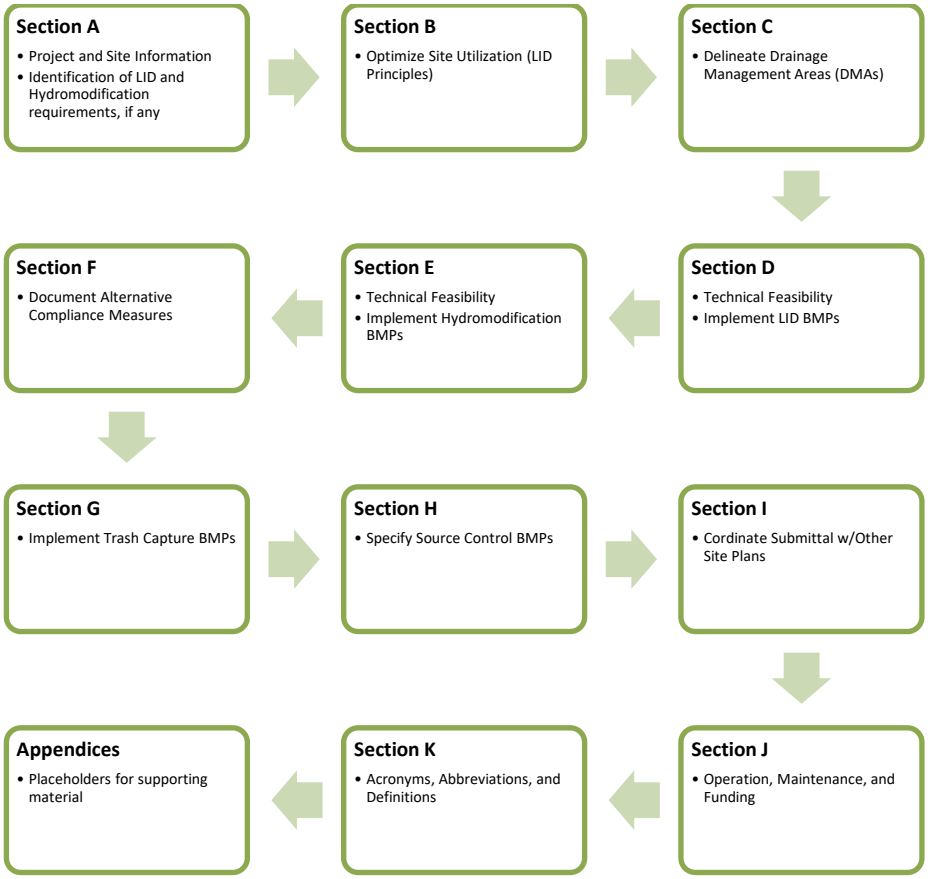
The County updated this template on July 24, 2018

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A Brief Introduction

The Regional Municipal Separate Stormwater Sewer System (MS4) Permit[1] requires that a Project-Specific WQMP be prepared for all development projects within the Santa Margarita Region (SMR) that meet the 'Priority Development Project' categories and thresholds listed in the SMR Water Quality Management Plan (WQMP). This Project-Specific WQMP Template for Development Projects in the **Santa Margarita Region** has been prepared to help document compliance and prepare a WQMP submittal. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



To ensure compliance with State permanent recordkeeping, the County of Riverside is no longer accepting hard copies of the **approved** Final or Preliminary WQMPs or Hydrology Reports. Electronic submittals are highly encouraged for submittal reviews, single PDF file submittal on two CD copies, to the Transportation Department (4080 Lemon Street, 8th Floor, Riverside, CA 92501) is preferred.

For Approved Final WQMPs, submit with the single file WQMP on CD:

- A wet-signed and notarized BMP maintenance agreement (See Appendix 9 for details)
- Owner's Certification signed and scanned into the PDF, or wet-signed hard copy, dated after approval.
- Print out of the WQMP site map (11x17") and Coversheet (8.5x11")
- The CD should include a Hydrology report when applicable. The County requires a hydrology report with hydraulics for the design of drainage facilities. Then provide a print out of the Pre- & Post-Hydrology map (11x17") and Report Coversheet (8.5x11")
- For tracts, submit the County EDA approved maintenance exhibit
- Signed Exhibit B.9 - WQMP O&M Cost Sheet.xlsx

[1] Order No. R9-2013-0001 as amended by Order Nos. R9-2015-0001 and R9-2015-0100, NPDES No. CAS0109266, National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements for Discharges from the MS4s Draining the Watersheds within the San Diego Region, California Regional Water Quality Control Board, May 8, 2013.

Signed and scanned into the PDF for Final Approved WQMP, or wet-signed hard copy

OWNER'S CERTIFICATION

This Project-Specific WQMP has been prepared for Lennar Homes by JLC Engineering and Consulting Inc. for the Tract 37028 project.

This WQMP is intended to comply with the requirements of Riverside County for County Ordinance No. 754 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater Best Management Practices until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under Riverside County Water Quality Ordinance (No. 754).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control Best Management Practices in this plan meet the requirements of Regional Water Quality Control Board Order No. **R9-2013-0001** as amended by Order Nos. **R9-2015-0001 and R9-2015-0100**."

Preparer's Signature	1/21/25 Date
Joseph L. Castaneda Preparer's Printed Name	P.E./Project Manager Preparer's Title/Position

Preparer's Licensure:



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Section A: Project and Site Information

Use the table below to compile and summarize basic site information that will be important for completing subsequent steps. Subsections A.1 through A.4 provide additional detail on documentation of additional project and site information. The Regional MS4 Permit has effectively removed the ability for a project to be grandfathered from WQMP requirements. Even if a project were able to meet all the requirements stated in Section 1.2 of the WQMP, the 2014 WQMP requirements would apply.

PROJECT INFORMATION			
Type of PDP:	New Development		
Type of Project:	Charter School		
Planning Case Number:	PUP 230001		
Rough Grade Permit No.:	TBD		
Development Name:	Temecula Valley Charter School		
PROJECT LOCATION			
Latitude & Longitude (DMS):	33°36'4"N 117°04'56"W		
Project Watershed and Sub-Watershed:	Santa Margarita River, Murrieta HSA		
24-Hour 85th Percentile Storm Depth (inches):	0.55		
Is project subject to Hydromodification requirements?	☒ Y	☐ N	(Select based on Section A.3)
APN(s):	472-210-002		
Map Book and Page No.:	Book 74, page 38		
PROJECT CHARACTERISTICS			
Proposed or Potential Land Use(s)	Charter School		
Proposed or Potential SIC Code(s)	N/A		
Existing Impervious Area of Project Footprint (SF)	0		
Total area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	322,048		
Total Project Area (ac)	696,221		
Does the project consist of offsite road improvements?	☐ Y	☒ N	
Does the project propose to construct unpaved roads?	☐ Y	☒ N	
Is the project part of a larger common plan of development (phased project)?	☐ Y	☒ N	
Has preparation of Project-Specific WQMP included coordination with other site plans?	☒ Y	☐ N	
EXISTING SITE CHARACTERISTICS			
Is the project located within any Multi-Species Habitat Conservation Plan area (MSHCP Criteria Cell?)	☒ Y	☐ N	
	5567		
Is a Geotechnical Report attached?	☒ Y	☐ N	
If no Geotech. Report, list the Natural Resources Conservation Service (NRCS) soils type(s) present on the site (A, B, C and/or D)			
Provide a brief description of the project: The project site proposes to construct a charter school in the unincorporated area of Riverside County. Due to the low infiltration rates. The project site will also construct a subsurface storage basin (Stormtech System) and a Modular Wetland System Biofiltration Unit. The subsurface system will be used to mitigate hydromodifications and to reduce flow rates to the approved design flow rate for the project area. The project proposes two catch basins to be constructed within Yates Road. A diversion structure will be designed in each catch basin to allow for low flows to be directed into the Modular Wetland System for treatment. The proposed storm drain will connect to the existing Line A Storm Drain System (Project Number 7-0544) which is an existing storm drain that discharges directly into Benton Creek Channel at Washington Street and Shrimp Lane.			

Paver and dirt roads are considered pervious for determining WQMP applicability.

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the Project vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Vicinity and location maps
- Parcel Boundary and Project Footprint
- Existing and Proposed Topography
- Drainage Management Areas (DMAs)
- Proposed Structural Best Management Practices (BMPs)
- Drainage Paths
- Drainage infrastructure, inlets, overflows
- Source Control BMPs
- Site Design BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Pervious Surfaces (i.e. Landscaping)
- Standard Labeling
- Cross Section and Outlet details

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Copermittee plan reviewer must be able to easily analyze your Project utilizing this template and its associated site plans and maps. Complete the checklists in Appendix 1 to verify that all exhibits and components are included.

A.2 Identify Receiving Waters

Using Table A-1 below, list in order of upstream to downstream, the Receiving Waters that the Project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated Beneficial Uses, and proximity, if any, to a RARE Beneficial Use. Include a map of the Receiving Waters in Appendix 1. This map should identify the path of the stormwater discharged from the site all the way to the outlet of the Santa Margarita River to the Pacific Ocean. Use the most recent 303(d) list available from the State Water Resources Control Board Website.
(http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/)

Table A-1 Identification of Receiving Waters

Receiving Waters	USEPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Red Carriage Road Storm Drain (DMA C)	N/A	N/A	Not a RARE water body
Benton Creek Channel	N/A	N/A	Not a RARE water body
Warm Springs Creek	Fecal Indicator Bacteria (Indicator Bacteria); Pesticides (Chlorpyrifos); Metals (Iron, Manganese); Nutrients (Phosphorus, Nitrogen)	MUN, AGR, IND, PROC, REC1, REC2, WARM, WILD	Not a RARE water body
Murrieta Creek	Pesticides (Chlorpyrifos); Metals (Copper, Iron, Manganese); Nutrients (Nitrogen, Phosphorus); Fecal Indicator Bacteria (Indicator Bacteria); Toxicity (Toxicity)	MUN, AGR, IND, PROC, GWR, REC-2, WARM, WILD	Not a RARE water body
Santa Margarita River – Upper portion (HAS 2.22, 2.21)	Nutrients (Nitrogen, Phosphorus), Fecal Indicator Bacteria (Indicator Bacteria); Metals (Iron, Manganese; Toxicity (Toxicity)	MUN, AGR, IND, REC-1, REC-2, WARM, COLD, WILD, RARE	RARE WATERBODY 9.13 MILES

Santa Margarita River – Lower Portion (HSA 2.13, 2.12, 2.11)	Nutrients (Nitrogen, Phosphorus); Fecal Indicator Bacteria (Indicator Bacteria); Pesticides (Chlorpyrifos); Toxicity (Toxicity); Miscellaneous (Benthic Community Effects)	MUN, AGR, IND, PROC, REC-1, REC-2, WARM, COLD, WILD, RARE	RARE WATERBODY 19.16 MILES
Santa Margarita Lagoon	Nutrients (Eutrophic)	REC-1, REC-2, EST, WILD, RARE, MAR, MIGR, SPWN	RARE WATERBODY 28.61 MILES
Pacific Ocean	None	IND, NAV, REC-1, REC-2, COMM, BIOL, WILD, RARE, MAR, AQUA, MIGR, SPWN, SHELL	RARE WATERBODY 28.61 MILES

A.3 Drainage System Susceptibility to Hydromodification

Using Table A-2 below, list in order of the point of discharge at the project site down to the Santa Margarita River[2], each drainage system or receiving water that the project site is tributary to. Continue to fill each row with the material of the drainage system, and any exemption (if applicable). Based on the results, summarize the applicable hydromodification performance standards that will be documented in Section E. Exempted categories of receiving waters include:

- Existing storm drains that discharge directly to water storage reservoirs, lakes, or enclosed embayments, or
- Conveyance channels whose bed and bank are concrete lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- Other water bodies identified in an approved WMAA (See Exhibit G to the WQMP)

Include a map exhibiting each drainage system and the associated susceptibility in Appendix 1.

Table A-2 Identification of Susceptibility to Hydromodification

Drainage System	Drainage System Material	Hydromodification Exemption	Hydromodification Exempt
Tract 30387 Line A Storm Drain Project # 7-0544	Reinforced Concrete Pipe	Engineered, Fully Hardened and Maintained (EFHM)	☒ Y ☐ N
Benton Creek Channel – Improved Channel	Concrete Channel	Engineered, Fully Hardened and Maintained (EFHM)	☒ Y ☐ N
Benton Creek Channel – Natural	Natural Channel	None	☐ Y ☒ N
Warm Springs Creek – Natural	Natural Channel	None	☐ Y ☒ N
Warm Springs Creek – Improved Channel	Concrete sides/soft bottom channel	Engineered, Hardened and Maintained (EHM)	☒ Y ☐ N

[2] Refer to Exhibit G of the WQMP for a map of exempt and potentially exempt areas. These maps are from the Draft SMR WMAA as of January 5, 2018 and will be replaced upon acceptance of the SMR WMAA.

Drainage System	Drainage System Material	Hydromodification Exemption	Hydromodification Exempt
Warm Springs Creek – Natural Channel	Natural Channel	None	☐ Y ☒ N
Murrieta Creek – South of Warm Springs Creek	Natural Channel	None	☐ Y ☒ N
Santa Margarita River	Natural Channel	None	☐ Y ☒ N

Summary of Performance Standards

☐ **Hydromodification Exempt** – Select if "Y" is selected in the Hydromodification Exempt column above, project is exempt from hydromodification requirements.

☒ **Not Exempt**-Select if "N" is selected in any row of the Hydromodification Exempt column above. Project is subject to hydrologic control requirements and may be subject to sediment supply requirements.

A.4 Additional Permits/Approvals required for the Project:

Table A-3 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act Section 401 Water Quality Certification	☐ Y	☒ N
US Army Corps of Engineers, Clean Water Act Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)* Grading Permit, Building Permit, RCTD Encroachment Permit	☒ Y	☐ N

If yes is answered to any of the questions above, the Copermittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for LID Bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your Low Impact Development (LID) design and explain your design decisions to others.

Apply the following LID Principles to the layout of the PDP to the extent they are applicable and feasible. Putting thought upfront about how best to organize the various elements of a site can help to significantly reduce the PDP's potential impact on the environment and reduce the number and size of Structural LID BMPs that must be implemented. Integrate opportunities to accommodate the following LID Principles within the preliminary PDP site layout to maximize implementation of LID Principles.

Site Optimization

Complete checklist below to determine applicable Site Design BMPs for your site.

Project- Specific WQMP Site Design BMP Checklist

The following questions below are based upon Section 3.2 of the SMR WQMP will help you determine how to best optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

SITE DESIGN REQUIREMENTS

Answer the following questions below by indicating "Yes," "No," or "N/A" (Not Applicable). Justify all "No" and "N/A" answers by inserting a narrative at the end of the section. The narrative should include identification and justification of any constraints that would prevent the use of those categories of LID BMPs. Upon identifying Site Design BMP opportunities, include these on your WQMP Site plan in Appendix 1.

☒ Yes ☐ No ☐ N/A

Did you identify and preserve existing drainage patterns?

Integrating existing drainage patterns into the site plan helps to maintain the time of concentration and infiltration rates of runoff, decreasing peak flows, and may also help preserve the contribution of Critical Coarse Sediment (i.e., Bed Sediment Supply) from the PDP to the Receiving Water. Preserve existing drainage patterns by:

- Minimizing unnecessary site grading that would eliminate small depressions, where appropriate add additional "micro" storage throughout the site landscaping.
- Where possible conform the PDP site layout along natural landforms, avoid excessive grading and disturbance of vegetation and soils, preserve or replicate the sites natural drainage features and patterns.
- Set back PDP improvements from creeks, wetlands, riparian habitats and any other natural water bodies.
- Use existing and proposed site drainage patterns as a natural design element, rather than using expensive impervious conveyance systems. Use depressed landscaped areas, vegetated buffers, and bioretention areas as amenities and focal points within the site and landscape design.

Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer.
The existing project site flows from the east to the west. The overall project site is a graded undeveloped property and does not have any natural drainage corridors. The existing areas drains towards Line A Storm Drain system. The project will perpetuate the existing drainage pattern. When possible existing drainage area that do not require disturbance will be preserved.

☐ Yes ☒ No ☐ N/A

Did you identify and protect existing vegetation?

Identify any areas containing dense native vegetation or well-established trees, and try to avoid disturbing these areas. Soils with thick, undisturbed vegetation have a much higher capacity to store and infiltrate runoff than do disturbed soils. Reestablishment of a mature vegetative community may take decades. Sensitive areas, such as streams and floodplains should also be avoided.

- Define the development envelope and protected areas, identifying areas that are most suitable for development and areas that should be left undisturbed.
- Establish setbacks and buffer zones surrounding sensitive areas.
- Preserve significant trees and other natural vegetation where possible.

Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. *The project site does not preserve existing vegetation. The project site was a developed residential rural property.*

Project- Specific WQMP Site Design BMP Checklist	
☐ Yes ☒ No ☐ N/A	**Did you identify and preserve natural infiltration capacity?** A key component of LID is taking advantage of a site's natural infiltration and storage capacity. A site survey and geotechnical investigation can help define areas with high potential for infiltration and surface storage. • Identify opportunities to locate LID Principles and Structural BMPs in highly pervious areas. Doing so will maximize infiltration and limit the amount of runoff generated. • Concentrate development on portions of the site with less permeable soils, and preserve areas that can promote infiltration.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. *The existing infiltration rates within the project site extremely low. Therefore the existing site does not have substantial infiltration capacity to preserve.*	
☒ Yes ☐ No ☐ N/A	**Did you minimize impervious area?** Look for opportunities to limit impervious cover through identification of the smallest possible land area that can be practically impacted or disturbed during site development. • Limit overall coverage of paving and roofs. This can be accomplished by designing compact, taller structures, narrower and shorter streets and sidewalks, clustering buildings and sharing driveways, smaller parking lots (fewer stalls, smaller stalls, and more efficient lanes), and indoor or underground parking. • Inventory planned impervious areas on your preliminary site plan. Identify where permeable pavements, or other permeable materials, such as crushed aggregate, turf block, permeable modular blocks, pervious concrete or pervious asphalt could be substituted for impervious concrete or asphalt paving. This will help reduce the amount of Runoff that may need to be addressed through Structural BMPs. • Examine site layout and circulation patterns and identify areas where landscaping can be substituted for pavement, such as for overflow parking. • Consider green roofs. Green roofs are roofing systems that provide a layer of soil/vegetative cover over a waterproofing membrane. A green roof mimics pre-development conditions by filtering, absorbing, and evapotranspiring precipitation to help manage the effects of an otherwise impervious rooftop.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. *The project site will minimize the impervious area as much as feasible. The landscape areas and turf areas provided area based on minimum requirement for a school site.*	

Project- Specific WQMP Site Design BMP Checklist	
☒ Yes ☐ No ☐ N/A	**Did you identify and disperse runoff to adjacent pervious areas or small collection areas?** Look for opportunities to direct runoff from impervious areas to adjacent landscaping, other pervious areas, or small collection areas where such runoff may be retained. This is sometimes referred to as reducing Directly Connected Impervious Areas. • Direct roof runoff into landscaped areas such as medians, parking islands, planter boxes, etc., and/or areas of pervious paving. Instead of having landscaped areas raised above the surrounding impervious areas, design them as depressed areas that can receive Runoff from adjacent impervious pavement. For example, a lawn or garden depressed 3"-4" below surrounding walkways or driveways provides a simple but quite functional landscape design element. • Detain and retain runoff throughout the site. On flatter sites, smaller Structural BMPs may be interspersed in landscaped areas among the buildings and paving. • On hillside sites, drainage from upper areas may be collected in conventional catch basins and piped to landscaped areas and LID BMPs and/or Hydrologic Control BMPs in lower areas. Low retaining walls may also be used to create terraces that can accommodate LID BMPs. Wherever possible, direct drainage from landscaped slopes offsite and not to impervious surfaces like parking lots. • Reduce curb maintenance and provide for allowances for curb cuts. • Design landscaped areas or other pervious areas to receive and infiltrate runoff from nearby impervious areas. • Use Tree Wells to intercept, infiltrate, and evapotranspire precipitation and runoff before it reaches structural BMPs. Tree wells can be used to limit the size of Drainage Management Areas that must be treated by structural BMPs. Guidelines for Tree Wells are included in the Tree Well Fact Sheet in the LID BMP Design Handbook.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. *The roof runoff will be directed into the adjacent landscaping prior to discharging into impervious areas.*	
☒ Yes ☐ No ☐ N/A	**Did you utilize native or drought tolerant species in site landscaping?** Wherever possible, use native or drought tolerant species within site landscaping instead of alternatives. These plants are uniquely suited to local soils and climate and can reduce the overall demands for potable water use associated with irrigation.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. *The project will utilize native or drought tolerant species in the site landscaping.*	

Project- Specific WQMP Site Design BMP Checklist	
☐ Yes ☒ No ☐ N/A	**Did implement harvest and use of runoff?** Under the Regional MS4 Permit, Harvest and Use BMPs must be employed to reduce runoff on any site where they are applicable and feasible. However, Harvest and Use BMPs are effective for retention of stormwater runoff only when there is adequate demand for non-potable water during the wet season. If demand for non-potable water is not sufficiently large, the actual retention of stormwater runoff will be diminished during larger storms or during back-to-back storms. For the purposes of planning level Harvest and Use BMP feasibility screening, Harvest and Use is only considered to be a feasible if the total average wet season demand for non-potable water is sufficiently large to use the entire DCV within 72 hours. If the average wet season demand for non-potable water is not sufficiently large to use the entire DCV within 72 hours, then Harvest and Use is not considered to be feasible and need not be considered further. The general feasibility and applicability of Harvest and Use BMPs should consider: • Any downstream impacts related to water rights that could arise from capturing stormwater (not common). • Conflicts with recycled water used – where the project is conditioned to use recycled water for irrigation, this should be given priority over stormwater capture as it is a year-round supply of water. • Code Compliance - If a particular use of captured stormwater, and/or available methods for storage of captured stormwater would be contrary to building codes in effect at the time of approval of the preliminary Project-Specific WQMP, then an evaluation of harvesting and use for that use would not be required. • Wet season demand – the applicant shall demonstrate, to the acceptance of the County of Riverside, that there is adequate demand for harvested water during the wet season to drain the system in a reasonable amount of time.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. *Based on Harvest and Use assessment, project is not a candidate for this type of system.*	
☒ Yes ☐ No ☐ N/A	**Did you keep the runoff from sediment producing pervious area hydrologically separate from developed areas that require treatment?** Pervious area that qualify as self-treating areas or off-site open space should be kept separate from drainage to structural BMPs whenever possible. This helps limit the required size of structural BMPs, helps avoid impacts to sediment supply, and helps reduce clogging risk to BMPs.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. *Flows from the offsite area bypass the project site*	

Section C: Delineate Drainage Management Areas (DMAs) & Green Streets

This section provides streamlined guidance and documentation of the DMA delineation and categorization process, for additional information refer to the procedure in Section 3.3 of the SMR WQMP which discusses the methods of delineating and mapping your project site into individual DMAs. Complete Steps 1 to 4 to successfully delineate and categorize DMAs.

Step 1: Identify Surface Types and Drainage Pathways

Carefully delineate pervious areas and impervious areas (including roofs) throughout site and identify overland flow paths and above ground and below ground conveyances. Also identify common points (such as BMPs) that these areas drain to.

Step 2: DMA Delineation

Use the information in Step 1 to divide the entire PDP site into individual, discrete DMAs. Typically, lines delineating DMAs follow grade breaks and roof ridge lines. Where possible, establish separate DMAs for each surface type (e.g., landscaping, pervious paving, or roofs). Assign each DMA a unique code and determine its size in square feet. The total area of your site should total the sum of all of your DMAs (unless water from outside the project limits comingles with water from inside the project limits, i.e. run-on). Complete Table C-1

Table C-1 DMA Identification

DMA Name or Identification	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
DMA A1	Mixed	573,686	To be Determined in Step 3
DMA B1	Mixed	26,703	
DMA AA1	Mixed	89,298	
DMA AA2	Mixed	6,534	

Add Columns as Needed. Consider a separate DMA for Tree Wells or other LID principals like Self-Retaining areas are used for mitigation.

Step 3: DMA Classification

Determine how drainage from each DMA will be handled by using information from Steps 1 and 2 and by completing Steps 3.A to 3.C. Each DMA will be classified as one of the following four types:

- Type 'A': Self-Treating Areas:
- Type 'B': Self-Retaining Areas
- Type 'C': Areas Draining to Self-Retaining Areas
- Type 'D': Areas Draining to BMPs

Tree wells are considered Type 'B' areas, and their tributary areas limited to a 10:1 ratio are considered Type 'C' areas. If Tree wells are proposed, consider grading or other features to minimize the pervious runoff to the tree wells, to avoid overwhelming the trees. Type 'A', 'B', and 'C' are considered LID Principals that can be used to minimize or potentially eliminate structural LID BMPs.

If Tree wells are proposed, a landscape architect shall be consulted on the tree selection, since compliance will be determined based on the survival of the tree. The tree type should be noted on the WQMP site map.

Step 3.A – Identify Type 'A' Self-Treating Area

(PROJECT DOES NOT INCORPORATE SELF TREATING AREAS)

Indicate if the DMAs meet the following criteria by answering "Yes" or "No".

☐ Yes ☒ No	Area is undisturbed from their natural condition OR restored with Native and/or California Friendly vegetative covers.
☐ Yes ☒ No	Area is irrigated, if at all, with appropriate low water use irrigation systems to prevent irrigation runoff.
☐ Yes ☒ No	Runoff from the area will not comingle with runoff from the developed portion of the site, or across other landscaped areas that do not meet the above criteria.

If all answers indicate "Yes," complete Table C-2 to document the DMAs that are classified as Self-Treating Areas.

Table C-2 Type 'A', Self-Treating Areas

DMA Name or Identification	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)

Step 3.B – Identify Type 'B' Self-Retaining Area and Type 'C' Areas Draining to Self-Retaining Areas

(PROJECT DOES NOT INCORPORATE SELF RETAINING AREAS)

Type 'B' Self-Retaining Area: A Self-Retaining Area is shallowly depressed 'micro infiltration' areas designed to retain the Design Storm rainfall that reaches the area, without producing any Runoff.

Indicate if the DMAs meet the following criteria by answering "Yes," "No," or "N/A".

☐ Yes ☐ No ☐ N/A	Inlet elevations of area/overflow drains, if any, should be clearly specified to be three inches or more above the low point to promote ponding.
☐ Yes ☐ No ☐ N/A	Soils will be freely draining to not create vector or nuisance conditions.
☐ Yes ☐ No ☐ N/A	Pervious pavements (e.g., crushed stone, porous asphalt, pervious concrete, or permeable pavers) can be self-retaining when constructed with a gravel base course four or more inches deep below any underdrain discharge elevation.

If all answers indicate "Yes," DMAs may be categorized as Type 'B', proceed to identify Type 'C' Areas Draining to Self-Retaining Areas.

Type 'C' Areas Draining to Self-Retaining Areas: Runoff from impervious or partially pervious areas can be managed by routing it to Self-Retaining Areas consistent with the LID Principle discussed in SMR WQMP Section 3.2.5 for 'Dispersing Runoff to Adjacent Pervious Areas'.
Indicate if the DMAs meet the following criteria by answering "Yes" or "No".

☐ Yes ☐ No — The drainage from the tributary area must be directed to and dispersed within the Self-Retaining Area.

☐ Yes ☐ No — The maximum ratio of Tributary Area to Self-Retaining area is (2 ÷ Impervious Fraction): 1

If all answers indicate "Yes," DMAs may be categorized as Type 'C'.

Complete Table C-3 and Table C-4 to identify Type 'B' Self-Retaining Areas and Type 'C' Areas Draining to Self-Retaining Areas.

Table C-3 Type 'B', Self-Retaining Areas

Self-Retaining Area				Type 'C' DMAs that are draining to the Self-Retaining Area		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C-4= [C]	Required Retention Depth (inches) [D] = $[B] + \frac{[B]\cdot[C]}{[A]}$

Note: Tree well areas can extend well beyond the drip line. The Tree Well area for open top types would include the shallow depressed area at the soil surface. The Tree Well area for Structural Soil Tree Wells or Suspended Pavement Tree Wells includes the area with open-graded gravel or void space over the structural soil or structural cells. Please specify type in this table and WQMP site map. See LID handbook Tree Well factsheet for additional details.

$$\left(\frac{2}{\boldsymbol{Impervious\ Fraction}}\right) : 1$$

(Tributary Area: Self-Retaining Area)

Table C-4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet) [A]	Post-project surface type	Runoff factor [B]	Product [C] = [A] x [B]	DMA name /ID	Area (square feet) [D]	Ratio [C]/[D]

Note: (See Section 3.3 of SMR WQMP) Ensure that partially pervious areas draining to a Self-Retaining area do not exceed the following ratio:

Step 3.B.1 – Document the use of Green Street Exemption (see Section 3.11 of the WQMP Guidance)

The Regional MS4 Permit specifies that projects that consist of **retrofitting or redevelopment of existing paved alleys, streets, or roads** may be exempted from classification as PDPs if they are designed and constructed in accordance with USEPA Green Streets Guidance. This does not apply for interior roads for PDP projects. For projects with road frontage improvements, Green Street standards can be used in the frontage road right-of-way. The remainder of the project is subject to full WQMP and Hydromodification requirements. See excerpt from Section 3.11 of the WQMP Guidance below:

Note: The Project will use Green Street Exemptions for the improvements along Washington Street and Yates Road. The project will be treating runoff from these streets by directing low flows to a Modular Wetland System that is located onsite.

3.11.4 BMP Sizing Targets for Applicable Green Streets Projects

Applicable green street projects are not required to meet the same sizing requirements for BMPs as other projects, but should attempt to meet a sizing target to the MEP. The following steps are used to size BMPs for applicable Green Streets projects:

1. Delineate drainage areas tributary to BMP locations and compute imperviousness.
2. Determine sizing goal by referring to sizing criteria presented in Section 2.3.2 (V_{BMP}).
3. Attempt to provide the target BMP sizing according to Step 2.
4. If the target criteria cannot be achieved, document the constraints that override the application of BMPs, and provide the largest portion of the sizing criteria that can be reasonably provided given constraints.

Even if BMPs cannot be sized to meet the target sizing criteria, it is still important to design the BMP inlet, energy dissipation, and overflow capacity for the full tributary area to ensure that flooding and scour is avoided. It is strongly recommended that BMPs which are designed to less than their target design volume be designed to bypass peak flows.

Table C-4.1 – Green Streets

DMA Name or ID	Street Name	BMP Sizing Targets Calculations and documenting constraints included in Appendix 6*
		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No

Step 3.C – Identify Type 'D' Areas Draining to BMPs

Areas draining to BMPs are those that could not be fully managed through LID Principles (DMA Types A through C) and will instead drain to an LID BMP and/or a Conventional Treatment BMP designed to manage water quality impacts from that area, and Hydromodification where necessary.

Complete Table C-5 to document which DMAs are classified as Areas Draining to BMPs

Table C-5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID Receiving Runoff from DMA
DMA A1	Subsurface System A (Stormtech) & Modular Wetland System A
DMA B1	Modular Wetland System A
DMA AA1	Modular Wetland System A
DMA AA2	Modular Wetland System A

Note: More than one DMA may drain to a single LID BMP; however, one DMA may not drain to more than one BMP.

Section D: Implement LID BMPs

The Regional MS4 Permit requires the use of LID BMPs to provide retention or treatment of the DCV and includes a BMP hierarchy which requires Full Retention BMPs (Priority 1) to be considered before Biofiltration BMPs (Priority 2) and Flow-Through Treatment BMPs and Alternative Compliance BMPs (Priority 3). LID BMP selection must be based on technical feasibility and should be considered early in the site planning and design process. Use this section to document the selection of LID BMPs for each DMA. Note that feasibility is based on the DMA scale and may vary between DMAs based on site conditions.

D.1 Full Infiltration Applicability

An assessment of the feasibility of utilizing full infiltration BMPs is required for all projects, *except where it can be shown that site design LID principles fully retain the DCV (i.e., all DMAs are Type A, B, or C), or where Harvest and Use BMPs fully retain the DCV. Check the following box if applicable:*

☐ Site design LID principles or Tree Wells fully retain the DCV (i.e., all DMAs are Type A, B, or C), (Proceed to Section E).

If the above box remains unchecked, perform a site-specific evaluation of the feasibility of Infiltration BMPs using each of the applicable criteria identified in Chapter 2.3.3 of the SMR WQMP and complete the remainder of Section D.1.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Copermittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the SMR WQMP. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Infiltration Feasibility

Table D-1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the SMR WQMP in Chapter 2.3.3. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D-1 Infiltration Feasibility

Downstream Impacts (SMR WQMP Section 2.3.3.a)		
Does the project site…	**YES**	**NO**
…have any DMAs where infiltration would negatively impact downstream water rights or other Beneficial Uses[3]?		X
If Yes, list affected DMAs:		
Groundwater Protection (SMR WQMP Section 2.3.3.b)		
Does the project site…	**YES**	**NO**
…have any DMAs with industrial, and other land uses that pose a high threat to water quality, which cannot be treated by Bioretention BMPs? Or have DMAs with active industrial process areas?		X
If Yes, list affected DMAs:		
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet horizontally of a water supply well?		X
If Yes, list affected DMAs:		
…have any DMAs that would restrict BMP locations to within a 2:1 (horizontal: vertical) influence line extending from any septic leach line?		X
If Yes, list affected DMAs:		
…have any DMAs been evaluated by a licensed Geotechnical Engineer, or Environmental Engineer, who has concluded that the soils do not have adequate physical and chemical characteristics for the protection of groundwater, and has treatment provided by amended media layers in Bioretention BMPs been considered in evaluating this factor?		X
If Yes, list affected DMAs:		
Public Safety and Offsite Improvements (SMR WQMP Section 2.3.3.c)		
Does the project site…	**YES**	**NO**
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact, such as potential seepage through fill conditions?		X
If Yes, list affected DMAs:		
Infiltration Characteristics For LID BMPs (SMR WQMP Section 2.3.3.d)		
Does the project site…	**YES**	**NO**
…have measured infiltration rates of less than 1.6 inches / hour? Riverside County may allow measure rates as low as 0.8in/hr to support infiltration BMPs, if the Engineer believes infiltration is appropriate and sustainable. Mark no, if this is the case.	X	
If Yes, list affected: DMA A1, B1, AA1, & AA2. Infiltration Rates varied from 0.05 to 0.09 in/hr.		
Cut/Fill Conditions (SMR WQMP Section 2.3.3.e)		
Does the project site…	**YES**	**NO**
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
Other Site-Specific Factors (SMR WQMP Section 2.3.3.f)		
Does the project site…	**YES**	**NO**
…have DMAs where the geotechnical investigation discovered other site-specific factors that would preclude effective and/or safe infiltration?		X
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs that rely solely on infiltration should not be used for those DMAs and you should proceed to the assessment for Biofiltration BMPs below. Biofiltration BMPs that provide partial infiltration may still be feasible and should be assessed in Section D.2. Summarize concerns identified in the Geotechnical Report, if any, that resulted in a "YES" response above in the table below.

[3] Such a condition must be substantiated by sufficient modeling to demonstrate an impact and would be subject to County of Riverside discretion. There is not a standardized method for assessing this criterion. Water rights evaluations should be site-specific.

Table D-2 Geotechnical Concerns for Onsite Infiltration

Type of Geotechnical Concern	DMAs Feasible (By Name or ID)	DMAs Infeasible (By Name or ID)
Collapsible Soil		
Expansive Soil		
Slopes		
Liquefaction		
Low Infiltration Rate		A1, B1, AA1, & AA2
Other		

D.2 Biofiltration Applicability

This section should document the applicability of biofiltration BMPs for Type D DMAs that are not feasible for full infiltration BMPs. The key decisions to be documented in this section include:

1. Are biofiltration BMPs with partial infiltration feasible?
    a. Biofiltration BMPs must be designed to maximize incidental infiltration via a partial infiltration design unless it is demonstrated that this design is not feasible.
    b. These designs can be used at sites with low infiltration rates where other feasibility factors do not preclude incidental infiltration.

    Document summary in Table D-3.
2. If not, what are the factors that require the use of biofiltration with no infiltration? This may include:
    a. Geotechnical hazards
    b. Water rights issues
    c. Water balance issues
    d. Soil contamination or groundwater quality issues
    e. Very low infiltration rates (factored rates < 0.1 in/hr)
    f. Other factors, demonstrated to the acceptance of the local jurisdiction

    If this applies to any DMAs, then rationale must be documented in Table D-3.
3. Are biofiltration BMPs infeasible?
    a. If yes, then provide a site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee with jurisdiction over the Project site to discuss this option. Proceed below.

Table D-3 Evaluation of Biofiltration BMP Feasibility

DMA ID	Is Partial/ Incidental Infiltration Allowable? (Y/N)	Basis for Infeasibility of Partial Infiltration (provide summary and include supporting basis if partial infiltration not feasible)
DMA A1	N	Infiltration Rate is 0.05 -0.09 in/hr
DMA B1	N	Infiltration Rate is 0.05 -0.09in/hr
DMA AA1	N	Infiltration Rate is 0.05 -0.09in/hr
DMA AA2	N	Infiltration Rate is 0.05 -0.09in/hr

Proprietary Biofiltration BMP Approval Criteria

Does the Co-Permittee allow Proprietary BMPs as an equivalent to Biofiltration, if specific criteria is met?

☒ Yes or ☐ No, if no skip to Section F to document your alternative compliance measures.

If the project will use proprietary BMPs as biofiltration BMPs, then this section and Appendix 5 shall be completed to document that the proprietary BMPs are selected in accordance with Section 2.3.6 of the SMR WQMP and County requirements. Proprietary Biofiltration BMPs must meet both of the following approval criteria:

1. Demonstrate equivalency to Biofiltration by completing the BMP Design worksheet and Proprietary Biofiltration Criteria, which is found in Appendix 5, including all supporting documentation, and
2. Obtain Co-Permittee concurrence for the long term Operation and Maintenance Plan for the proprietary BMP. The Co-Permittee has the sole discretion to allow or reject Proprietary BMPs, especially if they will be maintained publically through a CFD, CSA, or L&LMD.

Add additional rows to Table D-4 to document approval criteria are met for each type of BMP proposed.

Table D-4 Proprietary BMP Approval Requirement Summary

Proposed Proprietary Biofiltration BMP	Approval Criteria	Notes/Comments
Modular Wetland System A	BMP Design worksheets and Proprietary Biofiltration Criteria are completed in Appendix 5	☒ Yes or ☐ No Insert text here
	Proposed BMP has an active TAPE GULD Certification for the project pollutants of concern[4] or equivalent 3rd party demonstrated performance.	☒ Yes or ☐ No Insert text here
	Is there any media or cartridge required to maintain the function of the BMP sole-sourced or proprietary in any way? If yes, obtain explicit approval by the Agency. Potentially full replacement costs to a non-proprietary BMP needs to be considered.	☒ Yes or ☐ No If yes, provide the date of concurrence from the Co-Permittee. 1/21/25
	☒ The BMP includes biological features including vegetation supported by engineered or other growing media.	Modular Wetland will have shrubs that will be planted in soil media.

[4] Use Table F-1, F-2, and F-3 to identify and document the pollutants of concern and include these tables in Appendix 5.

D.3 Feasibility Assessment Summaries

From the Infiltration, Biofiltration with Partial Infiltration and Biofiltration with No Infiltration Sections above, complete Table D-5 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D-5 LID Prioritization Summary Matrix

DMA Name/ID	LID Principles or Tree Wells	LID BMP Hierarchy			No LID (Alternative Compliance)
		1. Infiltration	2. Biofiltration with Partial Infiltration*	3. Biofiltration with No Infiltration*	
DMA A1	☐	☐	☐	☒	☐
DMA B1	☐	☐	☐	☒	☐
DMA AA1	☐	☐	☐	☒	☐
DMA AA2	☐	☐	☐	☒	☐

*Includes Proprietary Biofiltration, if accepted by the Co-Permittee.

For those DMAs where LID BMPs are not feasible, provide a narrative in Table D-6 below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section F below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

This is based on the clarification letter titled "San Diego Water Board's Expectations of Documentation to Support a Determination of Priority Development Project Infiltration Infeasibility" (April 28, 2017, Via email from San Diego Regional Water Quality Control Board to San Diego County Municipal Storm Water Copermittees[5]).

Table D-6 Summary of Infeasibility Documentation

Question	Narrative Summary (include reference to applicable appendix/attachment/report, as applicable)
a) When in the entitlement process did a geotechnical engineer analyze the site for infiltration feasibility?	
b) When in the entitlement process were other investigations conducted (e.g., groundwater quality, water rights) to evaluate infiltration feasibility?	
c) What was the scope and results of testing, if conducted, or rationale for why testing was not needed to reach findings?	
d) What public health and safety requirements affected infiltration locations?	

[5] http://www.projectcleanwater.org/download/pdp-infiltration-infeasibility/

e) What were the conclusions and recommendations of the geotechnical engineer and/or other professional responsible for other investigations?	
f) What was the history of design discussions between the permittee and applicant for the proposed project, resulting in the final design determination related locations feasible for infiltration?	
g) What site design alternatives were considered to achieve infiltration or partial infiltration on site?	
h) What physical impairments (i.e., fire road egress, public safety considerations, utilities) and public safety concerns influenced site layout and infiltration feasibility?	
i) What LID Principles (site design BMPs) were included in the project site design?	

D.4 LID BMP Sizing

Each LID BMP must be designed to ensure that the DCV will be captured by the selected BMPs with no discharge to the storm drain or surface waters during the DCV size storm. Infiltration BMPs must at minimum be sized to capture the DCV to achieve pollutant control requirements.

Biofiltration BMPs must at a minimum be sized to:

- Treat 1.5 times the DCV not reliably retained on site using a volume-base or flow-based sizing method, or
- Include static storage volume, including pore spaces and pre-filter detention volume, at least 0.75 times the portion of the DCV not reliably retained on site.

First**,** calculate the DCV for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using the methods included in Section 3 of the LID BMP Design Handbook. Utilize the worksheets found in the LID BMP Design Handbook or consult with the Copermittee to assist you in correctly sizing your LID BMPs. Use Table D-7 below to document the DCV each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D-7 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Subsurface Basin A*
	[A]		[B]	[C]	[A] x [C]	

A1	*573,686*	*Mixed*	*0.57*	*0.39*	*223,738*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	573,686				223,738	0.55	10,255	***13,000***

*The DCV, V_{BMP} differs from the volume shown in the Santa Margarita Water BMP Design Volume Spreadsheet (Appendix 6) due to rounding errors in the spreadsheet. The spreadsheet shows a DCV of 10,039 cubic feet which is still less than the proposed water quality storage volume.

[B], [C] is obtained as described in Section 2.6.1.b of the SMR WQMP

[E] is obtained from Exhibit A in the SMR WQMP

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6.

Table D-8.2 DCV Calculations for LID BMPs

DMA Type/ID	**DMA (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Areas x Runoff Factor**	***Subsurface Basin A***		
	[A]		[B]	[C]	[A] x [C]			
B1	*26,572*	*Mixed*	*0.70*	*0.49*	*13,020*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	26,572				13,020	0.55	598	***13,000***

Table D-9.3 DCV Calculations for LID BMPs

DMA Type/ID	**DMA (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Areas x Runoff Factor**	***Subsurface Basin A***		
	[A]		[B]	[C]	[A] x [C]			
AA1	*89,298*	*Mixed*	*0.65*	*0.45*	*40,184*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	89,298				40,184	0.55	1,860	***13,000***

Table D-10.4 DCV Calculations for LID BMPs

DMA Type/ID	**DMA (square feet)**	**Post-Project Surface Type**	**Effective Impervious Fraction, I_f**	**DMA Runoff Factor**	**DMA Areas x Runoff Factor**	***Subsurface Basin A***

	[A]		[B]	[C]	[A] x [C]			
AA2	*6,534*	*Mixed*	*0.75*	*0.54*	*3,528*	*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	6,534				3,528	0.55	163	***13,000***

Table D-11.5 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*MWS UNIT A*		
	[A]		[B]	[C]	[A] x [C]			
B1	*26,703*	*Mixed*	*0.70*	*0.49*	*13,084*	*Design Rainfall Intensity (in/hr)*	*Design flow rate, Q_{BMP} (CFS)*	*Proposed Flow Rate on Plans (cfs)*
	26,703				13,084	0.20	0.06	***0.346***

[B], [C] is obtained as described in Section 2.6.1.b of the SMR WQMP
[E] is obtained from Exhibit A in the SMR WQMP
[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6.

Table D-12.6 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*MWS UNIT A*		
	[A]		[B]	[C]	[A] x [C]			
AA1	*89,298*	*Mixed*	*0.65*	*0.45*	*40,184*	*Design Rainfall Intensity (in/hr)*	*Design flow rate, Q_{BMP} (CFS)*	*Proposed Flow Rate on Plans (cfs)*
	89,298				40,184	0.20	0.19	***0.346***

Table D-13.6 DCV Calculations for LID BMPs

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*MWS UNIT A*		
	[A]		[B]	[C]	[A] x [C]			
AA2	*6,534*	*Mixed*	*0.75*	*0.54*	*3,528*			

						Design Rainfall Intensity (in/hr)	*Design flow rate, Q_{BMP} (CFS)*	*Proposed Flow Rate on Plans (cfs)*
	6,534			3,528		0.20	0.02	***0.346***

Complete Table D-8 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. You can add rows to the table as needed. Alternatively, the Santa Margarita Hydrology Model (SMRHM) can be used to size LID BMPs to address the DCV and, if applicable, to size Hydrologic Control BMPs to meet the Hydrologic Performance Standard described in the SMR WQMP, as identified in Section E.

Table D-8 LID BMP Sizing

BMP Name / ID	DMA No.	BMP Type / Description	Design Capture Volume (ft^3)	Proposed Volume (ft^3)
Subsurface Basin A	A1, B1, AA1 and AA2	Subsurface Basin A Modular Wetland Biofiltration Basin with no infiltration	12,876	13,000
Note: The design capture volume is the total of the capture volumes for all four DMA areas.				

able D-8.1 LID BMP Sizing

BMP Name / ID	DMA No.	BMP Type / Description	Design Capture Flow rate (cfs)	Proposed Flow rate (cfs)
Modular Wetland System	A1, B1, AA1 and AA2	Subsurface Basin A Modular Wetland Biofiltration Basin with no infiltration	0.33	0.346
Note: The flow rate is the sum of the design flow rates for DMAs B1, AA1, and AA2, along with the flow rate needed to drain the design volume for DMA A1 within 48 hours. $\frac{10255\ cf}{48\ hr\ x\ 3600\frac{s}{hr}} + 0.06\ cfs + .19\ cfs + .02\ cfs = 0.33\ cfs$				

If bioretention will include a capped underdrain, then include sizing calculations demonstrating that the BMP will meet infiltration sizing requirements with the underdrain capped and also meet biofiltration sizing requirements if the underdrain is uncapped.

The proposed volumes on plans for the Modular Wetland System biofiltration basins were obtained from the design spreadsheets and represent the $V_{biofiltered}$ volume. DMA A1, B1, AA1 AND AA2 have a total area of 15.98 acres. This includes area from Yates Road and Washington Street which includes 2.64 acres of street areas. The volume generated from DMA A1 will be collected by a subsurface system. The water

quality volume will be retained within the Subsurface Basin A Stormtech System. A designated storage area has been provided to store the water quality volume of 13,000 cf.

Section E: Implement Hydrologic Control BMPs and Sediment Supply BMPs

See Appendix 7 for additional required information.

If a completed Table 1.2 demonstrates that the project is exempt from Hydromodification Performance Standards, specify N/A and proceed to Section G.

☐ N/A Project is Exempt from Hydromodification Performance Standards.

If a PDP is not exempt from hydromodification requirements than the PDP must satisfy the requirements of the performance standards for hydrologic control BMPs and Sediment Supply BMPs. The PDP may choose to satisfy hydrologic control requirements using onsite or offsite BMPs (i.e. Alternative Compliance). Sediment supply requirements cannot be met via alternative compliance. If N/A is not selected above, select one of the two options below and complete the applicable sections.

☒ Project is Not Hydromodification Exempt and chooses to implement Hydrologic Control and Sediment Supply BMPs Onsite (complete Section E).

☐ Project is Not Hydromodification Exempt and chooses to implement Hydrologic Control Requirements using Alternative Compliance (complete Section F). Selection of this option must be approved by the Copermittee.

E.1 Hydrologic Control BMP Selection

Capture of the DCV and achievement of the Hydrologic Performance Standard may be met by combined and/or separate structural BMPs. The user should consider the full suite of Hydrologic Control BMPs to manage runoff from the post-development condition and meet the Hydrologic Performance Standard identified in this section.

For the Preliminary WQMP, in lieu of preparing detailed routing calculations, the basin size may be estimated as the difference in volume between the pre-development and post-development hydrograph for the 10-year 24-hour storm event plus the Vbmp. This does not relieve the engineer of the responsibility for meeting the full Hydrologic Control requirements during final design.

The Hydrologic Performance Standard consists of matching or reducing the flow duration curve of post-development conditions to that of pre-existing, naturally occurring conditions, for the range of geomorphically significant flows (the low flow threshold runoff event up to the 10-year runoff event). 10% of the 2-year runoff event can be used for the low flow threshold without any justification. Higher low flow thresholds can be used with site-specific analysis, see Section 2.6.2.b of the WQMP guidance document. Select each of the hydrologic control BMP types that are applied to meet the above performance standard on the site.

☐ LID principles as defined in Section 3.2 of the SMR WQMP, including Tree Wells.

☒ Structural LID BMPs that may be modified or enlarged, if necessary, beyond the DCV.

☐ Structural Hydrologic Control BMPs that are distinct from the LID BMPs above. The LID BMP Design Handbook provides information not only on Hydrologic Control BMP design, but also on BMP design to meet the combined LID requirement and Hydrologic Performance Standard. The Handbook specifies the type of BMPs that can be used to meet the Hydrologic Performance Standard.

E.2 Hydrologic Control BMP Sizing

Hydrologic Control BMPs must be designed to ensure that the flow duration curve of the post-development DMA will not exceed that of the pre-existing, naturally occurring, DMA for the range of geomorphically significant flows. Using SMRHM, (or another acceptable continuous simulation model if approved by the Copermittee) the applicant shall demonstrate that the performance of the Hydrologic Control BMPs complies with the Hydrologic Performance Standard. Complete Table E-1 below and identify, for each DMA, the type of Hydrologic Control BMP, if the SMRHM model confirmed the management (Identified as "passed" in SMRHM), the total volume capacity of the Hydrologic Control BMP, the Hydrologic Control BMP footprint at top floor elevation, and the drawdown time of the Hydrologic Control BMP. SMRHM summary reports should be documented in Appendix 7. Refer to the SMRHM Guidance Document for additional information on SMRHM. You can add rows to the table as needed.

Table E-1 Hydrologic Control BMP Sizing

BMP Name / ID	DMA No.	BMP Type / Description	SMRHM* Passed	BMP Volume (ac-ft)	BMP Footprint (ac)	Drawdown time (hr)
Subsurface Basin A & Modular Wetland System	A1, B1, AA1 & AA2	Subsurface Basin A (Stormtech Chamber) Biofiltration Basin with no infiltration	☒	0.68	0.10	48

**Or other continuous simulation model, compliant with the WQMP and Permit. If Tree Wells are proposed for some or all of the project, check the box for Tree Wells in Section E.1 and enter each Tree Well DMA in Table E-1 above for the BMP Name/ID, DMA No. and BMP Type/Description. For Tree Wells, leave SMRHM* Passed Column and the columns to the left blank.*

If a bioretention BMP with capped underdrain is used and hydromodification requirements apply, then sizing calculations must demonstrate that the BMP meets flow duration control criteria with the underdrain capped and uncapped. Both calculations must be included.

E.3 Implement Sediment Supply BMPs

The sediment supply performance standard applies to PDPs for which hydromodification applied that have the potential to impact Potential Critical Coarse Sediment Yield Areas. Refer to Exhibit G-1 of the WQMP Guidance Document to determine if there are onsite Potential Critical Coarse Sediment Yield Areas (based on on-going WMAA analysis) or Potential Sediment Source Areas (sites added through the Regional Board review process). Select one of the two options below and include the Potential Critical Coarse Sediment Yield Area Exhibit showing your project location in Appendix 7.

☒ There are no mapped Potential Critical Coarse Sediment Yield Areas or Potential Sediment Source Areas on the site. Include a copy of Exhibit G - CCSY & PSS Areas in Appendix 7, with the project location marked. If the project is outside of the "Potential Critical Coarse Sediment Yield Areas and Potential Sediment Source Areas" then check this box. The Sediment Supply Performance Standard is met with no further action is needed.

☐ There are mapped Potential Critical Coarse Sediment Yield Areas or Potential Sediment Source Areas on the site, the Sediment Supply Performance Standard will be met through Option 1 (E.3.1) or Option 2 (E.3.2) below.

☐ **E.3.1 Option 1: Avoid Potential Critical Coarse Sediment Yield Areas and Potential Sediment Source Areas**

The simplest approach for complying with the Sediment Supply Performance Standard is to avoid impacts to areas identified as Potential Critical Coarse Sediment Yield Areas or Potential Sediment Supply Areas. If a portion of PDP is identified as a Potential Critical Coarse Sediment Yield Area or a Potential Sediment Source Area, that PDP may still achieve compliance with the Sediment Supply Performance Standards if Potential Critical Coarse Sediment Yield Areas and Potential Sediment Supply Areas are avoided, i.e. areas are not developed and thereby delivery of Critical Coarse Sediment to the receiving waters is not impeded by site developments.

Provide a narrative describing how the PDP has avoided impacts to Potential Critical Coarse Sediment Yield Areas and/or Potential Sediment Source Areas below.

Insert narrative description here

If it is not feasible to avoid these areas, proceed to Option 2 to complete a Site-Specific Critical Coarse Sediment Analysis.

☐ **E.3.2 Option 2: Site-Specific Critical Coarse Sediment Analysis**

Perform a stepwise assessment to ensure the pre-project source(s) of Critical Coarse Sediment (i.e., Bed Sediment Supply) is maintained:

Step 1: Identify if the site is an actual verified Critical Coarse Sediment Yield Area supplying Bed Sediment Supply to the receiving channel

☐ **Step 1.A** – Is the Bed Sediment of onsite streams similar to that of receiving streams?

Rate the similarity: ☐ High
☐ Medium
☐ Low

Results from the geotechnical and sieve analysis to be performed both onsite and in the receiving channel should be documented in Appendix 7. Of particular interest, the results of the sieve analysis, the soil erodibility factor, a description of the topographic relief of the project area, and the lithology of onsite soils should be reported in Appendix 7.

☐ **Step 1.B** – Are onsite streams capable of delivering Bed Sediment Supply from the site, if any, to the receiving channel?

Rate the potential:
☐ High
☐ Medium
☐ Low

Results from the analyses of the sediment delivery potential to the receiving channel should be documented in Appendix 7 and identify, at a minimum, the Sediment Source, the distance to the receiving channel, the onsite channel density, the project watershed area, the slope, length, land use, and rainfall intensity.

☐ **Step 1.C** – Will the receiving channel adversely respond to a change in Bed Sediment Load?

Rate the need for bed sediment supply:
☐ High
☐ Medium
☐ Low

Results from the in-stream analysis to be performed both onsite should be documented in Appendix 7. The analysis should, at a minimum, quantify the bank stability and the degree of incision, provide a gradation of the Bed Sediment within the receiving channel, and identify if the channel is sediment supply-limited.

☐ **Step 1.D** – Summary of Step 1

Summarize in Table E.3 the findings of Step 1 and associate a score (in parenthesis) to each step. The sum of the three individual scores determines if a stream is a significant contributor to the receiving stream.

- Sum is equal to or greater than eight - Site is a significant source of sediment bed material – all on-site streams must be preserved or by-passed within the site plan. The applicant shall proceed to Step 2 for all onsite streams.
- Sum is greater than five but lower than eight. Site is a source of sediment bed material – some of the on-site streams must be preserved (with identified streams noted). The applicant shall proceed to Step 2 for the identified streams only.
- Sum is equal to or lower than five. Site is not a significant source of sediment bed material. The applicant may advance to Section F.

Table E-2 Triad Assessment Summary

Step	Rating			Total Score
1.A	☐ High (3)	☐ Medium (2)	☐ Low (1)	

1.B	☐ High (3)	☐ Medium (2)	☐ Low (1)	
1.C	☐ High (3)	☐ Medium (2)	☐ Low (1)	
Significant Source Rating of Bed Sediment to the receiving channel(s)				

Step 2: Avoid Development of Critical Coarse Sediment Yield Areas, Potential Sediment Sources Areas, and Preserve Pathways for Transport of Bed Sediment Supply to Receiving Waters

Onsite streams identified as a actual verified Critical Coarse Sediment Yield Areas should be avoided in the site design and transport pathways for Critical Coarse Sediment should be preserved

Check those that apply:

☐ The site design does avoid all onsite channels identified as actual verified Critical Coarse Sediment Yield Areas ***AND***

☐ The drainage design bypasses flow and sediment from onsite upstream drainages identified as actual verified Critical Coarse Sediment Yield Areas to maintain Critical Coarse Sediment supply to receiving waters

(If both are yes, the applicant may disregard subsequent steps of Section E.3 and directly advance directly to Section G)

Or -

Provide in Appendix 7 a site map that identifies all onsite channels and highlights those onsite channels that were identified as a Significant Source of Bed Sediment. The site map shall demonstrate, if feasible, that the site design avoids those onsite channels identified as a Significant Source of Bed Sediment. In addition, the applicant shall describe the characteristics of each onsite channel identified as a Significant Source of Bed Sediment. If the design plan cannot avoid the onsite channels, please provide a rationale for each channel individually.

The site map shall demonstrate that the drainage design bypasses those onsite channels that supply Critical Coarse Sediment to the receiving channel(s). In addition, the applicant shall describe the characteristics of each onsite channel identified as an actual verified Critical Coarse Sediment Yield Area.

Identified Channel #1 - Insert narrative description here

Identified Channel #2 - Insert narrative description here

☐ The site design **does NOT avoid** all onsite channels identified as actual verified Critical Coarse Sediment Yield Areas

OR

☐ The project blocks the potential for Critical Coarse Sediment from migrating to receiving waters.

(If either of these are the case, the applicant shall continue completing this section).

E.3.3 Sediment Supply BMPs to Result in No Net Impact to Downstream Receiving Waters

If impacts to Critical Coarse Sediment Yield Areas cannot be avoided, sediment supply BMPs must be implemented such there is no net impact to receiving waters. Sediment supply BMPs may consist of

approaches that permit flux of bed sediment supply from Critical Coarse Sediment Yield Areas within the project boundary. This approach is subject to acceptance by the County of Riverside. It may require extensive documentation and analysis by qualified professionals to support this demonstration.

Appendix H of the San Diego Model BMP Design Manual provides additional information on site-specific investigation of Critical Coarse Sediment Supply areas.

http://www.projectcleanwater.org/download/2018-model-bmp-design-manual/

If applicable, insert narrative description here

Documentation of sediment supply BMPs should be detailed in Appendix 7.

Section F: Alternative Compliance

Alternative Compliance may be used to achieve compliance with pollutant control and/or hydromodification requirements for a given PDP. Alternative Compliance may be used under two scenarios, check the applicable box if the PDP is proposing to use Alternative Compliance to satisfy all or a portion of the Pollutant Control and/or Hydrologic Control requirements (but not sediment supply requirements)

☐ If it is not feasible to fully implement Infiltration or Biofiltration BMPs at a PDP site, Flow-Through Treatment Control BMPs may be used to treat pollutants contained in the portion of DCV not reliably retained on site and Alternative Compliance measures must also be implemented to mitigate for those pollutants in the DCV that are not retained or removed on site prior to discharging to a receiving water.

☐ Alternative Compliance is selected to comply with either pollutant control or hydromodification flow control requirements even if complying with these requirements is potentially feasible on-site. If such voluntary Alternative Compliance is implemented, Flow-Through Treatment Control BMPs must still be used to treat those pollutants in the portion of the DCV not reliably retained on site prior to discharging to a receiving water.

Refer to Section 2.7 of the SMR WQMP and consult the Local Jurisdiction for currently available Alternative Compliance pathways. Coordinate with the Copermittee if electing to participate in Alternative Compliance and complete the sections below to document implementation of the Flow-Through BMP component of the program.

F.1 Identify Pollutants of Concern

The purpose of this section is to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs and to document compliance and.

Utilize Table A-1 from Section A, which noted your project's Receiving Waters, to identify impairments for Receiving Waters (including downstream receiving waters) by completing Table F-1. Table F-1 includes the watersheds identified as impaired in the Approved 2010 303(d) list; check box corresponding with the PDP's receiving water. The most recent 303(d) lists are available from the State Water Resources Control Board website:
https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml).https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml.

Table F-1 Summary of Approved 2010 303(d) listed waterbodies and associated pollutants of concern for the Riverside County SMR Region and downstream waterbodies.

	Water Body	Nutrients[1]	Metals[2]	Toxicity	Bacteria and Pathogens	Pesticides and Herbicides	Sulfate	Total Dissolved Solids
☐	De Luz Creek	X	X				X	
☐	Long Canyon Creek		X		X	X		
☐	Murrieta Creek	X	X	X		X		
☐	Redhawk Channel	X	X		X	X		X
☐	Santa Gertudis Creek	X	X		X	X		
☐	Santa Margarita Estuary	X						
☐	Santa Margarita River (Lower)	X			X			
☐	Santa Margarita River (Upper)	X		X				
☐	Temecula Creek	X	X	X		X		X
☐	Warm Springs Creek	X	X		X	X		

[1] Nutrients include nitrogen, phosphorus and eutrophic conditions caused by excess nutrients.

[2] Metals includes copper, iron, and manganese.

Use Table F-2 to identify the pollutants identified with the project site. Indicate the applicable PDP Categories and/or Project Features by checking the boxes that apply. If the identified General Pollutant Categories are the same as those listed for your Receiving Waters, then these will be your Pollutants of Concern; check the appropriate box or boxes in the last row.

Table F-2 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)		General Pollutant Categories									
		Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease	Total Dissolved Solids	Sulfate
☐	Detached Residential Development	P	N	P	P	N	P	P	P	N	N
☐	Attached Residential Development	P	N	P	P	N	P	P	P[(2)]	N	N
☐	Commercial/Industrial Development	P[(3)]	P[(7)]	P[(1)]	P[(1)]	P	P[(1)]	P	P	N	N
☐	Automotive Repair Shops	N	P	N	N	P[(4, 5)]	N	P	P	N	N
☐	Restaurants (>5,000 ft^2)	P	N	N	P[(1)]	N	N	P	P	N	N
☐	Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P	N	N
☐	Parking Lots (>5,000 ft^2)	P[(6)]	P[(7)]	P[(1)]	P[(1)]	P[(4)]	P	P	P	N	N
☒	Streets, Highways, and Freeways	P[(6)]	P[(7)]	P[(1)]	P[(1)]	P[(4)]	P	P	P	N	N
☐	Retail Gasoline Outlets	N	P[(7)]	N	N	P[(4)]	N	P	P	N	N
Project Priority Pollutant(s) of Concern		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste products; otherwise not expected

(4) Including petroleum hydrocarbons

(5) Including solvents

(6) Bacterial indicators are routinely detected in pavement runoff

(7) A potential source of metals, primarily copper and zinc. Iron, magnesium, and aluminum are commonly found in the environment and are commonly associated with soils, but are not primarily of anthropogenic stormwater origin in the municipal environment.

F.2 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential Pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must be selected to address the Project Priority Pollutants of Concern (identified above) and meet the acceptance criteria described in Section 2.3.7 of the SMR WQMP. Documentation of acceptance criteria must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table F-3 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Copermittee Approved Study and provided in Appendix 6.
4 – Obtained from Final Report for BMP Retrofit Pilot Program, January 2004 prepared by Caltrans, Division of Environmental Analysis
5 – Obtained from Effectiveness of Best Management Practices for Bacteria Removal, June 2011 prepared by Emmons & Olivier Resources, Inc. (for Dry Detention Ponds)

F.3 Sizing Criteria

Utilize Table F-4 below to appropriately size flow-through BMPs to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.1 of the SMR WQMP for further information.

Table F-4 Treatment Control BMP Sizing

DMA Type/ID	DMA (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor			
	[A]		[B]	[C]	[A] x [C]			
						Design Storm Depth (in)	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*

[B], [C] is obtained as described in Section 2.6.1.b from the SMR WQMP
[E] either 0.2 inches or 2 times the 85th percentile hourly rainfall intensity
[G] = 43,560,.

F.4 Hydrologic Performance Standard – Alternative Compliance Approach

Alternative compliance options are only available if the governing Copermittee has acknowledged the infeasibility of onsite Hydrologic Control BMPs and approved an alternative compliance approach. See Section 3.5 and 3.6 of the SMR WQMP.

Select the pursued alternative and describe the specifics of the alternative:

☐ Offsite Hydrologic Control Management within the same channel system

Insert narrative description here

☐ In-Stream Restoration Project

Insert narrative description here

For Offsite Hydrologic Control BMP Option

Each Hydrologic Control BMP must be designed to ensure that the flow duration curve of the post-development DMA will not exceed that of the pre-existing, naturally occurring, DMA by more than ten percent over a one-year period. Using SMRHM, the applicant shall demonstrate that the performance of each designed Hydrologic Control BMP is equivalent with the Hydrologic Performance Standard for onsite conditions. Complete Table F-5 below and identify, for each Hydrologic Control BMP, the equivalent DMA the Hydrologic Control BMP mitigates, that the SMRHM model passed, the total volume capacity of the BMP, the BMP footprint at top floor elevation, and the drawdown time of the BMP. SMRHM summary reports for the alternative approach should be documented in Appendix 7. Refer to the SMRHM Guidance Document for additional information on SMRHM. You can add rows to the table as needed.

Table F-5 Offsite Hydrologic Control BMP Sizing

BMP Name / Type	Equivalent DMA (ac)	SMRHM Passed	BMP Volume (ac-ft)	BMP Footprint (ac)	Drawdown time (hr)
		☐			
		☐			
		☐			
		☐			

For Instream Restoration Option

Attach to Appendix 7 the technical report detailing the condition of the receiving channel subject to the proposed hydrologic and sediment regimes. Provide the full design plans for the in-stream restoration project that have been approved by the Copermittee. Utilize the San Diego Regional Water Quality Equivalency Guidance Document.

Section G: Implement Trash Capture BMPs

The Santa Margarita Regional Board has required Full Trash Capture compliance thru Order No. R9-2017-007. For the Santa Margarita Watershed, the County is requiring Track 1 full trash capture compliance for projects proposing the following uses as part of their development after **December 3, 2018**.

- High-density residential: all land uses with at least ten (10) developed dwelling units/acre.
- Industrial: land uses where the primary activities on the developed parcels involve product manufacture, storage, or distribution (e.g., manufacturing businesses, warehouses, equipment storage lots, junkyards, wholesale businesses, distribution centers, or building material sales yards).
- Commercial: land uses where the primary activities on the developed parcels involve the sale or transfer of goods or services to consumers (e.g., business or professional buildings, shops, restaurants, theaters, vehicle repair shops, etc.).
- Mixed urban: land uses where high-density residential, industrial, and/or commercial land uses predominate collectively (i.e., are intermixed).
- Public transportation stations: facilities or sites where public transit agencies' vehicles load or unload passengers or goods (e.g., bus stations and stops).

Riverside County Maintenance is generally supportive of United Storm Water – Connector Pipe Screens or equivalent. Equivalent systems or alternative designs shall be on the State of California Approved Trash Capture Device List and requires approval by the Transportation Department for maintenance. Riverside County is developing Trash Capture Device Standards, which are expected to be added to the Transportation Plan Check Policies and Guidelines when available. Design calculations are not expected to be required if the project uses standard sizes per the County's Trash Capture Device Standards. Until the Trash Capture Device Standards are available and the project uses standard sizes, the project shall complete the following tables and furnish hydraulic analysis calculating the flowrate in the catch basin does not exceed the flowrate capacity of the trash capture device in a fully clogged condition.

Trash Capture BMPs may be applicable to Type 'D' DMAs, as defined in Section 2.3.4 of the SMR WQMP. Trash Capture BMPs are designed to treat Q_{TRASH}, the runoff flow rate generated during the 1-year 1-hour precipitation depth. Utilize Table G-1 to size Trash Capture BMP. Refer to Table G-2 to determine the Trash Capture Design Storm Intensity (E).

This project does not need to implement trash capture BMPS.

Table G-1 Sizing Trash Capture BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor		
	[A]		[B]	[C]	[A] x [C]		
						Trash Capture Design Storm Intensity (in)	*Trash Capture Design Flow Rate (cubic feet or cfs)*

[B], [C] is obtained as described in Section 2.6.1.b from the SMR WQMP
[G] = 43,560

Table G-2 Approximate precipitation depth/intensity values for calculation of the Trash Capture Design Storm

City	1-year 1-hour Precipitation Depth/Intensity (inches/hr)
Murrieta	0.47
Temecula	0.50
Wildomar	0.37

Use Table G-3 to summarize and document the selection and sizing of Trash Capture BMPs.

Table G-3 Trash Capture BMPs

BMP Name / ID	DMA No(s)	BMP Type / Description	Required Trash Capture Flowrate (cf)	Provided Trash Capture Flowrate (cf)[1]

[1] For connector pipe screens, the Trash Capture Flowrate shall be based on a fully clogged condition for the screen, where the water level is at the top of the screen. Then determined the Flowrate based on weir equation (Qweir = C x L x H^(2/3), where C = 3.4). The height used to calculate the weir flow rate shall maintain a 6" freeboard to the invert of the catch basin opening at the road. This analysis is meant to replicate the hydraulic analysis used in the County's Full Trash Capture Device Standards.

Section H: Source Control BMPs

Section H need only be completed at the Preliminary WQMP phase if source control is critical to the project successfully handling the anticipated pollutants.

Source Control BMPs include permanent, structural features that may be required in your Project plans, such as roofs over and berms around trash and recycling areas, and Operational BMPs, such as regular sweeping and "housekeeping," that must be implemented by the site's occupant or user. The Maximum Extent Practicable (MEP) standard typically requires both types of BMPs. In general, Operational Source Control BMPs cannot be substituted for a feasible and effective Structural Source Control BMP. Complete checklist below to determine applicable Source Control BMPs for your site.

Project-Specific WQMP Source Control BMP Checklist

All development projects must implement Source Control BMPs. Source Control BMPs are used to minimize pollutants that may discharge to the MS4. Refer to Chapter 3 (Section 3.8) of the SMR WQMP for additional information. Complete Steps 1 and 2 below to identify Source Control BMPs for the project site.

Step 1: Identify Pollutant Sources

Review project site plans and identify the applicable pollutant sources. "Yes" indicates that the pollutant source is applicable to project site. "No" indicates that the pollutant source is not applicable to project site.

☒ Yes ☐ No	Storm Drain Inlets		☐ Yes ☒ No	Outdoor storage areas	
☐ Yes ☒ No	Floor Drains		☐ Yes ☒ No	Material storage areas	
☐ Yes ☒ No	Sump Pumps		☐ Yes ☒ No	Fueling areas	
☒ Yes ☐ No	Pets Control/Herbicide Application		☐ Yes ☒ No	Loading Docks	
☐ Yes ☒ No	Food Service Areas		☐ Yes ☒ No	Fire Sprinkler Test/Maintenance water	
☒ Yes ☐ No	Trash Storage Areas		☒ Yes ☐ No	Plazas, Sidewalks and Parking Lots	
☐ Yes ☒ No	Industrial Processes		☒ Yes ☐ No	Pools, Spas, Fountains and other water features	
☐ Yes ☒ No	Vehicle and Equipment Cleaning and Maintenance/Repair Areas				

Step 2: Required Source Control BMPs

List each Pollutant source identified above in column 1 and fill in the corresponding Structural Source Control BMPs and Operational Control BMPs by referring to the Stormwater Pollutant Sources/Source Control Checklist included in Appendix 8. The resulting list of structural and operational source control BMPs must be implemented as long as the associated sources are present on the project site. Add additional rows as needed.

Pollutant Source	Structural Source Control BMP	Operational Source Control BMP
Storm Drain Inlets	Mark "Only Rain Down the Storm Drain" or similar. Catch basin markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	• Maintain and periodically repaint or replace markers. Provide stormwater pollution prevention information to new site owners, lessees, employees or operators.
Pest Control/Herbicide Application	• Note building design features that discourage entry of pests.	• Maintain landscaping using minimum or no pesticides.

	• Preserve existing native trees, shrubs, and ground cover to the maximum extent practicable. • Design landscaping to minimize irrigation and runoff to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. • Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. • Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plans appropriate to site soils, slopes, climate, sun, wind, rain, landuse, air movement, ecological consistency, and plant interactions.	• See applicable operational BMPs in "What you should know for Landscape and Gardening" • Provide Integrated Pest Management information to new owners, lessees and operators
Trash Storage Areas	• Trash receptacles will be covered or closed at all times. • Signs will be posted on dumpsters stating "Do not dump hazardous materials here" or similar.	• Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping or liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com
Plazas, sidewalks and parking lots		• Sweep sidewalks regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into storm drain system.
Pools, Spas, Fountains and other water features	• Connections for pools will be per the co-permittee requirements	• See applicable operational BMPs in "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/

Section I: Coordinate Submittal with Other Site Plans

For Final WQMPs, populate Table I-1 below to assist the plan checker in an expeditious review of your project. During construction and at completion, County of Riverside inspectors will verify the installation of BMPs against the approved plans. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table I-1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
A	Subsurface Biofiltration Basin A	TBD

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. The Copermittee with jurisdiction over the Project site can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Use Table I-2 to identify other applicable permits that may impact design of the site. If yes is answered to any of the items below, the Copermittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Table I-2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act Section 401 Water Quality Certification	☐ Y	☒ N
US Army Corps of Engineers, Clean Water Act Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☒ Y	☐ N
Other *(please list in the space below as required)* Grading Permit, Building Permit, Encroachment Permit	☒ Y	☐ N

Section J: Operation, Maintenance and Funding

Applicant is required to state the intended responsible party for BMP Operation, Maintenance and Funding at the Preliminary WQMP phase. The remaining requirements as outlined above are required for Final WQMP only.

The Copermittee with jurisdiction over the Project site will periodically verify that BMPs on your Project are maintained and continue to operate as designed. To make this possible, the Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement maintenance of BMPs in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized Operations and Maintenance or inspections but will require typical landscape maintenance as noted in Chapter 5, in the SMR WQMP. Include a brief description of typical landscape maintenance for these areas.

The Copermittee with jurisdiction over the Project site will also require that you prepare and submit a detailed BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a BMP Operation and Maintenance Plan are in Chapter 5 of the SMR WQMP.

Maintenance Mechanism: Temecula Valley Charter School

Will the proposed BMPs be maintained by a Homeowners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9, **see Appendix 9 for additional instructions.** Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Section K: Acronyms, Abbreviations and Definitions

Regional MS4 Permit	Order No. R9-2013-0001 as amended by Order No. R9-2015-0001 and Order No. R9-2015-0100 an NPDES Permit issued by the San Diego Regional Water Quality Control Board.
Applicant	Public or private entity seeking the discretionary approval of new or replaced improvements from the Copermittee with jurisdiction over the project site. The Applicant has overall responsibility for the implementation and the approval of a Priority Development Project. The WQMP uses consistently the term "user" to refer to the applicant such as developer or project proponent. The WQMP employs also the designation "user" to identify the Registered Professional Civil Engineer responsible for submitting the Project-Specific WQMP, and designing the required BMPs.
Best Management Practice (BMP)	Defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In the case of municipal storm water permits, BMPs are typically used in place of numeric effluent limits.
BMP Fact Sheets	BMP Fact Sheets are available in the LID BMP Design Handbook. Individual BMP Fact Sheets include sitting considerations, and design and sizing guidelines for seven types of structural BMPs (infiltration basin, infiltration trench, permeable pavement, harvest-and-use, bioretention, extended detention basin, and sand filter).
California Stormwater Quality Association (CASQA)	Publisher of the California Stormwater Best Management Practices Handbooks, available at www.cabmphandbooks.com.
Conventional Treatment Control BMP	A type of BMP that provides treatment of stormwater runoff. Conventional treatment control BMPs, while designed to treat particular Pollutants, typically do not provide the same level of volume reduction as LID BMPs, and commonly require more specialized maintenance than LID BMPs. As such, the Regional MS4 Permit and this WQMP require the use of LID BMPs wherever feasible, before Conventional Treatment BMPs can be considered or implemented.
Copermittees	The Regional MS4 Permit identifies the Cities of Murrieta, Temecula, and Wildomar, the County, and the District, as Copermittees for the SMR.

County	The abbreviation refers to the County of Riverside in this document.
CEQA	California Environmental Quality Act - a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.
CIMIS	California Irrigation Management Information System - an integrated network of 118 automated active weather stations all over California managed by the California Department of Water Resources.
CWA	Clean Water Act - is the primary federal law governing water pollution. Passed in 1972, the CWA established the goals of eliminating releases of high amounts of toxic substances into water, eliminating additional water pollution by 1985, and ensuring that surface waters would meet standards necessary for human sports and recreation by 1983. CWA Section 402(p) is the federal statute requiring NPDES permits for discharges from MS4s.
CWA Section 303(d) Waterbody	Impaired water in which water quality does not meet applicable water quality standards and/or is not expected to meet water quality standards, even after the application of technology based pollution controls required by the CWA. The discharge of urban runoff to these water bodies by the Copermittees is significant because these discharges can cause or contribute to violations of applicable water quality standards.
Design Storm	The Regional MS4 Permit has established the 85th percentile, 24-hour storm event as the "Design Storm". The applicant may refer to Exhibit A to identify the applicable Design Storm Depth (D85) to the project.
DCV	Design Capture Volume (DCV) is the volume of runoff produced from the Design Storm to be mitigated through LID Retention BMPs, Other LID BMPs and Volume Based Conventional Treatment BMPs, as appropriate.
Design Flow Rate	The design flow rate represents the minimum flow rate capacity that flow-based conventional treatment control BMPs should treat to the MEP, when considered.
DCIA	Directly Connected Impervious Areas - those impervious areas that are hydraulically connected to the MS4 (i.e. street curbs, catch basins, storm drains, etc.) and thence to the structural BMP without flowing over pervious areas.
Discretionary Approval	A decision in which a Copermittee uses its judgment in deciding whether and how to carry out or approve a project.
District	Riverside County Flood Control and Water Conservation District.

DMA	A Drainage Management Area - a delineated portion of a project site that is hydraulically connected to a common structural BMP or conveyance point. The Applicant may refer to Section 3.3 for further guidelines on how to delineate DMAs.
Drawdown Time	Refers to the amount of time the design volume takes to pass through the BMP. The specified or incorporated drawdown times are to ensure that adequate contact or detention time has occurred for treatment, while not creating vector or other nuisance issues. It is important to abide by the drawdown time requirements stated in the fact sheet for each specific BMP.
Effective Area	Area which 1) is suitable for a BMP (for example, if infiltration is potentially feasible for the site based on infeasibility criteria, infiltration must be allowed over this area) and 2) receives runoff from impervious areas.
ESA	An Environmental Sensitive Area (ESA) designates an area "in which plants or animals life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which would be easily disturbed or degraded by human activities and developments". (Reference: California Public Resources Code § 30107.5).
ET	Evapotranspiration (ET) is the loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues). It is also an indicator of how much water crops, lawn, garden, and trees need for healthy growth and productivity
FAR	The Floor Area Ratio (FAR) is the total square feet of a building divided by the total square feet of the lot the building is located on.
Flow-Based BMP	Flow-based BMPs are conventional treatment control BMPs that are sized to treat the design flow rate.
FPPP	Facility Pollution Prevention Plan
HCOC	Hydrologic Condition of Concern - Exists when the alteration of a site's hydrologic regime caused by development would cause significant impacts on downstream channels and aquatic habitats, alone or in conjunction with impacts of other projects.
HMP	Hydromodification Management Plan – Plan defining Performance Standards for PDPs to manage increases in runoff discharge rates and durations.
Hydrologic Control BMP	BMP to mitigate the increases in runoff discharge rates and durations and meet the Performance Standards set forth in the HMP.
HSG	Hydrologic Soil Groups – soil classification to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. The HSGs are A (very low runoff potential/high infiltration rate), B, C, and D (high runoff potential/very low infiltration rate)

Hydromodification	The Regional MS4 Permit identifies that increased volume, velocity, frequency and discharge duration of storm water runoff from developed areas has the potential to greatly accelerate downstream erosion, impair stream habitat in natural drainages, and negatively impact beneficial uses.
JRMP	A separate Jurisdictional Runoff Management Plan (JRMP) has been developed by each Copermittee and identifies the local programs and activities that the Copermittee is implementing to meet the Regional MS4 Permit requirements.
LID	Low Impact Development (LID) is a site design strategy with a goal of maintaining or replicating the pre-development hydrologic regime through the use of design techniques. LID site design BMPs help preserve and restore the natural hydrologic cycle of the site, allowing for filtration and infiltration which can greatly reduce the volume, peak flow rate, velocity, and pollutant loads of storm water runoff.
LID BMP	A type of stormwater BMP that is based upon Low Impact Development concepts. LID BMPs not only provide highly effective treatment of stormwater runoff, but also yield potentially significant reductions in runoff volume – helping to mimic the pre-project hydrologic regime, and also require less ongoing maintenance than Treatment Control BMPs. The applicant may refer to Chapter 2.
LID BMP Design Handbook	The LID BMP Design Handbook was developed by the Copermittees to provide guidance for the planning, design and maintenance of LID BMPs which may be used to mitigate the water quality impacts of PDPs within the County.
LID Bioretention BMP	LID Bioretention BMPs are bioretention areas are vegetated (i.e., landscaped) shallow depressions that provide storage, infiltration, and evapotranspiration, and provide for pollutant removal (e.g., filtration, adsorption, nutrient uptake) by filtering stormwater through the vegetation and soils. In bioretention areas, pore spaces and organic material in the soils help to retain water in the form of soil moisture and to promote the adsorption of pollutants (e.g., dissolved metals and petroleum hydrocarbons) into the soil matrix. Plants use soil moisture and promote the drying of the soil through transpiration. The Regional MS4 Permit defines "retain" as to keep or hold in a particular place, condition, or position without discharge to surface waters.
LID Biofiltration BMP	BMPs that reduce stormwater pollutant discharges by intercepting rainfall on vegetative canopy, and through incidental infiltration and/or evapotranspiration, and filtration, and other biological and chemical processes. As stormwater passes down through the planting soil, pollutants are filtered, adsorbed, biodegraded, and sequestered by the soil and plants, and collected through an underdrain.

LID Harvest and Reuse BMP	BMPs used to facilitate capturing Stormwater Runoff for later use without negatively impacting downstream water rights or other Beneficial Uses.
LID Infiltration BMP	BMPs to reduce stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite soils. Typical LID Infiltration BMPs include infiltration basins, infiltration trenches and pervious pavements.
LID Retention BMP	BMPs to ensure full onsite retention without runoff of the DCV such as infiltration basins, bioretention, chambers, trenches, permeable pavement and pavers, harvest and reuse.
LID Principles	Site design concepts that prevent or minimize the causes (or drivers) of post-construction impacts, and help mimic the pre-development hydrologic regime.
MEP	Maximum Extent Practicable - standard established by the 1987 amendments to the CWA for the reduction of Pollutant discharges from MS4s. Refer to Attachment C of the Regional MS4 Permit for a complete definition of MEP.
MF	Multi-family – zoning classification for parcels having 2 or more living residential units.
MS4	Municipal Separate Storm Sewer System (MS4) is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designated or used for collecting or conveying storm water; (iii) Which is not a combined sewer; (iv) Which is not part of the Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.26.
New Development Project	Defined by the Regional MS4 Permit as 'Priority Development Projects' if the project, or a component of the project meets the categories and thresholds described in Section 1.1.1.
NPDES	National Pollution Discharge Elimination System - Federal program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the CWA.
NRCS	Natural Resources Conservation Service

PDP	Priority Development Project - Includes New Development and Redevelopment project categories listed in Provision E.3.b of the Regional MS4 Permit.
Priority Pollutants of Concern	Pollutants expected to be present on the project site and for which a downstream water body is also listed as Impaired under the CWA Section 303(d) list or by a TMDL.
Project-Specific WQMP	A plan specifying and documenting permanent LID Principles and Stormwater BMPs to control post-construction Pollutants and stormwater runoff for the life of the PDP, and the plans for operation and maintenance of those BMPs for the life of the project.
Receiving Waters	Waters of the United States.
Redevelopment Project	The creation, addition, and or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include trenching and resurfacing associated with utility work; resurfacing existing roadways; new sidewalk construction, pedestrian ramps, or bike lane on existing roads; and routine replacement of damaged pavement, such as pothole repair. Project that meets the criteria described in Section 1.
Runoff Fund	Runoff Funds have not been established by the Copermittees and are not available to the Applicant. If established, a Runoff Fund will develop regional mitigation projects where PDPs will be able to buy mitigation credits if it is determined that implementing onsite controls is infeasible.
San Diego Regional Board	San Diego Regional Water Quality Control Board - The term "Regional Board", as defined in Water Code section 13050(b), is intended to refer to the California Regional Water Quality Control Board for the San Diego Region as specified in Water Code Section 13200. State agency responsible for managing and regulating water quality in the SMR.
SCCWRP	Southern California Coastal Water Research Project
Site Design BMP	Site design BMPs prevent or minimize the causes (or drivers) of post-construction impacts, and help mimic the pre-development hydrologic regime.
SF	Parcels with a zoning classification for a single residential unit.
SMC	Southern California Stormwater Monitoring Coalition
SMR	The Santa Margarita Region (SMR) represents the portion of the Santa Margarita Watershed that is included within the County of Riverside.

Source Control BMP	Source Control BMPs land use or site planning practices, or structural or nonstructural measures that aim to prevent runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between Pollutants and runoff.
Structural BMP	Structures designed to remove pollutants from stormwater runoff and mitigate hydromodification impacts.
SWPPP	Storm Water Pollution Prevention Plan
Tentative Tract Map	Tentative Tract Maps are required for all subdivision creating five (5) or more parcels, five (5) or more condominiums as defined in Section 783 of the California Civil Code, a community apartment project containing five (5) or more parcels, or for the conversion of a dwelling to a stock cooperative containing five (5) or more dwelling units.
TMDL	Total Maximum Daily Load - the maximum amount of a Pollutant that can be discharged into a waterbody from all sources (point and non-point) and still maintain Water Quality Standards. Under CWA Section 303(d), TMDLs must be developed for all waterbodies that do not meet Water Quality Standards after application of technology-based controls.
USEPA	United States Environmental Protection Agency
Volume-Based BMP	Volume-Based BMPs applies to BMPs where the primary mode of pollutant removal depends upon the volumetric capacity such as detention, retention, and infiltration systems.
WQMP	Water Quality Management Plan
Wet Season	The Regional MS4 Permit defines the wet season from October 1 through April 30.

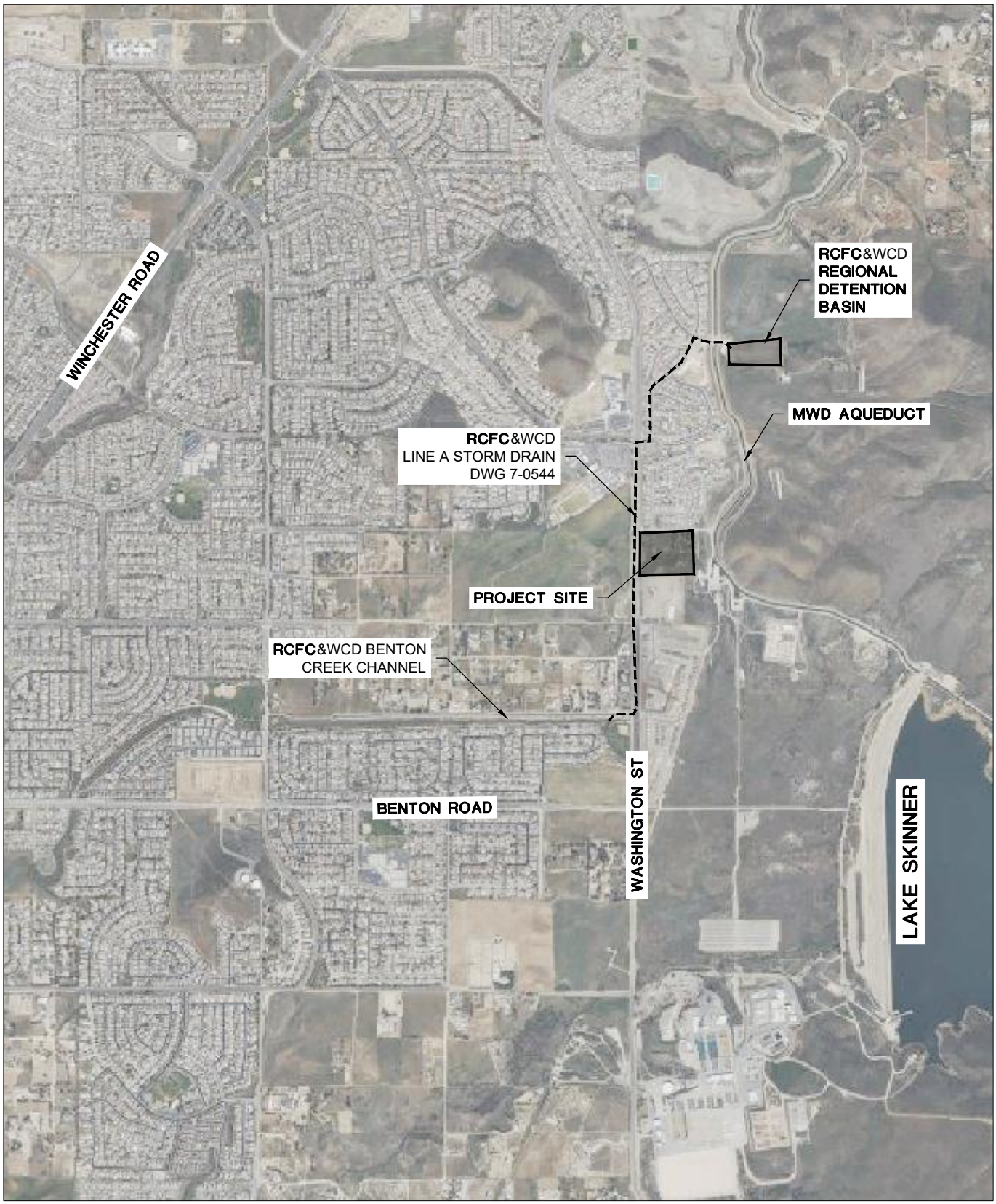
Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

Complete the checklist below to verify all exhibits and components are included in the Project-Specific WQMP. Refer Section 4 of the SMR WQMP and Section D of this Template.

Map and Site Plan Checklist
Indicate all Maps and Site Plans are included in your Project-Specific WQMP by checking the boxes below.
☒ Vicinity and Location Map
☐ Existing Site Map (unless exiting conditions are included in WQMP Site Plan)
☒ WQMP Site Plan
☒ Parcel Boundary and Project Footprint
☒ Existing and Proposed Topography & Drainage Management Areas (DMAs)
☒ Proposed Structural Best Management Practices (BMPs), with cross sections
☒ Drainage Paths
☒ Drainage infrastructure, inlets, overflows
☒ Source Control & Site Design BMPs (notes can be used for BMPs that can't be depicted)
☐ Buildings, Roof Lines, Downspouts
☒ Impervious Surfaces
☒ Pervious Surfaces (i.e. Landscaping)
☒ Standardized Labeling
☒ Use Riverside County Flood Control CB-110 for outlet structure with block outs for a trash screen out the outside, and an orifice/weir plate(s) on the inside of the structure or other design that is as easy to maintain. The screen should be as large as possible to minimize clogging.
☐ If BMPs are in the road R/W (only with CFD/CSA maintenance or LID Principals) add "BMP" paddle markers at the start and end of each BMPs and LID principals
☒ When underdrain are proposed, gravel shall be clean washed gravel, AASHTO #57 stone preferred. Underdrains shall be Schedule 40 PVC, with a minimum slope of 0.005, with cleanouts equal in diameter of the subdrain that extends 6 inches above the media with a lockable screw cap, spaced every 50 feet, at the collector drain line connection, and at any bends.
☒ When BSM is proposed, BSM shall consist of 60-80% clean sand, up to 20% clean topsoil, and 20% of a nutrient-stabilized organic amendment. BSM shall be placed on top of 3-inches of Choker Sand placed on top of 3-inches of ASTM No. 8 stone (1/4 to 1/2-inch pea gravel), and placed on top of 12 to 24-inches of a clean, open-graded drain rock layer.
☒ For Tracts, the Regional Board requires fully functioning WQMP BMPs for opening model home complexes, sales offices, or use of roads (i.e. prior to occupancy or intended use of any portion of the project). The County encourages phasing post-construction BMPs, small structural BMPs (e.g. specifically for sales offices), or self-retaining areas. This phasing can be shown on the WQMP site map and sequencing shall be included on the Grading plans, so that a fully functioning WQMP BMP is addressing any portion of the project that has been granted occupancy or granted the intended use.

Vicinity Map

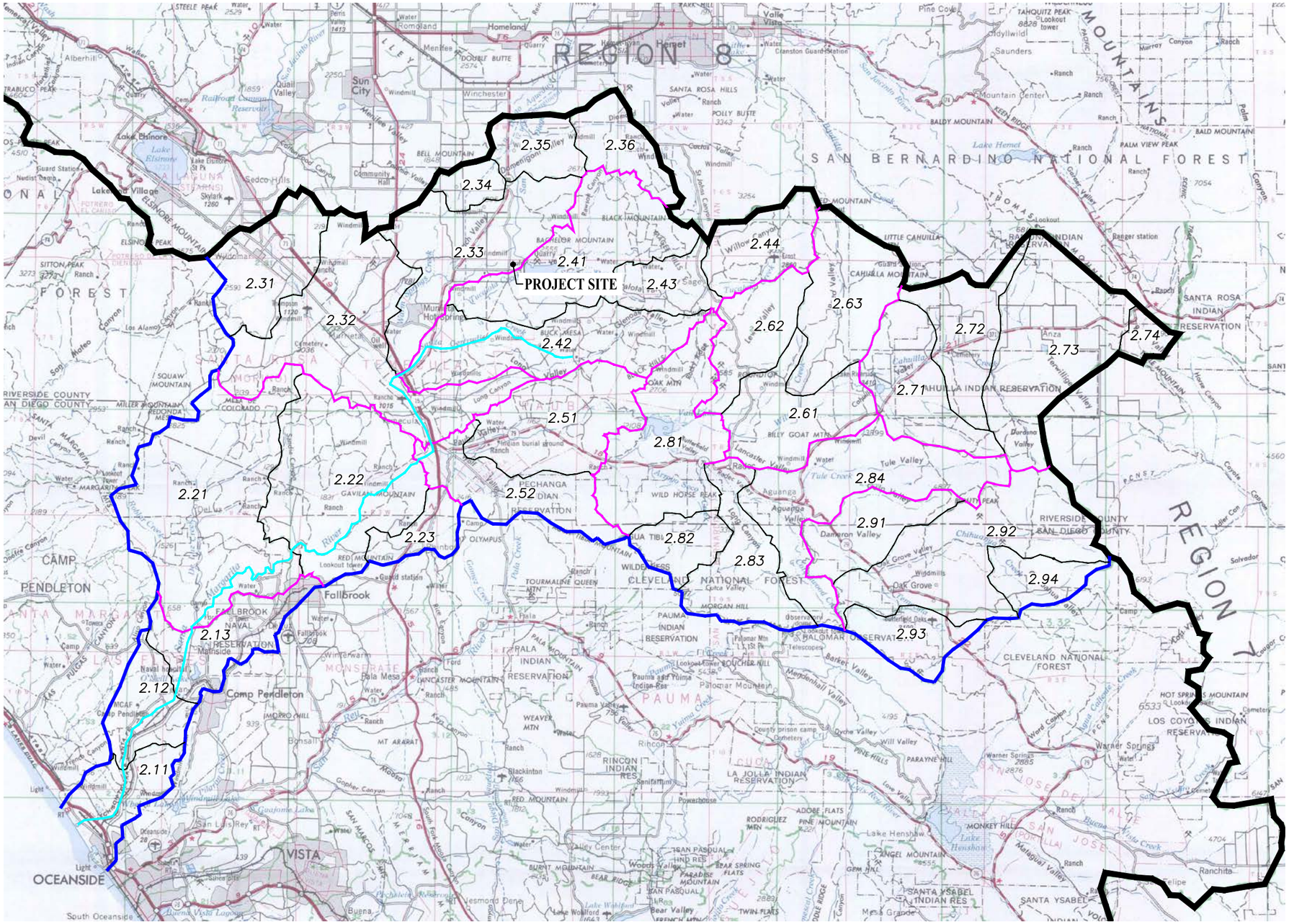


VICINITY MAP

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Receiving Waters Map



LEGEND

- Regional Boundary
- Hydrologic Unit Boundary (HU)
- Hydrologic Area Boundary (HA)
- Hydrologic Subarea Boundary (SA)
- FLOW PATH

902.00	SANTA MARGARITA HYDROLOGIC UNIT
902.10	Ysidora HA
2.11	Lower Ysidora HSA
2.12	Chappo HSA
2.13	Upper Ysidora HSA
902.20	DeLuz HA
2.21	DeLuz Creek HSA
2.22	Gavilan HSA
2.23	Vallecitos HSA
902.30	Murrieta HA
2.31	Wildomar HSA
2.32	Murrieta HSA
2.33	French HSA
2.34	Lower Domenigoni HSA
2.35	Domenigoni HSA
2.36	Diamond HSA
902.40	Auld HA
2.41	Bachelor Mountain HSA
2.42	Gertrudis HSA
2.43	Lower Tucalota HSA
2.44	Tucalota HSA
902.50	Pechanga HA
2.51	Pauba HSA
2.52	Wolf HSA
902.60	Wilson HA
2.61	Lancaster Valley HSA
2.62	Lewis HSA
2.63	Reed Valley HSA
902.70	Cave Rocks HA
2.71	Lower Coahuila HSA
2.72	Upper Coahuila HSA
2.73	Anza HSA
2.74	Burnt HSA
902.80	Aguanga HA
2.81	Vail HSA
2.82	Devils Hole HSA
2.83	Redec HSA
2.84	Tule Creek HSA
902.90	Oakgrove HA
2.91	Lower Culp HSA
2.92	Previtt Canyon HSA
2.93	Dodge HSA
2.94	Chihuahua HSA

TEMECULA VALLEY CHARTER SCHOOL
RECEIVING WATERS MAP

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RECEIVING WATERS MAP

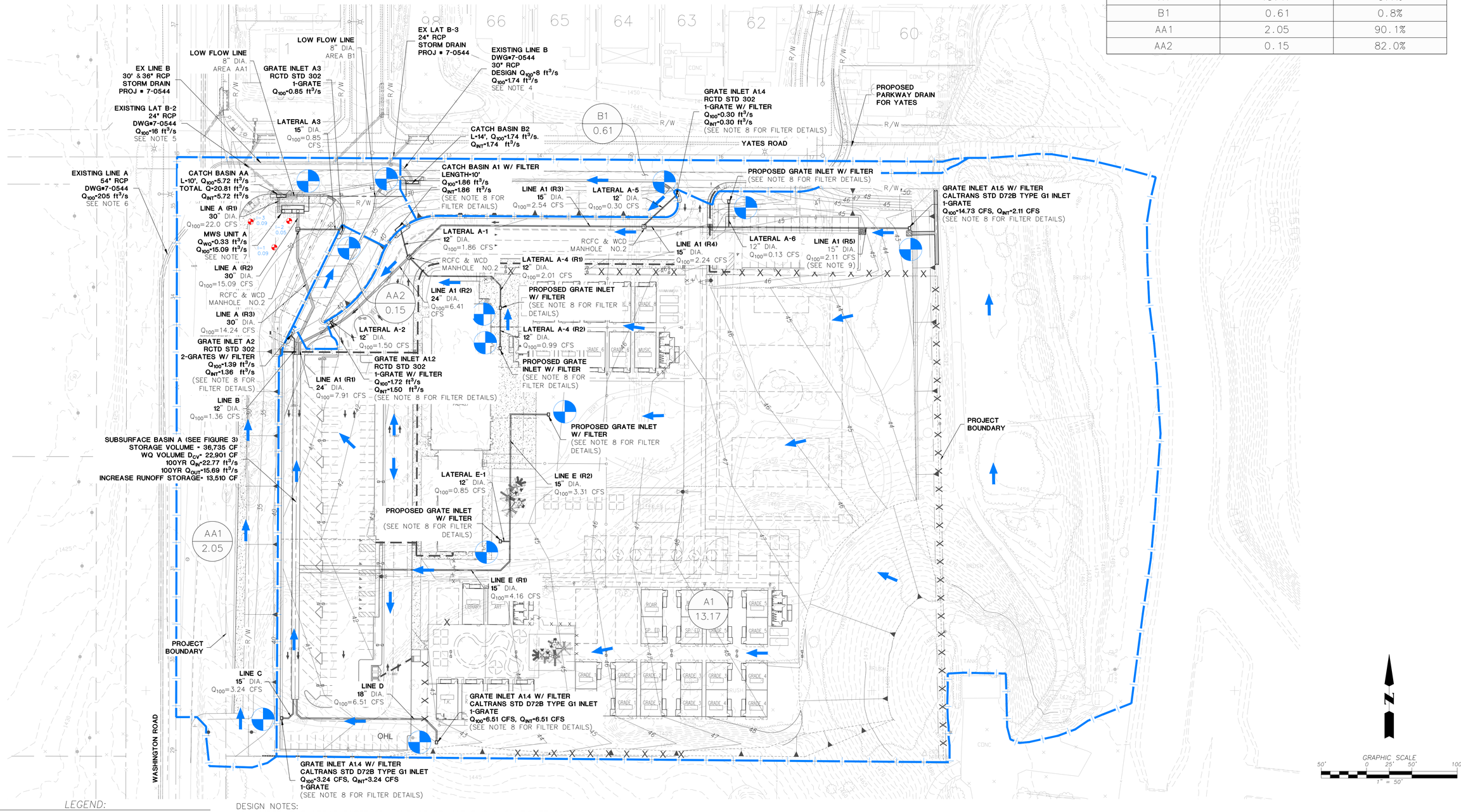
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Figure 1 – WQMP Site Plan

WQMP SITE PLAN

COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

DMA AREA IMPERVIOUS PERCENT (SEE NOTE 1)		
DMA	AREA	EFFECTIVE IMPERVIOUS%
A1	13.17	0.7%
B1	0.61	0.8%
AA1	2.05	90.1%
AA2	0.15	82.0%



LEGEND:

XXX / X.X — DMA NAME / ACRES

FLOW PATH

WATERSHED BOUNDARY

SOURCE CONTROL:

STORM DRAIN INLETS

INFILTRATION TEST LOCATIONS AND INFILTRATION RATE (IN/HR)

I = X.XX

DESIGN NOTES:

1. IMPERVIOUS AREAS BASED ON LAND COVER MAP SHOWN ON FIGURE 2.
2. DUE TO PROJECT CONSTRAINTS DMA B1 AND DMA AA1 WILL BE TREATED USING A CATCH BASIN DIVERSION DEVICE TO SEND LOW FLOWS INTO MODULAR WETLAND SYSTEM. THESE AREAS PRODUCE RUNOFF FROM STREET RIGHT-OF-WAY.
3. SUBSURFACE BASIN A HAS BEEN DESIGNED TO CAPTURE THE D_{CV} AND INCREASE RUNOFF. THE PROJECT IS USING A COMBINATION OF TWO STRUCTURES a) SUBSURFACE STORMTECH MC-7200 AND b) MODULAR WETLAND SYSTEM. MODULAR WETLAND IS CLASSIFIED AS A PRIORITY 2 BIOFILTRATION BMP PER WQMP GUIDELINES SECTION 2.3.2.
4. EXISTING LINE B HAS BEEN CONSTRUCTED PER DWG# 7-0544. FLOW RATES LIMITED TO 8 CFS.
5. EXISTING LATERAL B-2 HAS BEEN CONSTRUCTED PER DWG# 7-0544. FLOW RATE LIMITED TO 16 CFS. CB AA INTERCEPTS 5.7 CFS. AS A RESULT, SUBSURFACE BASIN B WILL BE LIMITED TO APPROXIMATELY 14.7 CFS.
6. LINE A 54" STORM DRAIN DISCHARGED INTO RCFC&WCD BENTON CHANNEL WHICH IS A 100 YEAR STORM DRAIN FACILITY.
7. THE MWS WILL BE A MODEL # MWS-L-8-12 WHICH HAS A TREATMENT FLOW RATE CAPACITY OF 0.346 CFS AND A TREATMENT VOLUME CAPACITY OF 15,109 CF AT 48-HOUR DRAIN DOWN. THE DESIGN WQ FLOW RATE IS 0.33 CFS AND THE DESIGN WQ VOLUME IS 12,876 CF.
8. ALL INLETS THAT DRAIN DIRECTLY TO THE SUBSURFACE BASIN SHALL BE INSTALLED WITH FLOGARD +PLUS® STANDARD CATCH BASIN INSERT FILTERS. SEE APPENDIX 6 FOR FILTER DETAILS.
9. A PORTION OF DMA A1 WILL BE RETAINED TO THE EAST OF THE PROPOSED SOCCER FIELD. THIS RETENTION AREA WILL RECEIVE 14.73 CFS AND DISCHARGE 2.11 CFS INTO INLET A1.5.

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FIGURE 1

WQMP SITE PLAN

TEMECULA VALLEY CHARTER SCHOOL

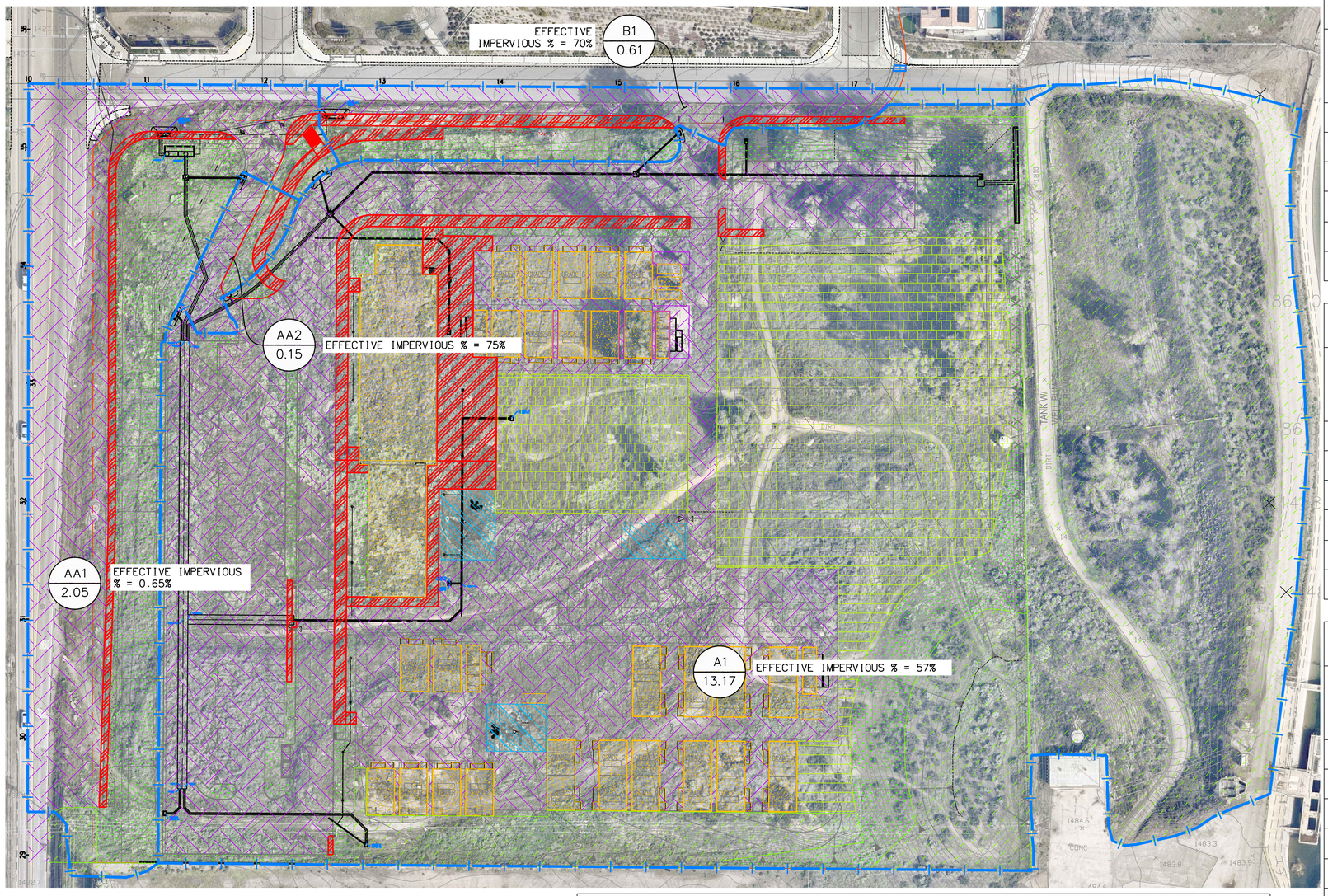
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Figure 2 – Land Use Map

TEMECULA VALLEY CHARTER SCHOOL

COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

LAND USE COVER



DMA AA1				
SURFACE TYPE	AREA (FT^2)	AREA (AC-FT)	EFFECTIVE IMPERVIOUS FRACTION, I_f	COMPOSITE I_f
CONCRETE OR ASPHALT	54361.05	1.25	1.00	0.65
ROOFS	0	0	1.00	
TURF	0	0	0.10	
ORNAMENTAL LANDSCAPING	32949.67	0.76	0.10	
NATURAL (C SOIL)	2008.85	0.05	0.30	
NATURAL (D SOIL)	0	0	0.40	

DMA AA2				
SURFACE TYPE	AREA (FT^2)	AREA (AC-FT)	EFFECTIVE IMPERVIOUS FRACTION, I_f	COMPOSITE I_f
CONCRETE OR ASPHALT	4591.98	0.11	1.00	0.75
ROOFS	0	0	1.00	
TURF	0	0	0.10	
ORNAMENTAL LANDSCAPING	1794.67	0.04	0.10	
NATURAL (C SOIL)	0	0	0.30	
NATURAL (D SOIL)	0	0	0.40	

DMA B1				
SURFACE TYPE	AREA (FT^2)	AREA (AC-FT)	EFFECTIVE IMPERVIOUS FRACTION, I_f	COMPOSITE I_f
CONCRETE OR ASPHALT	17152.27	0.39	1.00	0.70
ROOFS	0	0.00	1.00	
TURF	0	0.00	0.10	
ORNAMENTAL LANDSCAPING	7956.54	0.18	0.10	
NATURAL (C SOIL)	0	0.00	0.30	
NATURAL (D SOIL)	1594.69	0.04	0.40	

LEGEND:

- BUILDING
- PAVEMENT
- PLAYGROUND IMPERVIOUS
- CONCRETE
- TURF
- LANDSCAPE
- OPEN SPACE

GRAPHIC SCALE
50' 0 25' 50' 100'
1" = 50'

DMA A1				
SURFACE TYPE	AREA (FT^2)	AREA (AC-FT)	EFFECTIVE IMPERVIOUS FRACTION, I_f	COMPOSITE I_f
CONCRETE OR ASPHALT	190141.88	4.37	1.00	0.57
ROOFS	55800.76	1.28	1.00	
TURF	94662.86	2.17	0.10	
ORNAMENTAL LANDSCAPING	54518.07	1.25	0.10	
NATURAL (C SOIL)	37366.45	0.86	0.30	
NATURAL (D SOIL)	140754.91	3.23	0.40	

JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

FIGURE 2

TEMECULA VALLEY CHARTER SCHOOL

LAND USE MAP

Drawing Name: 0:\277.02.24\Engineering\WQMP\Appendix 1 - Maps & Site Plan\FIGURE_2_LAND_COVER.dwg
Last Opened: Jan 21, 2025 - 12:01pm by eperez

Appendix 2: Construction Plans

*The latest set of Grading, Drainage Plans, and Street Improvement plans **shall be included***

Bioretention/Biofiltration BMPs construction notes (Santa Margarita Region only). For Bioretention and Biofiltration facilities, the **following construction notes shall be shown on the Grading and/or Drainage plans:**

1. *The Engineer shall furnish to the County a copy of the source testing and a signed certification that the fully blended Bioretention/Biofiltration Soil Media (BSM) material meets all of the WQMP requirements before material is imported or if the material is mixed onsite prior to installation.*
2. *As BSM material is being installed, Quality Assurance (QA) tests shall be conducted or for every 1,200 tons or 800 cubic yards mixed on-site from a completely mixed stockpile or windrow, with a minimum of three tests. For imported material from a supplier with a quality control program the QA tests shall be conducted 2,400 tons or 1,600 cubic yards from the supplier.*
3. *The Engineer conducting the Quality Control testing shall furnish to the County copy of the QA testing and a certification that the BSM for the project meets all of the following requirements. Certified mitigation plans can be used for exceedances, as long as all requirements are designed to be met.*
    a. *BSM shall not be compacted. BSM shall consist of 60-80% clean sand, up to 20% clean topsoil, and 20% of a nutrient-stabilized organic amendment. The initial infiltration rate shall be greater than 8 inches per hour per laboratory test.*
    b. *pH: 6.0 – 8.5; Salinity: 0.5 to 3.0 mmho/cm as electrical conductivity; Sodium absorption ratio: < 6.0; Chloride: < 800 ppm in saturated extract; Cation Exchange Capacity (CEC): > 10 meq/100 g; Organic Matter: 2 to 5-percent on a dry weight basis; Carbon: Nitrogen Ratio: 12 to 40, preferably 15 to 40; Gravel larger than 2mm: 0 to 25-percent of the total sample; Clay smaller than 0.005mm: 0 to 5 percent of the non-gravel fraction.*
    c. *BSM shall be tested to limit the leaching of potential inherent pollutants. BSM used in Biofiltration BMPs shall conform to the following limits for pollutant concentrations in saturated extract: Phosphorus: < 1 mg/L; Nitrate < 3 mg/L, Copper < 0.025 mg/L. These pollutant limits are for the amount that is leached from the sample, not from the soil sample itself. Testing may be performed after laboratory rinsing of media with up to 15 pore volumes of water. Equivalent test results will be accepted if certified by a laboratory or appropriate testing facility.*
    d. *Low nutrient compost used in BSM shall be sourced from a facility permitted through CalRecycle, preferably through USCC STA program. Compost shall conform to the following requirements: Physical contaminants <1% by dry weight; Carbon:Nitrogen ratio: 12:1 to 40:1; Maturity/Stability shall conform to either: Solvita Maturity Index: ≥ 5.5, CO2 Evolution: < 2.5 mg CO2-C per g compost organic matter per day, or < 5 mg CO2-C per g compost C per day; Select Pathogens and Trace metals shall pass US EPA Class A Standard. Testing shall be no more than 6 months old and representative of current stockpiles.*
    e. *Coconut coir pith used in BSM shall be thoroughly rinsed with freshwater and screened to remove coarse fibers as part of production and aged > 6 months. Peat used in BSM shall be sphagnum peat.*

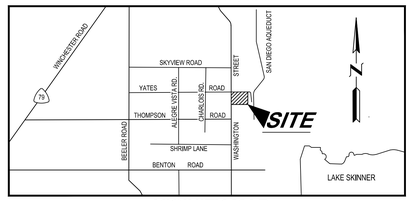
Please notify the County if additional sources and laboratories can be added to this list. The Potential Sources and Laboratories are not part of the construction note - **Potential BSM sources may include**: Gail Materials (Temescal Valley), Agriservice (Oceanside), and Greatsoils (Escondido). Earthworks (Riverside); **Potential Laboratories may include**: Fruit Growers Laboratory, Inc. (Santa Paula, http://www.fglinc.com/) Wallace Laboratories (El Segundo, http://us.wlabs.com/). Control Labs (Watsonville, http://www.controllabs.com) and A&L Western Laboratories (Modesto, http://www.al-labs-west.com/).

IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

PUBLIC USE PERMIT 230001

JANUARY 2025

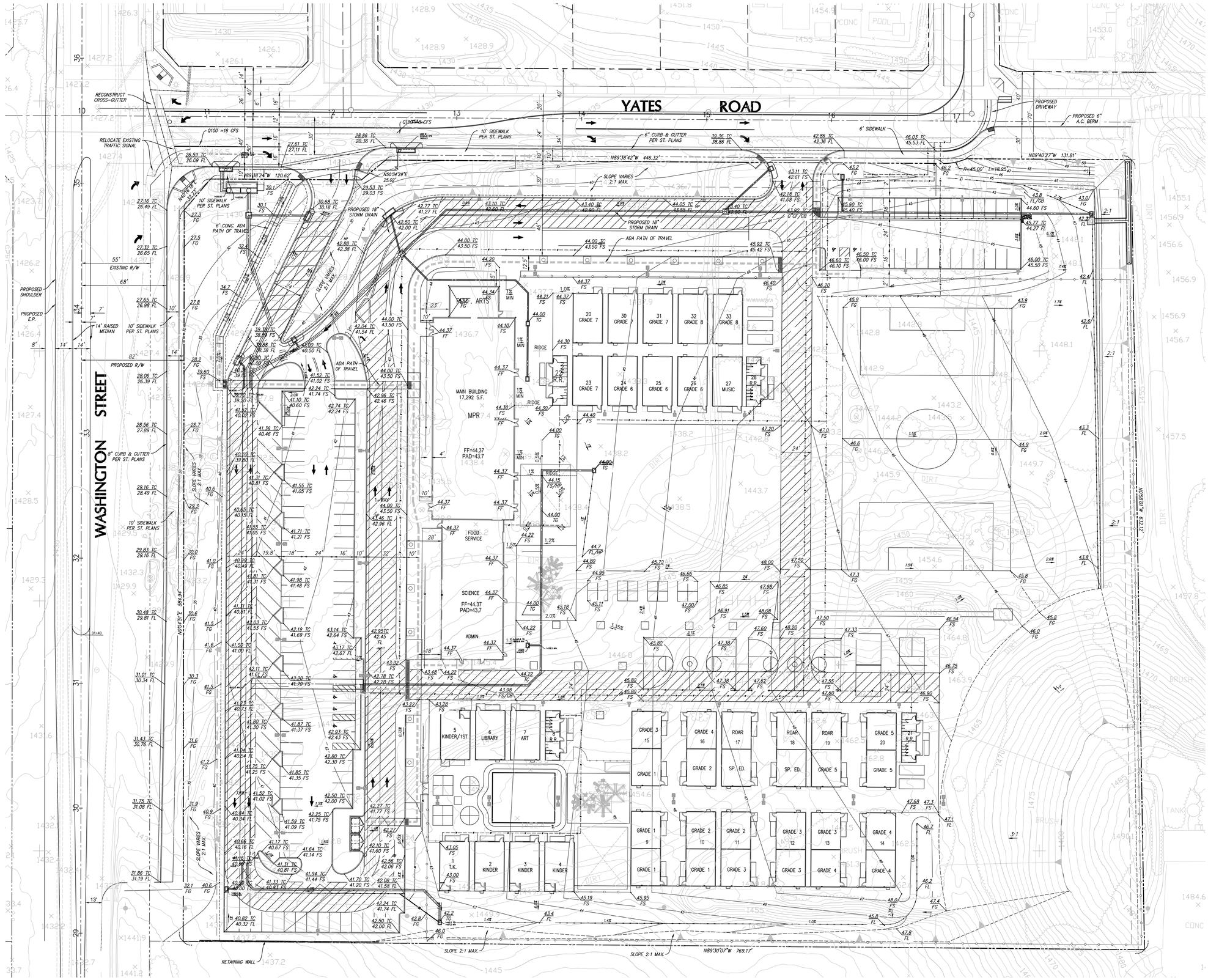
T.6S., R.2W., SEC.34, S.B.M.

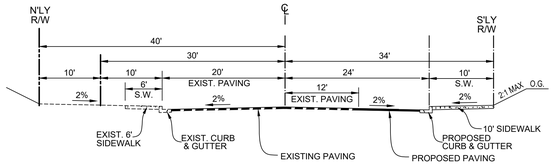


VICINITY MAP

NOT TO SCALE

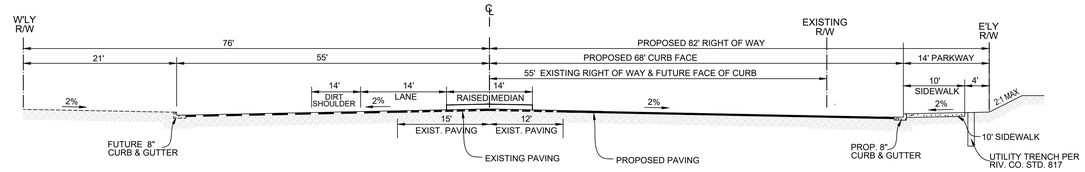
THOMAS BROS. (RIVERSIDE & SAN BERNARDINO COUNTIES)
PAGE 899, COORD G-6, 2022 EDITION





YATES ROAD TYPICAL SECTION

NOT TO SCALE
RIV. CO. STD. NO.104
T.I.= 6.5'
R-VALUE = 30



WASHINGTON STREET TYPICAL SECTION

NOT TO SCALE
RIV. CO. STD. NO. 91
T.I.= 6.5'
R-VALUE = 30

PROJECT INFORMATION

- SITE IS NOT SUBJECT TO LIQUEFACTION
- FEMA ZONE DESTINATION: ZONE X

SCHOOL DISTRICT

TEMECULA VALLEY UNIFIED SCHOOL DISTRICT
31350 RANCHO VISTA RD.
TEMECULA, CA 92592
(909) 676-2661

SCALE: 1"=30'
0 30 60 90

SITE DRAINAGE SUMMARY:

	Q10 (CFS)	Q100 (CFS)
EXISTING CONDITION	15.7	25.6
PROPOSED CONDITION	7.9	7.4

DISCHARGE FROM PROPOSED CONDITION IS MITIGATED BY UNDERGROUND DETENTION SYSTEMS AND ORIFICES CONTROLLING OUTFLOW FROM THE SITE TO BE LESS THAN OUTFLOW FROM THE EXISTING CONDITION.

WATER QUALITY DESCRIPTION: THE SITE DOES NOT INFILTRATE. HARVEST & REVISE WAS ANALYZED AND DETERMINED TO BE NOT FEASIBLE. BIOTREATEMENT BMP WAS DETERMINED TO BE FEASIBLE. MODULAR WETLAND SYSTEM'S PRODUCT WITH UNDERGROUND DETENTION SYSTEM HAS BEEN DESIGNED FOR THIS SITE.

PRELIMINARY EARTHWORK CALCULATIONS

EARTHWORK VOLUMES	CUT (CY)	FILL (CY)
RAW	50,000	50,000
TOTAL	50,000	50,000

NET = 0 CY IMPORT BALANCED SITE

THE ABOVE QUANTITIES DO NOT REFLECT OR ANDY SPECIAL CONDITIONS THAT MAY BE SPECIFIED IN THE PRELIMINARY SOILS REPORT AND ARE FOR REFERENCE AND FEE PURPOSES ONLY. SINCE THE ENGINEER CANNOT CONTROL THE EXACT METHOD OR MEANS USED BY THE CONTRACTOR DURING GRADING OPERATION, NOR CAN THE ENGINEER GUARANTEE THE EXACT SOIL CONDITION OVER THE ENTIRE SITE, THE ENGINEER ASSUMES NOT RESPONSIBILITY FOR FINAL EARTHWORK QUANTITIES FOR BIDDING, CONTRACT, AND CONSTRUCTION PURPOSES. IF IT APPEARS THERE WILL BE AN EXCESS OR SHORTAGE OF MATERIAL, THE CONTRACTOR MAY NOTIFY THE ENGINEER TO DETERMINE IF POSSIBLE GRADE ADJUSTMENTS CAN BE MADE TO ALLEVIATE SAID MATERIAL EXCESS OR SHORTAGE.

CONSTRUCTION NOTES:

1. CONSTRUCT 6" PCC CURB
2. CONSTRUCT 6" PCC CURB & GUTTER
3. CONSTRUCT 0" PCC CURB
4. CONSTRUCT 3' CONCRETE GUTTER
5. CONSTRUCT 4" THICK CONCRETE SIDEWALK
6. CONSTRUCT TRASH ENCLOSURE PER ARCHITECT'S PLANS
7. INSTALL TRUNCATED DOMES
8. INSTALL GRATE INLET
9. INSTALL CATCH BASIN
10. CONSTRUCT 6" PCC CURB
11. AC / AB PAVING
12. PCC / AB PAVING
13. NOT USED
14. INSTALL VAULT TYPE MODULAR WETLANDS SYSETM (WATER QUALITY UNIT)
15. CONSTRUCT 6' WIDE CONCRETE GUTTER
16. ALL MODULAR BUILDINGS PLACED ON ASPHALT PAVED AREAS WITH FOUNDATION SYSTEM. (TYPICAL)

BENCH MARK

NGS BENCHMARK DX5501: LOCATED AT BOREL ROAD AND AULD ROAD AT UTILITY POLE NUMBER 2328445E.
ELEV.= 1397.43 FEET (NAVD88)

UTILITIES

WATER/SEWER: EASTERN MUNICIPAL WATER DISTRICT
2270 TRUMBLE RD.
PERRIS, CA 92572-8300
(909) 928-3777

GAS: SOUTHERN CALIFORNIA GAS COMPANY
CENTRALIZED CORRESPONDENCE
P.O. BOX 3150
SAN DIMAS, CA 91773
(800) 427-2000

TELEPHONE: VERIZON
CUSTOMER SALES & SOLUTIONS CENTER
P.O. BOX 11328
ST. PETERSBURG, FL 33733
(800) 483-4000

ELECTRICAL: SOUTHERN CALIFORNIA EDISON COMPANY
26100 MENIFEE RD.
ROMOLAND, CA 92585
(909) 928-8207

CABLE: ADELPHIA CABLE
4077 W. STETSON AVE.
HEMET, CA 92545
(888) 683-1000

SCHOOL DISTRICT: TEMECULA UNIFIED SCHOOL DISTRICT
31350 RANCHO VISTA RD.
TEMECULA, CA 92592
(909) 676-2661

FIRE PROTECTION: RIVERSIDE COUNTY HEADQUARTERS
210 W. SAN JACINTO AVE.
PERRIS, CA 92570
(909) 940-6900

EASEMENT NOTE(S):

1. AN EASEMENT FOR UTILITIES IN FAVOR OF SO. CALIF. EDISON CO. & GENERAL TELEPHONE CO., REC. JAN. 6, 1961 PER INST. # 1422.

LEGEND

- CENTERLINE
- PROPERTY LINE
- RIGHT-OF-WAY
- EDGE OF PAVEMENT
- EXISTING DIRT ROAD
- EXISTING CHAIN LINK FENCE
- EXISTING PIPE-RAIL FENCE
- EXISTING WIRE FENCE
- EXISTING WOOD RAIL FENCE
- PROP. RETAINING WALL
- EXISTING POWER POLE
- EXISTING GUY WIRE
- OHL EXISTING OVERHEAD LINE
- EXISTING DEPRESSION
- 1445 EXISTING CONTOURS
- 44 PROPOSED CONTOURS
- PROPOSED FIRE HYDRANT

Engineer Mark:	By:	Date:	Revisions: Description:	County Appr.	Date

Designed By: GB Drawn By: BB Checked By:

Principal

REGISTERED PROFESSIONAL ENGINEER GRANT W. BECKLUND No. 23737 Exp. 12/31/25 CIVIL STATE OF CALIFORNIA

Prepared Under The Supervision Of:
GRANT BECKLUND CIVIL ENGINEERING
30811 GARBANI ROAD WINCHESTER, CA 92596 (951) 288-0601
GRANT BECKLUND R.C.E. No. 23737 EXP. 12/31/2025
Date:

Reviewed By: COUNTY OF RIVERSIDE
Date:

Scale: AS NOTED

Bench Mark: TOPO DATA AS NOTED ABOVE

COUNTY OF RIVERSIDE
PUBLIC USE PERMIT 230001
CONCEPTIONAL GRADING PLAN
TEMECULA VALLEY CHARTER SCHOOL

Sheet No. 1 OF 1 SHEET
File No.

Plot date: 1/02/2025 File name:

Appendix 3: Soils Information

Geotechnical Study, Other Infiltration Testing Data, and/or Other Documentation

Examples of material to provide in Appendix 3 may include but are not limited to the following:

- Geotechnical Study/Report prepared for the project,
- Additional soils testing data (if not included in the Geotechnical Study),
- Exhibits/Maps/Other Documentation of the Hydrologic Soils Groups (HSG)s at the project site.

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections A and D of this Template.

The County will accept explicit recommendations from the Geotechnical Engineer, such as specifying a design infiltration rate (unfactored) when infiltration rates vary, recommendations for impermeable liners due to concerns about seepage in fill areas/near gas tanks, or other site specific recommendations based on physical conditions.

UPDATED GEOTECHNICAL EVALUATION

PROPOSED TEMECULA VALLEY CHARTER SCHOOL DEVELOPMENT

ASSESSOR'S PARCEL NO. (APN) 472-210-002
35780 WASHINGTON STREET
WINCHESTER AREA, RIVERSIDE COUNTY, CALIFORNIA

PREPARED FOR

TEMECULA VALLEY CHARTER SCHOOL
30811 GARBANI ROAD
WINCHESTER, CALIFORNIA 92596

PREPARED BY

GEOTEK, INC.
1548 NORTH MAPLE STREET
CORONA, CALIFORNIA 92878

GeoTek, Inc.
1548 North Maple Street, Corona, California 92878
(951) 710-1160 Office (951) 710-1167 Fax www.geotekusa.com

July 18, 2022
Project No. 2135.1-CR

Temecula Valley Charter School
30811 Garbani Road
Winchester, California 92596

Attention: Mr. Grant Becklund

Subject: **Updated Geotechnical Evaluation**
Proposed Temecula Valley Charter School
Assessor's Parcel No. (APN) 472-210-002,
35780 Washington Street
Winchester Area, Riverside County, California

Dear Mr. Becklund:

GeoTek, Inc. (GeoTek) is pleased to provide the results of this Updated Geotechnical Evaluation for the subject project to be located at 35780 Washington Street in the Winchester area of Riverside County, California. This report presents the results of GeoTek's evaluation and discussion of the findings.

Based on the results of this evaluation, development of the property appears feasible from a geotechnical viewpoint provided that the recommendations presented in this report and in future reports are incorporated into design and construction.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to call GeoTek.

Respectfully submitted,
GeoTek, Inc.





Edward H. LaMont
CEG 1892, Exp. 07/31/24
Principal Geologist

Bruce A. Hick
GE 2284, Exp. 12/31/22
Geotechnical Engineer

Anna M. Scott
Project Geologist

Distribution: (1) Addressee via email

G:\Projects\2101 to 2150\2135.1CR Temecula Valley Charter School Winchester \Updated Geotechnical Evaluation\2135.1CR Updated Geotechnical Evaluation Temecula Valley Charter School.doc

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ENCLOSURES

Figure 1 – Site Location and Topography Map
Figure 2 – Infiltration Test Location Map
Figure 3 – Trench Location Map
Figure 4 – Site Plan

Appendix A – Logs of Exploratory Trenches (GeoTek., 2004)
Appendix B – Laboratory Test Results (GeoTek., 2004)
Appendix C – Logs of Exploratory Borings (GeoTek., 2022)
Appendix D – Laboratory Test Results (GeoTek., 2022)
Appendix E – Percolation Data Sheets and Porchet Calculations (GeoTek., 2022)
Appendix F – General Earthwork Grading Guidelines

1. PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to evaluate the geotechnical conditions for the proposed development. Services provided for this study included the following:

- Research and review of available geologic and geotechnical data, and general information pertinent to the site,
- Review of the geotechnical report previously prepared for this site by GeoTek, Inc. (GeoTek, 2004),
- Excavation of three (3) borings to depths ranging from approximately five (5) to eight (8) feet below existing grade and performing an infiltration test in each boring,
- Review and evaluation of site seismicity, and
- Compilation of this Updated Geotechnical Report which presents GeoTek's findings and a general summary of pertinent geotechnical conditions relevant for site development.

The intent of this report is to aid in the evaluation of the site for future development from a geotechnical perspective. The professional opinions and geotechnical information contained in this report will likely need to be updated based on our review of final site development plans. These should be provided to GeoTek for review when available.

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

2.1 Site Description

The subject property, identified as APN 472-210-002, is located at 35780 Washington Street in the Winchester area of Riverside County, California. (see Figure 1). The property is a roughly rectangular-shaped parcel measuring approximately 12 acres. The property is bounded to the north by Yates Road (paved), to the south by a vacant parcel of land, to the east by the San Diego Aqueduct (and associated improvements), and to the west by Washington Street (paved).

Based on a recent site reconnaissance, the site is currently vacant. Remnants of an existing concrete building pad, a barn, corrals and stables occupy a graded pad within the northeastern corner of the site. Underground improvements (septic tanks, leach fields, utilities, etc.) associated with this previous development are anticipated to be present in this area. Artificial fill (piles and mass placements) and debris was observed scattered across the site. Rock outcrops were observed in the eastern portion of the site (see Figures 2 and 3). Surface gradient across the site slopes moderately down to the northwest, with total relief on the order of approximately 55 feet. At the time of the site reconnaissance, the property to the north was being developed as a single-family residential development.

2.2 Proposed Development

Based on review of the *Public Use Permit Plan* dated August 1, 2022 prepared by Grant Becklund Civil Engineering (Sheet Number 1), the proposed charter school complex will consist of a main building and several modular buildings, with approximately 54,000 square feet of classroom and administrative building space. Other associated improvements, such as sports courts, turf areas, playgrounds, patios, parking and drive aisle areas/fire lanes, hardscaping and landscaping are also planned (See Site Plan, Figure 4). For purposes of this evaluation, it is assumed that the main structure will be of concrete tilt-up panel construction which will incorporate concrete slab-on-grade floors, apart from the pre-fabricated modular buildings. Although no site grading plans are available for review, based on site topography it is anticipated that cuts and fills will be required for site development, and slopes and retaining walls may be utilized.

As site development planning progresses and plans become available, the plans should be provided to GeoTek for review and comment. Additional engineering analyses may be necessary in order to provide specific earthwork recommendations and geotechnical design parameters for actual site development.

2.3 Prior Report Review

A *Preliminary Geotechnical Evaluation* was prepared by GeoTek (2004) for the project site, formerly proposed for a residential development. The GeoTek evaluation included the excavation of 12 exploratory trenches to a maximum depth of seven feet.

The GeoTek trenches indicate that at the trench locations the site is underlain by topsoil consisting of brown, moist, sandy silt to silty fine sand (ML and SM soil types based upon the Unified Soil Classification System) underlain by weathered metamorphic bedrock that excavates as sandy gravel with some cobble sized rocks (GP and GM soil types). Artificial fill and alluvium were noted in various areas throughout the site and ranged from approximately one foot to 3.5

feet in thickness. The artificial fill consists of brown, moist, clayey fine to coarse sand (SC soil type). The alluvium consists of yellow to brown, moist, silty clay to clayey silt with some sand and gravel (CL and ML soil types).

GeoTek recommended that all trash, debris, topsoil, and alluvium should be removed to expose competent bedrock materials from areas to receive engineered fill and beneath structural areas. GeoTek noted that the topsoil, alluvium, and fill may have a shrinkage factor of 15 percent to 20 percent; whereas the metamorphic rock may have zero to five percent bulking in the upper five feet, and five percent to 10 percent bulking below 5 feet.

Copies of the previous trench logs and the Trench Location Plan are included within Appendix A and Figure 3 of this report, respectively.

Laboratory testing was performed by GeoTek on selected disturbed and relatively undisturbed samples collected during the field investigation. The purpose of laboratory testing was to confirm the field classification of the soil materials encountered and to evaluate their physical properties for use in the engineering design and analysis. The results of the laboratory-testing program along with a brief description and relevant information regarding testing procedures are included in Appendix B.

3. FIELD EXPLORATION AND LABORATORY TESTING

3.1 Field Exploration

Field explorations (exploratory trench excavations) were previously performed at this site by GeoTek in 2004. Copies of the previous trench logs and the Trench Location Plan are included within Appendix A and Figure 3 of this report, respectively.

Three (3) percolation test borings (I-1 through I-3, inclusive) were excavated in northwestern portion of the project site in the area of the proposed storm water facility as indicated on the referenced *Site Plan* to depths ranging from approximately five (5) to eight (8) feet below existing grade at the boing locations. The boring logs for these excavations and the Infiltration Test Location Plan are included within Appendix C and Figure 2 of this report, respectively.

Infiltration/percolation testing was conducted in the borings in general accordance with the requirements of the County of Riverside. The percolation tests consisted of drilling an eight-inch diameter test hole to the desired depth and installing approximately two inches of gravel

in the bottom of the hole. A three-inch diameter perforated PVC pipe, wrapped in a filter sock, was placed in the excavations and the annular space was filled with gravel to prevent caving within the boring. Water was then placed in the borings to presoak the holes and percolation testing was performed the following the pre-soak period. The percolation tests were then performed which consisted of adding water to each test hole and measuring the water drop over a 30-minute period. The water drop was recorded for 12 test intervals for the test conducted using a 30-minute test period. Water was added to the test holes after each test interval. The field percolation rates were then converted to an infiltration rate using the Porchet Method. The converted infiltration rates are tabulated below:

SUMMARY OF RESULTS	
Boring	Measured Infiltration Rate (inches per hour)
I-1	0.09
I-2	0.05
I-3	0.05

The results of the conversions indicate soils which have very poor percolation characteristics. Copies of the percolation data sheets and the Porchet infiltration rate conversion calculations are presented in Appendix E. No factors of safety were applied to the rates provided. Over the lifetime of the infiltration areas, the infiltration rates may be affected by sediment build up and biological activities, as well as local variations in near surface soil conditions. A suitable factor of safety should be applied to the field rate in designing the infiltration system.

It should be noted that the infiltration rates provided above were performed in relatively undisturbed on-site soils. Infiltration rates will vary and are mostly dependent on the underlying consistency of the site soils and relative density. Infiltration rates may be impacted by weight of equipment travelling over the soils, placement of engineered fill and other various factors. GeoTek assumes no responsibility or liability for the ultimate design or performance of the storm water facility.

3.2 Laboratory Testing

Laboratory testing was previously performed by GeoTek for soil and bedrock samples collected from the site during the prior field exploration program (GeoTek, 2004). The results of the prior laboratory testing are presented in Appendix B.

Laboratory testing was recently performed by GeoTek on selected soil samples obtained during the current field exploration. The purpose of the laboratory testing was to confirm the

field classification of the soils encountered and to evaluate the physical properties of the soils for use in engineering design and analysis. A summary of this laboratory test data is presented in Appendix D of this report.

4. GEOLOGIC AND SOILS CONDITIONS

4.1 Regional Setting

The subject property is situated in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. It extends from the point of contact with the Transverse Ranges geomorphic province, southerly to the tip of Baja California. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province.

The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Several major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zone trend northwest-southeast and are mostly found near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province, and the San Jacinto fault borders the province adjacent the Colorado Desert province.

More specific to the subject property, Morton, D.M. et al (2003) map the site to be underlain by Mesozoic age phyllite. Additionally, the nearest known active fault to the site is the Wildomar Fault of the Elsinore fault zone fault located approximately 7.4 miles to the southwest.

The County of Riverside (Map My County v10 (countyofriverside.us) has designated the site area as "not in a fault zone", "not in a fault line", as having a "low" liquefaction potential and being "susceptible" to subsidence. The site is also not situated within a State of California liquefaction hazard area and is not within a designated Earthquake Fault "Alquist-Priolo" hazard zone.

4.2 Earth Materials

4.2.1 Undocumented Fill

GeoTek (GeoTek, 2004) reported undocumented fill in different areas of the site. The undocumented fill consists of reddish brown to grayish brown, moist, clayey sand (SC soil type) with gravel, cobble, and variable amounts of debris most likely derived from on-site alluvial soils. The fill depth ranges up to four feet as encountered in Trench T-7. However, GeoTek noted that based on visual observations the depth of fill may range up to 14 feet in the southeastern portion of the site.

4.2.2 Topsoil

GeoTek reported a layer of topsoil varying in thickness between one and 2.5 feet. The topsoil consists of dark-brown, dry to damp, loose, clayey to silty fine sand (SC and SM soil types) with occasional rootlets.

4.2.3 Alluvium

Alluvial deposits were reported to be present within the northwestern portion of the site. The alluvium extends to depths of 4.5 to 6.5 feet as encountered in Trenches T-1 and T-12 (GeoTek, 2004). The alluvium is generally comprised of yellow to brown clayey silt to silty clay (ML and CL soil types). Areas of deeper alluvium may be present in unexplored areas of the site.

4.2.4 Metamorphic Bedrock

Mesozoic-aged metasedimentary rock was reported to underlie the project site. The metasedimentary bedrock is moderately to completely weathered and moderately to highly jointed or fractured. The bedrock excavates as gray sandy gravel with some clay and cobbles.

4.3 Surface water and Groundwater

4.3.1 Surface Water

If encountered during earthwork construction, surface water on this site will likely be the result of precipitation or possibly some minor surface run-off from immediately surrounding properties. Overall site area drainage is generally in a southwesterly direction, as directed by site topography. Provisions for surface drainage will need to be accounted for by the project civil engineer.

4.3.2 Groundwater

GeoTek noted that seepage was encountered in Trench T-10 (GeoTek, 2004, Appendix A) at a depth of approximately 4.5 to 7 feet below existing grade. As previously discussed, the San Diego Aqueduct is located adjacent to the eastern boundary of the site: seepage may be encountered is cut slopes or excavations in this area. Based on the groundwater depths reported at a well located approximately one mile south of the site (Department of Water Resources Water Data Library) groundwater is approximately 35 feet below existing grade. Groundwater is not anticipated to impact the planned development but should be reviewed when plans are provided.

4.4 Faulting and Seismicity

The geologic structure of the entire southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is in a seismically active region. No active or potentially active fault is known to exist at this site nor is the site situated within a State of California designated *"Alquist-Priolo"* Earthquake Fault Zone (Bryant and Hart, 2007; CGS, 1986). Based on the *Riverside County Parcel Report,* the site is "not in a fault zone," "not on a fault line," has a "low" liquefaction potential, and is "susceptible" to subsidence. The nearest known active fault is the Wildomar Fault of the Elsinore fault zone fault located approximately 7.4 miles to the southwest.

4.4.1 Seismic Design Parameters

The site is located at approximately 33.6005º North Latitude and -117.0816º West Longitude. Due to the relatively dense nature of the site soils and presence of relatively shallow bedrock across the site, a Site Class "D" is deemed appropriate for the site.

Site spectral accelerations (S_a and S_1) for 0.2 and 1.0 second periods for a Class "D" site were determined from the SEAOC/OSHPD web interface that utilizes the USGS web services and retrieves the seismic design data and presents that information in a report format. Using the ASCE 7-16 option on the SEAOC/OSHPD website results in the values for S_{M1} and S_{D1} reported as "null-See Section 11.4.8" (of ASCE 7-16). As noted in ASCE 7-16, Section 11.4.8, a site-specific ground motion procedure is recommended for Site Class D when the value S_1 exceeds 0.2. The value S_1 for the subject site exceeds 0.2.

For a site Class D, an exception to performing a site-specific ground motion analysis is allowed in ASCE 7-16 where S_1 exceeds 0.2 provided the value of the seismic response coefficient, Cs, is conservatively calculated by Eq 12.8-2 of ASCE 7-16 for values of T≤1.5Ts and taken as equal

to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5Ts$ or Eq. 12.8-4 for $T > T_L$.

The results, based on the 2015 NEHRP and the 2019 CBC, are presented in the following table assuming that the exception as allowed in ASCE 7-16 is applicable. If the exception is deemed not appropriate, a site-specific ground motion analysis will be required.

SITE SEISMIC PARAMETERS	
Mapped 0.2 sec Period Spectral Acceleration, S_S	1.5g
Mapped 1.0 sec Period Spectral Acceleration, S_1	0.6g
Site Coefficient for Site Class "C," F_a	1.0
Site Coefficient for Site Class "C," F_v	1.5
Maximum Considered Earthquake Spectral Response Acceleration for 0.2 Second, S_{MS}	1.5g
Maximum Considered Earthquake Spectral Response Acceleration for 1.0 Second, S_{M1}	0.9g
5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, S_{DS}	1.0g
5% Damped Design Spectral Response Acceleration Parameter at 1 second, S_{D1}	0.6g
PGA_M	0.6g
Seismic Design Category	D

Final selection of the appropriate seismic design coefficients should be made by the project structural engineer based upon the local practices and ordinances, expected building response and desired level of conservatism.

4.4.2 Liquefaction & Seismic Settlements

Liquefaction describes a phenomenon in which cyclic stresses, produced by earthquake-induced ground motion, create excess pore pressures in relatively cohesionless soils. These soils may thereby acquire a high degree of mobility, which can lead to lateral movement, sliding, consolidation and settlement of loose sediments, sand boils and other damaging deformations. This phenomenon occurs only below the water table, but, after liquefaction has developed, the effects can propagate upward into overlying non-saturated soil as excess pore water dissipates.

The factors known to influence liquefaction potential include soil type and grain size, relative density, groundwater level, confining pressures, and both intensity and duration of ground

shaking. In general, materials that are susceptible to liquefaction are loose, saturated granular soils having low fines content under low confining pressures.

Due to the absence of shallow groundwater and the presence of dense and cohesive subsurface soils underlain by dense metamorphic bedrock, it is GeoTek's opinion that the potential for soil liquefication is low**.**

4.4.3 Other Seismic Hazards

The potential for secondary seismic hazards such as seiche and tsunami is considered to be remote due to site elevation and distance from an open body of water. Due to the absence of a nearby free-face and the very low liquefaction hazard, the potential for lateral spreading is considered to be nil. The project site is not within the flood inundation zone for Skinner Reservoir.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 General

Development of the site appears feasible from a geotechnical viewpoint. Specific recommendations for site development provided in this report will need to be further evaluated when development plans are provided for our review. The following sections present general recommendations. More specific geotechnical recommendations for site development can be provided when more finalized site development plans are available for review.

5.2 Earthwork Considerations

5.2.1 General

Earthwork and grading should be performed in accordance with the applicable grading ordinances of Riverside County, the 2019 California Building Code (CBC) and recommendations contained in this report. The General Grading Guidelines included in Appendix F outline general procedures and do not anticipate all site-specific situations. In the event of conflict, the recommendations presented in the text of this report should supersede those contained in Appendix F.

All undocumented fill materials, topsoil and the alluvium are considered unsuitable for the support of settlement-sensitive structures or additional fill in their current condition and should be subject to complete removal and recompaction below all areas to receive improvements. These areas include the new buildings, any wall footings, and pavement and hardscape areas.

5.2.2 Site Clearing and Demolition

Site preparation should start with removal of existing improvements, debris, trees (including root balls), deleterious materials, any existing structures, foundations, pavements/concrete slabs and vegetation within the planned development areas of the site. All remnants of prior construction, not to be re-used, should also be removed. All materials generated during site stripping and clearing operations should be properly disposed of off-site. Existing underground improvements, utilities and trench backfill should also be removed or be further evaluated as part of site development operations. All deleterious materials should be properly disposed of off-site.

5.2.3 Remedial Grading

Based on the referenced report (GeoTek, 2004), all undocumented fill materials, topsoil and the alluvium are considered unsuitable for the support of settlement-sensitive structures or additional fill in their current condition and should be subject to complete removal and recompaction below all areas to receive improvements. These areas include the new buildings, any wall footings, and pavement and hardscape areas.

The removals should generally extend down to bedrock materials (metamorphic bedrock). A representative of this firm should observe the bottom of all excavations. In areas where loose material is present in the bottom of the excavations, the removals should continue until competent natural bedrock is encountered.

In areas where compressible alluvium is present in the bottom of the excavations (i.e. areas of deeper alluvium within the northwest portion of the site), removals should continue until competent natural materials are encountered. At a minimum, an engineered fill blanket of three feet should underlie all structural footings and slabs on this site. Competent materials are defined as relatively non-porous natural soils with an in-place relative density of at least 85 percent.

Transition (i.e. cut/fill) lots should be overexcavated a minimum of five feet below proposed grades or to a depth of one-third the maximum fill thickness.

The horizontal extent of removals should extend at least five feet outside the footings and floor slabs, or a distance equal to the depth of overexcavation below the bottom of the structural elements, whichever is greater.

Once the base of the over-excavation is approved, the exposed soils should be scarified to a depth of about 12 inches, be moisture treated to slightly above the soil's optimum moisture content (ASTM D1557) and then be compacted to at least 90% of the soil's maximum dry density (ASTM D1557).

Testing by GeoTek is recommended to document that the engineered fill soils have been properly moisture conditioned and compacted as recommended.

5.2.4 Slope Construction

Fill and cut slopes constructed at gradients of 2:1 (h:v) or flatter, in accordance with industry standards, are anticipated to be both grossly and surficially stable. Fill slopes, fill over natural slopes and fill over cut slopes, should be constructed with a keyway at the toe of slope and subsequent horizontal benches. The keyway should possess a minimum width of 15 feet, or generally half the slope height for slopes higher than 20 feet, with a minimum depth into competent material of 2 feet. The keyway should be inclined at least 2 percent back into the slope. Fill placed on slopes should be properly benched into competent soils per the recommendations of the geotechnical engineer. Any cut slopes should be observed by a geotechnical engineer/engineering geologist to approve the exposed conditions upon excavation.

Swales should be constructed at the top of all slopes to collect and divert drainage away from the slope face. Drainage should be directed to an approved drainage discharge location. Swales should be constructed with concrete, shotcrete or approved non-erosive material. Swales should be cleaned of loose soil and debris on an on-going basis.

Fill slopes should be overfilled by at least three (3) feet during construction and then cut back to expose fully compacted soil. As an alternate, the fill slopes may be constructed as designed provided that the slope face is back-rolled with a sheepsfoot rolled at vertical intervals not exceeding 4 feet. The final slope face should be compacted as needed such that the slope face material is compacted to at least 90 percent of the soil's maximum dry density per ASTM D1557. Berms should be constructed and maintained at the top of all fill slopes to divert drainage away from the slope faces. An abatement program to control ground-burrowing rodents should be implemented and maintained. Burrowing rodents can decrease the long-term performance of slopes.

5.2.5 Canyon Subdrains

Canyon subdrains are not anticipated to be necessary, but final recommendations and actual locations of any subdrains should be based on actual conditions exposed during the earthwork construction (i.e., grading). A typical canyon subdrain detail is provided as Figure F-1 in Appendix F. The canyon subdrains should be tied into the project storm drain system (where possible) or daylighted as appropriate. The final 20-foot segment of the subdrain should consist of a non-perforated pipe. Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

5.2.6 Transition Lots and Cut Lots

Rough grading will create cut, cut/fill transition and shallow fill lots. All lots should be overexcavated such that all building pads are underlain by at least three (3) feet of compacted engineered fill and overexcavation bottoms should slope to drain to the adjacent street of suitable direction so ponding of water is not likely. The lateral extent of this recommendation should include the area extending at least five (5) feet beyond the building limits.

Transition (i.e., cut/fill) lots should be overexcavated a minimum of three (3) feet below proposed grades or to a depth of 1/3 the maximum fill thickness.

All cut lots exposing granitic bedrock should be overexcavated to a depth of three (3) feet below proposed grade and replaced with engineered fill.

5.2.7 Engineered Fill

The on-site soils are generally considered suitable for reuse as engineered fill provided they are free from vegetation, debris and other deleterious material. Over-sized materials (+ 6 inches in greatest dimension) should be removed from the soil prior to its use as engineered fill. Alternatively, over-sized materials can be incorporated in the fills provided they comply with the Rock Burial Details presented on Plate F-4 in Appendix F.

The undercut areas should be brought to final subgrade elevations with fill materials that are placed and compacted in general accordance with minimum project standards. Engineered fill should be placed in six-inch to eight-inch loose lifts, moisture conditioned to at least the optimum moisture content and compacted to a minimum relative compaction of 90 percent as determined by ASTM D1557 test procedures.

If wet soils are encountered during site or remedial grading, methods for drying soils such as stockpiling or mixing with dry soil may be required to bring the soils to the required moisture content for placement as engineered fill. Placement of engineered fill should be observed and tested on a full-time basis by a GeoTek representative during grading activities.

5.2.8 Excavation Characteristics

Excavations in the on-site fill/topsoil/alluvial materials and weathered bedrock should be readily accomplished with heavy-duty earthmoving or excavating equipment in good operating condition. It is possible that deep excavations extending into the on-site bedrock materials will require specialized excavation techniques and/or equipment may be needed. Localized blasting may also be necessary. "Over-break" (shattering) of utility trench excavations in bedrock should be anticipated, which may result in trench instabilities and more difficultly in backfilling.

Overexcavation of street/paving areas underlain by bedrock during rough grading should be considered to prevent significant trenching difficulties associated with utility installations. The overexcavation should extend to a depth of at least one foot below the deepest planned utility and then be backfilled with properly compacted fill.

5.2.9 Trench Excavations and Backfill

Temporary trench excavations within the on-site materials should be stable at 1:1 inclinations for short durations during construction and where cuts do not exceed 15 feet in height. It is anticipated that temporary cuts to a maximum height of four feet can be excavated vertically.

Trench excavations should conform to Cal-OSHA regulations. The contractor should have a competent person, per OSHA requirements, on site during construction to observe conditions and to make the appropriate recommendations.

Utility trench backfill should be compacted to at least 90 percent relative compaction (as determined by ASTM D 1557 test procedures). Under-slab trenches should also be compacted to project specifications. Where applicable, based on jurisdictional requirements, the top 12 inches of backfill below subgrade for pavements should be compacted to at least 95 percent relative compaction. On-site materials may not be suitable for use as bedding material but should be suitable as backfill provided particles larger than 6 inches are removed.

Compaction should be achieved with a mechanical compaction device. Ponding or jetting of trench backfill is not recommended. If backfill soils have dried out, they should be properly moisture conditioned prior to placement in trenches.

5.2.10 Shrinkage and Bulking

For planning purposes, a shrinkage factor of up to 20 percent may be considered for removal of any undocumented fill, topsoil, and alluvial materials that are removed and replaced as engineered fill. A bulking factor of about 5 percent or possibly higher is estimated for excavations extending into the bedrock materials at the site.

Based on the recommended over-excavation of unsuitable materials, subsidence on the order of up to 0.10 may be anticipated for the underlying left in-place alluvial soils.

Site balance areas should be available in order to adjust project grades, depending on actual field conditions at the conclusion of earthwork construction.

5.2.11 Grading Plan Review

Upon completion of the site grading plans, it is recommended that those plans be provided to GeoTek for review. Based on that review, some modifications to the recommendations provided in this report may be necessary.

5.3 Design Recommendations

5.3.1 Foundation Design Criteria

Foundation design criteria for a conventional foundation system, in general conformance with the 2019 CBC, are presented below. The grades site soils are anticipated to have a "very low" (0-20) to "low" (21-50) expansion index in accordance with ASTM D 4829. Typical design criteria for the site based upon a "very low" and "low" expansion index are tabulated below. These are minimal recommendations and are not intended to supersede the design by the project structural engineer.

The conventional foundation elements for the proposed buildings should bear entirely in engineered fill soils or bedrock (not a combination of the two). Foundations should be designed in accordance with the 2019 CBC.

Expansion index, Atterberg limits (if applicable) and soluble sulfate testing of the soils should be performed during construction to evaluate the as-graded conditions. Final recommendations should be based upon the actual as-graded soils conditions.

It should be noted that the criteria provided are based on soil support characteristics only. The structural engineer should design the slab and beam reinforcement based on actual loading conditions. A summary of the foundation design recommendations is presented in the following table:

GEOTECHNICAL RECOMMENDATIONS FOR FOUNDATION DESIGN

Design Parameter	"Very Low" Expansion Index	"Low" Expansion Index
Foundation Depth (inches below lowest adjacent grade)	12 – One-Story 12 – Two-Story	12 – One-Story 18 – Two-Story
Minimum Foundation Width (Inches)*	12	12 – One-Story 15 – Two-Story
Minimum Slab Thickness (actual)	4 – Actual	4 – Actual
Minimum Slab Reinforcing	6" x 6" – W1.4 x W1.4 welded wire fabric placed in middle of slab or No. 3 bars at 24 inch centers placed in middle of slab	6" x 6" – W2.9 x W2.9 welded wire fabric placed in middle of slab or No. 3 bars at 18 inch centers placed in middle of slab
Minimum Footing Reinforcement	Two No. 4 reinforcing bars, one placed near the top and one near the bottom	Two No. 4 reinforcing bars, one placed near the top and one near the bottom
Effective Plasticity Index**	N/A	<15
Presaturation of Subgrade Soil (Percent of Optimum)	Minimum of 100% of the optimum moisture content to a depth of at least 12 inches prior to placing concrete	Minimum of 110% of the optimum moisture content to a depth of at least 12 inches prior to placing concrete

*Code minimums per Table 1809.7 of the 2019 CBC should be complied with.
**Effective Plasticity Index should be verified at the completion of grading

The structural engineer should design the slab and beam reinforcement based on actual loading conditions. The bottom of the perimeter edge beam/deepened footing should be designed to resist tension forces using either cable or conventional reinforcement, per the structural engineer.

5.3.1.1 An allowable soil bearing capacity of 2,000 pounds per square foot (psf) may be used for design of continuous and perimeter footings 12 inches deep and 12 inches wide, and pad footings 24 inches square and 12 inches deep. Additionally, an increase of one-third may be applied when considering short-term live loads (e.g., seismic and wind loads).

5.3.1.2 Based on the recommended site grading, it is estimated a total static settlement of less than 1 inch will occur. A differential static settlement of about ½ inch over a 40-foot span is also estimated.

5.3.1.3 The passive earth pressure may be computed as an equivalent fluid having a density of 150 psf per foot of depth, to a maximum earth pressure of 2,000 psf for footings founded on engineered fill. An allowable coefficient of friction between soil and concrete of 0.30 may be used with dead load forces. When combining passive

pressure and frictional resistance, the passive pressure component should be reduced by one-third.

5.3.1.4 A grade beam, a minimum of 12 inches wide and 18 inches deep, should be utilized across large entrances. The base of the grade beam should be at the same elevation as the bottom of the adjoining footings.

5.3.1.5 A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the 2019 California Green Building Standards Code (CALGreen) Section 4.505.2, the 2019 CBC Section 1907.1 and ACI 360R-10. The vapor retarder design and construction should also meet the requirements of ASTM E 1643. A portion of the vapor retarder design should be the implementation of a moisture vapor retardant membrane.

It should be realized that the effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures (e.g. stake penetrations, tears, punctures from walking on the vapor retarder placed atop the underlying aggregate layer, etc.). These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture than thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a 6 mil vapor retarder membrane, it is GeoTek's opinion that a minimum 10 mil thick membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional. The membrane should consist of Stego wrap or the equivalent.

Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limited migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties (i.e. thickness, composition, strength, and permeability) to achieve the desired performance level.

Moisture retarders can reduce, but not eliminate, moisture vapor rise from the underlying soils up through the slab. Moisture retarder systems should be designed

and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, ASTM, CALGreen and California Building Code requirements and guidelines.

GeoTek recommends that a qualified person, such as the flooring contractor, structural engineer, architect, and/or other experts specializing in moisture control within the building be consulted to evaluate the general and specific moisture and vapor transmission paths and associated potential impact on the proposed construction. That person (or persons) should provide recommendations relative to the slab moisture and vapor retarder systems and for migration of potential adverse impact of moisture vapor transmission on various components of the structures, as deemed appropriate.

In addition, the recommendations in this report and GeoTek's services in general are not intended to address mold prevention; since GeoTek, along with geotechnical consultants in general, do not practice in the area of mold prevention. If specific recommendations addressing potential mold issues are desired, then a professional mold prevention consultant should be contacted.

5.3.1.6 GeoTek recommends that control joints be placed in two directions spaced approximately 24 to 36 times the thickness of the slab in inches. These joints are a widely accepted means to control cracks and should be reviewed by the project structural engineer.

5.3.2 Miscellaneous Foundation Recommendations

5.3.2.1 To minimize moisture penetration beneath the slab-on-grade areas, utility trenches should be backfilled with engineered fill, lean concrete or concrete slurry where they intercept the perimeter footing or thickened slab edge.

5.3.2.2 Soils from the footing excavations should not be placed in the slab-on-grade areas unless properly compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.

5.3.3 Foundation Setbacks

Where applicable, the following setbacks should apply to all foundations. Any improvements not conforming to these setbacks may be subject to lateral movements and/or differential settlements:

- The outside bottom edge of all footings should be set back a minimum of H/3 (where H is the slope height) from the face of any descending slope. The setback should be at least 7 feet and need not exceed 40 feet.
- The bottom of all footings for structures near retaining walls should be deepened so as to extend below a 1:1 projection upward from the bottom inside edge of the wall stem. This applies to the existing retaining walls along the perimeter, if they are to remain.
- The bottom of any proposed foundations for structures should be deepened so as to extend below a 1:1 projection upward from the bottom of the nearest excavation.

5.4 Retaining Wall Design and Construction

5.4.1 General Design Criteria

Recommendations presented herein may apply to typical masonry or concrete vertical retaining walls to a maximum height of six feet. Additional review and recommendations should be requested for higher walls.

Retaining wall foundations embedded a minimum of 12 inches into engineered fill or competent bedrock should be designed using an allowable bearing capacity of 2,000 psf. An increase of one-third may be applied when considering short-term live loads (e.g., seismic and wind loads).

The passive earth pressure may be computed as an equivalent fluid having a density of 150 psf per foot of depth, to a maximum earth pressure of 2,000 psf. A coefficient of friction between soil and concrete of 0.30 may be used with dead load forces. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

An equivalent fluid pressure approach may be used to compute the horizontal active pressure against the wall. The appropriate fluid unit weights are given in the table below for specific slope gradients of retained materials.

Surface Slope of Retained Materials (H:V)	Equivalent Fluid Pressure (PCF) Select Backfill*
Level	33
2:1	45

*Select backfill should consist of approved materials with an expansion index less than or equal to 20

For walls with a retained height greater than six (6) feet, an incremental seismic pressure should be included into the wall design. Where needed, it is recommended that an equivalent fluid pressure of 20 pcf be included into the wall design to account for seismic loading conditions. This pressure may be applied as a standard triangular distribution.

5.4.2 Wall Backfill and Drainage

Wall backfill should consist of very low expansive soil and should include a minimum one-foot wide section of ¾- to 1-inch clean crushed rock (or approved equivalent). The rock should be placed immediately adjacent to the back of the wall and extend up from the backdrain to within approximately 12 inches of finish grade. The upper 12 inches should consist of compacted on-site materials.

As an alternative to the drain, rock and fabric, a pre-manufactured wall drainage product (example: Mira Drain 6000 or approved equivalent) may be used behind the retaining wall. The wall drainage product should extend from the base of the wall to within two (2) feet of the ground surface. The subdrain should be placed in direct contact with the wall drainage product.

The backfill materials should be placed in lifts no greater than eight inches in thickness and compacted to a minimum of 90 percent relative compaction in accordance with ASTM D 1557 test procedures. Proper surface drainage needs to be provided and maintained. Water should not be allowed to pond behind retaining walls. Waterproofing of site walls should be performed where moisture migration through the walls is undesirable.

Retaining walls should be provided with an adequate pipe and gravel back drain system to reduce the potential for hydrostatic pressures to develop. A 4-inch diameter perforated collector pipe (Schedule 40 PVC, or approved equivalent) in a minimum of one cubic foot per linear foot of ¾-inch or one-inch clean crushed rock or equivalent, wrapped in filter fabric should be placed near the bottom of the backfill and be directed (via a solid outlet pipe) to an appropriate disposal area.

Walls from two to four feet in height may be drained using localized gravel packs behind weep holes at 8 feet maximum spacing (e.g., approximately 1.5 cubic feet of gravel in a woven plastic bag). Weep holes should be provided or the head joints omitted in the first course of block extended above the ground surface. However, nuisance water may still collect in front of the wall.

Drain outlets should be maintained over the life of the project and should not be obstructed or plugged by adjacent improvements.

5.4.3 Restrained Retaining Walls

Any retaining wall that will be restrained prior to placing backfill or walls that have male or reentrant corners should be designed for at-rest soil conditions using an equivalent fluid pressure of 65 pcf (select backfill), plus any applicable surcharge loading. For areas having male or reentrant corners, the restrained wall design should extend a minimum distance equal to twice the height of the wall laterally from the corner, or as otherwise determined by the structural engineer.

5.4.3.1 Other Design Considerations

- Retaining and garden wall foundation elements should be designed in accordance with building code setback requirements. A minimum horizontal setback distance of five feet as measured from the bottom outside edge of the footing to a sloped face is recommended.
- Wall design should consider the additional surcharge loads from superjacent slopes and/or footings, where appropriate.
- No backfill should be placed against concrete until minimum design strengths are evident by compression tests of cylinders.
- The retaining wall footing excavations, backcuts and backfill materials should be approved by the project geotechnical engineer or their authorized representative.
- Positive separations should be provided in garden walls at horizontal distances not exceeding 20 feet.

5.4.4 Soil Corrosivity

Corrosivity testing has not been performed for the on-site soils. Testing should be performed during site grading to assess the corrosivity levels of the site soils. Recommendations for protection of buried ferrous metal should be provided by a corrosion engineer.

5.4.5 Soil Sulfate Content

The soil water-soluble sulfate content was determined by GeoTek (2004) on one representative soil sample from the site. The results indicate that the soil water-soluble sulfate for the tested sample was less than 0.1 percent by weight, which is considered "not applicable" (i.e., negligible) as per Table 4.2.1 of ACI 318. Based upon the test results, no special recommendations for concrete are required due to soil sulfate on this site. Additional soluble sulfate testing should be performed during site grading to determine if special sulfate-resistant concrete will be needed for areas of the site.

5.4.6 Import Soils

Import soils should have expansion characteristics similar to the on-site soils. GeoTek also recommends that the proposed import soils be tested for expansion and sulfate potential. GeoTek should be notified a minimum of 72 hours prior to importing so that appropriate sampling and laboratory testing can be performed.

5.5 Pavement Design Considerations

5.5.1 Asphalt Concrete (AC) Pavement

Although planned final grades beneath the project streets and parking lot/access lane improvements within the site are not yet known, the following preliminary pavement design recommendations are based on Traffic Indexes of 4.5 for parking/drive lanes and 5.5 for access lanes. Based upon Roadway Design Requirements provided by the County of Riverside (Standard No. 114), a Traffic Index of 5.5 for Local Streets (Yates Road) and 7.0 for Collector Streets (Washington Street) are anticipated. Preliminary pavement thickness design is based on the CalTrans Highway Design Manual (2018). An R-value of 25 has been assumed for the preliminary design of the project pavement sections. Once the traffic loading information becomes more defined, revision to the pavement design recommendations may be warranted. It is recommended that the final pavement design be based on R-value testing of the as-graded subgrade soils within the pavement areas.

Based on the assumptions noted above the following preliminary pavement recommendations are provided for the site:

PRELIMINARY MINIMUM PAVEMENT SECTION		
Traffic Index	Thickness of Asphalt Concrete (inches)	Thickness of Aggregate Base (inches)
4.5	3.0	5.0
5.5	3.0*	8.0
7.0	4.0* 5.0	11.0 9.0

*Riverside County minimum

Traffic Indices (TIs) used in the pavement design should provide a pavement life of approximately 20 years with a normal amount of flexible pavement maintenance. Irrigation adjacent to pavements, without a deep curb or other cutoff to separate landscaping from the paving may result in premature pavement failure. Traffic parameters used for design were

selected based upon engineering judgment and not upon information furnished to us such as an equivalent wheel load analysis or a traffic study.

Any aggregate base should consist of crushed rock with an R-Value and gradation in accordance with Crushed Aggregate Base (Section 400-2.4 of the "Greenbook" Regional Supplement Amendments). Minimum compaction requirements should be 95 percent of maximum dry density as determined by ASTM D 1557 test procedures for both soil subgrade and aggregate base. Jurisdictional minimum compaction requirements in excess of the aforementioned minimums may govern. The upper 12 inches of subgrade should be moisture-conditioned to at least optimum moisture. The top of the subgrade should be graded so that is drains to the perimeter of the pavement.

All base material and the upper 12 inches of subgrade should be compacted to at least 95 percent of the material's maximum dry density as determined by ASTM D 1557 test procedures. All materials and methods of construction should conform to the requirements of the County of Riverside.

5.5.2 Portland Cement Concrete (PCC) Pavement

For proposed vehicle parking, access lanes, vehicle service and emergency (fire truck) access lanes it is recommended that a minimum of 5 inches of PCC pavement over a minimum of 4 inches of crushed aggregate base (either CAB or CMB) over 12 inches subgrade compacted to at least 95 percent of maximum dry density as determined by ASTM D 1557 test procedures be utilized. This section should also be used in heavy truck traffic areas such as fire lanes, trash dumpster pads and approaches.

Requirements of Section 90 of Caltrans Standard Specifications, and various ACI and ASTM standards regarding mixing and placing concrete should be followed. The PCC pavement should consist of a "pavement"-type concrete mix design and not a "slab"-type mix design. The concrete mix design should have a minimum modulus of rupture of 600 pounds per square inch, and a minimum 28-day compressive strength of 4,000 pounds per square inch. Concrete should incorporate 1-inch maximum size aggregate and should be proportioned to achieve a maximum slump of four inches. Instead of increasing the water content, a plasticizing admixture may be utilized to increase the workability of the concrete. The concrete should be properly cured after placement. Concrete should not be placed during hot and windy weather.

Any aggregate base should consist of crushed rock with an R-Value and gradation in accordance with Crushed Aggregate Base (Section 400-2.4 of the "Greenbook" Regional Supplement Amendments). Minimum compaction requirements should be 95 percent of maximum dry

density as determined by ASTM D 1557 test procedures for both soil subgrade and aggregate base. Jurisdictional minimum compaction requirements in excess of the aforementioned minimums may govern. The upper 12 inches of subgrade should be moisture-conditioned to at least optimum moisture. The top of the subgrade should be graded so that is drains to the perimeter of the pavement.

Crack control joints should be provided in the transverse direction spaced at horizontal intervals ranging from 24 to 36 times the thickness of the concrete.

5.6 Concrete Construction

5.6.1 General

Concrete construction should follow the 2019 CBC and ACI guidelines regarding design, mix placement and curing of the concrete. If desired, GeoTek could provide quality control testing of the concrete during construction.

5.6.2 Concrete Flatwork

Exterior concrete slabs, sidewalks, patios, and driveways should be designed using a four-inch minimum thickness. No specific reinforcement is required from a geotechnical perspective. However, some shrinkage and cracking of the concrete should be anticipated as a result of typical mix designs and curing practices commonly utilized in industrial construction.

Sidewalks and driveways may be under the jurisdiction of the governing agency. If so, jurisdictional design and construction criteria would apply, if more restrictive than the recommendations presented in this report.
Subgrade soils should be pre-moistened prior to placing concrete. The subgrade soils below exterior slabs, sidewalks, driveways, etc. should be pre-saturated to a minimum of 100% of the optimum moisture content to a depth of 12 inches for soils having a "very low" expansion index; 110% of the optimum moisture content to a depth of 12 inches for soils having a "low" expansion index; or 120% of the optimum moisture content to a depth of 12 inches for soils having a "medium" expansion index.

All concrete installation, including preparation and compaction of subgrade, should be performed in accordance with the County of Riverside specifications, and under the observation and testing of GeoTek and a County inspector, if necessary.

5.6.3 Concrete Performance

Concrete cracks should be expected. These cracks can vary from sizes that are "hairline" to more than 1/8 inch in width. Most cracks in concrete while unsightly do not significantly impact long-term performance. While it is possible to take measures (proper concrete mix, placement, curing, control joints, etc.) to reduce the extent and size of cracks that occur, some cracking will occur despite the best efforts to minimize it. Concrete undergoes chemical processes that are dependent on a wide range of variables, which are difficult, at best, to control. Concrete, while seemingly a stable material, is subject to internal expansion and contraction due to external changes over time.

One of the simplest means to control cracking is to provide weakened control joints for cracking to occur along. These do not prevent cracks from developing; they simply provide a relief point for the stresses that develop. These joints are a widely accepted means to control cracks but are not always effective. Control joints are more effective the more closely spaced they are. GeoTek suggests that control joints be placed in two directions and located a distance apart approximately equal to 24 to 36 times the slab thickness.

Exterior concrete flatwork (patios, walkways, driveways, etc.) is often some of the most visible aspects of site development. They are typically given the least level of quality control, being considered "non-structural" components. It is suggested that the same standards of care be applied to these features as to the structures themselves.

5.7 Post Construction Considerations

5.7.1 Landscape Maintenance and Planting

Water has been shown to weaken the inherent strength of soil, and slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from graded slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Controlling surface drainage and runoff and maintaining a suitable vegetation cover can minimize erosion. Plants selected for landscaping should be lightweight, deep-rooted types that require little water and are capable of surviving the prevailing climate.

Overwatering should be avoided. Care should be taken when adding soil amendments to avoid excessive watering. Leaching as a method of soil preparation prior to planting is not recommended. An abatement program to control ground-burrowing rodents should be

implemented and maintained. This is critical as burrowing rodents can decreased the long-term performance of slopes.

It is common for planting to be placed adjacent to structures in planter or lawn areas. This will result in the introduction of water into the ground adjacent to the foundations. This type of landscaping should be avoided. Planters within 30 feet of the buildings should be above ground and underlain by a concrete slab. Waterproofing of the foundation and/or subdrains may be warranted and advisable. GeoTek could discuss these issues, if desired, when plans are made available.

5.7.2 Drainage

The need to maintain proper surface drainage and subsurface systems cannot be overly emphasized. Positive site drainage should be maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond or seep into the ground adjacent to the footings and floor-slabs. Pad drainage should be directed toward approved areas and not be blocked by other improvements.

Roof gutters should be considered that will direct the collected water at least 20 feet from the buildings.

It is the owner's responsibility to maintain and clean drainage devices on or contiguous to their lot. In order to be effective, maintenance should be conducted on a regular and routine schedule and necessary corrections made prior to each rainy season.

5.8 Plan Review and Construction Observations

GeoTek recommends that site grading, specifications, retaining wall/shoring plans and foundation plans be reviewed by this office prior to construction to check for conformance with the recommendations of this report. Additional recommendations may be necessary based on these reviews. GeoTek also recommends that representatives from this firm be present during site grading and foundation construction to check for proper implementation of the geotechnical recommendations. The owner/developer should have GeoTek's representative perform at least the following duties:

- Observe site clearing and grubbing operations for proper removal of unsuitable materials.
- Observe and test bottom of removals prior to fill placement.

- Evaluate the suitability of on-site and import materials for fill placement and collect soil samples for laboratory testing when necessary.
- Observe the fill for uniformity during placement including utility trenches.
- Test the fill for field density and relative compaction.
- Test the near-surface soils to verify proper moisture content.
- Observe and probe foundation excavations to confirm suitability of bearing materials.

If requested, a construction observation and compaction report can be provided by GeoTek, which can comply with the requirements of the governmental agencies having jurisdiction over the project. GeoTek recommends that these agencies be notified prior to commencement of construction so that necessary grading permits can be obtained.

6. LIMITATIONS

This evaluation does not and should in no way be construed to encompass any areas beyond the specific area of proposed construction as indicated to us by the client. Further, no evaluation of any existing site improvements is included. The scope is based on GeoTek's understanding of the project and the client's needs, GeoTek's proposal (Proposal No. P-0503719) dated May 14, 2019 and geotechnical engineering standards normally used on similar projects in this region.

The materials observed on the project site appear to be representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops or conditions exposed during site construction. Site conditions may vary due to seasonal changes or other factors. GeoTek, Inc. assumes no responsibility or liability for work, testing or recommendations performed or provided by others.

Since GeoTek's recommendations are based on the site conditions observed and encountered, and laboratory testing, GeoTek's conclusions and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty is expressed or implied. Standards of practice are subject to change with time.

7. SELECTED REFERENCES

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_____, 1998, "Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada," International Conference of Building Officials.

_____, 2008, "Guidelines for Evaluating and Mitigating Seismic Hazards in California," Special Publication 117A.

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GeoTek, Inc., In-house proprietary information.

_____, 2004, "Preliminary Geotechnical Evaluation for Proposed Residential Development, 35780 Washington Street, Riverside County, California," Project No. 2551-SD3, dated March 23.

_____, 2019, "Updated Geotechnical Evaluation, Proposed School Development, Temecula Valley Charter School, APN 472-210-002, 35780 Washington Street, Riverside County, California," Project No. 2135-CR, dated June 24.

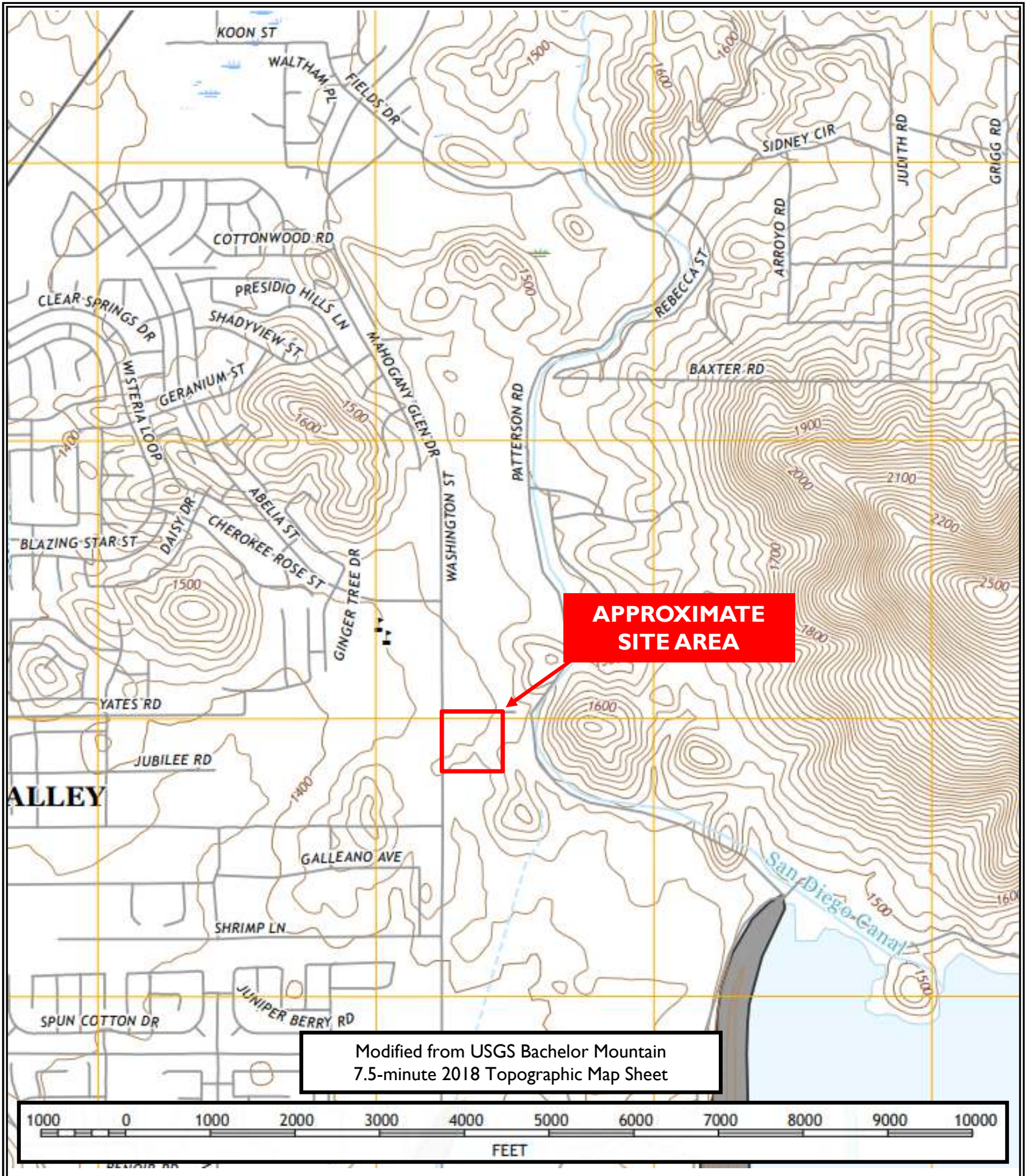
Morton, D.M., Kennedy, M.P., Bovard, K.R., and Burns, Diane, 2003, "Geologic Map and Digital Database of the Bachelor Mountain 7.5' Quadrangle, Riverside County, California," U.S. Geological Survey OF-2003-103, scale 1:24,000.

"Riverside County Parcel Report for APN 472-210-002-0, accessed July 6, 2022 (https://gis.countyofriverside.us/Html5Viewer/?viewer=MMC_Public).

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Modified from USGS Bachelor Mountain 7.5-minute 2018 Topographic Map Sheet

Temecula Charter Valley School
35780 Washington Street
Winchester, Riverside County, California

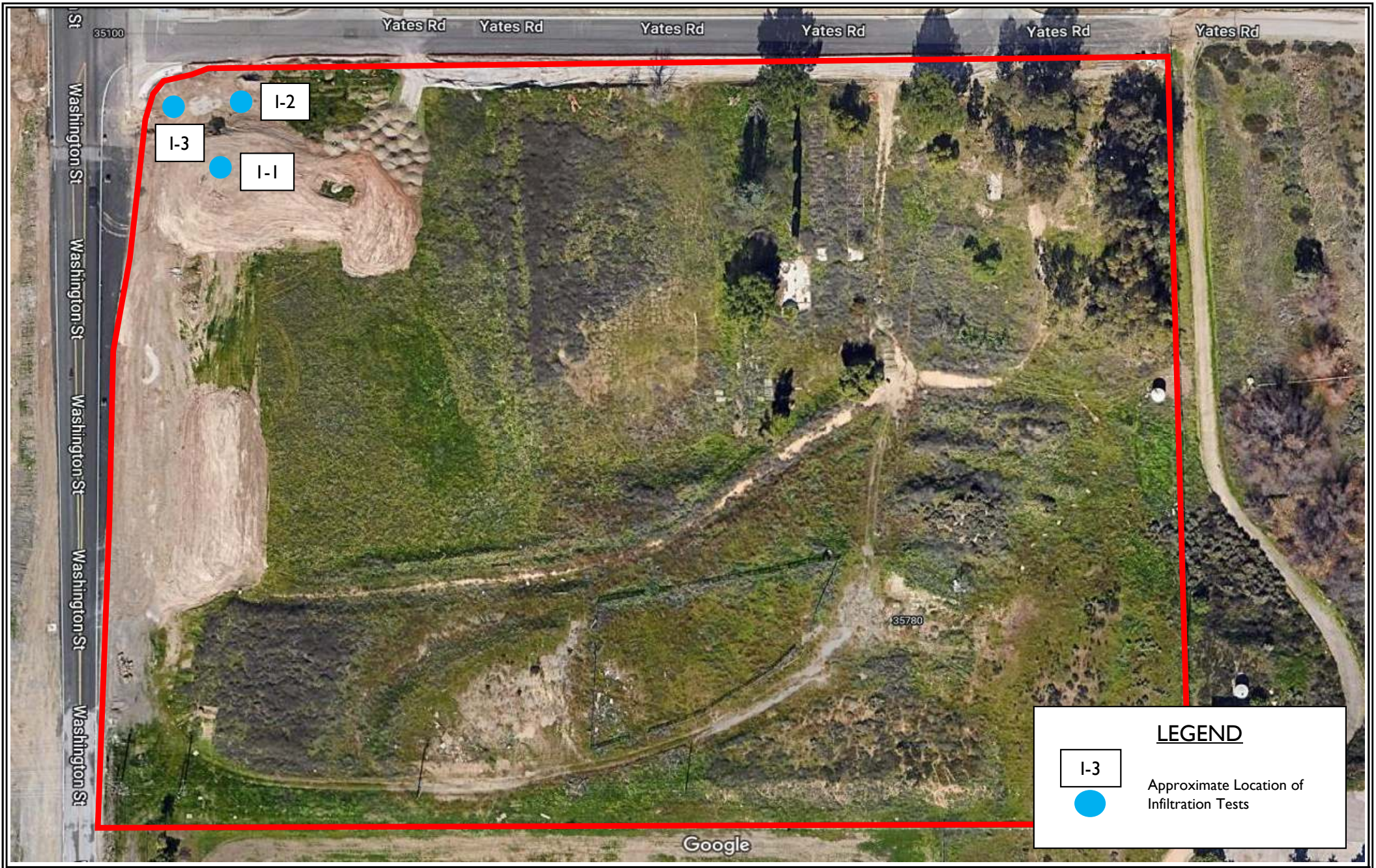
GeoTek Project No. 2135.1-CR

NORTH

Figure 1

Site Location and Topography Map

GEOTEK



Temecula Valley Charter School
Washington Street and Yates Road
Winchester, Riverside County, California

Project No. 2135.1-CR

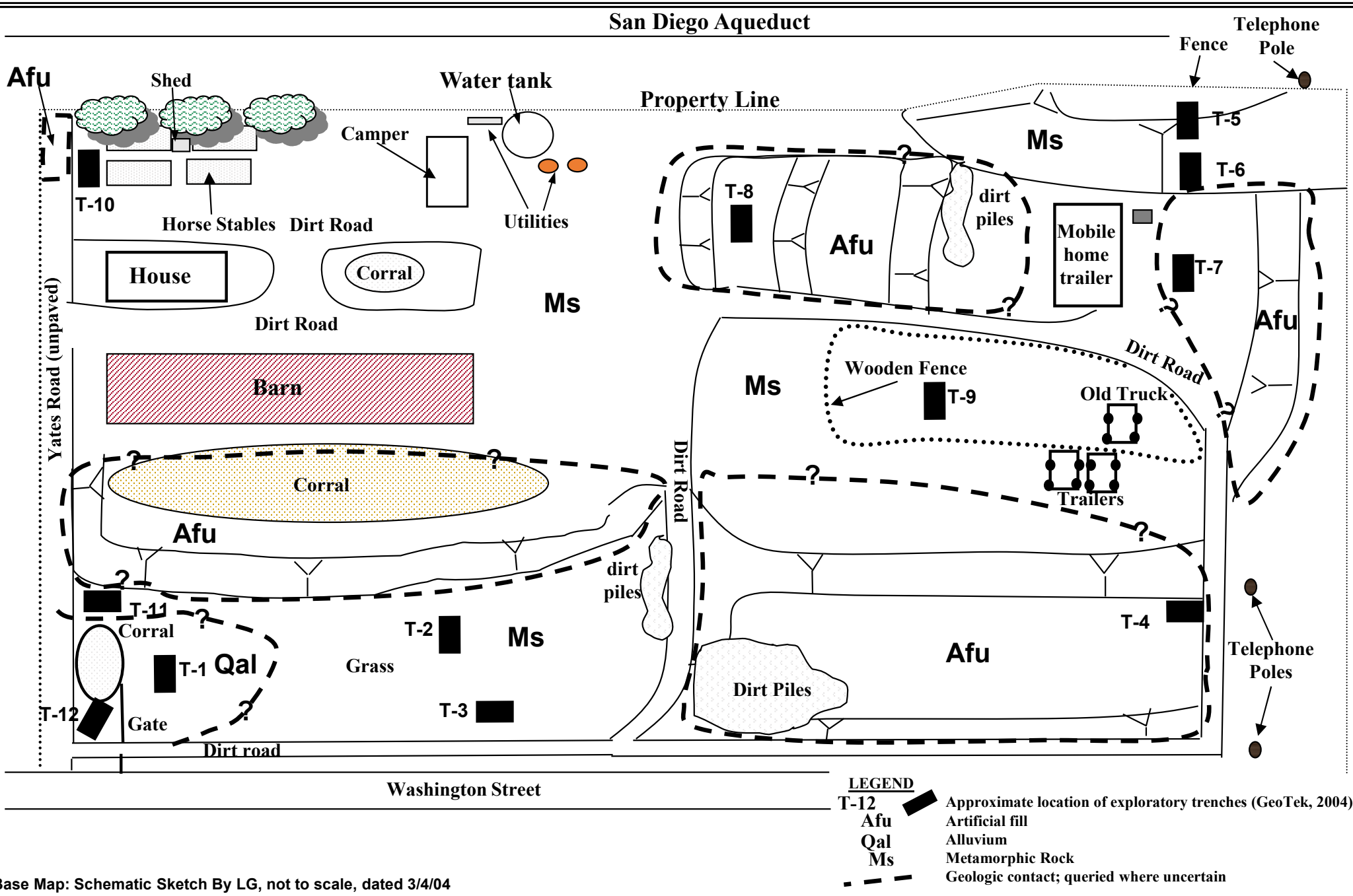
Scale As Shown

NORTH

Figure 2

Infiltration Test Location Map

GEOTEK



Base Map: Schematic Sketch By LG, not to scale, dated 3/4/04

Temecula Valley Charter School
Proposed School Development
APN 472-210-002, 35780 Washington Street
Winchester Area, Riverside County, California
GeoTek Project No. 2135-CR

Figure 3

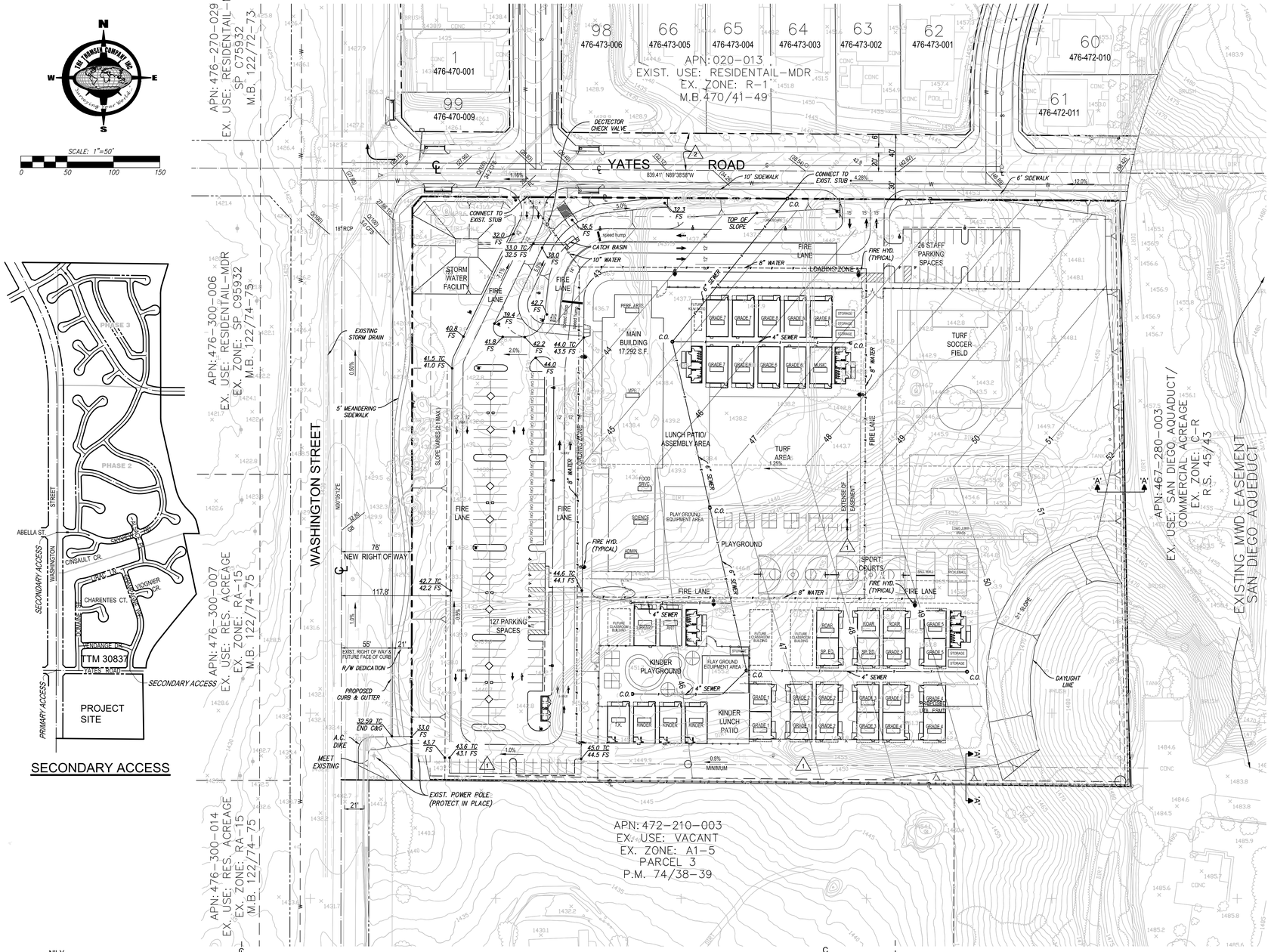
Trench Location Map

GEOTEK

IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

PUBLIC USE PERMIT XXX

JUNE 2022



OWNER / APPLICANT:

TEMECULA VALLY CHARTER SCHOOL
35755 ABELIA STREET
WINCHESTER, CA 92596
PHONE: (951) 294-6775

ENGINEER & REPRESENTATIVE:

GRANT BECKLUND CIVIL ENGINEERING
30811 GARBANI ROAD
WINCHESTER, CA. 92596
PHONE: (951) 288-0601
EMAIL: GRANTBECKLUND@GMAIL.COM

LEGAL DESCRIPTION

PARCEL 4 OF PARCEL MAP 14030 COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 74, PAGES 38 AND 39 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID RIVERSIDE COUNTY.

ASSESSOR'S PARCEL NO.

APN: 472-210-002

SITE ADDRESS:

35780 WASHINGTON STREET
WINCHESTER, CA 92596

OPINION OF EARTHWORK QUANTITIES

CUBIC YARDS OF CUT 50,000 CY (RAW). CUBIC YARDS OF FILL 5,000 CY (RAW). THE OPINION OF EARTHWORK QUANTITIES SHOWN ABOVE ARE UNADJUSTED GROSS VOLUMES, AND DO NOT INCLUDE THE EFFECTS OF SCARIFYING, OVER ESCAVATION, RECOMPACTION, SHRINKAGE, SUBSIDENCE OR OTHER FACTORS AND ARE SUBJECT TO FIELD CONDITIONS THAT MAY BE SPECIFIED IN THE PRELIMINARY SOILS REPORT AND ARE FOR REFERENCE AND FEE PURPOSES ONLY.

DEVELOPER SHALL BE REQUIRED TO SPECIFY THE PRECISE LOCATION OF EXPORT OR IMPORT IN EITHER CASE, PRIOR TO THE ISSUANCE OF A GRADING PERMIT. PROJECT WILL RESULT IN A "BALANCED" CONDITION.

NOTES:

1. ALL IMPROVEMENTS SHALL BE PER RIVERSIDE COUNTY STANDARDS
2. PUP INCLUDES THE ENTIRE CONTIGUOUS OWNERSHIP OF THE LAND DIVIDER.
3. ALL SLOPES ARE 2:1 RATIO EXCEPT IN DETENTION BASIN AREA WHERE THEY ARE 4:1, UNLESS OTHERWISE NOTED
4. SETBACKS OF SLOPES TO PROPERTY LINES SHALL CONFORM TO ORDINANCE 457 REQUIREMENTS.
5. ALL ON-SITE, OVERHEAD, EDISON POWER LINES WILL REMAIN IN PLACE
6. LANDSCAPING WILL BE PER DESIGN AND LANDSCAPING GUIDELINES IN WINCHESTER 1800 SPECIFIC PLAN NO. 286.
7. THIS PROPERTY DOES NOT LIE WITHIN A "COMMUNITY SERVICES DISTRICT."
8. WASHINGTON STREET AND YATES ROAD ARE TO BE DEDICATED PUBLIC RIGHT-OF-WAY TO THE COUNTY OF RIVERSIDE FOR TRANSPORTATION AND UTILITY PURPOSES.
9. THIS PROPERTY LIES WITHIN A NON-PRINTED/SPECIFIED FLOOD ZONE. (FIRM NO. 0602452755A) AND IS NOT SUBJECT TO OVERFLOW, INUNDATION, OR FLOOD HAZARDS.
10. THIS PROPERTY DOES NOT LIE WITHIN A SPECIAL STUDY ZONE, A C.S.D., AND IS NOT SUBJECT TO LIQUEFACTION OR OTHER GEOLOGIC HAZARDS.
11. NO SUBSURFACE SEPTIC SEWAGE DISPOSAL IS INTENDED.
12. THE PROJECT IS ADJACENT TO SPECIFIC PLAN 286.
13. THIS PROPERTY CONTAINS KNOWN WELLS.
14. THIS PROPERTY CONTAINS EXISTING STRUCTURES AS SHOWN.
15. THIS PROJECT IS WITHIN ZONE 'D' OF THE "SWAP R&BBD".
16. THIS PROJECT IS PROPOSED IN ONE PHASE.
17. MAINTENANCE OF ON-SITE SLOPES AND DETENTION BASIN SHALL BE BY OWNER

SEWER & WATER NOTES:

8" SEWER EXISTS IN YATES ROAD .

12" WATER EXISTS IN YATES ROAD .

FENCING:

ENTIRE SCHOOL WILL BE FENCED WITH 6 FT DECORATIVE AND/OR CHAIN LINK FENCING.

MANUAL GATES WILL BE INSTALLED AT DRIVEWAYS ON YATES ROAD AND ACCESS POINTS TO SCHOOL AREAS.

HAZARD MATERIALS:

NO FLAMMABLE/ COMBUSTIBLE LIQUIDS OR WASTE OIL WILL BE STORED ON SITE.

FIRE DEPARTMENT NOTES:

PRIOR TO ISSUANCE OF A BUILDING PERMIT THE FOLLOWING SHALL PROVIDED:

FIRE HYDRANTS AND FIRE FLOW: PROVIDE OR SHOW THERE EXIST FIRE HYDRANT(S) CAPABLE OF DELIVERING FIRE FLOW AS REQUIRED BY CALIFORNIA FIRE CODE AND RIVERSIDE COUNTY FIRE DEPARTMENT STANDARDS WITHIN 400 FEET OF ALL PORTIONS OF ALL STRUCTURES.

TOPOGRAPHY SOURCE

TOPO BY AERIAL SURVEY BY: WALTERS MAPS & ASSOCIATES
7225 ALABAMA AVENUE
CANOGA PARK, CALIFORNIA 91303
COMPLETED 4/13/2022

BENCH MARK

NGS BENCHMARK DX5501: LOCATED AT BOREL ROAD AND AULD ROAD AT UTILITY POLE NUMBER 2328445E.
ELEV.= 1397.43 FEET (NAVD88)

AREA CALCULATIONS

TOTAL NET AREA: 11.44 AC.
TOTAL GROSS AREA: 11.99 AC.

ZONING AND LAND USE

EXIST. ZONING:	R-1 (SINGLE FAMILY RESIDENTIAL)
EXIST. LAND USE:	VACANT
PROP. LAND USE:	CHARTER SCHOOL
GENERAL PLAN DESIGNATION:	MEDIUM DENSITY RESIDENTIAL (2-5 DU/AC)
FLOOD ZONE:	NONE

UTILITIES

WATER/SEWER:	EASTERN MUNICIPAL WATER DISTRICT 2270 TRUMBLE RD. PERRIS, CA 92572-8300 (909) 928-3777
GAS:	SOUTHERN CALIFORNIA GAS COMPANY CENTRALIZED CORRESPONDENCE P.O. BOX 3150 SAN DIMAS, CA 91773 (800) 427-2009
TELEPHONE:	VERIZON CUSTOMER SALES & SOLUTIONS CENTER P.O. BOX 11328 ST. PETERSBURG, FL 33733 (800) 483-4000
ELECTRICAL:	SOUTHERN CALIFORNIA EDISON COMPANY 26100 MENIFEE RD. ROMELAND, CA 92585 (909) 928-8207
CABLE:	ADELPHIA CABLE 4077 W. STETSON AVE. HEMET, CA 92545 (888) 683-1000
SCHOOL DISTRICT:	TEMECULA UNIFIED SCHOOL DISTRICT 31350 RANCHO VISTA RD. TEMECULA, CA 92592 (909) 676-2661
FIRE PROTECTION:	RIVERSIDE COUNTY HEADQUARTERS 210 W. SAN JACINTO AVE. PERRIS, CA 92570 (909) 940-6900

EASEMENT NOTE(S):

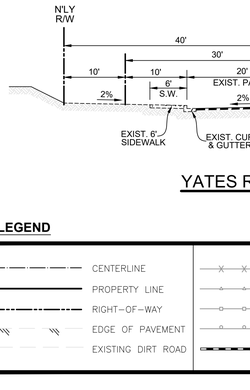
1. AN EASEMENT FOR UTILITIES IN FAVOR OF SO. CALIF. EDISON CO. & GENERAL TELEPHONE CO., REC. JAN. 6, 1961 PER INST. # 1422.

GENERAL CONSTRUCTION NOTES:

1. ALL 2:1 SLOPES 10' OR HIGHER AND RETAINING WALLS 5' OR HIGHER SHALL HAVE V-DITCHES PLACED AT THE TOP OF WALL OR SLOPE RIDGE.
2. ALL STRUCTURES ON SITE, EXCLUDING THOSE BELONGING TO ANY RELEVANT UTILITY COMPANIES, ARE TO BE REMOVED. THOSE BELONGING TO THE UTILITY COMPANIES SHALL BE EITHER PROTECTED IN PLACE OR RELOCATED.
3. ALL EXISTING ON-SITE POWER POLES WILL REMAIN.

ABBREVIATIONS

CENTER LINE	CL	IRRIGATION FACILITIES	IRR
ASSESSOR'S PARCEL NUMBER	APN	FINISHED SURFACE	FS
FLOW LINE	FL	FINISH GRADE	FG
POWER POLE	PP	PAD ELEVATION	P.E.
HIGH POINT	H.P.	EDGE OF PAVEMENT	EP
TOP OF CURB	TC	PROPERTY LINE	P.L.
ASPHALTIC CONCRETE	AC	RIGHT-OF-WAY	R/W
FIRE HYDRANT	F.H.	GRADE BREAK	GB

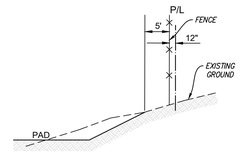


YATES ROAD TYPICAL SECTION

NOT TO SCALE
RIV. CO. STD. NO.104
T.I.= 6.5'
R-VALUE = 30

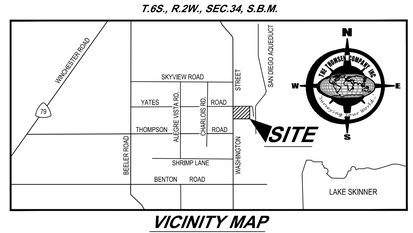
WASHINGTON STREET TYPICAL SECTION

NOT TO SCALE
RIV. CO. STD. NO. 91
T.I.= 6.5'
R-VALUE = 30



SECTION "A"-"A"

T.6S., R.2W., SEC.34, S.B.M.



VICINITY MAP

NOT TO SCALE
THOMAS BROS. (RIVERSIDE & SAN BERNARDINO COUNTIES)
PAGE 899, COORD G-6, 2022 EDITION

Figure 4 - Site Plan

LEGEND

- CENTERLINE
- PROPERTY LINE
- RIGHT-OF-WAY
- EDGE OF PAVEMENT
- EXISTING DIRT ROAD
- EXISTING CHAIN LINK FENCE
- EXISTING PIPE-RAIL FENCE
- EXISTING WIRE FENCE
- EXISTING WOOD RAIL FENCE
- PROP. RETAINING WALL
- EXISTING POWER POLE
- EXISTING GUY WIRE
- OHL EXISTING OVERHEAD LINE
- EXISTING DEPRESSION
- PROPOSED FIRE HYDRANT

Engineer			Revisions:	County	
Mark:	By:	Date:	Description:	Appr.	Date

Designed By: GB | Drawn By: BB | Checked By:

Principal

REGISTERED PROFESSIONAL ENGINEER — GRANT W. BECKLUND — No. 23737 Exp. 12/31/23 — CIVIL — STATE OF CALIFORNIA

Prepared Under The Supervision Of:
GRANT BECKLUND CIVIL ENGINEERING
30811 GARBANI ROAD WINCHESTER, CA 92596 (951) 288-0601
GRANT BECKLUND R.C.E. No. 23737 EXP. 12/31/2023
Date:

Reviewed By:
COUNTY OF RIVERSIDE
Date:

Scale: AS NOTED

Bench Mark: TOPO DATA AS NOTED ABOVE

COUNTY OF RIVERSIDE
PUBLIC USE PERMIT XXXX
FOR
TEMECULA VALLEY CHARTER SCHOOL

Sheet No. 1 OF 1 SHEET
File No.

Plot date: 8/1/2022 | File name:

APPENDIX A

LOGS OF EXPLORATORY TRENCHES
(GEOTEK, 2004)

Temecula Valley Charter School

Winchester Area, Riverside County, California

Project No. 2135.1-CR

GEOTEK

A - FIELD TESTING AND SAMPLING PROCEDURES

Bulk Samples (Large)
These samples are normally large bags of earth materials over 20 pounds in weight collected from the field by means of hand digging or exploratory cuttings.

Bulk Samples (Small)
These are plastic bag samples which are normally airtight and contain less than 5 pounds in weight of earth materials collected from the field by means of hand digging or exploratory cuttings. These samples are primarily used for determining natural moisture content and classification indices.

B - TRENCH LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the log of trenches:

SOILS

USCS	Unified Soil Classification System
f-c	Fine to coarse
f-m	Fine to medium

GEOLOGIC

B: Attitudes	Bedding: strike/dip
J: Attitudes	Joint: strike/dip
C: Contact line	
……..	Dashed line denotes USCS material change
———	Solid Line denotes unit / formational change
———	Thick solid line denotes end of trench

(Additional denotations and symbols are provided on the trench logs)

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	**TRENCH NO.:** *T-1* **MATERIAL DESCRIPTION AND COMMENTS**	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
	X	T1-1	SM	**Topsoil** Brown, moist, loose silty fine SAND with root hairs	13.4		
		T1-2	ML-CL	**Alluvium** Yellow, moist, clayey SILT to silty CLAY with fine sand			
5		T1-3		**Metamorphic Rock** @4.5' to 6.5':Highly weathered; breaks into gray-brown, sandy GRAVEL with clay; broken by hand; localized fracturing; foiliation			
		T1-4					
10				-HOLE TERMINATED AT 7 FEET- Practical refusal at 7 feet Hole backfilled with soil cuttings No groundwater encountered			
15							

LEGEND

Sample Type: --- Small Plastic Bag; --- Large Bulk Sample; ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	**TRENCH NO.:** *T-2* / **MATERIAL DESCRIPTION AND COMMENTS**	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**Topsoil** Brown, moist, loose, silty fine SAND; rootlets			
		T2-1		**Metamorphic Rock** Moderately to highly weathered; breaks into gray sandy GRAVEL withclay; angular gravel & cobble size rock fragments; hard, joints are tight with carbonate stringers; foiliation	8.8		
				-HOLE TERMINATED AT 1.5 FEET- Practical refusal at 1.5 feet Hole backfilled with soil cuttings No groundwater encountered			
5							
10							
15							

LEGEND

Sample Type: --- Small Plastic Bag; --- Large Bulk Sample; ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

TRENCH NO.: *T-3*

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**Topsoil** Brown, moist, loose, sandy SILT to silty fine SAND; rootlets			
		T3-1			11.6		
		T3-2		**Metamorphic Rock** Completely weathered; breaks into gray-brown, sandy CLAY; with calcium carbonate stringers & root hairs	13.6		
				@2': Highly weathered; breaks into gray sandy GRAVEL; angular gravel & cobble size rock fragments , hard to break with hand			
5				-HOLE TERMINATED AT 2.5 FEET- Practical refusal at 2.5 feet Hole backfilled with soil cuttings No groundwater encountered			
10							
15							

LEGEND

Sample Type: --- Small Plastic Bag; --- Large Bulk Sample; ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

TRENCH NO.: *T-4*

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
		T4-1		**Fill**	17.2		
		T4-2	SC	Brown, moist, loose, clayey f-c SAND with gravel			
				Topsoil			
			SM	Dark brown, moist, loose, silty fine SAND; rootlets			
				Metamorphic Rock			
				Moderately weathered;angular gravel & cobble size rock fragments; joints tight			
				-HOLE TERMINATED AT 2.5 FEET-			
5				Practical refusal at 2.5 feet			
				Hole backfilled with soil cuttings			
				No groundwater encountered			
10							
15							

LEGEND

Sample Type: --- Small Plastic Bag; --- Large Bulk Sample; ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	**TRENCH NO.:** *T-5* / **MATERIAL DESCRIPTION AND COMMENTS**	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			ML	**Topsoil** Brown, moist, loose, sandy SILT; rootlets			
				Metamorphic Rock Moderately weathered; breaks into gray sandy GRAVEL; with angular rock fragments gravel & cobble size Two well developed Joint sets; trending NE/ NW 80; iron oxidization along fracture; very little in fill @4': becomes harder to dig; slightly - less weathered			
5				-HOLE TERMINATED AT 4.5 FEET- Practical refusal at 4.5 feet Hole backfilled with soil cuttings No groundwater encountered			
10							
15							

LEGEND

Sample Type: --- Small Plastic Bag; --- Large Bulk Sample; ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

TRENCH NO.: *T-6*

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			ML	**Topsoil** Brown, moist, loose, sandy SILT ; rootlets			
5				**Metamorphic Rock** Moderately weathered; breaks into gravel & cobble rock fragments - angular Joints; NE/ NW trend @6': less weathered; less jointed			
10				-HOLE TERMINATED AT 6 FEET- Practical refusal at 6 feet Hole backfilled with soil cuttings No groundwater encountered			
15							

LEGEND

Sample Type: --- Small Plastic Bag; --- Large Bulk Sample; ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

TRENCH NO.: *T-7*

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**Fill** Red, moist, silty fine SAND with gravel & cobble @1': gray, moist, silty f-m SAND with gravel			
	■	T7-1	SC	@2': red-brown, moist, clayey f-c SAND @3': straw	10.5		
5				**Metamorphic Rock** Highly to moderately weathered: breaks into gray sandy GRAVEL; gravel & cobble size rock fragments-angular; Localized fracturing; foiliation; iron oxide staining; rootlets along fractures			
				-HOLE TERMINATED AT 5.5 FEET- Practical refusal at 5.5 feet Hole backfilled with soil cuttings No groundwater encountered			
10							
15							

LEGEND

Sample Type: ■ --- Small Plastic Bag ⊠ --- Large Bulk Sample ▽ ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

TRENCH NO.: *T-8*

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
		T8-1	SC	**Fill** Interbedded gray to red-brown, moist, clayey f-c SAND	14.5		
		T8-2					
5				**Metamorphic Rock** Highly weathered; breaks into gray sandy GRAVEL; gravel & cobble size rock fragments; slight iron oxide staining in localized fractures-tight			
10				-HOLE TERMINATED AT 6 FEET- Practical refusal at 6 feet Hole backfilled with soil cuttings No groundwater encountered			
15							

LEGEND

Sample Type: --- Small Plastic Bag; --- Large Bulk Sample; ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	**TRENCH NO.:** *T-9* / **MATERIAL DESCRIPTION AND COMMENTS**	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
		T9-1	SM	**Topsoil** Dark brown, moist, loose, silty fine SAND; rootlets			
				Metamorphic Rock Highly weathered; localized fracturing; less weathering; soft rock (scratches with fingernail)			
5				-HOLE TERMINATED AT 4 FEET- Practical refusal at 4 feet Hole backfilled with soil cuttings No groundwater encountered			
10							
15							

LEGEND

Sample Type: --- Small Plastic Bag; --- Large Bulk Sample; ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

TRENCH NO.: *T-10*

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
		T10-1	SC	**Topsoil** Brown, moist, loose, clayey f-m SAND; rootlets			
		T10-2					
		T10-3		**Metamorphic Rock** Completely to highly weathered; breaks into gray, moist, clayey SAND to sandy GRAVEL	12.9		
5		T10-4		Competely weathered; breaks into dark gray, moist, sandy CLAY; moderately jointed; completely weathered; water seepage at 4.5 feet along joints			
				-HOLE TERMINATED AT 6.5 FEET-			
				Hole backfilled with soil cuttings No groundwater encountered Seepage observed from approximately 4.5 feet to 7 feet			
10							
15							

LEGEND

Sample Type: --- Small Plastic Bag; --- Large Bulk Sample; ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

TRENCH NO.: *T-11*

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
	X	T11-1	SM-SC	**Topsoil** Brown, silty fine SAND to clayey fine SAND			
		T11-2		**Metamorphic Rock** Completely weathered; gray, moist, clayey SAND with gravel	15.8		
5				Highly weathered; breaks into gray, moist sandy GRAVEL; gravel & cobble size rock fragments; angular; can break with hand			
				-HOLE TERMINATED AT 5.5 FEET- Practical refusal at 5.5 feet Hole backfilled with soil cuttings No groundwater encountered			
10							
15							

LEGEND

Sample Type: --- Small Plastic Bag; --- Large Bulk Sample; ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

GeoTek, Inc.
LOG OF EXPLORATORY TRENCH

PROJECT NO.:	2551SD3	**LOGGED BY:**	LG/TS
PROJECT NAME:	Washington/Galvez	**EQUIPMENT:**	Case
CLIENT:	Galvez	**DATE:**	3/4/2004
LOCATION:	See Site Plan		

TRENCH NO.: *T-12*

Depth (ft)	SAMPLES: Sample Type*	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
			SM	**Topsoil** Brown, moist, silty fine SAND with roots			Pocket Penetrometer = 0.5 - 1.0 tsf
		T12-1	CL	**Alluvium** Brown, moist, silty CLAY with gravel		8.8	EI, AL, SR
		T12-2					Pocket Penetrometer = 1.0 to 1.5 tsf
5				**Metamorphic Rock** @4.5' to 5.5': Internally fracture; highly fracture; breaks into a gray, sandy GRAVEL; gravel & cobble size rock fragments; angular shaped			
				-HOLE TERMINATED AT 6 FEET- Hole backfilled with soil cuttings No groundwater encountered			
10							
15							

LEGEND

Sample Type: --- Small Plastic Bag; --- Large Bulk Sample; ---Water Table

Laboratory Testing: AL = Atterberg Limits; EI = Expansion Index; MD = Maximum Density; SA = Sieve Analysis; SR = Sulfate/Resistivity Test; SH = Shear Testing; RV = R-Value Test; CO = Consolidation

APPENDIX B

LABORATORY TEST RESULTS
(GEOTEK, 2004)

Temecula Valley Charter School

Winchester Area, Riverside County, California

Project No. 2135.1-CR

GEOTEK

SUMMARY OF LABORATORY TESTING

Classification

Soils were classified visually according to the Unified Soil Classification System (ASTM Test Method D2487). The soil classifications are shown on the exploratory logs in Appendix A.

Liquid limit, plastic limit and plasticity index were determined in accordance with ASTM Test Method D4318. Results are shown on the logs of exploratory borings and included herein, Plates AT 1 and AT-2.

Sulfate Content

Analysis to determine the water-soluble sulfate content was performed in accordance with California Test No. 417. Results of the testing indicated 0.005% Sulfate which is considered negligible as per Table 19-A-4 of the CBC. The results of the testing are included herein (see Plate SL-1).

Expansion Index

Expansion Index testing was performed on a representative near-surface samples. Testing was performed in general accordance with ASTM Test Method D4829. The results indicate an Expansion Index (EI) is 38 for the soil tested. This is considered a low expansion potential in accordance with Table 18AI-B of the 2001 CBC. The results are shown on Plate EI-1.

APPENDIX C

LOGS OF EXPLORATORY BORINGS
(GEOTEK, 2022)

Temecula Valley Charter School

Winchester Area, Riverside County, California

Project No. 2135.1-CR

GEOTEK

A - FIELD TESTING AND SAMPLING PROCEDURES

Bulk Samples (Large)
These samples are normally large bags of earth materials over 20 pounds in weight collected from the field by means of hand digging or exploratory cuttings.

Bulk Samples (Small)
These are plastic bag samples which are normally airtight and contain less than 5 pounds in weight of earth materials collected from the field by means of hand digging or exploratory cuttings. These samples are primarily used for determining natural moisture content and classification indices.

B - BORING LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the log of borings:

SOILS

USCS	Unified Soil Classification System
f-c	Fine to coarse
f-m	Fine to medium

GEOLOGIC

B: Attitudes	Bedding: strike/dip
J: Attitudes	Joint: strike/dip
C: Contact line	
……..	Dashed line denotes USCS material change
———	Solid Line denotes unit / formational change
———	Thick solid line denotes end of boring

(Additional denotations and symbols are provided on the boring logs)

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Temecula Valley Charter	**DRILLER:**	2R Drilling Inc.	**LOGGED BY:**	CBT
PROJECT NAME:	Proposed - Temecula Valley Charter School	**DRILL METHOD:**	Hollow stem Auger	**OPERATOR:**	Miguel
PROJECT NO.:	2135.1-CR	**HAMMER:**	140lbs/30in.	**RIG TYPE:**	CME 75
LOCATION:	See Exploration Location Map			**DATE:**	6/9/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	**BORING NO.: I-1** / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				SM	**Fill:** Silty f-c SAND, brown, slightly moist, medium dense, some organics, trace gravel, few 3" cobbles			
					Silty f-c SAND, brown, slightly moist, medium dense, few gravel, trace clay			
				ML	**Alluvium:** Clayey SILT, light brown, slightly moist, medium stiff, trace gravel			
5					Same as above			
					Clayey SILT, light gray, slightly moist, medium stiff			
					BORING TERMINATED AT 8 FEET			
					No groundwater encountered			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Temecula Valley Charter	**DRILLER:**	2R Drilling Inc.	**LOGGED BY:**	CBT
PROJECT NAME:	Proposed - Temecula Valley Charter School	**DRILL METHOD:**	Hollow stem Auger	**OPERATOR:**	Miguel
PROJECT NO.:	2135.1-CR	**HAMMER:**	140lbs/30in.	**RIG TYPE:**	CME 75
LOCATION:	See Exploration Location Map			**DATE:**	6/9/2022

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	BORING NO.: I-2 / MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
					Alluvium:			
				SM	Silty f-c SAND, brown, slightly moist, medium dense, some organics, some gravel			Maximum Density = 118.5 pcf Optimum Moisture = 8.5% Expansion Index = 21 43% Passing #200 Sieve Remolded Shear
				ML	Silty CLAY, brown, slightly moist, medium stiff, trace sand			
				CL/ML	Silty CLAY to clayey SILT, light gray, slightly moist, medium stiff			
5					**BORING TERMINATED AT 5 FEET** No groundwater encountered			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	Temecula Valley Charter	**DRILLER:**	2R Drilling Inc.	**LOGGED BY:**	CBT
PROJECT NAME:	Proposed - Temecula Valley Charter School	**DRILL METHOD:**	Hollow stem Auger	**OPERATOR:**	Miguel
PROJECT NO.:	2135.1-CR	**HAMMER:**	140lbs/30in.	**RIG TYPE:**	CME 75
LOCATION:	See Exploration Location Map			**DATE:**	6/9/2022

BORING NO.: I-3

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				SM	**Alluvium:** Silty f-c SAND, brown, slightly moist, medium dense, some organics, some gravel, few 3" cobbles			
					Silty f-c SAND, brown, slightly moist, medium dense, some gravel			
				CL/ML	Silty CLAY to clayey SILT, brown, slightly moist, medium stiff, some gravel few 3" cobbles			
					Silty CLAY to clayey SILT, brown, slightly moist, medium stiff, some gravel			
5					**BORING TERMINATED AT 5 FEET**			
					No groundwater encountered			
10								
15								
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing: AL = Atterberg Limits; EI = Expansion Index; SA = Sieve Analysis; RV = R-Value Test; SR = Sulfate/Resisitivity Test; SH = Shear Test; HC= Consolidation; MD = Maximum Density

APPENDIX D

LABORATORY TEST RESULTS
(GEOTEK, 2022)

Temecula Valley Charter School

Winchester Area, Riverside County, California

Project No. 2135.1-CR

GEOTEK

SUMMARY OF LABORATORY TESTING

Classification

Soils were classified visually in general accordance with the Unified Soil Classification System (ASTM Test Method D 2487). The soil classifications are shown on the logs of borings in Appendix C.

Direct Shear

Shear testing was performed in a direct shear machine of the strain-control type in general accordance with ASTM D 3080 test procedures. The rate of deformation was approximately 0.035 inch per minute. The sample was sheared under varying confining loads in order to determine the coulomb shear strength parameters, angle of internal friction and cohesion. The tests were performed on soil samples remolded to approximately 90 percent of maximum dry density as determined by ASTM D 1557 test procedures. The shear test results are presented graphically in Appendix D.

Expansion Index

Expansion Index testing was performed one (1) soil sample obtained from the field exploration. Testing was performed in general accordance with ASTM D 4829 test procedures. The results of the testing are provided below and in Appendix D.

Boring No.	Depth (ft.)	Description	Expansion Index	Classification
I-2	0-5	Silty Sand with Clay (SM)	16	Very Low

Moisture-Density Relationship

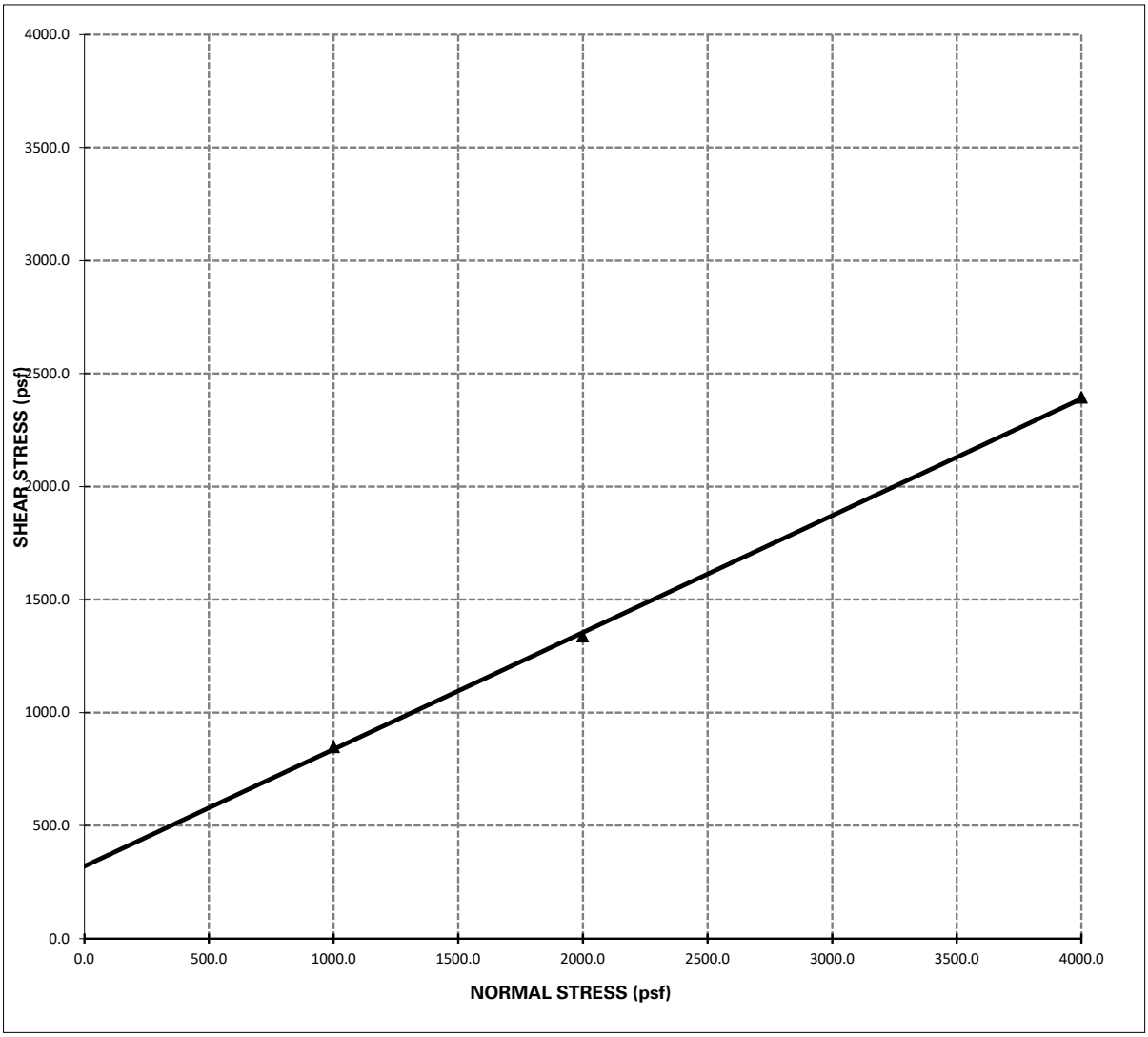
Laboratory testing was performed on one (1) sample collected during the subsurface exploration. The laboratory maximum dry density and optimum moisture content for the soil was determined in general accordance with ASTM D 1557 test procedures. The results are presented graphically in Appendix D.

Materials Finer Than the No. 200 Sieve

A #200 sieve wash was performed on selected samples of the soils according to ASTM Test Method D 1140. The results of this testing are presented on the boring logs in Appendix C.

DIRECT SHEAR TEST

Project Name:	Temecula Valley Charter School	***Sample Location:***	I-2 @ 0-5 feet
Project Number:	2135.1-CR	***Date Tested:***	7/13/2022



Shear Strength: Φ = 27 ° , C = 320 psf

Notes: 1 - The soil specimen used in the shear box was a ring sample remolded to approximately 90% relative compaction from a bulk sample collected during the field investigation.

2 - The above reflect direct shear strength at saturated conditions.

3 - The tests were run at a shear rate of 0.035 in/min.

GEOTEK

EXPANSION INDEX TEST

(ASTM D4829)

Client:	Temecula Valley Charter School	***Tested/ Checked By:***	KG Lab No Corona
Project Number:	2135.1-CR	***Date Tested:***	7/12/2022
Project Location:	Temecula Valley Charter School, Winchester	***Sample Source:***	I-2 @ 0-5 feet
		Sample Description:	

Ring #: _____ Ring Dia. : 4.01" Ring Ht. 1"

DENSITY DETERMINATION

Weight of compacted sample & ring (gm)	742.3
Weight of ring (gm)	365.6
Net weight of sample (gm)	**376.7**
Wet Density, lb / ft3 (C*0.3016)	**113.6**
Dry Density, lb / ft3 (D/1.F)	**101.0**

SATURATION DETERMINATION

Moisture Content, %	12.5
Specific Gravity, assumed	**2.70**
Unit Wt. of Water @ 20 °C, (pcf)	**62.4**
% Saturation	**50.5**

READINGS

DATE	TIME	READING	
7/12/2022		0.4910	Initial
7/12/2022		0.4880	10 min/Dry
7/13/2022		0.5090	Final

FINAL MOISTURE

Final Weight of wet sample & tare	% Moisture
772.2	**20.4**

EXPANSION INDEX = 21

GEOTEK

MOISTURE/DENSITY RELATIONSHIP

Client: Temecula Valley Charter School
Project: Temecula Valley Charter School
Location: Winchester
Material Type: Brown fine to coarse sand with trace clay
Material Supplier: -
Material Source: -
Sample Location: I-2 @ 0-5 feet
-

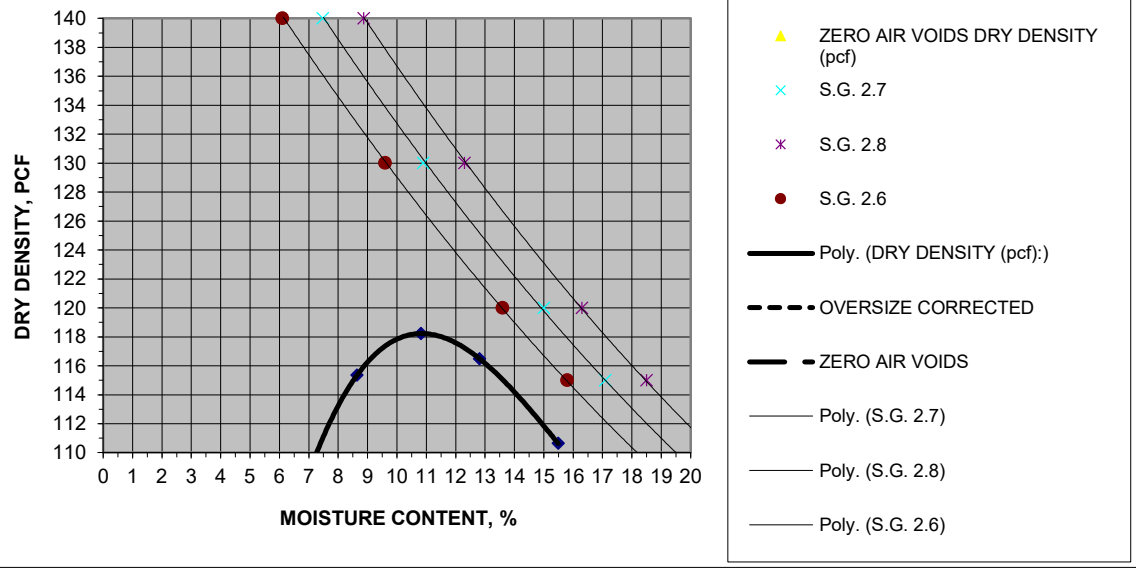
Job No.: 2135.1
Lab No.: Corona

Sampled By: CB
Received By: MP
Tested By: MP
Reviewed By: DA

Date Sampled: -
Date Received: 6/13/2022
Date Tested: 7/5/2022
Date Reviewed: 7/14/2022

Test Procedure: ASTM D1557 **Method:** A
Oversized Material (%): 16.0 **Correction Required:** ■ yes ☐ no

MOISTURE/DENSITY RELATIONSHIP CURVE



MOISTURE DENSITY RELATIONSHIP VALUES

Maximum Dry Density, pcf	118.0	**@ Optimum Moisture, %**	11.0
Corrected Maximum Dry Density, pcf		**@ Optimum Moisture, %**	

MATERIAL DESCRIPTION

Grain Size Distribution:

	% Gravel (retained on No. 4)
	% Sand (Passing No. 4, Retained on No. 200)
	% Silt and Clay (Passing No. 200)

Atterberg Limits:

	Liquid Limit, %
	Plastic Limit, %
	Plasticity Index, %

Classification:

Unified Soils Classification:
AASHTO Soils Classification:

APPENDIX E

PERCOLATION DATA SHEETS AND PORCHET CALCULATIONS (GEOTEK, 2022)

Temecula Valley Charter School

Winchester Area, Riverside County, California

Project No. 2135.1-CR

GEOTEK

PERCOLATION DATA SHEET

Project: Proposed - Temecula Valley Charter School Job No.: 2125.1-CR

Test Hole No.: 1 Tested By: CBT Date: 6/10/22

Depth of Hole As Drilled: 96" Before Test: 96" After Test: 96"

Riverside County

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ In Water Level (Inches)	Rate (minutes per inch)	Comments
1	10:25 10:50	25	96	20	18	2		presoak 6/09/22
2	10:51 11:16	25	96	20	19 1/2	1 1/2		
1	5:50 6:20	30	96	20	20	0		Test 6/10/22
2	6:21 6:51	30	96	20	18 3/4	1 1/4		
3	7:00 7:30	30	96	20	19 1/2	1/2		
4	7:31 8:01	30	96	20	19 1/2	1/2		
5	8:02 8:32	30	96	20	19 1/2	1/2		
6	8:33 9:03	30	96	20	19 1/2	1/2		
7	9:04 9:34	30	96	20	18 3/4	1 1/4		
8	9:35 10:05	30	96	20	19 1/2	1/2		

PERCOLATION DATA SHEET

Project: proposed - Temecula Valley Charter School Job No.: 2135.1-CR

Test Hole No.: 1 Tested By: CBT Date: 6/10/22

Depth of Hole As Drilled: 96" Before Test: 96" After Test: 96"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ In Water Level (Inches)	Rate (minutes per inch)	Comments
9	10:06 10:36	30	96	20	19 1/2	1/2		
10	10:37 11:07	30	96	20	19 1/2	1/2		
11	11:08 11:38	30	96	20	19 1/2	1/2		
12	11:40 12:10	30	96	20	19 1/2	1/2		

PERCOLATION DATA SHEET

Project: Proposed - Temecula Valley Charter School Job No.: 2135-1-CR

Test Hole No.: 2 Tested By: CBT Date: 6/10/22

Depth of Hole As Drilled: 61" Before Test: 61" After Test: 61"

Riverside County

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ In Water Level (Inches)	Rate (minutes per inch)	Comments
								Presoak 6/9/22
1	10:30 10:55	25	61	20	19	1		Test 6/10/22 1st 25 min
2	10:56 11:21	25	61	20	18 1/2	1 1/2		2nd 25 min
1	6:02 6:32	30	61	20	19	1		
2	6:33 7:03	30	61	20	19 3/4	1/4		
3	7:04 7:34	30	61	20	19 3/4	1/4		
4	7:35 8:05	30	61	20	19 3/4	1/4		
5	8:06 8:36	30	61	20	19 1/4	3/4		
6	8:37 9:07	30	61	20	19 3/4	1/4		
7	9:08 9:38	30	61	20	19	1		
8	9:39 10:09	30	61	20	19 3/4	1/4		

PERCOLATION DATA SHEET

Project: Proposed - Temecula Valley Charter School | Job No.: 2135.1-CT

Test Hole No.: 2 | Tested By: CBT | Date: 6/10/22

Depth of Hole As Drilled: 61" | Before Test: 61" | After Test: 61"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ In Water Level (Inches)	Rate (minutes per inch)	Comments
9	1010 1040	30	61	20	19 3/4	1/4		
10	1041 1111	30	61	20	19 3/4	1/4		
11	1112 1142	30	61	20	19 3/4	1/4		
12	1143 1213	30	61	20	19 3/4	1/4		

pg 1 of 2

PERCOLATION DATA SHEET

Project: Proposed - Temecula Valley Charter School **Job No.:** 2135.1-CR

Test Hole No.: 3 **Tested By:** CBT **Date:** 6/10/22

Depth of Hole As Drilled: 58" **Before Test:** 58" **After Test:** 58"

Riverside County

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ In Water Level (Inches)	Rate (minutes per inch)	Comments
1	10:28 10:53	25	58	20	18	2		Prescock 6/9/22
2	10:54 11:19	25	58	20	18 1/2	1 1/2		
1	6:06 6:36	30	58	20	19	1		Test 6/10/22
2	6:38 7:08	30	58	20	19 1/4	3/4		
3	7:09 7:39	30	58	20	18 1/2	1 1/2		
4	7:40 8:10	30	58	20	18 3/4	1 1/4		
5	8:11 8:41	30	58	20	19 1/4	3/4		
6	8:42 9:02	30	58	20	19 3/4	1/4		
7	9:05 9:35	30	58	20	19 1/4	3/4		
8	9:40 10:10	30	58	20	19 3/4	1/4		

PERCOLATION DATA SHEET

Project: Proposed Temecula Valley Charter School Job No.: 2135.1-CR

Test Hole No.: 3 Tested By: CBT Date: 6/10/22

Depth of Hole As Drilled: 58" Before Test: 58" After Test: 58"

Reading No.	Time	Time Interval (Min)	Total Depth of Hole (Inches)	Initial Water Level (Inches)	Final Water Level (Inches)	Δ In Water Level (Inches)	Rate (minutes per inch)	Comments
9	1013 1043	30	58	20	19 3/4	1/4		
10	1044 1114	30	58	20	19 1/4	3/4		
11	1115 1145	30	58	20	19 3/4	1/4		
12	1146 1216	30	58	20	19 3/4	1/4		

Client:	**Temecula Valley Charter School**
Project:	**35780 Washington Street**
Project No:	**2135.1-CR**
Date:	**6/10/2022**

Boring No. **I-1**

Percolation Rate (Porchet Method)

Time Interval, Δt =	30
Final Depth to Water, D_F =	76.5
Test Hole Radius, r =	4
Initial Depth to Water, D_O =	76
Total Test Hole Depth, D_T =	96

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

$H_O = D_T - D_O$ =	20
$H_F = D_T - D_F$ =	19.5
$\Delta H = \Delta D = H_O - H_F$ =	0.5
$H_{avg} = (H_O+H_F)/2$ =	19.75

I_t = 0.09 **Inches pe**

GEOTEK

Client:	**Temecula Valley Charter School**
Project:	**35780 Washington Street**
Project No:	**2135.1-CR**
Date:	**6/10/2022**

Boring No. **I-2**

Percolation Rate (Porchet Method)

Time Interval, Δt =	30
Final Depth to Water, D_F =	40.25
Test Hole Radius, r =	4
Initial Depth to Water, D_O =	40
Total Test Hole Depth, D_T =	60

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

$H_O = D_T - D_O$ =	20
$H_F = D_T - D_F$ =	19.75
$\Delta H = \Delta D = H_O - H_F$ =	0.25
$H_{avg} = (H_O+H_F)/2$ =	19.875

I_t = 0.05 **Inches pe**

GEOTEK

Client:	**Temecula Valley Charter School**
Project:	**35780 Washington Street**
Project No:	**2135.1-CR**
Date:	**6/10/2022**

Boring No. **I-3**

Percolation Rate (Porchet Method)

Time Interval, Δt =	30
Final Depth to Water, D_F =	40.25
Test Hole Radius, r =	4
Initial Depth to Water, D_O =	40
Total Test Hole Depth, D_T =	60

Equation - $I_t = \dfrac{\Delta H\,(60r)}{\Delta t\,(r+2H_{avg})}$

$H_O = D_T - D_O$ =	20
$H_F = D_T - D_F$ =	19.75
$\Delta H = \Delta D = H_O - H_F$ =	0.25
$H_{avg} = (H_O+H_F)/2$ =	19.875

I_t = 0.05 **Inches pe**

GEOTEK

APPENDIX F

GENERAL EARTHWORK GRADING GUIDELINES

Temecula Valley Charter School
Winchester Area, Riverside County, California
Project No. 2135.1-CR

GEOTEK

GENERAL GRADING GUIDELINES

Guidelines presented herein are intended to address general construction procedures for earthwork construction. Specific situations and conditions often arise which cannot reasonably be discussed in general guidelines, when anticipated these are discussed in the text of the report. Often unanticipated conditions are encountered which may necessitate modification or changes to these guidelines. It is our hope that these will assist the contractor to more efficiently complete the project by providing a reasonable understanding of the procedures that would be expected during earthwork and the testing and observation used to evaluate those procedures.

General

Grading should be performed to at least the minimum requirements of governing agencies, Chapters 18 and 33 of the California Building Code, CBC (2019) and the guidelines presented below.

Preconstruction Meeting

A preconstruction meeting should be held prior to site earthwork. Any questions the contractor has regarding our recommendations, general site conditions, apparent discrepancies between reported and actual conditions and/or differences in procedures the contractor intends to use should be brought up at that meeting. The contractor (including the main onsite representative) should review our report and these guidelines in advance of the meeting. Any comments the contractor may have regarding these guidelines should be brought up at that meeting.

Grading Observation and Testing

1. Observation of the fill placement should be provided by our representative during grading. Verbal communication during the course of each day will be used to inform the contractor of test results. The contractor should receive a copy of the "Daily Field Report" indicating results of field density tests that day. If our representative does not provide the contractor with these reports, our office should be notified.
2. Testing and observation procedures are, by their nature, specific to the work or area observed and location of the tests taken, variability may occur in other locations. The contractor is responsible for the uniformity of the grading operations; our observations and test results are intended to evaluate the contractor's overall level of efforts during grading. The contractor's personnel are the only individuals participating in all aspect of site work. Compaction testing and observation should not be considered as relieving the contractor's responsibility to properly compact the fill.
3. Cleanouts, processed ground to receive fill, key excavations, and subdrains should be observed by our representative prior to placing any fill. It will be the contractor's responsibility to notify our representative or office when such areas are ready for observation.
4. Density tests may be made on the surface material to receive fill, as considered warranted by this firm.
5. In general, density tests would be made at maximum intervals of two feet of fill height or every 1,000 cubic yards of fill placed. Criteria will vary depending on soil conditions and size of the fill. More frequent testing may be performed. In any case, an adequate number of field density tests should be made to evaluate the required compaction and moisture content is generally being obtained.

6. Laboratory testing to support field test procedures will be performed, as considered warranted, based on conditions encountered (e.g. change of material sources, types, etc.) Every effort will be made to process samples in the laboratory as quickly as possible and in progress construction projects are our first priority. However, laboratory workloads may cause in delays and some soils may require a **minimum of 48 to 72 hours to complete test procedures**. Whenever possible, our representative(s) should be informed in advance of operational changes that might result in different source areas for materials.
7. Procedures for testing of fill slopes are as follows:
   a) Density tests should be taken periodically during grading on the flat surface of the fill, three to five feet horizontally from the face of the slope.
   b) If a method other than over building and cutting back to the compacted core is to be employed, slope compaction testing during construction should include testing the outer six inches to three feet in the slope face to determine if the required compaction is being achieved.
8. Finish grade testing of slopes and pad surfaces should be performed after construction is complete.

Site Clearing

1. All vegetation, and other deleterious materials, should be removed from the site. If material is not immediately removed from the site it should be stockpiled in a designated area(s) well outside of all current work areas and delineated with flagging or other means. Site clearing should be performed in advance of any grading in a specific area.
2. Efforts should be made by the contractor to remove all organic or other deleterious material from the fill, as even the most diligent efforts may result in the incorporation of some materials. This is especially important when grading is occurring near the natural grade. All equipment operators should be aware of these efforts. Laborers may be required as root pickers.
3. Nonorganic debris or concrete may be placed in deeper fill areas provided the procedures used are observed and found acceptable by our representative.

Treatment of Existing Ground

1. Following site clearing, all surficial deposits of alluvium and colluvium as well as weathered or creep effected bedrock, should be removed unless otherwise specifically indicated in the text of this report.
2. In some cases, removal may be recommended to a specified depth (e.g. flat sites where partial alluvial removals may be sufficient). The contractor should not exceed these depths unless directed otherwise by our representative.
3. Groundwater existing in alluvial areas may make excavation difficult. Deeper removals than indicated in the text of the report may be necessary due to saturation during winter months.
4. Subsequent to removals, the natural ground should be processed to a depth of six inches, moistened to near optimum moisture conditions and compacted to fill standards.
5. Exploratory back hoe or dozer trenches still remaining after site removal should be excavated and filled with compacted fill if they can be located.

Fill Placement

1. Unless otherwise indicated, all site soil and bedrock may be reused for compacted fill; however, some special processing or handling may be required (see text of report).

2. Material used in the compacting process should be evenly spread, moisture conditioned, processed, and compacted in thin lifts six (6) to eight (8) inches in compacted thickness to obtain a uniformly dense layer. The fill should be placed and compacted on a nearly horizontal plane, unless otherwise found acceptable by our representative.
3. If the moisture content or relative density varies from that recommended by this firm, the contractor should rework the fill until it is in accordance with the following:
    a) Moisture content of the fill should be at or above optimum moisture. Moisture should be evenly distributed without wet and dry pockets. Pre-watering of cut or removal areas should be considered in addition to watering during fill placement, particularly in clay or dry surficial soils. The ability of the contractor to obtain the proper moisture content will control production rates.
    b) Each six-inch layer should be compacted to at least 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency. In most cases, the testing method is ASTM Test Designation D 1557.
4. Rock fragments less than eight inches in diameter may be utilized in the fill, provided:
    a) They are not placed in concentrated pockets;
    b) There is a sufficient percentage of fine-grained material to surround the rocks;
    c) The distribution of the rocks is observed by, and acceptable to, our representative.
5. Rocks exceeding eight (8) inches in diameter should be taken off site, broken into smaller fragments, or placed in accordance with recommendations of this firm in areas designated suitable for rock disposal. On projects where significant large quantities of oversized materials are anticipated, alternate guidelines for placement may be included. If significant oversize materials are encountered during construction, these guidelines should be requested.
6. In clay soil, dry or large chunks or blocks are common. If in excess of eight (8) inches minimum dimension, then they are considered as oversized. Sheepsfoot compactors or other suitable methods should be used to break up blocks. When dry, they should be moisture conditioned to provide a uniform condition with the surrounding fill.

Slope Construction

1. The contractor should obtain a minimum relative compaction of 90 percent out to the finished slope face of fill slopes. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment.
2. Slopes trimmed to the compacted core should be overbuilt by at least three (3) feet with compaction efforts out to the edge of the false slope. Failure to properly compact the outer edge results in trimming not exposing the compacted core and additional compaction after trimming may be necessary.
3. If fill slopes are built "at grade" using direct compaction methods, then the slope construction should be performed so that a constant gradient is maintained throughout construction. Soil should not be "spilled" over the slope face nor should slopes be "pushed out" to obtain grades. Compaction equipment should compact each lift along the immediate top of slope. Slopes should be back rolled or otherwise compacted at approximately every 4 feet vertically as the slope is built.
4. Corners and bends in slopes should have special attention during construction as these are the most difficult areas to obtain proper compaction.
5. Cut slopes should be cut to the finished surface. Excessive undercutting and smoothing of the face with fill may necessitate stabilization.

UTILITY TRENCH CONSTRUCTION AND BACKFILL

Utility trench excavation and backfill is the contractors responsibility. The geotechnical consultant typically provides periodic observation and testing of these operations. While efforts are made to make sufficient observations and tests to verify that the contractors' methods and procedures are adequate to achieve proper compaction, it is typically impractical to observe all backfill procedures. As such, it is critical that the contractor use consistent backfill procedures.

Compaction methods vary for trench compaction and experience indicates many methods can be successful. However, procedures that "worked" on previous projects may or may not prove effective on a given site. The contractor(s) should outline the procedures proposed, so that we may discuss them **prior** to construction. We will offer comments based on our knowledge of site conditions and experience.

1. Utility trench backfill in slopes, structural areas, in streets and beneath flat work or hardscape should be brought to at least optimum moisture and compacted to at least 90 percent of the laboratory standard. Soil should be moisture conditioned prior to placing in the trench.
2. Flooding and jetting are not typically recommended or acceptable for native soils. Flooding or jetting may be used with select sand having a Sand Equivalent (SE) of 30 or higher. This is typically limited to the following uses:
   a) shallow (12 + inches) under slab interior trenches and,
   b) as bedding in pipe zone.

   The water should be allowed to dissipate prior to pouring slabs or completing trench compaction.
3. Care should be taken not to place soils at high moisture content within the upper three feet of the trench backfill in street areas, as overly wet soils may impact subgrade preparation. Moisture may be reduced to 2% below optimum moisture in areas to be paved within the upper three feet below sub grade.
4. Sand backfill should not be allowed in exterior trenches adjacent to and within an area extending below a 1:1 projection from the outside bottom edge of a footing, unless it is similar to the surrounding soil.
5. Trench compaction testing is generally at the discretion of the geotechnical consultant. Testing frequency will be based on trench depth and the contractors procedures. A probing rod would be used to assess the consistency of compaction between tested areas and untested areas. If zones are found that are considered less compact than other areas, this would be brought to the contractors attention.

JOB SAFETY

General

Personnel safety is a primary concern on all job sites. The following summaries are safety considerations for use by all our employees on multi-employer construction sites. On ground personnel are at highest risk of injury and possible fatality on grading construction projects. The company recognizes that construction activities will vary on each site and that job site safety is the contractor's responsibility. However, it is, imperative that all personnel be safety conscious to avoid accidents and potential injury.

In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of our field personnel on grading and construction projects.

1. Safety Meetings: Our field personnel are directed to attend the contractor's regularly scheduled safety meetings.
2. Safety Vests: Safety vests are provided for and are to be worn by our personnel while on the job site.
3. Safety Flags: Safety flags are provided to our field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

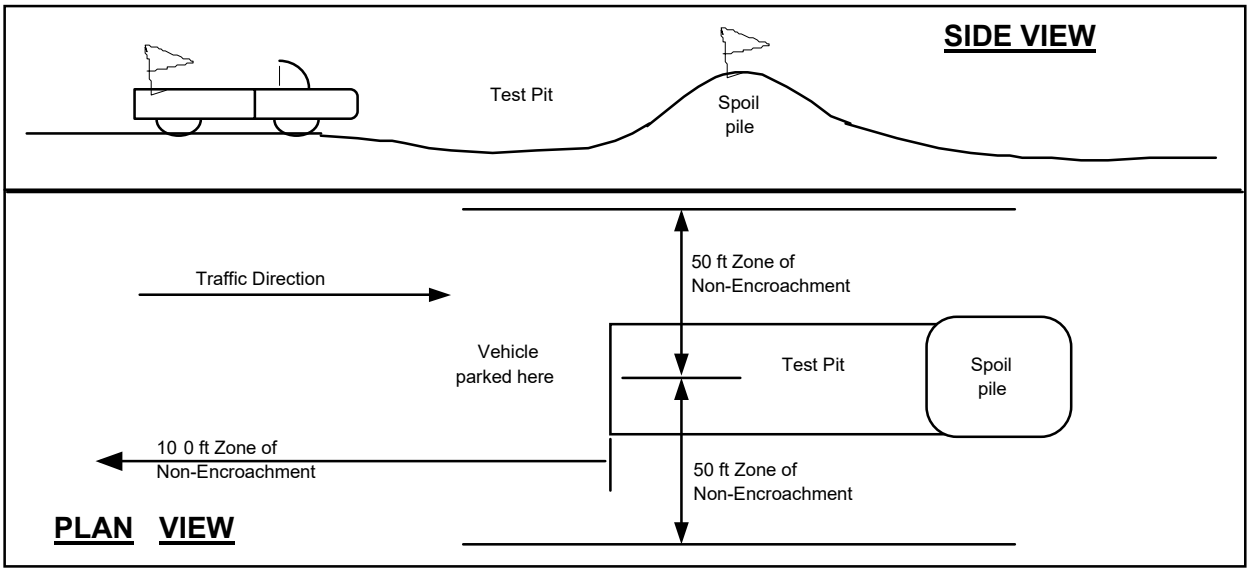
Test Pits Location, Orientation and Clearance

The technician is responsible for selecting test pit locations. The primary concern is the technician's safety. However, it is necessary to take sufficient tests at various locations to obtain a representative sampling of the fill. As such, efforts will be made to coordinate locations with the grading contractors authorized representatives (e.g. dump man, operator, supervisor, grade checker, etc.), and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractors authorized representative should direct excavation of the pit and safety during the test period. Again, safety is the paramount concern.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates that the fill be maintained in a drivable condition. Alternatively, the contractor may opt to park a piece of equipment in front of test pits, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits (see diagram below). No grading equipment should enter this zone during the test procedure. The zone should extend outward to the sides approximately 50 feet from the center of the test pit and 100 feet in the direction of traffic flow. This zone is established both for safety and to avoid excessive ground vibration, which typically decreases test results.

TEST PIT SAFETY PLAN



Slope Tests

When taking slope tests, the technician should park their vehicle directly above or below the test location on the slope. The contractor's representative should effectively keep all equipment at a safe operation distance (e.g. 50 feet) away from the slope during testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location.

Trench Safety

It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Trenches for all utilities should be excavated in accordance with CAL-OSHA and any other applicable safety standards. Safe conditions will be required to enable compaction testing of the trench backfill.

All utility trench excavations in excess of 5 feet deep, which a person enters, are to be shored or laid back. Trench access should be provided in accordance with OSHA standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

Our personnel are directed not to enter any excavation which;

1. is 5 feet or deeper unless shored or laid back,
2. exit points or ladders are not provided,
3. displays any evidence of instability, has any loose rock or other debris which could fall into the trench, or
4. displays any other evidence of any unsafe conditions regardless of depth.

If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraws and notifies their supervisor. The contractors representative will then be contacted in an effort to effect a solution. All backfill not tested due to safety concerns or other reasons is subject to reprocessing and/or removal.

Procedures

In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by company policy, to immediately withdraw and notify their supervisor. The contractor's representative will then be contacted in an effort to effect a solution. No further testing will be performed until the situation is rectified. Any fill placed in the interim can be considered unacceptable and subject to reprocessing, recompaction or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to technicians attention and notify our project manager or office. Effective communication and coordination between the contractors' representative and the field technician(s) is strongly encouraged in order to implement the above safety program and safety in general.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

Examples of material to provide in Appendix 4 may include but are not limited to the following:

- Environmental Site Assessments conducted for the project,
- Other information on Past Site Use that impacts the feasibility of LID BMP implementation on the site.

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections D of this Template.

Appendix 5: LID Feasibility Supplemental Information

Information that supports or supplements the determination of LID technical feasibility documented in Section D

Examples of material to provide in Appendix 5 may include but are not limited to the following:

- Technical feasibility criteria for DMAs
- Site specific analysis of technical infeasibility of all LID BMPs (if Alternative Compliance is needed)
- Documentation of Approval criteria for Proprietary Biofiltration BMPs

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 2.3 of the SMR WQMP and Sections D of this Template.

Proprietary Biofiltration Criteria

The applicant shall provide documentation of compliance with each criterion in this checklist as part of the project submittal. Proprietary Biofiltration BMPs shall not be proposed if the BMP will accept undeveloped off-site tributary flows, where potential silt/sediment could clog or otherwise negatively impact the BMP.

1	**All BMPs must be sited/designed with the max. feasible infiltration/evapotranspiration[6].**	
	Requirement	Response
1a	What was the development status of the site prior to project application (i.e. raw ungraded land, or redevelopment with existing graded conditions)? – There will be more expectations to infiltrate if the project is a new development.	The project development was an existing rural residential home that no longer exists. Infiltration rates range from 0.05 to 0.09 and poor quality.
1b	History of design discussions/coordination for the site proposed project, resulting in the final design determination (i.e. infiltration vs. flow-thru):	Infiltration is not feasible. The project attempted to use a biofiltration basin. Due to site constraints project used a subsurface chamber and Modular Wetland considered a priority 2 treatment.
1c	The consideration of site design alternatives to achieve infiltration or partial infiltration on site;	Infiltration is not feasible.
1d	The physical impairments (i.e., fire road egress, public safety considerations, sewer lines, etc.) and public safety concerns (impermeable liners only to avoid geotech or contamination issues);	Not Applicable
1e	The extent low impact development BMP requirements were included in the project site design (site design worksheets can be attached).	The project will maximize pervious areas within the school site.
1f	When in the development process (e.g. entitlement or plan check, with dates of geotechnical work and development approval dates) did a geotechnical engineer analyze the site for infiltration feasibility?	A geotechnical report prepared by Geotek was prepared to assess infiltration.
1g	What was the scope of the geotechnical testing?	The scope of testing was to perform 3 test at the downstream limits of property.
1h	What are Public Health and Safety requirements that affect infiltration locations?	None
1i	What are the conclusions and recommendations from the geotechnical engineer, in regards to	Infiltration is not feasible.

[6] To address San Diego Regional Board letter dated April 28, 2017 regarding documentation to support infeasibility to retain or infiltrate storm water on-site. This document will be used to meet the Regional Board requirements for documentation. As such, not apply or non-responses will not be accepted.

	infiltrating/retaining on-site or allowing some or all of the flows to flow-thru as a proprietary BMP?	
1j	How will the proposed proprietary biofiltration BMPs achieve maximum feasible retention (evapotranspiration and infiltration) of the water quality volume, as required by MS4 Permits?	The project is using a storm chamber with gravel backfill. Volume will be detained and discharged through a modular wetland. The storm chamber will allow for minor infiltration.

2	**Proprietary Biofiltration BMP sizing (all proprietary/compact BMPs require TAPE approval)[7]**	
	Requirement	Response
2a	Use Table F-1 and F-2 of the WQMP template to identify and list all the pollutants of concern.	
2b	Attached Active Technology Acceptance Protocol-Ecology (TAPE) certification, with General Use Level Designation (GULD) for all of applicable pollutants of concern	Yes X or No_____
2c	The most restrictive loading rates outlined in TAPE GULD approval[8] for all of the pollutants of concern.	Treats all pollutants
2d	Attach calculations, and all relevant steps to show that the sizing of the proprietary BMP is based on the flowrate (or volume) used to obtain TAPE/GULD approval (the most restrictive rate).	Yes _____ or No_____
2e	Are the infiltration rates are outlet controlled (e.g., via an underdrain and orifice/weir) or controlled by the infiltration rate of the media? Faster infiltration rates thru the media tend to reduce O&M issues.	Is the design infiltration rate controlled by the outlet? Yes X or No_____ If No, provide the rates for the outlet and the media and explain why outlet control is not practicable.
2f	Does the water surface drains to at least 12 inches below the media surface within 24 hours from the end of storm event flow to preserve plant health and promote healthy soil structure?	Yes X or No_____

[7] Full scale field testing data that has been verified by Washington Department of Ecology and General Use Level Designation is required. https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies. Otherwise, the County has no obligation to accept the use of any other proprietary flow-thru BMP. Additional guidance can be found at the end of this checklist from the San Diego BMPDM Appendix F.1 for other verified third-party, field scale testing performance criteria that does not meet the Washington Department of Ecology standards.

[8] E.g. if the BMP was certified/verified with 100 gallons per minute treatment rate, the BMP shall be sized with no more than the equivalent rate).

3	**Biofiltration BMPs must be designed to promote appropriate biological activity to support and maintain treatment processes.**	
	Requirement	Response
3a	Plants tolerant of project climate, design ponding depths and the treatment media composition.	Provide documentation justifying plant selection.[9]
3b	Plants that minimize irrigation requirements.	Provide documentation describing irrigation requirements for establishment and long term operation.
3c	Plant location and growth will not impede expected long-term media filtration rates and will enhance long-term infiltration rates to the extent possible.	Provide documentation justifying plant selection.[4]
3d	If plants are not applicable to the biofiltration design, other biological processes are supported as needed to sustain treatment processes (e.g., biofilm in a subsurface flow wetland). TAPE GULD approval that identifies approval with and without plants can be submitted for approval.	For biofiltration designs without plants, describe the biological processes that will support effective treatment and how they will be sustained.

4	**Biofiltration BMPs must be designed with a hydraulic loading rate to prevent erosion, scour, and channeling within the BMP. Erosion, scour, and/or channeling can disrupt treatment processes and reduce effectiveness.**	
	Requirement	Response
4a	What pre-treatment devices (e.g. vegetated buffers, catch basin inserts) and designs (e.g. forebay berms with cutouts) are proposed?	
4b	Adequate scour protection has been provided for both sheet flow and pipe inflows to the BMP.	
4c	Where scour protection has not been provided, flows into and within the BMP are kept to non-erosive velocities.	What are the maximum velocities for sheet flow and pipe inflows into the BMP?
4d	The BMP is used in a manner consistent with manufacturer guidelines and conditions of its third-party certification (e.g. maximum tributary area, maximum inflow velocities, etc.).	Manufacturer Requirements vs. the Design
4e	To preserve permeability, the media should have substantial void ratios and avoidance of choking layers.	Provide media gradation calculations and (if proposed) geotextile selection calculations if the geotextile could affect hydraulic loading rate.

[9] See Appendix E.20 of the San Deigo BMPDM for initial plan list for consideration for Riverside County.

5	**Biofiltration BMP must include operation and maintenance design features and planning considerations for continued effectiveness of pollutant removal and flow control functions. Biofiltration BMPs require regular maintenance in order provide ongoing function as intended. Additionally, it is not possible to foresee and avoid potential issues as part of design; therefore, plans must be in place to correct issues if they arise.**	
	Requirement	Response
5a	Is there any media or cartridge required to maintain the function of the BMP sole-sourced or proprietary in any way? If yes, obtain explicit approval by the Agency. Potentially full replacement costs to a non-proprietary BMP needs to be considered.	Yes _____ or No_____, explain:
5b	The maintenance plan specific for the proprietary BMP specific inspection activities, regular/periodic maintenance activities and specific corrective actions relating to scour, erosion, channeling, media clogging, vegetation health, and inflow and outflow structures.	This is in addition to the O&M Plan described in the WQMP guidance document, Section 5.
5c	Adequate site area and features have been provided for BMP inspection and maintenance access.	Illustrate maintenance access routes, setbacks, maintenance features as needed on project water quality plans
5d	For proprietary biofiltration BMPs, the BMP maintenance plan is consistent with manufacturer guidelines and conditions of its third-party certification (i.e., maintenance activities, frequencies).	Yes _____ or No_____
5e	Describe all portions of the BMP that may potentially clog or present an O&M issue.	
5f	Describe design features to address each of the potential clogging or O&M issues.	

By signing below, the preparer certifies all the information provided with this submittal and submittals related to proprietary BMPs for the project is accurate, and relevant information to assess the long term operation and maintenance of this proprietary BMP was not omitted with this submittal.

Prepared by: _____

Title: _____

Signature: _____

Date: _____

Alternative Pollutant Treatment Performance Standard

County staff may allow the applicant to submit alternative third-party documentation that the pollutant treatment performance of the system is consistent with Technology Acceptance Protocol-Ecology certifications. Table F.1-1 describes the required levels of certification and Table F.1-2 describes the pollutant treatment performance levels associated with each level of certification. Acceptance of this approach is at the sole discretion of County staff, preference would be given to:

a. Verified third-party, field-scale testing performance under the Technology Acceptance Reciprocity Partnership Tier II Protocol. This protocol is no longer operated, however this is considered to be a valid protocol and historic verifications are considered to be representative provided that product models being proposed are consistent with those that were tested. Technology Acceptance Reciprocity Partnership verifications were conducted under New Jersey Corporation for Advance Testing and are archived at the website linked below. Note that Technology Acceptance Reciprocity Partnership verifications must be matched to pollutant treatment standards in Table F.1-2 then matched to an equivalent Technology Acceptance Protocol-Ecology certification in Table F.1-1.

b. Verified third-party, field-scale testing performance under the New Jersey Corporation for Advance Testing protocol. Note that New Jersey Corporation for Advance Testing verifications must be matched to pollutant treatment standards in Table F.1-2 then matched to an equivalent Technology Acceptance Protocol- Ecology certification in Table F.1-1. A list of field-scale verified technologies under Technology Acceptance Reciprocity Partnership Tier II and New Jersey Corporation for Advance Testing can be accessed at: http://www.njcat.org/verification-process/technology-verification-database.html (refer to: field verified technologies only).

Table F.1-1: Required Technology Acceptance Protocol-Ecology Certifications for Polltuants of Concern for Biofiltration Performance Standard

Project Pollutant of Concern	Required Technology Acceptance Protocol-Ecology Certification for Biofiltration Performance Standard
Trash	Basic Treatment OR Phosphorus Treatment OR Enhanced Treatment
Sediments	Basic Treatment OR Phosphorus Treatment OR Enhanced Treatment
Oil and Grease	Basic Treatment OR Phosphorus Treatment OR Enhanced Treatment
Nutrients	Phosphorus Treatment[1]
Metals	Enhanced Treatment
Pesticides	Basic Treatment (including filtration)[2] OR Phosphorus Treatment OR Enhanced Treatment
Organics	Basic Treatment (including filtration)[2] OR Phosphorus Treatment OR Enhanced Treatment
Bacteria and Viruses	Basic Treatment (including bacteria removal processes)[3] OR Phosphorus Treatment OR Enhanced Treatment

1 – There is no Technology Acceptance Protocol-Ecology equivalent for nitrogen compounds; however systems that are designed to retain phosphorus (as well as meet basic treatment designation), generally also provide treatment of nitrogen compounds. Where nitrogen is a pollutant of concern, relative performance of available certified systems for nitrogen removal should be considered in BMP selection.
2 – Pesticides, organics, and oxygen demanding substances are typically addressed by particle filtration consistent with the level of treatment required to achieve Basic treatment certification; if a system with Basic treatment certification does not provide filtration, it is not acceptable for pesticides, organics or oxygen demanding substances.
3 – There is no Technology Acceptance Protocol-Ecology equivalent for pathogens (viruses and bacteria), and testing data are limited because of typical sample hold times. Systems with Technology Acceptance Protocol-Ecology Basic Treatment must be include one or more significant bacteria removal process such as media filtration, physical sorption, predation, reduced redox conditions, and/or solar inactivation. Where design options are available to enhance pathogen removal (i.e., pathogen-specific media mix offered by vendor), this design variation should be used.

Table F.1-2: Performance Standards for Technology Acceptance Protocol-Ecology Certification

Performance Goal	Influent Range	Criteria
Basic Treatment	20 – 100 mg/L TSS	Effluent goal ≤ 20 mg/L TSS
	100 – 200 mg/L TSS	≥ 80% TSS removal
	>200 mg/L TSS	> 80% TSS removal
Enhanced (Dissolved Metals) Treatment	Dissolved copper 0.005 – 0.02 mg/L	Must meet basic treatment goal and better than basic treatment currently defined as >30% dissolved copper removal
	Dissolved zinc 0.02 – 0.3 mg/L	Must meet basic treatment goal and better than basic treatment currently defined as >60% dissolved zinc removal
Phosphorous Treatment	Total phosphorous 0.1 – 0.5 mg/L	Must meet basic treatment goal and exhibit ≥50% total phosphorous removal
Oil Treatment	Total petroleum hydrocarbon > 10 mg/L	No ongoing or recurring visible sheen in effluent Daily average effluent Total petroleum hydrocarbon concentration < 10 mg/L Maximum effluent Total petroleum hydrocarbon concentration for a 15 mg/L for a discrete (grab) sample
Pretreatment	50 – 100 mg/L TSS	≤ 50 mg/L TSS
	≥ 200 mg/L TSS	≥ 50% TSS removal

Appendix 6: LID BMP Design Details

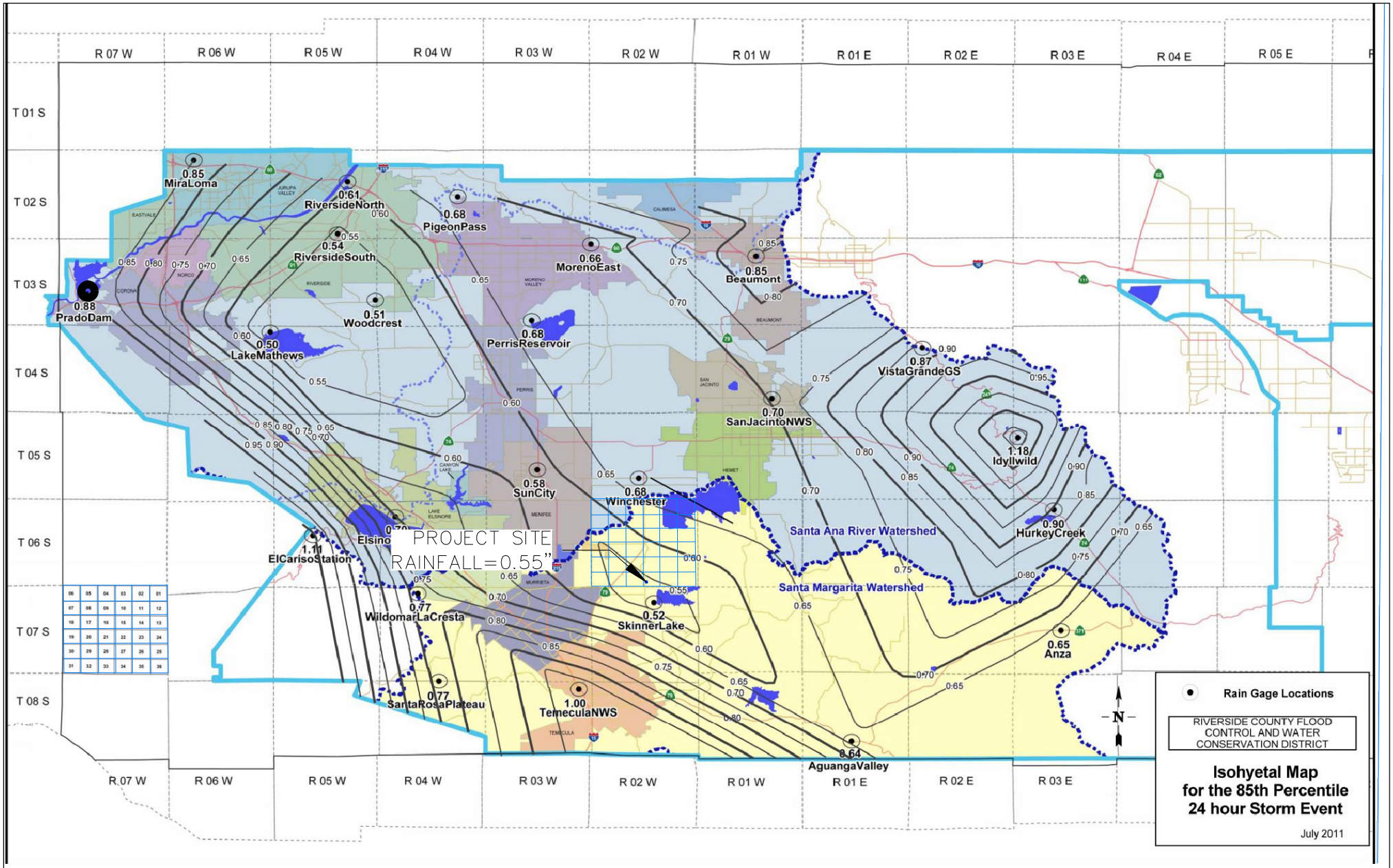
BMP Sizing, Design Details and other Supporting Documentation to supplement Section D

Examples of material to provide in Appendix 6 may include but are not limited to the following:

- DCV calculations,
- LID BMP sizing calculations from Exhibit C of the SMR WQMP
- Design details/drawings from manufacturers for proprietary BMPs

This information should support the Full Infiltration Applicability, and Biofiltration Applicability sections of this Template. Refer to Section 3.4 of the SMR WQMP and Sections D.4 of this Template.

85th Percentile 24-Hour Rainfall Map



85TH PERCENTILE 24 HOUR STORM EVENT MAP

JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

Design Volume Spreadsheets

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	JLC ENGINEERING	Date	1/15/2025
Designed by	EMMANUEL PEREZ	County/City Case No	PUP 230001
Company Project Number/Name	277.02.24 - TEMCULA VALLEY CHARTER SCHOOL		
Drainage Area Number/Name	DMA A1		

Enter the Area Tributary to this Feature A_T = 13.17 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: T6S

Range: R2W

Section: 34

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.55

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.57

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.39

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.21 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 10,039 ft^3

Notes:

$$I_{f\,composite} = \frac{[(I_f)_1 \cdot A_1] + [(I_f)_2 \cdot A_2] + [\ldots]}{A_T} \qquad I_{f\,composite} = \frac{(1*245943)+(0.1*149181)+(0.3*37366)+(0.4*140755)}{573{,}245} = 0.57$$

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	JLC ENGINEERING	Date	1/15/2025
Designed by	EMMANUEL PEREZ	County/City Case No	PUP 230001
Company Project Number/Name	277.02.24 - TEMCULA VALLEY CHARTER SCHOOL		
Drainage Area Number/Name	DMA AA1		

Enter the Area Tributary to this Feature A_T = 2.05 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: T6S

Range: R2W

Section: 34

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.55

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.65

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.45

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.25 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 1,860 ft^3

Notes:

$$I_{f\,composite} = \frac{[(I_f)_1 \cdot A_1] + [(I_f)_2 \cdot A_2] + [\ldots]}{A_T} \qquad I_{f\,composite} = \frac{(1.0*54361)+(0.1*32950)+(0.3*2009)}{89320} = 0.65$$

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	JLC ENGINEERING	Date	1/15/2025
Designed by	EMMANUEL PEREZ	County/City Case No	PUP 230001
Company Project Number/Name	277.02.24 - TEMCULA VALLEY CHARTER SCHOOL		
Drainage Area Number/Name	DMA AA2		

Enter the Area Tributary to this Feature A_T = 0.15 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township: T6S

Range: R2W

Section: 34

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.55

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.75

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.54

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.30 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 163 ft^3

Notes:

$$I_{f\,composite} = \frac{[(I_f)_1 \cdot A_1] + [(I_f)_2 \cdot A_2] + [\ldots]}{A_T}$$

$$I_{f\,composite} = \frac{(1.0*4592+.1*1795)}{6387} = 0.75$$

Santa Margarita Watershed

BMP Design Volume, V_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)

Company Name	JLC ENGINEERING	Date	1/15/2025
Designed by	EMMANUEL PEREZ	County/City Case No	PUP 230001
Company Project Number/Name	277.02.24 - TEMCULA VALLEY CHARTER SCHOOL		
Drainage Area Number/Name	DMA B1		

Enter the Area Tributary to this Feature A_T = 0.61 acres

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

Site Location

Township T6S

Range R2W

Section 34

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.55

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.70

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$ C = 0.49

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.27 (in*ac)/ac

Calculate the design storage volume of the BMP, V_{BMP}.

$$V_{BMP}\ (ft^3) = \frac{V_U\ (in\text{-}ac/ac) \times A_T\ (ac) \times 43{,}560\ (ft^2/ac)}{12\ (in/ft)}$$

V_{BMP} = 598 ft^3

Notes:

$$I_{f\,composite} = \frac{[(I_f)_1 \cdot A_1] + [(I_f)_2 \cdot A_2] + [\ldots]}{A_T} \qquad I_{f\,composite} = \frac{(1.0*17{,}152)+(0.1*7{,}957)+(0.4*1595)}{26{,}704} = 0.70$$

Design Flow Rate Spreadsheets

Santa Margarita Watershed

BMP Design Flow Rate, Q_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

Company Name	JLC ENGINEERING	Date	1/15/2025
Designed by	EMMANUEL PEREZ	County/City Case No	PUP 230001
Company Project Number/Name	277.02.24 - TEMCULA VALLEY CHARTER SCHOOL		
Drainage Area Number/Name	DMA AA1		

Enter the Area Tributary to this Feature A_T = 2.05 acres

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.65

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$

C = 0.45

BMP Design Flow Rate

$Q_{BMP} = C \times I \times A_T$

Q_{BMP} = 0.2 ft^3/s

Notes:

Santa Margarita Watershed

BMP Design Flow Rate, Q_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

Company Name	JLC ENGINEERING	Date	1/15/2025
Designed by	EMMANUEL PEREZ	County/City Case No	PUP 230001
Company Project Number/Name	277.02.24 - TEMCULA VALLEY CHARTER SCHOOL		
Drainage Area Number/Name	DMA AA2		

Enter the Area Tributary to this Feature A_T = 0.15 acres

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.75

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$

C = 0.54

BMP Design Flow Rate

$Q_{BMP} = C \times I \times A_T$

Q_{BMP} = 0.0 ft^3/s

Notes:

Santa Margarita Watershed

BMP Design Flow Rate, Q_{BMP} (Rev. 03-2012)

Legend: Required Entries / Calculated Cells

Company Name	JLC ENGINEERING	Date	1/15/2025
Designed by	EMMANUEL PEREZ	County/City Case No	PUP 230001
Company Project Number/Name	277.02.24 - TEMCULA VALLEY CHARTER SCHOOL		
Drainage Area Number/Name	DMA B1		

Enter the Area Tributary to this Feature A_T = 0.61 acres

Determine the Effective Impervious Fraction

Type of post-development surface cover (use pull down menu): Mixed Surface Types

Effective Impervious Fraction I_f = 0.70

Calculate the composite Runoff Coefficient, C for the BMP Tributary Area

Use the following equation based on the WEF/ASCE Method

$C = 0.858I_f^3 - 0.78I_f^2 + 0.774I_f + 0.04$

C = 0.49

BMP Design Flow Rate

$Q_{BMP} = C \times I \times A_T$

Q_{BMP} = 0.1 ft^3/s

Notes:

Subsurface Basin A Volume Calculations

BASIN A SUBSURFACE SYSTEM

1 Barrel 96-Inch Subsurface Infiltration Basin Volume Calculations

LENGTH OF SUBSURFACE SYSTEM (FT) = 470 **NUMBER OF CELLS 1**

Elevation	Depth	Pipe Depth	Pipe Area Each (ft^2)	Pipe Area Total (ft^2)	Pipe Total Gross Volume at Elev. (ft^3)	Gross Cross Sectional Area of System (ft^2)	Net Gravel Area (ft^2)	Gravel Volume (ft^3)	Cumulative Subsurface System Volume (ft^3)	Cumulative Subsurface System Volume (ac-ft)	Incremental Increase in Subsurface System Volume (ac-ft)	Q100 Effective Storage
26.5	0	0	0.00	0.00	0.00	0	0.00	0.00	0.00	0.000	-	-
27	0.5	0	0.00	0.00	0.00	6	6.00	1128.00	1128.00	0.026	0.026	-
27.5	1	0	0.00	0.00	0.00	12	12.00	2256.00	2256.00	0.052	0.026	-
28	1.5	0.5	1.31	1.31	614.78	18	16.69	3138.09	3752.87	0.086	0.034	-
28.5	2	1	3.63	3.63	1704.45	24	20.37	3830.22	5534.67	0.127	0.041	-
29	2.5	1.5	6.52	6.52	3066.46	30	23.48	4413.41	7479.88	0.172	0.045	-
29.5	3	2	9.83	9.83	4618.67	36	26.17	4920.53	9539.20	0.219	0.047	-
30	3.5	2.5	13.42	13.42	6307.51	42	28.58	5372.99	11680.51	0.268	0.049	0.000
30.5	4	3	17.22	17.22	8091.93	48	30.78	5787.23	13879.16	0.319	0.050	0.050
31	4.5	3.5	21.14	21.14	9937.30	54	32.86	6177.08	16114.38	0.370	0.051	0.102
31.5	5	4	25.13	25.13	11812.39	60	34.87	6555.04	18367.43	0.422	0.052	0.154
32	5.5	4.5	29.12	29.12	13687.48	66	36.88	6933.01	20620.49	0.473	0.052	0.205
32.5	6	5	33.05	33.05	15532.85	72	38.95	7322.86	22855.71	0.525	0.051	0.257
33	6.5	5.5	36.85	36.85	17317.26	78	41.15	7737.10	25054.36	0.575	0.050	0.307
33.5	7	6	40.44	40.44	19006.11	84	43.56	8189.56	27195.66	0.624	0.049	0.356
34	7.5	6.5	43.74	43.74	20558.31	90	46.26	8696.67	29254.99	0.672	0.047	0.403
34.5	8	7	46.64	46.64	21920.32	96	49.36	9279.87	31200.19	0.716	0.045	0.448
35	8.5	7.5	48.96	48.96	23009.99	102	53.04	9972.00	32982.00	0.757	0.041	0.489
35.5	9	8	50.27	50.27	23624.78	108	57.73	10854.09	34478.87	0.792	0.034	0.523
36	9.5	8	50.27	50.27	23624.78	114	63.73	11982.09	35606.87	0.817	0.026	0.549
36.5	10	8	50.27	50.27	23624.78	120	69.73	13110.09	36734.87	0.843	0.026	0.575

wq volume

INPUT DATA

SUBSURFACE SYSTEM NAME	A	-
DIAMETER OF SUBSURFACE SYSTEM	8	FT
NUMBER OF BARRELS	1	EA
LENGTH OF SUBSURFACE SYSTEM	470	FT
BOTTOM INVERT OF GRAVEL BED	27	FT
EFFECTIVE STORAGE ELEVATION	30	FT
PIPE SPACING	2	FT
EDGE THICKNESS	2	FT
TOP CLEARANCE, THICKNESS	1	FT
BOTTOM CLEARANCE, THICKNESS	1	FT
GRAVEL POROSITY, N	0.4	-
FT^2 -> AC	43560	FT^2/AC

OPTIONAL INPUT DATA

WATER QUALITY VOLUME TO RETAIN	22901	FT^3

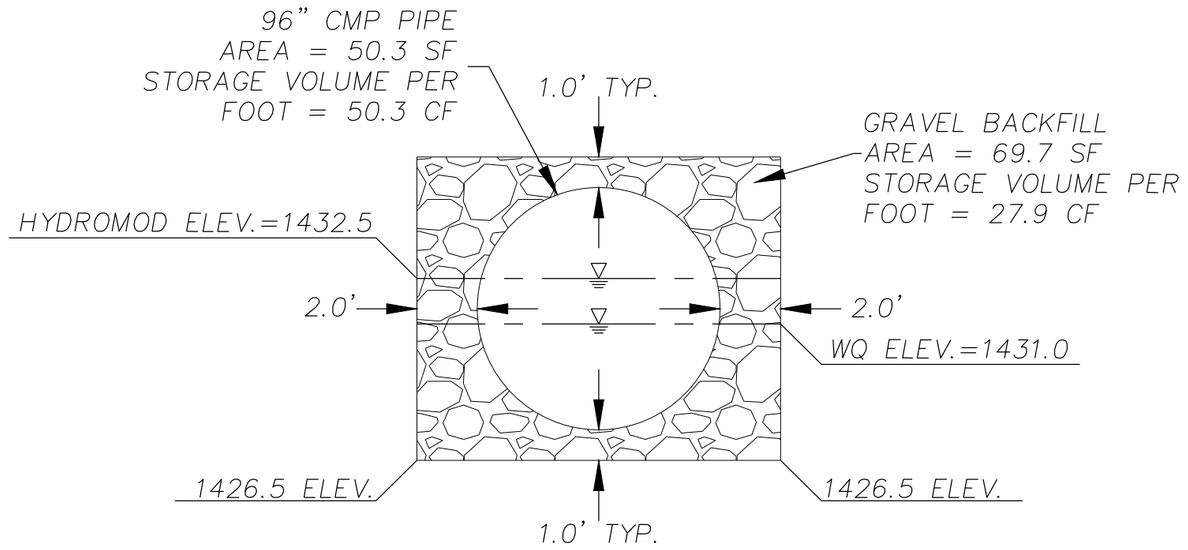
NOTE: WQ VOLUME IS 12,660 BUT HYDROMODS VOLUME IS 22,901 SO HYDROMOD VOLUME CONTROLS

COMPUTED DATA

WIDTH	12	
MAX_HEIGHT	10	
PIPE INVERT	1	FT
NEAREST SUBSURFACE VOLUME TO WQ VOLUME	25054.36	FT^3
WSE FOR WQ VOLUME (INTERPOLATED)	32.51	FT

Figure 3 – Subsurface System A

SUBSURFACE BASIN - CROSS SECTION



96" CMP UNDERGROUND CHAMBER

SCALE: 1"=5'

DESIGN NOTES:

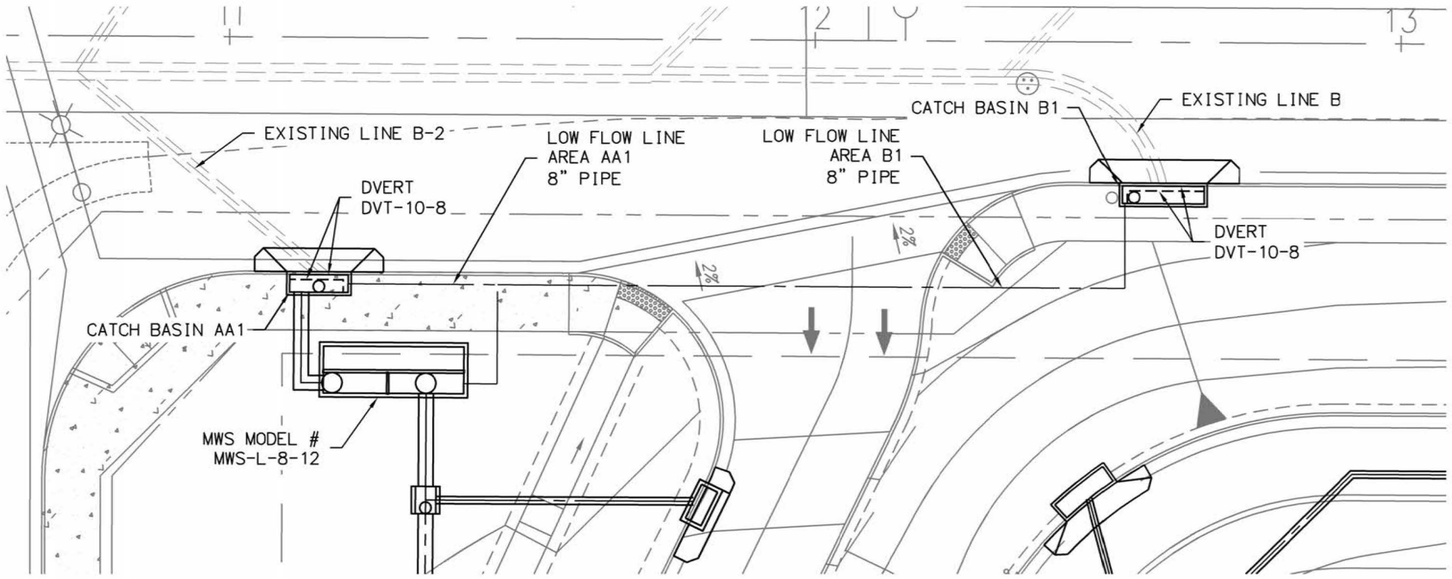
1. *GRAVEL BACKFILL, n=0.4*
2. *LENGTH OF SUBSURFACE SYSTEM = 470 FT*
3. *WATER QUALITY VOLUME = 12,876 CF*
4. *HYDROMOD VOLUME = 22,901 CF*
5. *PROPOSED STORAGE VOLUME = 36,735 CF*

JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

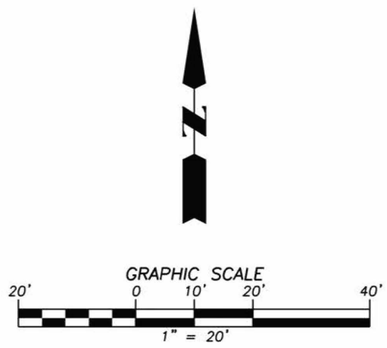
FIGURE 3

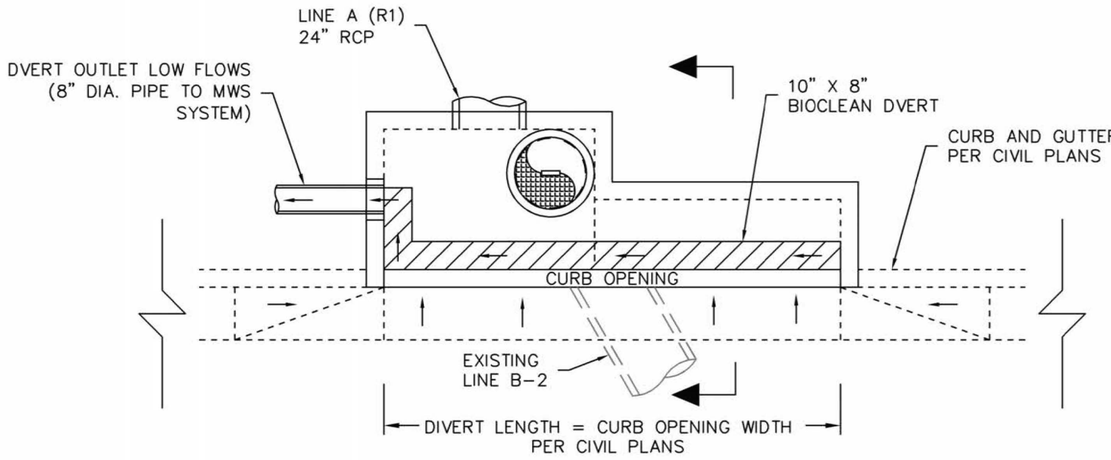
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Figure 4 – DVRT Details

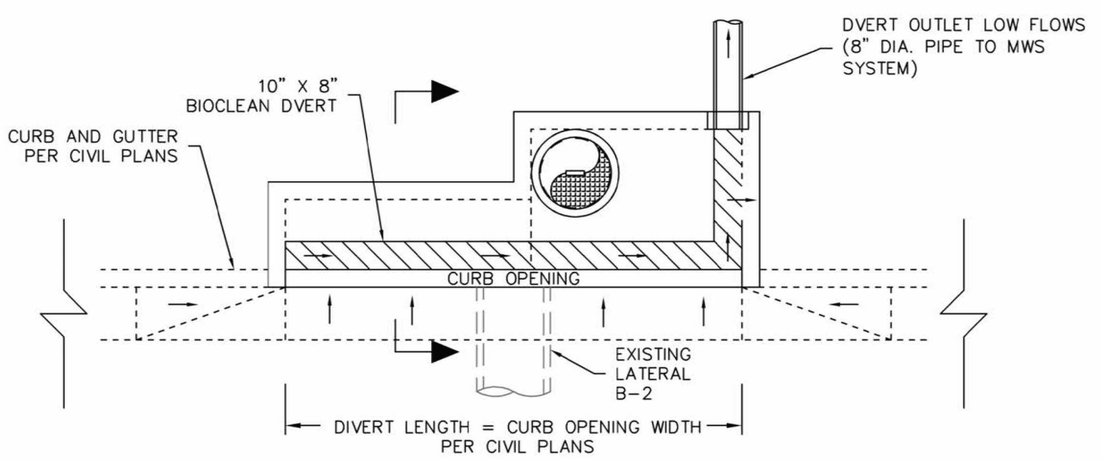


PLAN VIEW
SCALE: 1"=20'

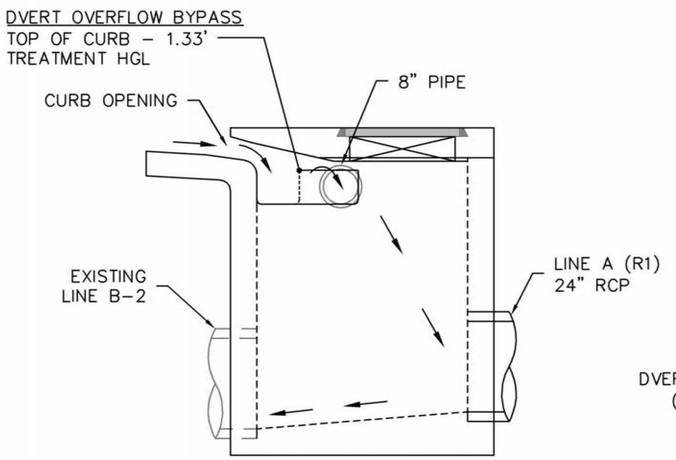




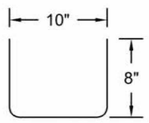
CATCH BASIN AA1 PLAN VIEW
SCALE: N.T.S.



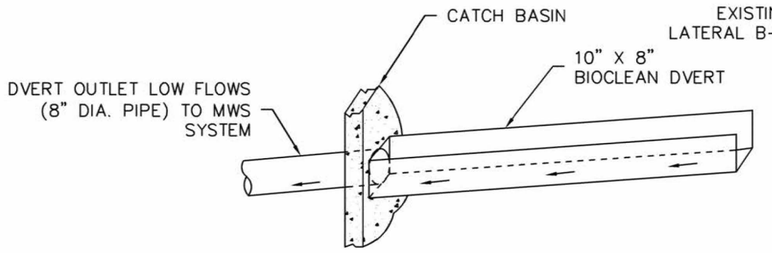
CATCH BASIN B1 PLAN VIEW
SCALE: N.T.S.



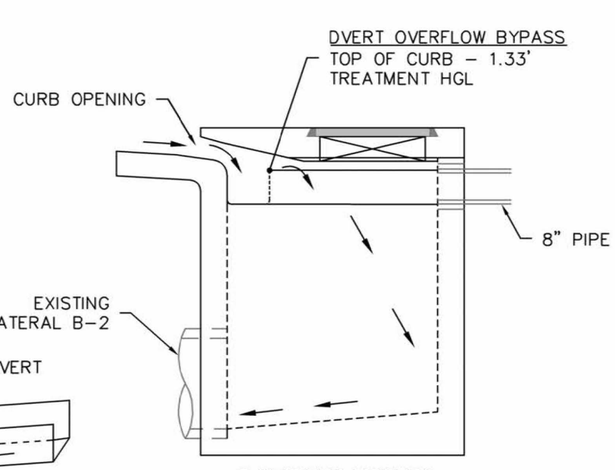
CATCH BASIN AA1
SCALE: N.T.S.



DVERT END VIEW



ISOMETRIC VIEW



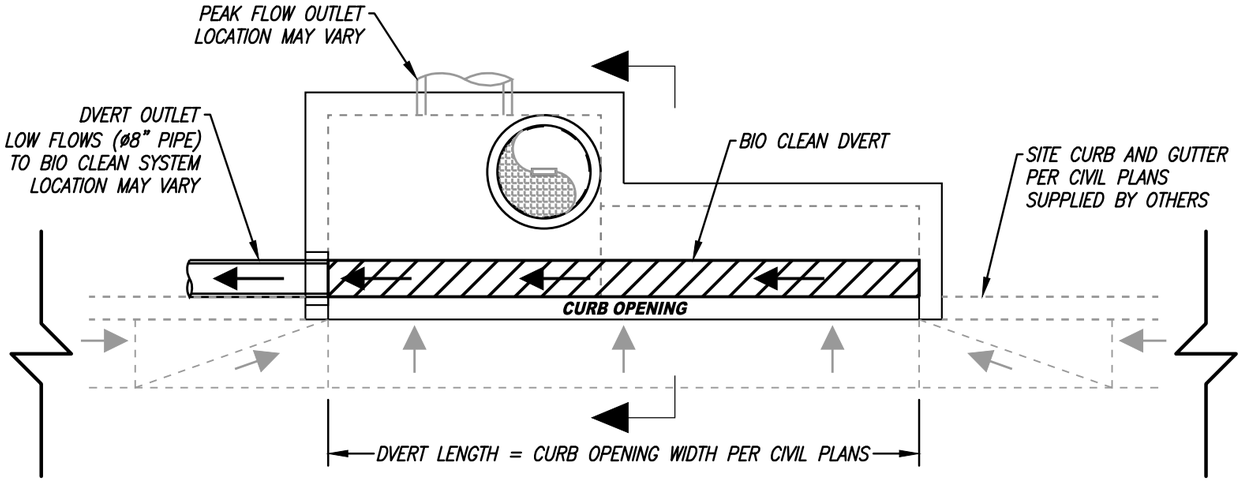
CATCH BASIN B1
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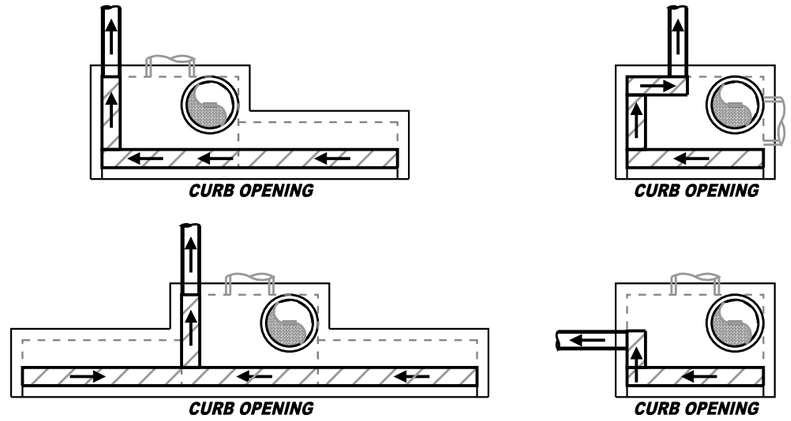
FIGURE 4

TEMECULA VALLEY CHARTER SCHOOL

BioClean DVRT Standard Detail

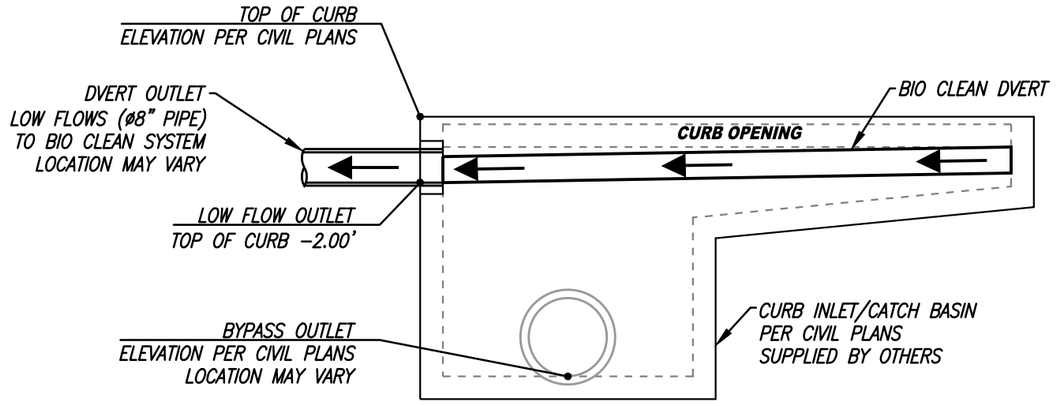


PLAN VIEW

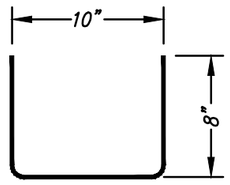


ALTERNATE CONFIGURATIONS

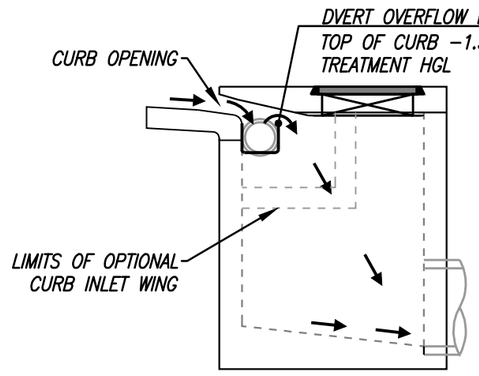
CONTACT BIO CLEAN FOR ADDITIONAL CUSTOM CONFIGURATIONS



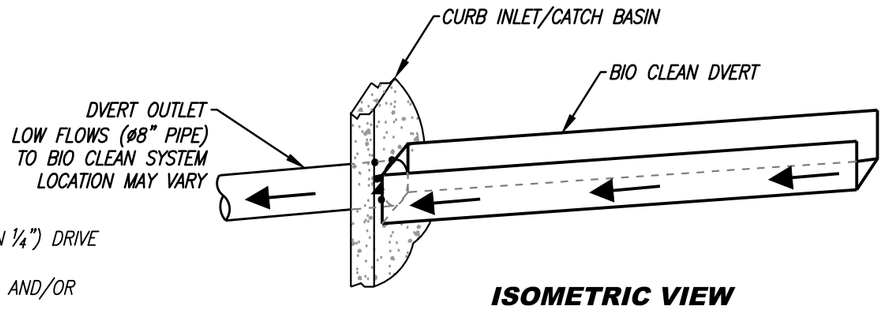
ELEVATION VIEW



DVERT END VIEW



SECTION VIEW



ISOMETRIC VIEW

INSTALLATION NOTES

1. DVERT TO BE CONNECTED TO CONCRETE BELOW CURB OPENING USING 316 STAINLESS STEEL (MIN ¼") DRIVE PIN ANCHORS SPACED 12" ON CENTER AND 316 STAINLESS STEEL RIVETS (MIN 3/16").
2. ALL SEAMS BETWEEN DVERT AND CONCRETE SHALL BE FILLED WITH WATERTIGHT CONCRETE FILLER AND/OR SILICONE SEALANT.
3. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH THE FLOWLINE OF THE DVERT. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURERS STANDARD CONNECTION DETAIL.
4. CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURES WARRANTY IS VOID WITH OUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

MAXIMUM LOW FLOW DIVERSION (CFS)	0.74
LOW FLOW OUTLET PIPE SIZE (INCHES)	ø8"
STATIC HEAD (INCHES)	8"
SAFETY FACTOR	2

PROPRIETARY AND CONFIDENTIAL:

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Bio Clean
A Forterra Company

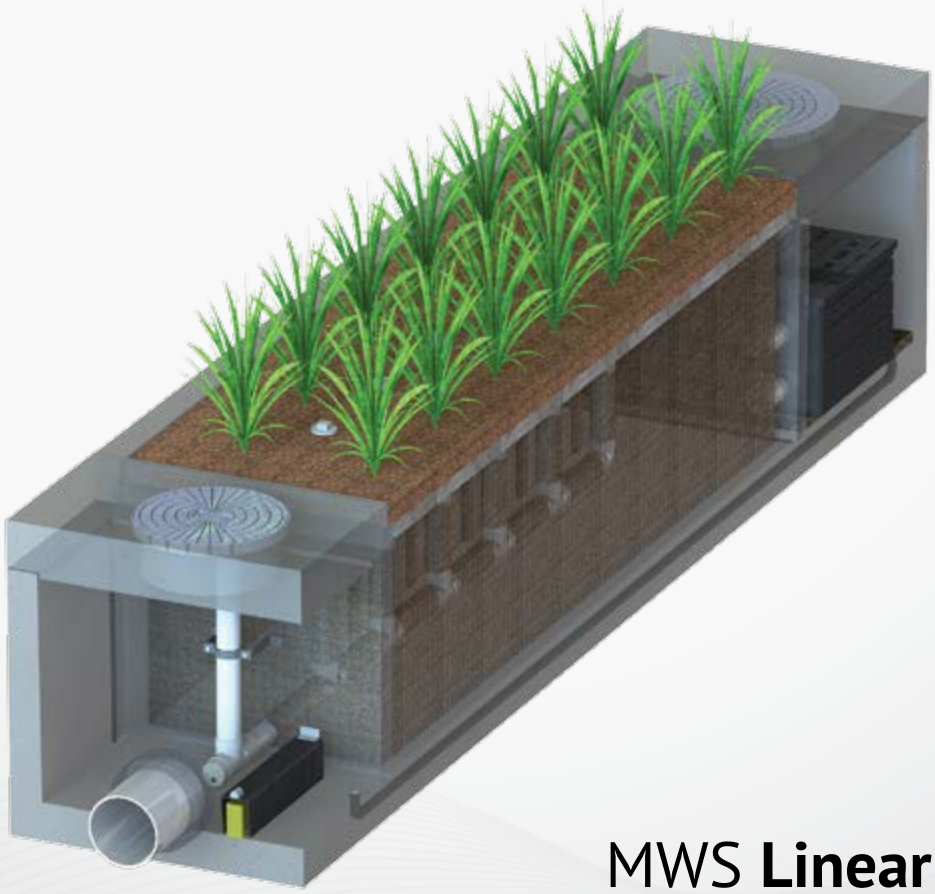
DVERT DVT-10-8
MODULAR TROUGH DIVERSION SYSTEM
STANDARD DETAIL

4/4/18/HAYDEN

Modular Wetland System Brochure

MODULAR WETLANDS™

*Advanced **Stormwater** Biofiltration*



MWS **Linear**



Contents

1 Introduction

2 Applications

3 Configurations

4 Advantages

5 Operation

6 Orientations | Bypass

7 Performance | Approvals

8 Sizing

9 Installation | Maintenance | Plants

The Urban Impact

For hundreds of years natural wetlands surrounding our shores have played an integral role as nature's stormwater treatment system. But as our cities grow and develop, these natural wetlands have perished under countless roads, rooftops, and parking lots.



Plant A Wetland

Without natural wetlands our cities are deprived of water purification, flood control, and land stability. Modular Wetlands and the MWS Linear re-establish nature's presence and rejuvenate water ways in urban areas.





MWS **Linear**

The Modular Wetland System Linear represents a pioneering breakthrough in stormwater technology as the only biofiltration system to utilize patented horizontal flow, allowing for a smaller footprint and higher treatment capacity. While most biofilters use little or no pre-treatment, the MWS Linear incorporates an advanced pre-treatment chamber that includes separation and pre-filter cartridges. In this chamber sediment and hydrocarbons are removed from runoff before it enters the biofiltration chamber, in turn reducing maintenance costs and improving performance.

Applications

The MWS Linear has been successfully used on numerous new construction and retrofit projects. The system's superior versatility makes it beneficial for a wide range of stormwater and waste water applications - treating rooftops, streetscapes, parking lots, and industrial sites.



Industrial

Many states enforce strict regulations for discharges from industrial sites. The MWS Linear has helped various sites meet difficult EPA mandated effluent limits for dissolved metals and other pollutants.



Residential

Low to high density developments can benefit from the versatile design of the MWS Linear. The system can be used in both decentralized LID design and cost-effective end-of-the-line configurations.



Streets

Street applications can be challenging due to limited space. The MWS Linear is very adaptable, and offers the smallest footprint to work around the constraints of existing utilities on retrofit projects.



Parking Lots

Parking lots are designed to maximize space and the MWS Linear's 4 ft. standard planter width allows for easy integration into parking lot islands and other landscape medians.



Commercial

Compared to bioretention systems, the MWS Linear can treat far more area in less space - meeting treatment and volume control requirements.



Mixed Use

The MWS Linear can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

More applications are available on our website: www.ModularWetlands.com/Applications

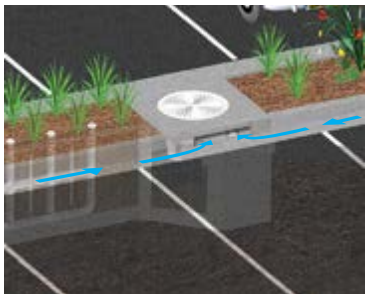
- Agriculture
- Reuse
- Low Impact Development
- Waste Water





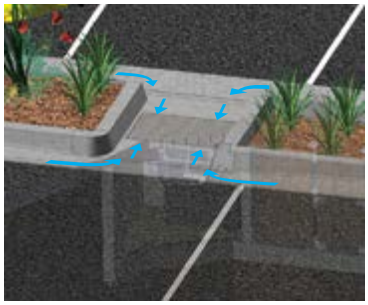
Configurations

The MWS Linear is the preferred biofiltration system of Civil Engineers across the country due to its versatile design. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your stormdrain design.



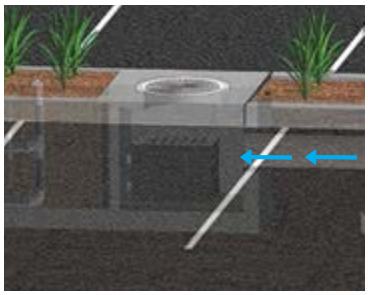
Curb Type

The *Curb Type* configuration accepts sheet flow through a curb opening and is commonly used along road ways and parking lots. It can be used in sump or flow by conditions. Length of curb opening varies based on model and size.



Grate Type

The *Grate Type* configuration offers the same features and benefits as the *Curb Type* but with a grated/drop inlet above the systems pre-treatment chamber. It has the added benefit of allowing for pedestrian access over the inlet. ADA compliant grates are available to assure easy and safe access. The *Grate Type* can also be used in scenarios where runoff needs to be intercepted on both sides of landscape islands.



Vault Type

The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pre-treatment chamber, meaning the MWS Linear can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/bioretention systems. Another benefit of the "pipe in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements.



Downspout Type

The *Downspout Type* is a variation of the *Vault Type* and is designed to accept a vertical downspout pipe from roof top and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

Advantages & Operation

The MWS Linear is the most efficient and versatile biofiltration system on the market, and the only system with horizontal flow which improves performance, reduces footprint, and minimizes maintenance. Figure-1 and Figure-2 illustrate the invaluable benefits of horizontal flow and the multiple treatment stages.

Featured Advantages

- Horizontal Flow Biofiltration
- Greater Filter Surface Area
- Pre-Treatment Chamber
- Patented Perimeter Void Area
- Flow Control
- No Depressed Planter Area

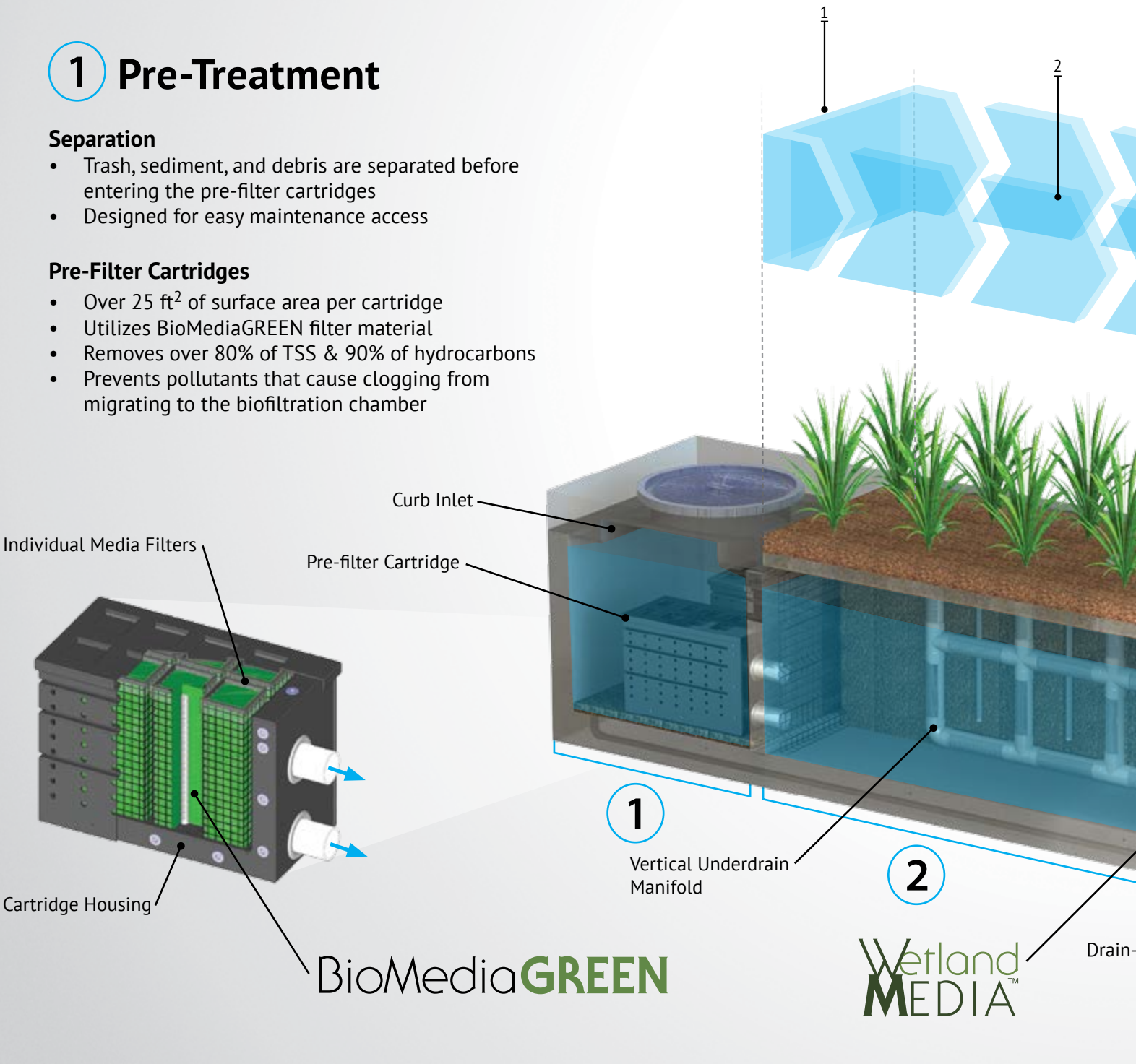
1 Pre-Treatment

Separation

- Trash, sediment, and debris are separated before entering the pre-filter cartridges
- Designed for easy maintenance access

Pre-Filter Cartridges

- Over 25 ft^2 of surface area per cartridge
- Utilizes BioMediaGREEN filter material
- Removes over 80% of TSS & 90% of hydrocarbons
- Prevents pollutants that cause clogging from migrating to the biofiltration chamber



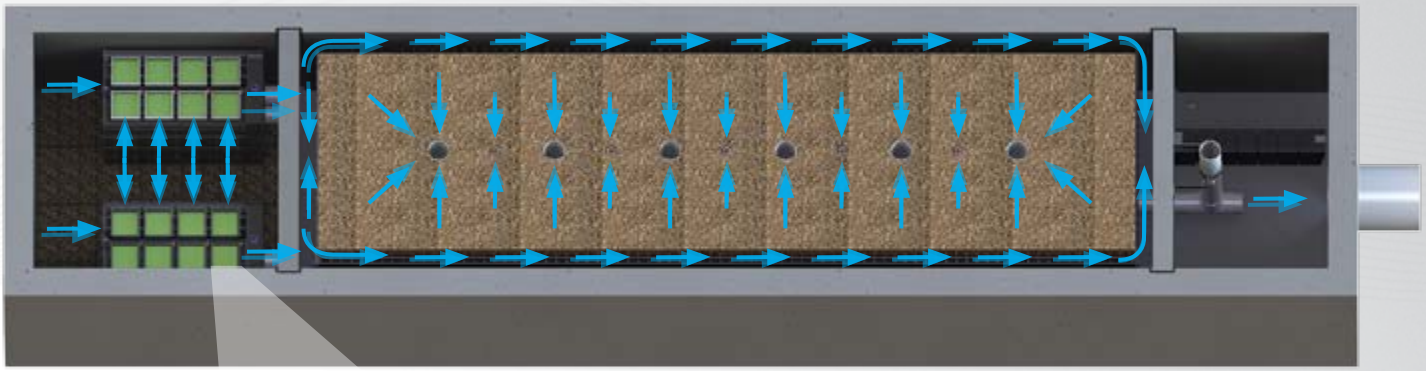


Fig. 2 - Top View

2x to 3x More Surface Area Than Traditional Downward Flow Bioretention Systems.



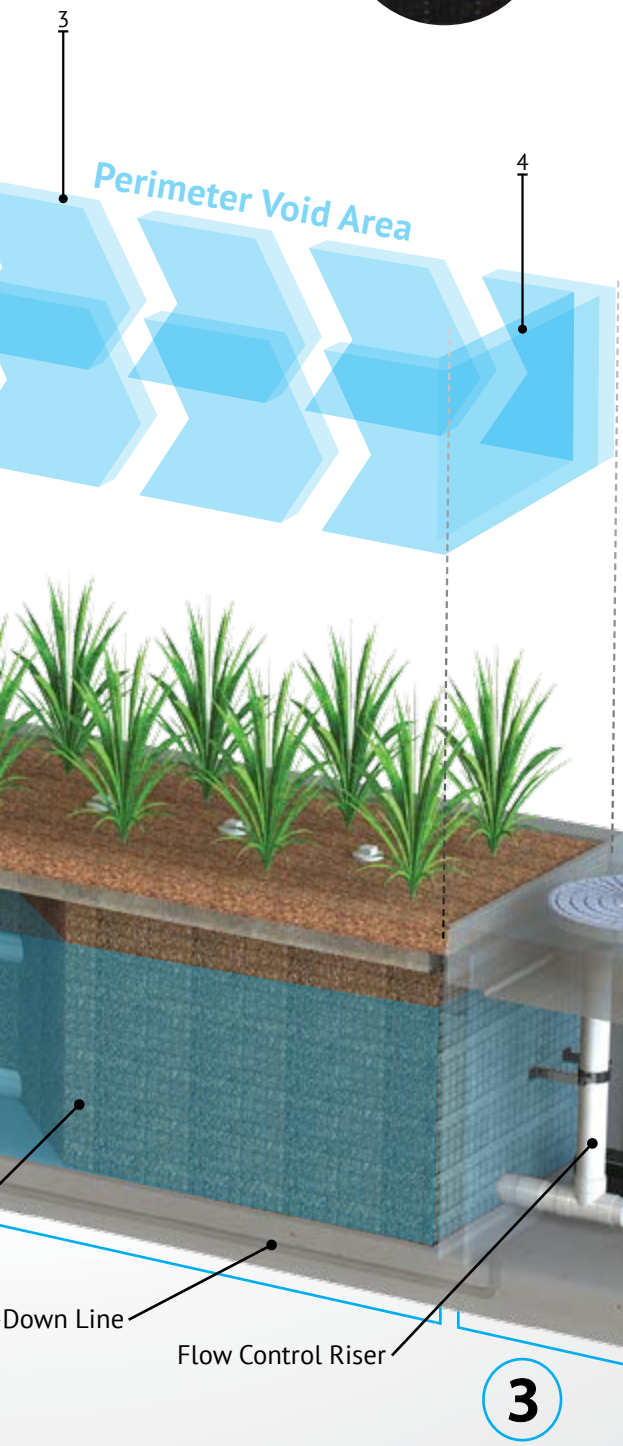


Fig. 1

2 Biofiltration

Horizontal Flow

- Less clogging than downward flow biofilters
- Water flow is subsurface
- Improves biological filtration

Patented Perimeter Void Area

- Vertically extends void area between the walls and the WetlandMEDIA on all four sides.
- Maximizes surface area of the media for higher treatment capacity

WetlandMEDIA

- Contains no organics and removes phosphorus
- Greater surface area and 48% void space
- Maximum evapotranspiration
- High ion exchange capacity and light weight

3 Discharge

Flow Control

- Orifice plate controls flow of water through WetlandMEDIA to a level lower than the media's capacity.
- Extends the life of the media and improves performance

Drain-Down Filter

- The Drain-Down is an optional feature that completely drains the pre-treatment chamber
- Water that drains from the pre-treatment chamber between storm events will be treated

Orientations



Side-By-Side

The *Side-By-Side* orientation places the pre-treatment and discharge chamber adjacent to one another with the biofiltration chamber running parallel on either side. This minimizes the system length, providing a highly compact footprint. It has been proven useful in situations such as streets with directly adjacent sidewalks, as half of the system can be placed under that sidewalk. This orientation also offers internal bypass options as discussed below.



End-To-End

The *End-To-End* orientation places the pre-treatment and discharge chambers on opposite ends of the biofiltration chamber therefore minimizing the width of the system to 5 ft (outside dimension). This orientation is perfect for linear projects and street retrofits where existing utilities and sidewalks limit the amount of space available for installation. One limitation of this orientation is bypass must be external.

Bypass

Internal Bypass Weir (Side-by-Side Only)

The *Side-By-Side* orientation places the pre-treatment and discharge chambers adjacent to one another allowing for integration of internal bypass. The wall between these chambers can act as a bypass weir when flows exceed the system's treatment capacity, thus allowing bypass from the pre-treatment chamber directly to the discharge chamber.

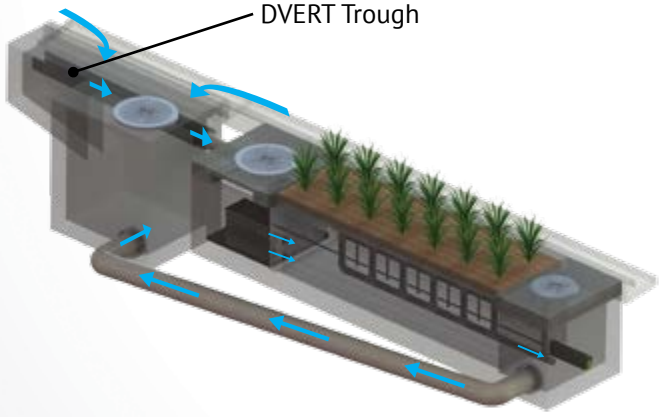
External Diversion Weir Structure

This traditional offline diversion method can be used with the MWS Linear in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert low flows over to the MWS Linear for treatment. The second is the main pipe that receives water once the system has exceeded treatment capacity and water flows over the weir.

Flow By Design

This method is one in which the system is placed just upstream of a standard curb or grate inlet to intercept the first flush. Higher flows simply pass by the MWS Linear and into the standard inlet downstream.

DVERT Low Flow Diversion



This simple yet innovative diversion trough can be installed in existing or new curb and grate inlets to divert the first flush to the MWS Linear via pipe. It works similar to a rain gutter and is installed just below the opening into the inlet. It captures the low flows and channels them over to a connecting pipe exiting out the wall of the inlet and leading to the MWS Linear. The DVERT is perfect for retrofit and green street applications that allows the MWS Linear to be installed anywhere space is available.





Performance

The MWS Linear continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, hydrocarbons and bacteria. Since 2007 the MWS Linear has been field tested on numerous sites across the country. With it's advanced pre-treatment chamber and innovative horizontal flow biofilter, the system is able to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes. With the same biological processes found in natural wetlands, the MWS Linear harnesses natures ability to process, transform, and remove even the most harmful pollutants.

Approvals

The MWS Linear has successfully met years of challenging technical reviews and testing from some of the most prestigious and demanding agencies in the nation, and perhaps the world.

Washington State TAPE Approved

The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft^2 loading rate. The highest performing BMP on the market for all main pollutant categories.

TSS	Total Phosphorus	Ortho Phosphorus	Nitrogen	Dissolved Zinc	Dissolved Copper	Total Zinc	Total Copper	Motor Oil
85%	64%	67%	45%	66%	38%	69%	50%	95%

DEQ Assignment

The Virginia Department of Environmental Quality assigned the MWS Linear, the highest phosphorus removal rating for manufactured treatment devices to meet the new Virginia Stormwater Management Program (VSMP) Technical Criteria.

Maryland Department Of The Environment Approved

Granted ESD (Environmental Site Design) status for new construction, redevelopment and retrofitting when designed in accordance with the Design Manual.

MASTEP Evaluation

The University of Massachusetts at Amherst – Water Resources Research Center, issued a technical evaluation report noting removal rates up to 84% TSS, 70% Total Phosphorus, 68.5% Total Zinc, and more.

Rhode Island DEM Approved

Approved as an authorized BMP and noted to achieve the following minimum removal efficiencies: 85% TSS, 60% Pathogens, 30% Total Phosphorus, and 30% Total Nitrogen.

Flow Based Sizing

The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

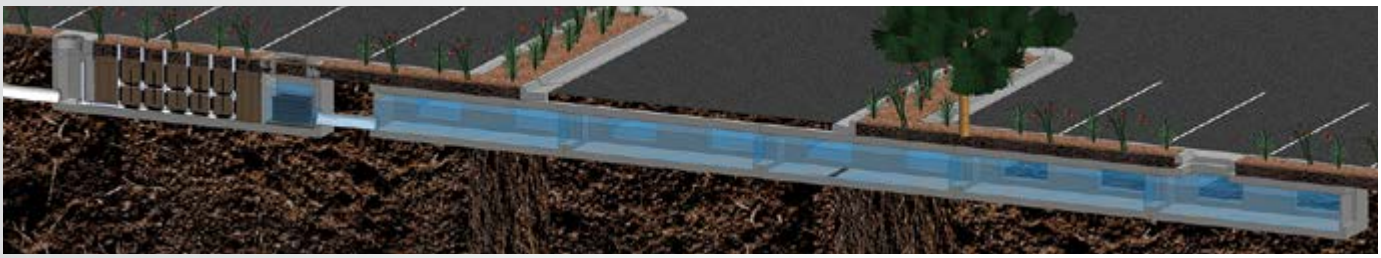


Treatment Flow Sizing Table

Model #	Dimensions	WetlandMedia Surface Area	Treatment Flow Rate (cfs)
MWS-L-4-4	4' x 4'	23 ft^2	0.052
MWS-L-4-6	4' x 6'	32 ft^2	0.073
MWS-L-4-8	4' x 8'	50 ft^2	0.115
MWS-L-4-13	4' x 13'	63 ft^2	0.144
MWS-L-4-15	4' x 15'	76 ft^2	0.175
MWS-L-4-17	4' x 17'	90 ft^2	0.206
MWS-L-4-19	4' x 19'	103 ft^2	0.237
MWS-L-4-21	4' x 21'	117 ft^2	0.268
MWS-L-8-8	8' x 8'	100 ft^2	0.230
MWS-L-8-12	8' x 12'	151 ft^2	0.346
MWS-L-8-16	8' x 16'	201 ft^2	0.462

Volume Based Sizing

Many states require treatment of a water quality volume and do not offer the option of flow based design. The MWS Linear and its unique horizontal flow makes it the only biofilter that can be used in volume based design installed downstream of ponds, detention basins, and underground storage systems.



Treatment Volume Sizing Table

Model #	Treatment Capacity (cu. ft.) @ 24-Hour Drain Down	Treatment Capacity (cu. ft.) @ 48-Hour Drain Down
MWS-L-4-4	1140	2280
MWS-L-4-6	1600	3200
MWS-L-4-8	2518	5036
MWS-L-4-13	3131	6261
MWS-L-4-15	3811	7623
MWS-L-4-17	4492	8984
MWS-L-4-19	5172	10345
MWS-L-4-21	5853	11706
MWS-L-8-8	5036	10072
MWS-L-8-12	7554	15109
MWS-L-8-16	10073	20145

Installation

The MWS Linear is simple, easy to install, and has a space efficient design that offers lower excavation and installation costs compared to traditional tree-box type systems. The structure of the system resembles pre-cast catch basin or utility vaults and is installed in a similar fashion.

The system is delivered fully assembled for quick installation. Generally, the structure can be unloaded and set in place in 15 minutes. Our experienced team of field technicians are available to supervise installations and provide technical support.



Maintenance

Reduce your maintenance costs, man hours, and materials with the MWS Linear. Unlike other biofiltration systems that provide no pre-treatment, the MWS Linear is a self-contained treatment train which incorporates simple and effective pre-treatment.

Maintenance requirements for the biofilter itself are almost completely eliminated, as the pre-treatment chamber removes and isolates trash, sediments, and hydrocarbons. What's left is the simple maintenance of an easily accessible pre-treatment chamber that can be cleaned by hand or with a standard vac truck. Only periodic replacement of low-cost media in the pre-filter cartridges is required for long term operation and there is absolutely no need to replace expensive biofiltration media.



Plant Selection

Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the MWS Linear do even more - they increase pollutant removal. What's not seen, but very important, is that below grade the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants. The flow rate is controlled in the MWS Linear, giving the plants more "contact time" so that pollutants are more successfully decomposed, volatilized and incorporated into the biomass of The MWS Linear's micro/macro flora and fauna.

A wide range of plants are suitable for use in the MWS Linear, but selections vary by location and climate. View suitable plants by selecting the list relative to your project location's hardy zone.

Please visit **www.ModularWetlands.com/Plants** for more information and various plant lists.

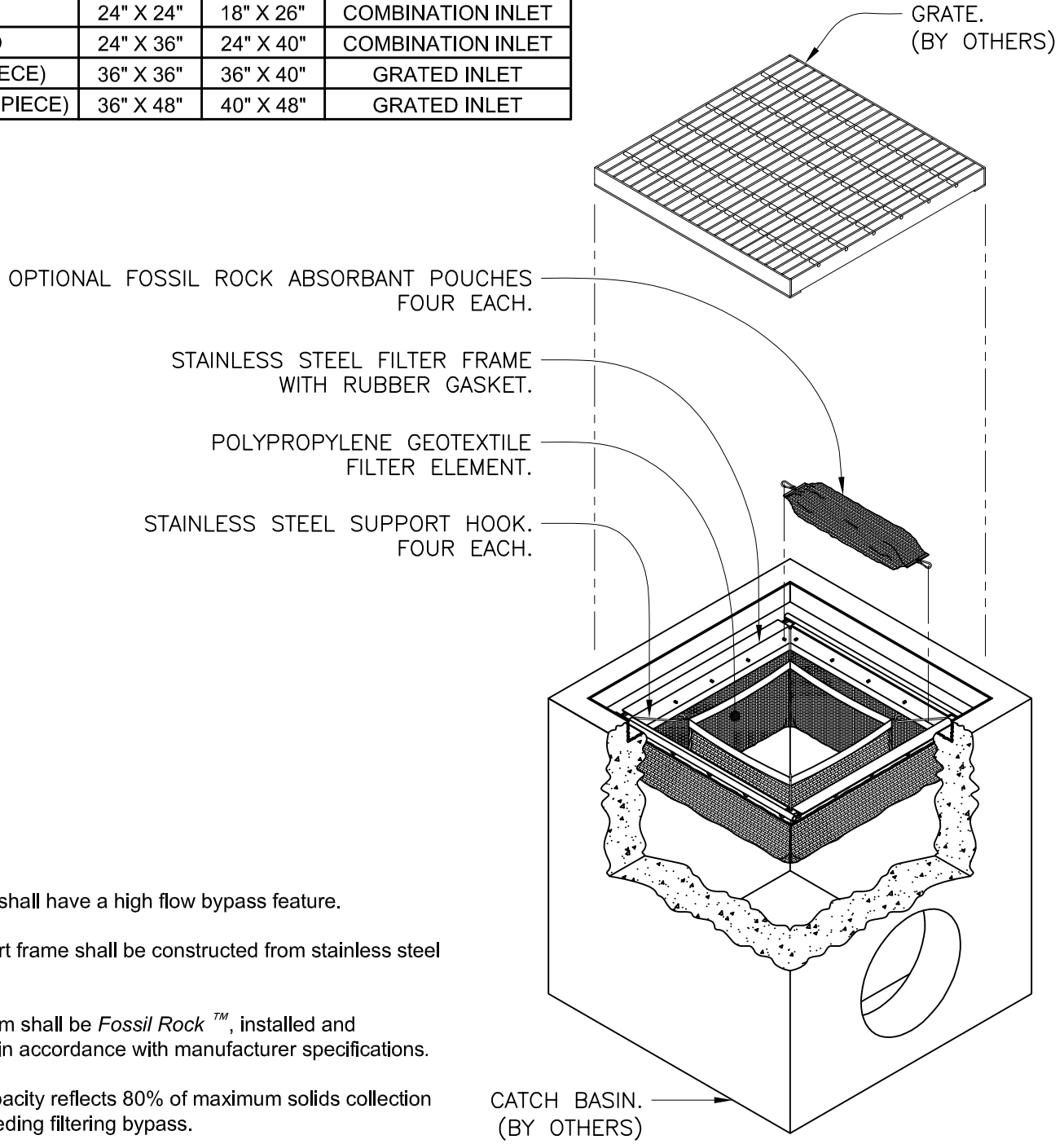


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FloGard Catch Basin Filter Details

FG-0001

SPECIFIER CHART			
MODEL	INLET ID	GRATE OD	COMMENTS
FF-12D	12" X 12"	15" X 15"	GRATED INLET
FF-16D	16" X 16"	18" X 18"	GRATED INLET
FF-18D	18" X 18"	20" X 20"	GRATED INLET
FF-1836SD	18" X 36"	18" X 40"	GRATED INLET
FF-1836DGO	18" X 36"	18" X 40"	COMBINATION INLET
FF-24D	24" X 24"	26" X 26"	GRATED INLET
FF-2436SD	24" X 36"	24" X 40"	GRATED INLET
FF-24DGO	24" X 24"	18" X 26"	COMBINATION INLET
FF-2436DGO	24" X 36"	24" X 40"	COMBINATION INLET
FF-36D (2 PIECE)	36" X 36"	36" X 40"	GRATED INLET
FF-3648D (2 PIECE)	36" X 48"	40" X 48"	GRATED INLET



NOTES:

1. Filter insert shall have a high flow bypass feature.
2. Filter support frame shall be constructed from stainless steel Type 304.
3. Filter medium shall be *Fossil Rock* ™, installed and maintained in accordance with manufacturer specifications.
4. Storage capacity reflects 80% of maximum solids collection prior to impeding filtering bypass.

Inlet Filtration

FloGard®

Catch Basin Insert Filter

Grated Inlet Style

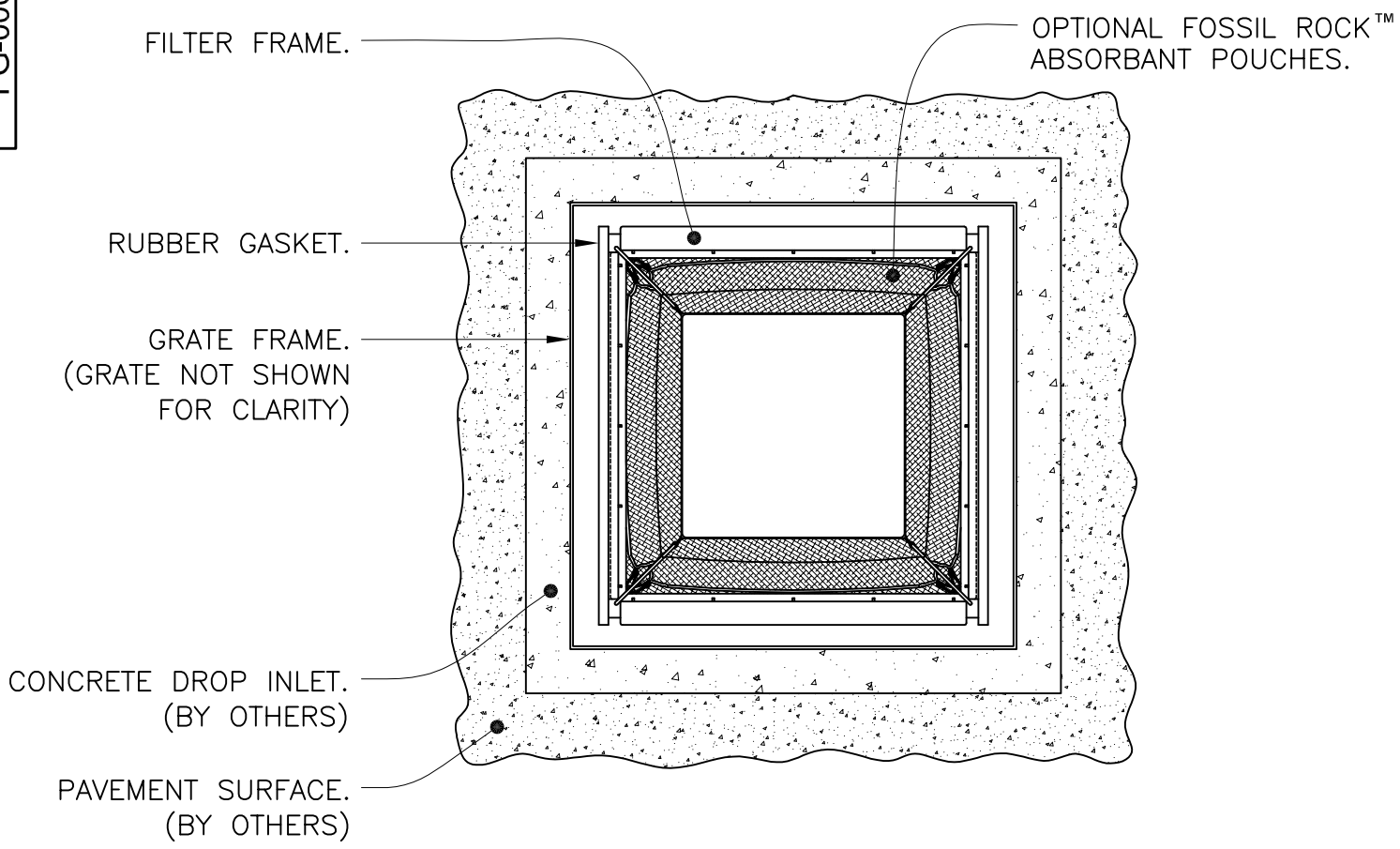
Oldcastle®
Stormwater Solutions

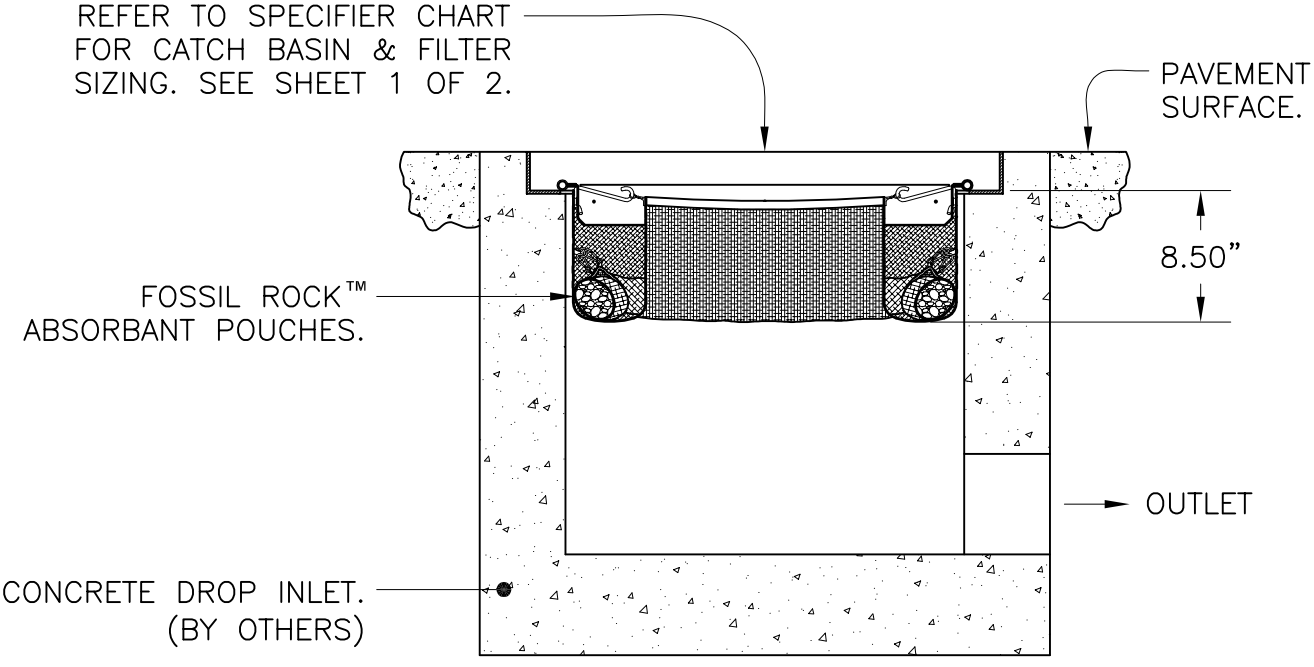
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DRAWING NO.	REV	ECO	DATE	
FG-0001	E	ECO–0142 JPR 7/13/16	JPR 12/18/06	SHEET 1 OF 2

FG-0001





SECTION VIEW

Inlet Filtration

FloGard®

Catch Basin Insert Filter

Grated Inlet Style

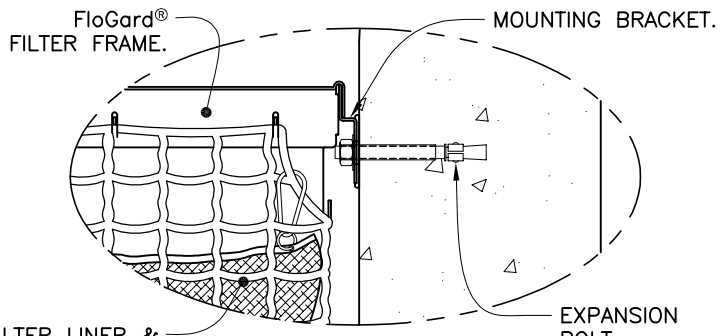
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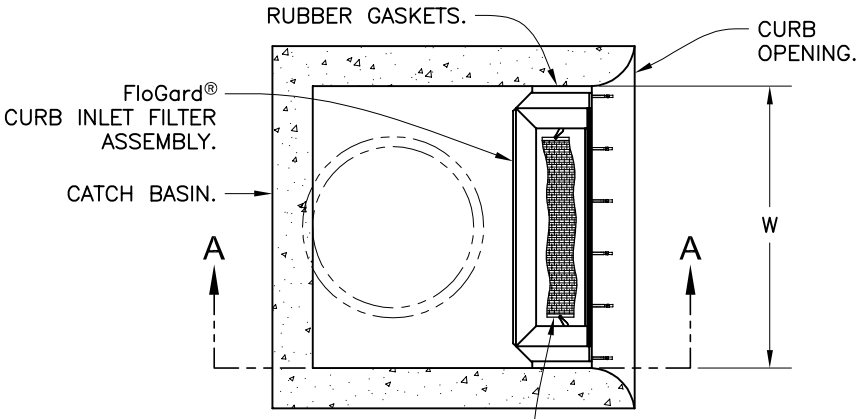
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DRAWING NO.	REV	ECO	DATE	
FG-0001	E	ECO-0142 JPR 7/13/16	JPR 12/18/06	SHEET 2 OF 2

FGP-0002

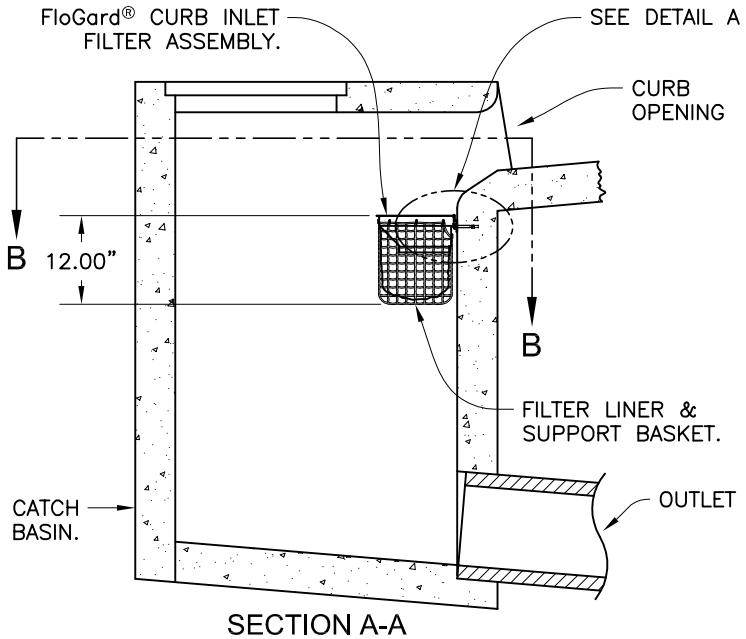


DETAIL A
MOUNTING BRACKET & EXPANSION BOLTS
SEE NOTE 2
SCALE: 6X



SECTION B-B
TOP VIEW
SCALE: 1X

SPECIFIER CHART				
MODEL NO.	Curb Opening Width - W -	Storage Capacity - Cu. Ft. -	Filtered Flow Rate - GPM/CFS -	Bypass Flow Rate - GPM/CFS -
FGP-24CI	2.0' (24")	.95	338 / .75	2,513 / 5.6
FGP-30CI	2.5' (30")	1.20	450 / 1.00	3,008 / 6.7
FGP-36CI	3.0' (36")	1.50	563 / 1.25	3,547 / 7.9
FGP-42CI	3.5' (42")	1.80	675 / 1.50	3,951 / 8.8
FGP-48CI	4.0' (48")	2.10	768 / 1.76	4,445 / 9.9
FGP-5.0CI	5.0' (60")	2.40	900 / 2.00	5,208 / 11.6
FGP-6.0CI	6.0' (72")	3.05	1,126 / 2.51	6,196 / 13.8
FGP-7.0CI	7.0' (84")	3.65	1,350 / 3.01	7,139 / 15.9
FGP-8.0CI	8.0' (96")	4.25	1,576 / 3.51	8,082 / 18.0
FGP-10.0CI	10.0' (120")	4.85	1,800 / 4.01	9,833 / 21.9
FGP-12.0CI	12.0' (144")	6.10	2,252 / 5.02	11,764 / 26.2
FGP-14.0CI	14.0' (168")	7.30	2,700 / 6.02	13,515 / 30.1
FGP-16.0CI	16.0' (192")	8.55	3.152 / 7.02	15,446 / 34.4
FGP-18.0CI	18.0' (216")	9.45	3,490 / 7.78	17,152 / 38.2
FGP-21.0CI	21.0' (252")	10.95	4,050 / 9.02	19,891 / 44.3
FGP-28.0CI	28.0 (336")	14.60	5,400 / 12.03	26,311 / 58.6



SECTION A-A
SIDE VIEW
SCALE: 1X

NOTES:

1. Filter insert shall have a high flow bypass feature.
2. Filter support frame shall be constructed from stainless steel Type 304.
3. Filter medium shall be *Fossil Rock* ™, installed and maintained in accordance with manufacturer specifications.
4. Storage capacity reflects 80% of maximum solids collection prior to impeding filtering bypass.

Inlet
Filtration

FloGard®

Catch Basin Insert Filter

Curb Inlet Style

Oldcastle®
Stormwater Solutions

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DRAWING NO.	REV	ECO	DATE	
FGP-0002	E	ECO-0127 JPR 5/18/15	JPR 1/3/06	SHEET 1 OF 1

Appendix 7:
Hydromodification & Critical Coarse Sediment

Supporting Detail for Hydromodification compliance & Exhibit G - CCSY & PSS Areas with the project location.

The preparer shall include the following in this Appendix (Refer to Section 2.4 and 3.6 of the SMR WQMP and Sections E of this Template):

- Hydromodification Exemption Exhibit (if the project is in an area exempt from Hydromod)
- Potential Critical Coarse Sediment Yield Area Mapping (to show if the site is out of a CCSYA)
- Hydromodification BMP sizing calculations (i.e. County Hydromod Spreadsheet – Hydromod, and BMP Design tabs, SMRHM report files, or other acceptable Hydromod calculations)
- Site-Specific Critical Coarse Sediment Analysis (if a project impacts a CCSYA)
- Design details/drawings from manufacturers for proprietary BMPs (if proprietary BMPs are proposed)

In addition, the project shall comply with drainage law and good practices:

- Protect the Site and Roads from Q100yr, without impacting adjacent property owners.
- Pad elevations must be above the Q100yr water surface at all locations.

I. Identify Offsite Hydrology

A. If the project intends to allow the flows to pass through the project uninterrupted, the flows must remain along its natural flow-path and natural condition. The project must also:
   (1) Ensure that the existing stream is stable. If not, the design must include stabilization.
   (2) Does the 100 year flow path affect proposed project elements, such as streets and fill slopes? If so, the project must properly design for impingements, provide revetment, etc. If the water surface changes due to impingements on neighbor's properties, Permission to pond letters must be provided.

B. If the project intends to collect and convey the offsite flows, see the next section:

II. Hydraulics

A. Project must provide collection inlets that can be accessed for maintenance. If located outside of the project boundary, the project must provide a Permission Letter or drainage easement. If the inlet creates new ponding on private property, the project must provide a Permission to Pond letter or easement.

B. The project should not divert watershed areas over 1 acre. If so, Permission Letter to accept project's diversion and drainage concept must be received by the project.

C. The project should have an adequate outlet. If not, include Permission Letters and implement Increased Runoff criteria (2, 5,10 year storm events and the 1, 3, 6 and 24 hour durations). 100 year storm routing is not to be used. Runoff from the offsite plus onsite must be returned to its natural (existing) condition of velocity, peak flow-rate, flow-width and location/right of way, if permission letters have not been obtained.

D. The project must adequately convey the 100 year storm between the combination of street flow and pipe flow per County Ordinance.

E. The project should use the downstream connection as the Q100yr water surface control elevation, to ensure 6 inches minimum of freeboard in proposed drainage system.

III. Basin Layout

A. Implement Basin Guidelines as best as possible from Appendix C, Design Handbook for LID BMPs.

Santa Margarita Region – RCTD SPREADSHEET

It is expressly agreed and understood by the USER of this Excel Spreadsheet file (file) released hereby (whether released in digital or hard copy form) that Riverside County (County) makes no representation as to its accuracy. Further, it is the intent of the parties hereto that the USER shall review and verify calculations, analyze results, and/or independently determine the accuracy thereof prior to placing any reliance whatsoever on the information. Further, the USER shall hold the County, together with the officers, agents and employees of each, free and harmless from any liability whatsoever, including wrongful death, based or asserted upon any act or omission of the District or County, their officers, agents, employees or subcontractors, relating to or in any way connected with the unauthorized use of these files or information; and USER agrees to protect and defend, including all attorney fees and other expenses, each of the foregoing bodies and persons in any legal action based or asserted upon any such acts or omissions. USER also agrees not to sell, reproduce or release these files to others for any purpose whatsoever, ex those incidental uses for which the files were acquired, verified and combined with USER'S own work product. Reasonable effort was made to fully comply with the San Diego MS4 Permit requirements using the methods found in the Riverside County Hydrology Manual. If the user finds an error in any way, please contact the County so that the error can be corrected. Any direct tampering of the equations in this spreadsheet would be considered extremely inappropriate, and potentially fraudulent.

Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):	TEMECULA VALLEY CHARTER SCHOOL	Rain Gauge	Temecula Valley
Latitude (decimal format):	33d 36' 4.45"	BMP Type (per WQMP):	Subsurface Chamber
Longitude (decimal format):	117d 4' 58.7"	BMP Number (Sequential):	BMP A

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	15.07	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.5
LONGEST WATERCOURSE (FT) - 1,000' max[1]	1395	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1 or D-4.5	0.788
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1490	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.55
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	1427.9	CLOSEST IMPERVIOUS PERCENTAGE (%)	0% Undeveloped - Poor Cover
EX. IMPERV. PERCENTAGE (%), SMR requires Pre-dev. Condition	0		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
14	15.07 Ac.	Open Brush	Fair Cover		5	50	45	62	**79**	91
								0	**0**	0
								0	**0**	0
	15.07 Ac.						**Weighted Average RI Numbers =**	**62.0**	**79.0**	**91.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit	Calculated Lower Flow-rate limit
Ex. 10-year Flowrate[1] = **15.700** cfs	Ex. 10% of the 2-year Flowrate[1] = **2.100** cfs
(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]	
Ex. 10-year Flowrate (Attach Study) = 15.7 cfs	Ex. 2-year Flowrate (Attach Study) = 21 cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	15.98
LONGEST WATERCOURSE (FT)	1303
DIFFERENCE IN ELEV (FT) - along watercourse	59
PROPOSED IMPERVIOUS PERCENTAGE (%)	46

Go to "BMP Design" tab to design your BMP, then check results below.
Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
24	15.98 Ac.	Turf	Fair Cover	0	1	60	39	62	**79**	91
								0	**0**	0
								0	**0**	0
	15.98 Ac.						**Weighted Average RI Numbers =**	**62.0**	**79.0**	**91.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are:
AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

		First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
Hydromod Ponded depth	**4.500**						
Hydromod Drain Time (unclogged)	**16.30 hours**	Requirement		Proposed			
Is the HydroMod BMP properly sized?	**Yes, this is acceptable**	---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---
Mitigated Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---

Responsible-in-charge: Joseph Castaneda Date: 1/16/2025

Signature: Spreadsheet Developed by: Benjie Cho, P.E.

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BMP Design

Fill in **blue** shaded areas

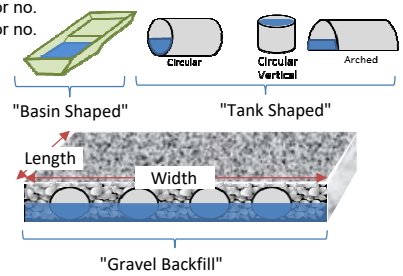
BMP Geometry, Outlets, & Detention Calculations

0.25 feet, Stage Intervals — Larger Stage Intervals may incr. the Q at the bottom stg.

PROPOSED BMP DIMENSIONS

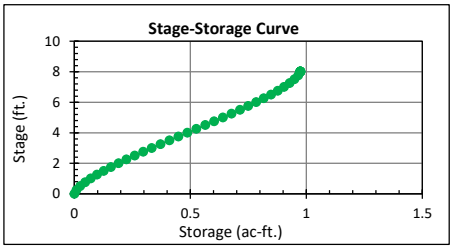
STEP1: Size the BMP, so that the Total Vol. > Max HydroMod Vol. (Deeper is ok, it will be refined in the Minimum Design Geometry)

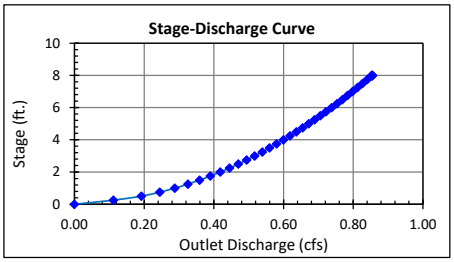
Circular Tank BMP	Is the BMP a Tank shape?	1	1 for yes; 2 for no.
	Is the BMP Arched shape?	2	1 for yes; 2 for no.
	If circular, is the tank vertical?	2	1 for yes; 2 for no.
	Is this Harvest & Reuse?	2	1 for yes; 2 for no.
	Total number of Tanks =	2	
	Diameter (Hortz. for arch) =	96	IN
	Length (or Ht. for Vertical) =	422	FT
Increase Backfill Size	Propose Gravel Backfill?	Yes	
	Gravel Backfill Width =	2	FT
	Gravel Backfill Length =	2	FT
	Gravel Void Ratio =	40	%



Prop Multi-Circular Vol =	42,424	FT3
Total Prop. Volume[1] =	42,424	FT3
Max HydroMod Volume =	22,901	FT3
[2]		
Max HydroMod Depth[3] =	4.50	FT

[1]Does not include forebay, or low flow trench
[2]Does not account for freeboard or access roads
[3]Does not consider Increased Runoff





Stage-Storage-Discharge

*Q includes Q-Subdrain for Biofiltration

Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q* (CFS)
0	0	0	0
0.25	0.009	394	0.11
0.50	0.025	1104	0.19
0.75	0.046	2008	0.24
1.00	0.070	3061	0.29
1.25	0.097	4234	0.33
1.50	0.126	5507	0.36
1.75	0.158	6864	0.39
2.00	0.190	8294	0.42
2.25	0.225	9785	0.45
2.50	0.260	11327	0.47
2.75	0.296	12911	0.49
3.00	0.334	14531	0.52
3.25	0.371	16178	0.54
3.50	0.410	17845	0.56
3.75	0.448	19525	0.58
4.00	0.487	21212	0.60
4.25	0.526	22899	0.62
4.50	0.564	24579	0.64
4.75	0.603	26246	0.66
5.00	0.640	27893	0.67
5.25	0.678	29513	0.69
5.50	0.714	31097	0.71
5.75	*0.749*	*32639*	*0.72*
6.00	*0.784*	*34130*	*0.74*
6.25	*0.816*	*35560*	*0.75*
6.50	*0.848*	*36917*	*0.77*
6.75	*0.877*	*38191*	*0.78*
7.00	*0.904*	*39363*	*0.80*
7.25	*0.928*	*40416*	*0.81*
7.50	*0.949*	*41320*	*0.83*
7.75	*0.965*	*42030*	*0.84*
8.00	*0.974*	*42424*	*0.85*
8.00	0.974	42,424	

MINIMUM DESIGN GEOMETRY

STEP2: Delete outlets, then propose the largest lowest orifice that does not, exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a outlet slightly below the stage that has an issue.

VISIBLE OUTLETS (for Stage-Discharge)

Orifice Outlets			Weir Outlets		
Invert Height (FT)	Diameter (INCHES)	No. of Orifices	Crest Height (FT)	Crest Width (FT)	No. of Weirs
0	3.00	1			

Hydromod Depth = 4.50 FT
+ 1' Freeboard = 5.50 FT
Resize with Hydromod Depth +1' Freeboard

STEP3: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

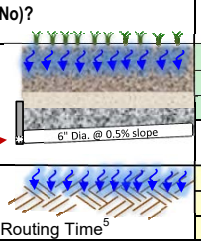
Infiltration / BioRetention / BioFiltration

SUBSURFACE DRAINAGE

No Infiltration - Hydromod Only

1.5 inch, Restricted Subdrain Diameter

No	Consider Infiltration, Bioretention, or Biofiltration (Yes or No)?	
0.25	IN/HR, Infiltration rate thru soil media (K)[3]	-8000 FT3, Vol. of Media Section above subdrain
0.1	FT, Ht. of Soil Media	0.000 Δh [FT], Energy Loss at Max. Hydromod depth
0	FT, Ht. of Sand Filter Course	0.126 CFS, Flowrate thru the subdrain at Max Hydromod
0	FT, Ht. of Gravel Layer	
1.5	IN, Restricted Subdrain Diameter	@Max Hydromod Depth: Orifice Control: Media is fully pressurized
0	IN/HR, Infiltration rate thru subgrade[4]	- FT3/sec, Infiltration
3	Factor of Safety	- FT3, Vol. Infiltrated, over representative time
300	Minutes, Time represented by Infil. Tests or Biofiltraton Routing Time[5]	- FT3/sec, Low-Loss after representative time



[3] For BioRetention/ BioFiltration use a rate thru the media of 2.5 in/hr (long term design rate).
[4]Measured Infiltration Rate per the LID Manual, Appendix A for Infiltration/BioRetention.
[5]Time that infiltration rate is being applied for Hydromod analysis for Infiltration/BioRention. Use 300 minutes (5hrs) for BioFiltration. Pore space is not accounted for at this time.

Existing Condition Rational Method Hydrology Calculations

2-Year Storm Event

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 08/11/24 File:ara2.out

277.02.24
2-YEAR RATIONAL TABLING METHOD FOR AREA A
PRE-PROJECT CONDITION
FN: ARA10.RRV

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6279

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.200(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.500(In/Hr)
Slope of intensity duration curve = 0.5500

++
Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 719.000(Ft.)
Top (of initial area) elevation = 1490.000(Ft.)
Bottom (of initial area) elevation = 1447.000(Ft.)
Difference in elevation = 43.000(Ft.)
Slope = 0.05981 s(percent)= 5.98
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.322 min.
Rainfall intensity = 0.990(In/Hr) for a 2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.542
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.220
Decimal fraction soil group D = 0.780
RI index for soil(AMC 1) = 67.06
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 1.695(CFS)

```
Total initial stream area =        3.160(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      102.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.509
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.710
Decimal fraction soil group D = 0.290
RI index for soil(AMC 1)  =  63.63
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    17.32 min.
Rainfall intensity =      0.990(In/Hr) for a     2.0 year storm
Subarea runoff =      0.433(CFS) for      0.860(Ac.)
Total runoff =      2.128(CFS)      Total area =       4.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      2.779(CFS)
Depth of flow =   0.518(Ft.), Average velocity =   3.193(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2              3.50              1.00
      3              6.00              0.00
      4             10.00              1.00
      5             22.00              2.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =      2.779(CFS)
  '     '    flow top width =      3.364(Ft.)
  '     '    velocity=    3.193(Ft/s)
  '     '    area =      0.870(Sq.Ft)
  '     '    Froude number =     1.106

Upstream point elevation =  1447.000(Ft.)
Downstream point elevation =  1439.000(Ft.)
Flow length =   219.000(Ft.)
Travel time  =    1.14 min.
Time of concentration =   18.47 min.
Depth of flow =   0.518(Ft.)
Average velocity =   3.193(Ft/s)
Total irregular channel flow =     2.779(CFS)
Irregular channel normal depth above invert elev. =   0.518(Ft.)
Average velocity of channel(s) =   3.193(Ft/s)
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.494
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
```

```
Decimal fraction soil group C = 0.820
Decimal fraction soil group D = 0.180
RI index for soil(AMC 1)  =  62.88
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.956(In/Hr) for a     2.0 year storm
Subarea runoff =      1.227(CFS) for      2.600(Ac.)
Total runoff =      3.355(CFS)      Total area =       6.620(Ac.)
Depth of flow =   0.555(Ft.), Average velocity =   3.347(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      106.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      3.837(CFS)
Depth of flow =   0.631(Ft.), Average velocity =   2.970(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2              3.50              1.00
      3              6.00              0.00
      4             10.00              1.00
      5             22.00              2.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =      3.837(CFS)
  '     '    flow top width =      4.098(Ft.)
  '     '    velocity=    2.970(Ft/s)
  '     '    area =      1.292(Sq.Ft)
  '     '    Froude number =     0.932

Upstream point elevation =  1439.000(Ft.)
Downstream point elevation =  1427.900(Ft.)
Flow length =   457.000(Ft.)
Travel time  =    2.56 min.
Time of concentration =   21.03 min.
Depth of flow =   0.631(Ft.)
Average velocity =   2.970(Ft/s)
Total irregular channel flow =     3.837(CFS)
Irregular channel normal depth above invert elev. =   0.631(Ft.)
Average velocity of channel(s) =   2.970(Ft/s)
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.466
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.010
Decimal fraction soil group C = 0.990
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1)  =  61.68
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.890(In/Hr) for a     2.0 year storm
Subarea runoff =      0.867(CFS) for      2.090(Ac.)
Total runoff =      4.222(CFS)      Total area =       8.710(Ac.)
Depth of flow =   0.654(Ft.), Average velocity =   3.041(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      106.000
```

**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.842
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.290
Decimal fraction soil group C = 0.710
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 45.28
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 21.03 min.
Rainfall intensity = 0.890(In/Hr) for a 2.0 year storm
Subarea runoff = 0.157(CFS) for 0.210(Ac.)
Total runoff = 4.379(CFS) Total area = 8.920(Ac.)

++
Process from Point/Station 103.000 to Point/Station 106.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 8.920(Ac.)
Runoff from this stream = 4.379(CFS)
Time of concentration = 21.03 min.
Rainfall intensity = 0.890(In/Hr)
Program is now starting with Main Stream No. 2

++
Process from Point/Station 101.000 to Point/Station 104.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 697.000(Ft.)
Top (of initial area) elevation = 1490.000(Ft.)
Bottom (of initial area) elevation = 1440.000(Ft.)
Difference in elevation = 50.000(Ft.)
Slope = 0.07174 s(percent)= 7.17
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.497 min.
Rainfall intensity = 1.017(In/Hr) for a 2.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.562
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 1) = 68.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.801(CFS)
Total initial stream area = 1.400(Ac.)
Pervious area fraction = 1.000

++
Process from Point/Station 104.000 to Point/Station 105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.239(CFS)
Depth of flow = 0.372(Ft.), Average velocity = 2.749(Ft/s)

```
      ******* Irregular Channel Data ***********
--------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2              3.50              1.00
      3              6.00              0.00
      4             10.00              1.00
      5             22.00              2.00
Manning's 'N' friction factor =   0.035
--------------------------------------------------------------------
Sub-Channel flow  =      1.239(CFS)
  '     '    flow top width =      2.421(Ft.)
  '     '    velocity=    2.749(Ft/s)
  '     '    area =      0.451(Sq.Ft)
  '     '    Froude number =     1.122

Upstream point elevation =  1440.000(Ft.)
Downstream point elevation =  1429.000(Ft.)
Flow length =   262.000(Ft.)
Travel time  =    1.59 min.
Time of concentration =   18.09 min.
Depth of flow =   0.372(Ft.)
Average velocity =   2.749(Ft/s)
Total irregular channel flow =     1.239(CFS)
Irregular channel normal depth above invert elev. =   0.372(Ft.)
Average velocity of channel(s) =   2.749(Ft/s)
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.507
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.660
Decimal fraction soil group D = 0.340
RI index for soil(AMC 1)  =  63.98
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.967(In/Hr) for a     2.0 year storm
Subarea runoff =      0.808(CFS) for      1.650(Ac.)
Total runoff =      1.609(CFS)      Total area =       3.050(Ac.)
Depth of flow =   0.411(Ft.), Average velocity =   2.934(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =      2.202(CFS)
Depth of flow =   0.786(Ft.), Average velocity =   1.096(Ft/s)
      ******* Irregular Channel Data ***********
--------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2              3.50              1.00
      3              6.00              0.00
      4             10.00              1.00
      5             22.00              2.00
Manning's 'N' friction factor =   0.035
--------------------------------------------------------------------
Sub-Channel flow  =      2.202(CFS)
```

```
  '     '    flow top width =      5.110(Ft.)
  '     '    velocity=    1.096(Ft/s)
  '     '    area =      2.008(Sq.Ft)
  '     '    Froude number =     0.308

Upstream point elevation =  1429.000(Ft.)
Downstream point elevation =  1427.900(Ft.)
Flow length =   446.000(Ft.)
Travel time  =    6.78 min.
Time of concentration =   24.87 min.
Depth of flow =   0.786(Ft.)
Average velocity =   1.096(Ft/s)
Total irregular channel flow =     2.202(CFS)
Irregular channel normal depth above invert elev. =   0.786(Ft.)
Average velocity of channel(s) =   1.096(Ft/s)
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.444
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.890
Decimal fraction soil group D = 0.060
RI index for soil(AMC 1)  =  61.56
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      0.812(In/Hr) for a     2.0 year storm
Subarea runoff =      1.118(CFS) for      3.100(Ac.)
Total runoff =      2.727(CFS)      Total area =       6.150(Ac.)
Depth of flow =   0.852(Ft.), Average velocity =   1.156(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.150(Ac.)
Runoff from this stream =      2.727(CFS)
Time of concentration =   24.87 min.
Rainfall intensity =     0.812(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        4.379     21.03               0.890
2        2.727     24.87               0.812
Largest stream flow has longer or shorter time of concentration
Qp =      4.379 + sum of
        Qa          Tb/Ta
         2.727 *    0.846 =      2.306
Qp =      6.686

Total of 2 main streams to confluence:
Flow rates before confluence point:
       4.379       2.727
Area of streams before confluence:
        8.920        6.150
```

Results of confluence:
Total flow rate = 6.686(CFS)
Time of concentration = 21.030 min.
Effective stream area after confluence = 15.070(Ac.)
End of computations, total study area = 15.07 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.987
Area averaged RI index number = 80.5

Existing Condition Rational Method Hydrology Calculations

10-Year Storm Event

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 08/11/24 File:ara10.out

277.02.24
10-YEAR RATIONAL TABLING METHOD FOR AREA A
PRE-PROJECT CONDITION
FN: ARA10.RRV

********* Hydrology Study Control Information **********

English (in-lb) Units used in input data file

Program License Serial Number 6279

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.500(In.)
100 year, 1 hour precipitation = 1.200(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.788(In/Hr)
Slope of intensity duration curve = 0.5500

++
Process from Point/Station 101.000 to Point/Station 102.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 719.000(Ft.)
Top (of initial area) elevation = 1490.000(Ft.)
Bottom (of initial area) elevation = 1447.000(Ft.)
Difference in elevation = 43.000(Ft.)
Slope = 0.05981 s(percent)= 5.98
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 17.322 min.
Rainfall intensity = 1.561(In/Hr) for a 10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.765
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.220
Decimal fraction soil group D = 0.780
RI index for soil(AMC 2) = 82.90
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 3.773(CFS)

```
Total initial stream area =        3.160(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      102.000 to Point/Station      102.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.745
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.710
Decimal fraction soil group D = 0.290
RI index for soil(AMC 2)  =  80.45
Pervious area fraction =  1.000; Impervious fraction =  0.000
Time of concentration =    17.32 min.
Rainfall intensity =      1.561(In/Hr) for a    10.0 year storm
Subarea runoff =      1.000(CFS) for      0.860(Ac.)
Total runoff =      4.773(CFS)      Total area =       4.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      6.271(CFS)
Depth of flow =   0.702(Ft.), Average velocity =   3.913(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2              3.50              1.00
      3              6.00              0.00
      4             10.00              1.00
      5             22.00              2.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =      6.271(CFS)
  '     '    flow top width =      4.565(Ft.)
  '     '    velocity=    3.913(Ft/s)
  '     '    area =      1.603(Sq.Ft)
  '     '    Froude number =     1.164

Upstream point elevation =  1447.000(Ft.)
Downstream point elevation =  1439.000(Ft.)
Flow length =   219.000(Ft.)
Travel time  =    0.93 min.
Time of concentration =   18.25 min.
Depth of flow =   0.702(Ft.)
Average velocity =   3.913(Ft/s)
Total irregular channel flow =     6.271(CFS)
Irregular channel normal depth above invert elev. =   0.702(Ft.)
Average velocity of channel(s) =   3.913(Ft/s)
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.737
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
```

```
Decimal fraction soil group C = 0.820
Decimal fraction soil group D = 0.180
RI index for soil(AMC 2)  =  79.90
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.516(In/Hr) for a    10.0 year storm
Subarea runoff =      2.905(CFS) for      2.600(Ac.)
Total runoff =      7.678(CFS)      Total area =       6.620(Ac.)
Depth of flow =   0.758(Ft.), Average velocity =   4.116(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      106.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      8.788(CFS)
Depth of flow =   0.860(Ft.), Average velocity =   3.653(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2              3.50              1.00
      3              6.00              0.00
      4             10.00              1.00
      5             22.00              2.00
Manning's 'N' friction factor =   0.035
------------------------------------------------------------------
Sub-Channel flow  =      8.788(CFS)
  '     '    flow top width =      5.592(Ft.)
  '     '    velocity=    3.653(Ft/s)
  '     '    area =      2.406(Sq.Ft)
  '     '    Froude number =     0.982

Upstream point elevation =  1439.000(Ft.)
Downstream point elevation =  1427.900(Ft.)
Flow length =   457.000(Ft.)
Travel time  =    2.08 min.
Time of concentration =   20.34 min.
Depth of flow =   0.860(Ft.)
Average velocity =   3.653(Ft/s)
Total irregular channel flow =     8.788(CFS)
Irregular channel normal depth above invert elev. =   0.860(Ft.)
Average velocity of channel(s) =   3.653(Ft/s)
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.720
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.010
Decimal fraction soil group C = 0.990
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2)  =  78.90
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.429(In/Hr) for a    10.0 year storm
Subarea runoff =      2.150(CFS) for      2.090(Ac.)
Total runoff =      9.829(CFS)      Total area =       8.710(Ac.)
Depth of flow =   0.897(Ft.), Average velocity =   3.757(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      106.000
```

**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.870
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.290
Decimal fraction soil group C = 0.710
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 65.23
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 20.34 min.
Rainfall intensity = 1.429(In/Hr) for a 10.0 year storm
Subarea runoff = 0.261(CFS) for 0.210(Ac.)
Total runoff = 10.090(CFS) Total area = 8.920(Ac.)

++
Process from Point/Station 103.000 to Point/Station 106.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 8.920(Ac.)
Runoff from this stream = 10.090(CFS)
Time of concentration = 20.34 min.
Rainfall intensity = 1.429(In/Hr)
Program is now starting with Main Stream No. 2

++
Process from Point/Station 101.000 to Point/Station 104.000
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 697.000(Ft.)
Top (of initial area) elevation = 1490.000(Ft.)
Bottom (of initial area) elevation = 1440.000(Ft.)
Difference in elevation = 50.000(Ft.)
Slope = 0.07174 s(percent)= 7.17
TC = k(0.710)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 16.497 min.
Rainfall intensity = 1.603(In/Hr) for a 10.0 year storm
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.777
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
RI index for soil(AMC 2) = 84.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 1.744(CFS)
Total initial stream area = 1.400(Ac.)
Pervious area fraction = 1.000

++
Process from Point/Station 104.000 to Point/Station 105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 2.730(CFS)
Depth of flow = 0.501(Ft.), Average velocity = 3.349(Ft/s)

```
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2              3.50              1.00
      3              6.00              0.00
      4             10.00              1.00
      5             22.00              2.00
Manning's 'N' friction factor =   0.035
-----------------------------------------------------------------
Sub-Channel flow  =      2.730(CFS)
  '     '    flow top width =      3.255(Ft.)
  '     '    velocity=    3.349(Ft/s)
  '     '    area =      0.815(Sq.Ft)
  '     '    Froude number =     1.179

Upstream point elevation =  1440.000(Ft.)
Downstream point elevation =  1429.000(Ft.)
Flow length =   262.000(Ft.)
Travel time  =    1.30 min.
Time of concentration =   17.80 min.
Depth of flow =   0.501(Ft.)
Average velocity =   3.349(Ft/s)
Total irregular channel flow =     2.730(CFS)
Irregular channel normal depth above invert elev. =   0.501(Ft.)
Average velocity of channel(s) =   3.349(Ft/s)
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.745
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.660
Decimal fraction soil group D = 0.340
RI index for soil(AMC 2)  =  80.70
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.537(In/Hr) for a    10.0 year storm
Subarea runoff =      1.891(CFS) for      1.650(Ac.)
Total runoff =      3.634(CFS)      Total area =       3.050(Ac.)
Depth of flow =   0.558(Ft.), Average velocity =   3.597(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_________________________________________________________________
Estimated mean flow rate at midpoint of channel =      5.103(CFS)
Depth of flow =   1.100(Ft.), Average velocity =   1.283(Ft/s)
      ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              2.00
      2              3.50              1.00
      3              6.00              0.00
      4             10.00              1.00
      5             22.00              2.00
Manning's 'N' friction factor =   0.035
-----------------------------------------------------------------
Sub-Channel flow  =      5.103(CFS)
```

```
  '     '    flow top width =      8.052(Ft.)
  '     '    velocity=    1.283(Ft/s)
  '     '    area =      3.979(Sq.Ft)
  '     '    Froude number =     0.322

Upstream point elevation =  1429.000(Ft.)
Downstream point elevation =  1427.900(Ft.)
Flow length =   446.000(Ft.)
Travel time  =    5.80 min.
Time of concentration =   23.60 min.
Depth of flow =   1.100(Ft.)
Average velocity =   1.283(Ft/s)
Total irregular channel flow =     5.103(CFS)
Irregular channel normal depth above invert elev. =   1.100(Ft.)
Average velocity of channel(s) =   1.283(Ft/s)
 Adding area flow to channel
UNDEVELOPED (fair cover) subarea
Runoff Coefficient = 0.707
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.890
Decimal fraction soil group D = 0.060
RI index for soil(AMC 2)  =  78.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Rainfall intensity =      1.317(In/Hr) for a    10.0 year storm
Subarea runoff =      2.887(CFS) for      3.100(Ac.)
Total runoff =      6.521(CFS)      Total area =       6.150(Ac.)
Depth of flow =   1.211(Ft.), Average velocity =   1.312(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** CONFLUENCE OF MAIN STREAMS ****
________________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      6.150(Ac.)
Runoff from this stream =      6.521(CFS)
Time of concentration =   23.60 min.
Rainfall intensity =     1.317(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       10.090     20.34               1.429
2        6.521     23.60               1.317
Largest stream flow has longer or shorter time of concentration
Qp =     10.090 + sum of
        Qa          Tb/Ta
         6.521 *    0.862 =      5.621
Qp =     15.711

Total of 2 main streams to confluence:
Flow rates before confluence point:
      10.090       6.521
Area of streams before confluence:
        8.920        6.150
```

Results of confluence:
Total flow rate = 15.711(CFS)
Time of concentration = 20.340 min.
Effective stream area after confluence = 15.070(Ac.)
End of computations, total study area = 15.07 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.987
Area averaged RI index number = 80.5

Existing Condition Hydromods Hydrology Map

TEMECULA VALLEY CHARTER SCHOOL

COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

PRE-PROJECT CONDITION SITE HYDROLOGY MAP



RATIONAL METHOD RESULTS - AREA A				
NODE TO NODE	Q_{100} (CFS)	T_C (MIN)	Q_{10} (CFS)	T_C (MIN)
101-102	6.06	17.32	3.77	17.32
102-102	7.68	17.32	4.77	17.32
102-103	12.41	18.16	7.68	18.25
103-106	15.96	20.05	9.83	20.33
103-106	16.36	20.05	10.09	20.33
101-104	2.79	16.50	1.74	16.50
104-105	5.86	17.65	3.64	17.80
105-106	10.68	23.07	6.52	23.57
*105-106	25.64	20.04	15.72	20.33

* DENOTES CONFLUENCE POINT

N

GRAPHIC SCALE
50' 0 25' 50' 100'
1" = 50'

EXHIBIT "A"

PUBLIC USE PERMIT 230001

JLC Engineering & Consulting, Inc.
41660 IVY STREET, SUITE A
MURRIETA, CA 92562
PH. 951.304.9552 FAX 951.304.3568

PRE-PROJECT HYDROLOGY

TEMECULA VALLEY CHARTER SCHOOL

Drawing Name: Q:\277.02.24\Engineering\Hydrology\277.02.24-EXHIBIT_A-PRE_PROJECT_HYDROLOGY.dwg
Last Opened: Aug 11, 2024 - 8:13pm by Rtecs0624

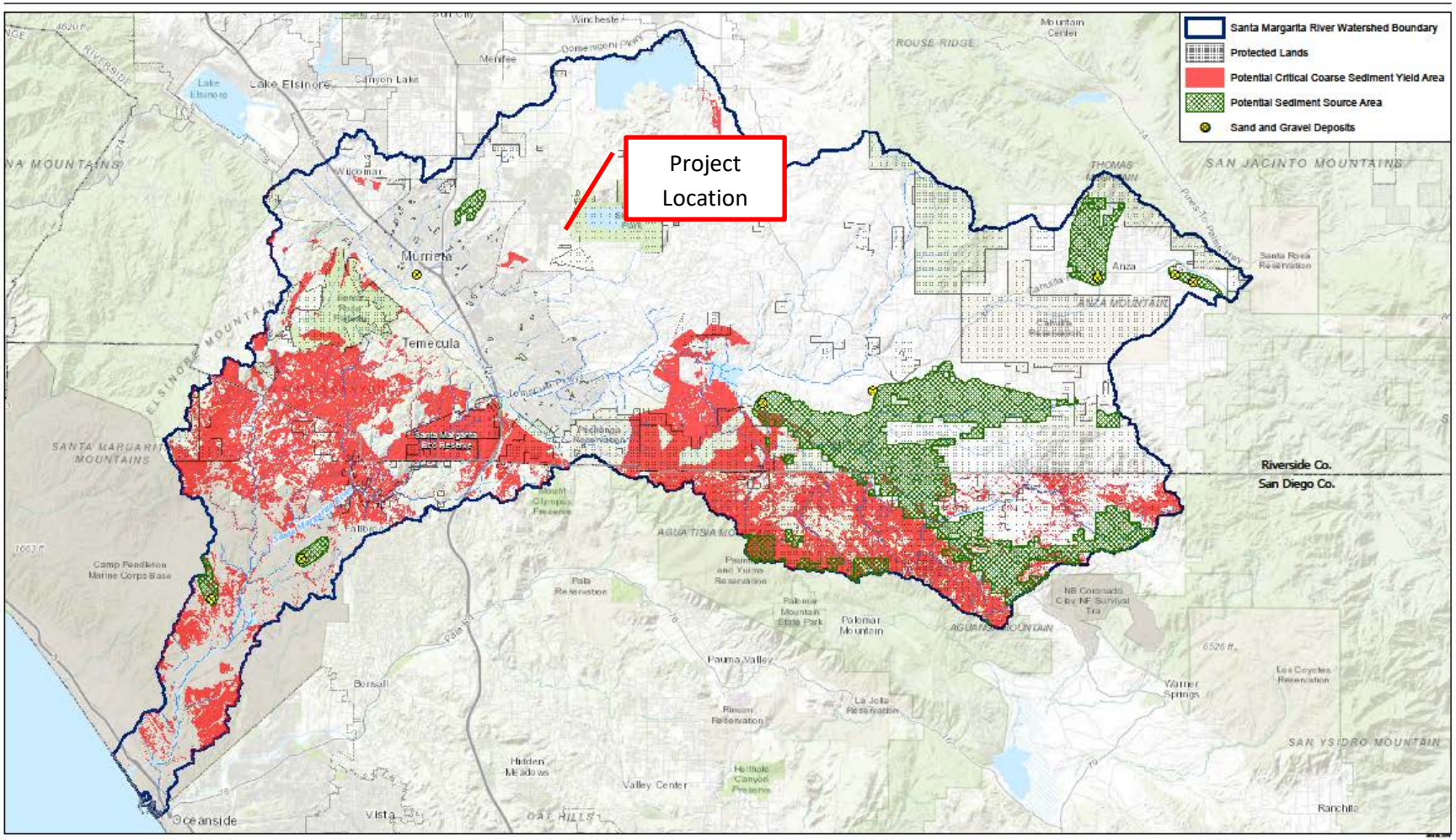


Exhibit G-1

SANTA MARGARITA RIVER WATERSHED
POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREAS AND POTENTIAL SEDIMENT SOURCE AREAS

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

For Final WQMP, include a copy of the completed Pollutant Sources/Source Control Checklist in the subsequent pages and summarize Source Control BMPs in Section H of this Template.

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☒ **A.** On-site storm drain inlets	☒ Locations of inlets.	☒ Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	☒ Maintain and periodically repaint or replace inlet markings. ☒ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ☒ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ❑ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
❑ **B.** Interior floor drains and elevator shaft sump pumps		❑ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	❑ Inspect and maintain drains to prevent blockages and overflow.
❑ **C.** Interior parking garages		❑ State that parking garage floor drains will be plumbed to the sanitary sewer.	❑ Inspect and maintain drains to prevent blockages and overflow.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
☒ **D1.** Need for future indoor & structural pest control		☒ Note building design features that discourage entry of pests.	☒ Provide Integrated Pest Management information to owners, lessees, and operators.
☒ **D2.** Landscape/ Outdoor Pesticide Use	❑ Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ❑ Show self-retaining landscape areas, if any. ☒ Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)	State that final landscape plans will accomplish all of the following. ❑ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ☒ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ❑ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ☒ Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☒ Maintain landscaping using minimum or no pesticides. ☒ See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ☒ Provide IPM information to new owners, lessees and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ **E.** Pools, spas, ponds, decorative fountains, and other water features.	❑ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)	If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	❑ See applicable operational BMPs in "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
❑ **F.** Food service	❑ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ❑ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	❑ Describe the location and features of the designated cleaning area. ❑ Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	❑ See the brochure, "The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ Provide this brochure to new site owners, lessees, and operators.
☒ **G.** Refuse areas	☒ Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. ☒ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area. ☒ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	☒ State how site refuse will be handled and provide supporting detail to what is shown on plans. ☒ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	☒ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **H.** Industrial processes.	❑ Show process area.	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release (CalARP) ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank www.cchealth.org/groups/hazmat/	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **J.** Vehicle and Equipment Cleaning	☒ Show on drawings as appropriate: **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑**Car dealerships and similar may rinse cars with water only.**

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
❑ **K.** Vehicle/Equipment Repair and Maintenance	❑ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. ❑ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ❑ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	❑ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ❑ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ❑ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the Stormwater Control Plan, note that all of the following restrictions apply to use the site: ❑ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ❑ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ❑ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment. Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ **L.** Fuel Dispensing Areas	❑ Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable. ❑ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.		❑ The property owner shall dry sweep the fueling area routinely. ❑ See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

[6] The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ **M.** Loading Docks	❑ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer. ❑ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ❑ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		❑ Move loaded and unloaded items indoors as soon as possible. ❑ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ **N.** Fire Sprinkler Test Water		☒ Provide a means to drain fire sprinkler test water to the sanitary sewer.	☒ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
O. Miscellaneous Drain or Wash Water or Other Sources ❑ Boiler drain lines ❑ Condensate drain lines ❑ Rooftop equipment ❑ Drainage sumps ☒ Roofing, gutters, and trim. ❑ Other sources		❑ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ❑ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ❑ Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ❑ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. ☒ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. Include controls for other sources as specified by local reviewer.	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ **P.** Plazas, sidewalks, and parking lots.			☒ Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

For the Final WQMP the following information shall be provided:

1. Maintenance Plan per Section 5.3.5 of the WQMP Guidance Document. County will regularly inspect BMPs, so BMPs without access (e.g. backyards, etc) will be rejected. Due to liability, the County does not allow for overlapping private maintenance in the public right-of-way.
2. For all projects, include one wet-signed and notarized hardcopy of the BMP Maintenance agreement. Please note, references to Exhibit A and B on Page 1can be struck out if the entire parcel is mentioned in the "Legal Description" on Page 1 of the agreement. Otherwise see below for Exhibit A and B standards. For BMP agreement, ensure that the name on the agreement matches throughout and the notary sheet, Notary shall be the latest California format, the date of the agreement is the date of the notary, all text does not exceed the margins, then the County will sign, attest & record
3. For Tracts, contact County EDA regarding maintenance determinations/formations. Include a completed Exhibit B.9 - WQMP O&M Cost Sheet.xlsx that is signed by both the preparer (to ensure quantities are correct) and the owner (to understand the maintenance obligations in perpetuity) & an Approved Maintenance Exhibit from EDA.
4. For Tracts or any project , written documentation from the maintenance entity that they are willing to maintain (e.g. CFD, CSA, L&LMD, etc.)

BMP EXHIBIT "A" STANDARDS

1. Use the legal description of the parcel as shown on the tentative exhibit. If not available, use the one in the most current title report.
2. As a backup, if the project is a map the description of the future lot may be included for reference

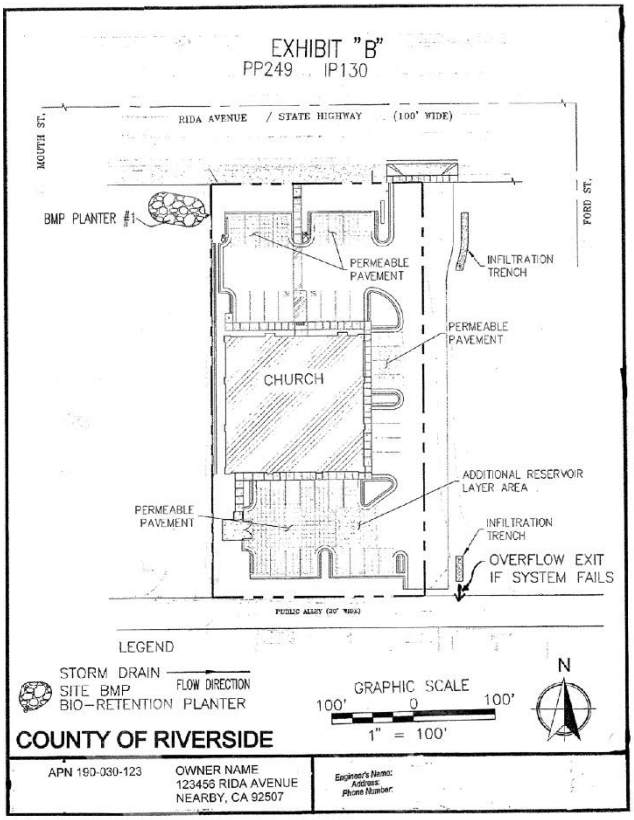
BMP EXHIBIT "B" STANDARDS

1. 0.12" minimum lettering
2. Sheet size must be 8.5" x 11"
3. Show Street names, north arrow
4. Indicate point of flow exit into street if basin system fails
5. Indicate Q100 of flow exit into street
6. Indicate direction of flow exit into street
7. Indicate by notation and/or show nearest downstream drainage facility (catch basin, culvert, riser, etc)
8. Show "Exhibit A", IP and project number (TR, PM, PUP, PP etc)
9. Title block, signature block, engineer seals, USA note is not necessary on Exhibit
10. Show scale used for drawing, provide 4" graphic scale

MAINTENANCE EXHIBIT "B" STANDARDS

1. 0.12" minimum lettering
2. Sheet size must be 8.5" x 11"
3. Show street names, north arrow
4. Show "Exhibit A", IP and project number (TR, PM, PUP, PP etc)
5. Title block, signature block, engineer seals, USA note is not necessary on Exhibit
6. Show scale used for drawing, provide 4" graphic scale

BMP EXHIBIT B EXAMPLE



Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

For the Final WQMP, examples of material to provide in Appendix 10 may include but are not limited to the following:

- BMP Fact Sheets for proposed BMPs form Exhibit C: LID BMP Design Handbook of the SMR WQMP,
- Source control information and training material for site owners and operators,
- O&M training material,
- Other educational/training material related to site drainage and BMPs.

Stormwater and the **Construction Industry**

Protect Natural Features



Bad **Good**

- Minimize clearing.
- Minimize the amount of exposed soil.
- Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity.
- Protect streams, stream buffers, wild woodlands, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas.

Construction Phasing



- Sequence construction activities so that the soil is not exposed for long periods of time.
- Schedule or limit grading to small areas.
- Install key sediment control practices before site grading begins.
- Schedule site stabilization activities, such as landscaping, to be completed immediately after the land has been graded to its final contour.

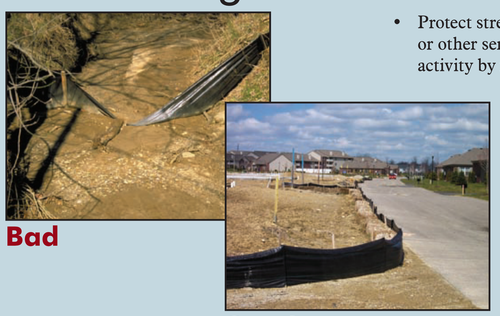
Vegetative Buffers



Bad **Good**

- Protect and install vegetative buffers along waterbodies to slow and filter stormwater runoff.
- Maintain buffers by mowing or replanting periodically to ensure their effectiveness.

Silt Fencing



Bad **Good**

- Inspect and maintain silt fences after each rainstorm.
- Make sure the bottom of the silt fence is buried in the ground.
- Securely attach the material to the stakes.
- Don't place silt fences in the middle of a waterway or use them as a check dam.
- Make sure stormwater is not flowing around the silt fence.

Maintain your BMPs!

IN RIVERSIDE COUNTY....Call 1-800-506-2555
TO REPORT ILLEGAL STORMDRAIN DISPOSAL

E-mail: Flood.fcnpdes@co.riverside.ca.us
Visit our website: www.floodcontrol.co.riverside.ca.us

Brought to you by the Storm Water/Clean Water Pollution Protection Program.....
REMEMBER, ONLY RAIN IN THE STORMDRAIN!

Site Stabilization



Bad **Good**

- Vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed.

Construction Entrances



Bad **Good**

- Remove mud and dirt from the tires of construction vehicles before they enter a paved roadway.
- Properly size entrance BMPs for all anticipated vehicles.
- Make sure that the construction entrance does not become buried in soil.

Slopes



Bad **Good**

- Rough grade or terrace slopes.
- Break up long slopes with sediment barriers, or under drain, or divert stormwater away from slopes.

Dirt Stockpiles



Bad **Good**

- Cover or seed all dirt stockpiles.

Storm Drain Inlet Protection



Bad **Good**

- Use rock or other appropriate material to cover the storm drain inlet to filter out trash and debris.
- Make sure the rock size is appropriate (usually 1 to 2 inches in diameter).
- If you use inlet filters, maintain them regularly.

www.epa.gov/npdes/menuofbmps

Stormwater and the Construction Industry

Planning and Implementing Erosion and Sediment Control Practices

The construction industry is a critical participant in the nation's efforts to protect streams, rivers, lakes, wetlands, and oceans. Through the use of best management practices (BMPs), construction site operators are the key defense against erosion and sedimentation.

As stormwater flows over a construction site, it picks up pollutants like sediment, debris, and chemicals. High volumes of stormwater can also cause stream bank erosion, and destroy downstream aquatic habitat. Preventing soil erosion and sedimentation is an important responsibility at all construction sites.

In addition to the environmental impact, uncontrolled erosion can have a significant financial impact on a construction project. It costs money and time to repair gullies, replace vegetation, clean sediment-clogged storm drains, replace poorly installed BMPs, and mitigate damage to other people's property or to natural resources.

Best Management Practice (BMP)
A BMP is a method used to prevent or control stormwater runoff and the discharge of pollutants, including sediment, into local waterbodies. Silt fences, inlet protection, and site-stabilization techniques are typical BMPs on a construction site.

Operator
An operator is someone who has control over and the ability to modify construction plans and specifications (e.g. owner, general contractor)

or

Someone who has control over the day-to-day operations at a site (e.g., owner, general contractor) that are necessary to ensure compliance with the permit requirements. It is the responsibility of a construction site owner or operator to contain stormwater runoff and prevent erosion during **all** stages of a project.

There may be more than one person at a site who meets these definitions and must apply for permit coverage. (States may have different definitions of the term "operator.")

So what's being done about polluted runoff?

The Clean Water Act includes the National Pollutant Discharge Elimination System (NPDES) permitting program. As of January 2003, 44 states and territories are authorized to issue NPDES stormwater permits. If your state isn't authorized to operate the NPDES stormwater permit program, EPA issues the permits. Permits vary from state to state, so contact your state or EPA for specific information. Your permitting authority has specific information on your state's NPDES stormwater permit program. In general, construction permits require construction operators to do all of the following:

- Develop and implement a stormwater pollution prevention plan
- Submit a permit application or notice of intent (NOI)
- Comply with the permit, including maintaining BMPs and inspecting the site

Under the NPDES program, construction activities that disturb 1 or more acres are required to obtain stormwater permit coverage. States have different names for the plans that construction operators must develop, such as

- Stormwater pollution prevention plan
- Erosion and sediment control plan
- Erosion control and stormwater management plan
- Stormwater management plan
- Water pollution control plan
- Pollution prevention plan

This document uses the term "*Plan*."

I think I need a permit... Where do I start?

All land-disturbing activities, including clearing, grading, and excavation, that disturb **1 or more acres** are required to be covered under a state or EPA-issued NPDES construction stormwater permit **prior to land disturbance**. Permit requirements vary by state. Begin by researching the specific requirements in your state. You might already be subject to local erosion and sediment control requirements, but that doesn't release you from the requirements of the NPDES program at the state or EPA level. Although you must comply with both sets of requirements, in most cases they have been designed to be complementary. Contact your permitting authority to find out exactly what you need to do. A good place to start your search is the Construction Industry Compliance Assistance web site at http://www.envcap.org/cica.

The NPDES permit requirements include small construction activities that are part of a larger common plan of development or sale, such as a single lot within a larger subdivision. For developments with multiple operators, all operators must have permit coverage for their individual parts of the larger development, no matter how large or small each operation happens to be. When there are multiple operators at one site, they're encouraged to develop and share one comprehensive Plan and obtain permit coverage as co-permitees.

The **owner or operator** of the construction site is responsible for complying with the requirements of the permit. Responsibilities include developing a Plan, obtaining permit coverage, implementing BMPs, and stabilizing the site at the end of the construction activity.

Construction sites that discharge unpermitted stormwater are in violation of the Clean Water Act and may be subject to fines of up to $27,500 a day per violation.

Determine your eligibility

All construction activity that disturbs 1 or more acres of land, as well as activity that disturbs less than 1 acre but is part of a larger common plan of development, must obtain permit coverage.

Read and understand your stormwater permit requirements

Get a copy of the permit for construction activities and a permit application (or notice of intent form) from your state or EPA permitting authority.

Develop a Plan

Most states do not require you to submit your Plan. However, you do need to keep the Plan on site. If that's impractical, you may post a notice that tells where the Plan is kept so it can be accessed by the permitting authority and other interested parties.

You'll need to post a copy of your completed application on site. Put it in a place where the public can see it so they'll know your site is covered by an NPDES permit!

Apply for permit coverage

Once you understand your permit requirements and have developed a Plan, you can submit a stormwater permit application (or notice of intent) to your permitting authority. This must be done before beginning any land disturbance on the site. Some states require a few days of lead time, so check with your permitting authority. Once you've submitted the application, you must satisfy the conditions of the permit.

Implement the Plan

Be prepared to implement the BMPs in your Plan before construction begins. Ensure that BMPs are properly maintained, and upgrade and repair them as necessary.

Developing and Implementing a Plan

You must have a Plan that includes erosion and sediment control and pollution prevention BMPs. These Plans require

- Advance planning and training to ensure proper implementation of the BMPs
- Erosion and sediment control BMPs in place until the area is permanently stabilized
- Pollution prevention BMPs to keep the construction site "clean"
- Regular inspection of the construction site to ensure proper installation and maintenance of BMPs

Fortunately, the practices and measures that must be included in your Plan are already part of the standard operating procedures at many construction sites.

Six steps are associated with developing and implementing a stormwater Plan. There's a wealth of information available on developing pollution prevention plans. Please contact your permitting authority for help in finding additional guidance materials, or visit www.epa.gov/npdes/stormwater. A sample construction plan is available at www.epa.gov/npdes/pubs/sample_swppp.pdf.

1. *Site Evaluation and Design Development*

- **Collect site information**
- **Develop site plan design**
- **Prepare pollution prevention site map**

The first step in preparing a Plan is to define the characteristics of the site and the type of construction that will occur. This involves collecting site information, identifying natural features that should be protected, developing a site plan design, describing the nature of the construction activity, and preparing a pollution prevention site map.

2. *Assessment*

- **Measure the site area**
- **Determine the drainage areas**
- **Calculate the runoff coefficient**

The next step is assessing the impact the project will have on stormwater runoff. Determine the drainage areas and estimate the runoff amounts and velocities. For more information on calculatng the runoff coefficient, go to www.epa.gov/npdes/pubs/chap02_conguide.pdf, page 11.

3. *Control Selection and Plan Design*

- **Review and incorporate state or local requirements**
- **Select erosion and sediment controls**
- **Select other controls**
- **Select stormwater management controls**
- **Indicate the location of controls on the site map**
- **Prepare an inspection and maintenance plan**
- **Coordinate controls with construction activity**
- **Prepare sequence of major activities**

In the third step you'll actually document your procedures to prevent and control polluted stormwater runoff. You must delineate areas that will not be disturbed, including critical natural areas like streamside areas, floodplains, and trees. You must also identify the measures (or BMPs) you'll use to protect these areas.

Phasing your project to minimize the amount of exposed soil at any given time is a highly effective way to prevent erosion. Erosion control measures designed to prevent soil from being mobilized include diversions to route stormwater away from exposed soils and stabilization with vegetation, mulch, and geotextiles. Sedimentation control measures designed to remove sediment from stormwater or prevent it from leaving the site include silt fences, sediment traps, and diversions.

You'll need to select erosion and sediment controls—including stabilization measures for protecting disturbed areas and structural controls for diverting runoff and removing sediment—that are appropriate for your particular site. The appropriateness of the control measures will depend on several factors, but will be influenced most directly by the site characteristics. Some stabilization measures you might consider are temporary seeding, permanent seeding, and mulching. Structural control measures include earth dikes, silt fences, and sediment traps. No single BMP will meet all of the erosion and sedimentation control needs of a construction site. A combination of BMPs is necessary. For more information on the types of BMPs appropriate for your construction site, see the BMP fact sheet series available at www.epa.gov/npdes/menuofbmps.

Soil erosion control tips...

- Design the site to infiltrate stormwater into the ground and to keep it out of storm drains. Eliminate or minimize the use of stormwater collection and conveyance systems while maximizing the use of stormwater infiltration and bioretention techniques.
- Minimize the amount of exposed soil on site.
  - To the extent possible, plan the project in stages to minimize the amount of area that is bare and subject to erosion. The less soil exposed, the easier and cheaper it will be to control erosion.
  - Vegetate disturbed areas with permanent or temporary seeding immediately upon reaching final grade.
  - Vegetate or cover stockpiles that will not be used immediately.
- Reduce the velocity of stormwater both onto and away from the project area.
  - Interceptors, diversions, vegetated buffers, and check dams are a few of the BMPs that can be used to slow down stormwater as it travels across and away from the project site.
  - Diversion measures can also be used to direct flow away from exposed areas toward stable portions of the site.
  - Silt fences and other types of perimeter filters should never be used to reduce the velocity of runoff.
- Protect defined channels immediately with measures adequate to handle the storm flows expected.
  - Sod, geotextile, natural fiber, riprap, or other stabilization measures should be used to allow the channels to carry water without causing erosion. Use softer measures like geotextile or vegetation where possible to prevent downstream impacts.
- Keep sediment on site.
  - Place aggregate or stone at construction site vehicle exits to accommodate at least two tire revolutions of large construction vehicles. Much of the dirt on the tires will fall off before the vehicle gets to the street.
  - Regular street sweeping at the construction entrance will prevent dirt from entering storm drains. Do not hose paved areas.
  - Sediment traps and basins are temporary structures and should be used in conjunction with other measures to reduce the amount of erosion.
- Maintaining all BMPs is critical to ensure their effectiveness during the life of the project.
  - Regularly remove collected sediment from silt fences, berms, traps, and other BMPs.
  - Ensure that geotextiles and mulch remain in place until vegetation is well established.
  - Maintain fences that protect sensitive areas, silt fences, diversion structures, and other BMPs.

Other BMPs and Activities to Control Polluted Runoff

You'll need to select other controls to address potential pollutant sources on your site. Construction materials, debris, trash, fuel, paint, and stockpiles become pollution sources when it rains. Basic pollution prevention practices can significantly reduce the amount of pollution leaving construction sites. The following are some simple practices that should be included in the Plan and implemented on site:

- Keep potential sources of pollution out of the rain as practicable (e.g., inside a building, covered with plastic or tarps, or sealed tightly in a leak-proof container).
- Clearly identify a protected, lined area for concrete truck washouts. This area should be located away from streams, storm drain inlets, or ditches and should be cleaned out periodically.
- Park, refuel, and maintain vehicles and equipment in one area of the site to minimize the area exposed to possible spills and fuel storage. This area should be well away from streams, storm drain inlets, or ditches. Keep spill kits close by and clean up any spills or leaks immediately, including spills on pavement or earthen surfaces.
- Practice good housekeeping. Keep the construction site free of litter, construction debris, and leaking containers. Keep all waste in one area to minimize cleaning.
- Never hose down paved surfaces to clean dust, debris, or trash. This water could wash directly into storm drains or streams. Sweep up materials and dispose of them in the trash. Never bury trash or debris!
- Dispose of hazardous materials properly.

4. *Certification and Notification*

- **Certify the Plan**
- **Submit permit application or notice of intent**

Once the Plan has been developed, an authorized representative must sign it. Now is the time to submit the permit application or notice of intent. Your permit might require that the Plan be kept on site, so be sure to keep it available for the staff implementing the Plan.

Erosion and sedimentation control practices are only as good as their installation and maintenance.

5. *Implementing and Maintaining a Plan*

- **Implement controls**
- **Inspect and maintain controls**
- **Update/change the Plan**
- **Report releases of hazardous materials**

A Plan describes the practices and activities you'll use to prevent stormwater contamination and meet the NPDES permit requirements. Make sure that the Plan is implemented and that the Plan is updated as necessary to reflect changes on the site.

Erosion and sedimentation control practices are only as good as their installation and maintenance. Train the contractors that will install the BMPs and inspect immediately to ensure that the BMPs have been installed correctly.

Regularly inspect the BMPs (especially before and after rain events) and perform any necessary repairs or maintenance immediately. Many BMPs are designed to handle a limited amount of sediment. If not maintained, they'll become ineffective and a source of sediment pollution.

It's also important to keep records of BMP installation, implementation, and maintenance. Keep track of major grading activities that occur on the site, when construction activities cease (temporarily or permanently), and when a site is temporarily or permanently stabilized.

If construction plans change at any time, or if more appropriate BMPs are chosen for the site, update the Plan accordingly.

6. *Completing the Project: Final Stabilization and Termination of the Permit*

- **Final stabilization**
- **Notice of Termination**
- **Record retention**

Many states and EPA require a Notice of Termination (NOT) or other notification signifying that the construction activity is completed. An NOT is required when

- Final stabilization has been achieved on all portions of the site for which the permittee is responsible.
- Another operator has assumed control over all areas of the site that have not been finally stabilized. That operator would need to submit a new permit application to the permitting authority.
- For residential construction only, temporary stabilization of a lot has been completed prior to transference of ownership to the homeowner, with the homeowner being made aware of the need to perform final stabilization.

Permittees must keep a copy of their permit application and their Plan for at least 3 years following final stabilization. This period may be longer depending on state and local requirements.

Preconstruction Checklist

- A site description, including
  - Nature of the activity
  - Intended sequence of major construction activities
  - Total area of the site
  - Existing soil type and rainfall runoff data
  - A site map with:
    - Drainage patterns
    - Approximate slopes after major grading
    - Area of soil disturbance
    - Outline of areas which will not be disturbed
    - Location of major structural and nonstructural soil erosion controls
    - Areas where stabilization practices are expected to occur
    - Surface waters
    - Stormwater discharge locations
  - Name of the receiving water(s)
- A description of controls:
  - Erosion and sediment controls, including
    - Stabilization practices for all areas disturbed by construction
    - Structural practices for all drainage/discharge locations
  - Stormwater management controls, including
    - Measures used to control pollutants occurring in stormwater discharges after construction activities are complete
    - Velocity dissipation devices to provide nonerosive flow conditions from the discharge point along the length of any outfall channel
  - Other controls, including
    - Waste disposal practices that prevent discharge of solid materials
    - Measures to minimize offset tracking of sediments by construction vehicles
    - Measures to ensure compliance with state or local waste disposal, sanitary sewer, or septic system regulations
  - Description of the timing during the construction when measures will be implemented
- State or local requirements incorporated into the Plan
- Inspection and maintenance procedures for control measures identified in the Plan
- Contractor certification and Plan certification

Implementation Checklist

- Maintain records of construction activities, including
  - Dates when major grading activities occur
  - Dates when construction activities temporarily cease on the site or a portion of the site
  - Dates when construction activities permanently cease on the site or a portion of the site
  - Dates when stabilization measures are completed on the site
- Prepare inspection reports summarizing
  - Name of person conducting BMP inspections
  - Qualifications of person conducting BMP inspections
  - BMPs/areas inspected
  - Observed conditions
  - Necessary changes to the Plan
- Report releases of reportable quantities of oil or hazardous materials
  - Notify the National Response Center at 800-424-8802 immediately
  - Report releases to your permitting authority immediately, or as specified in your permit. You must also provide a written report within 14 days.
  - Modify the Plan to include
    - The date of release
    - Circumstances leading to the release
    - Steps taken to prevent reoccurrence of the release
- Modify Plan as necessary
  - Incorporate requests of the permitting authority to bring the Plan into compliance
  - Address changes in design, construction operation, or maintenance that affect the potential for discharge of pollutants

An ounce of prevention is worth a pound of cure! It's far more efficient and cost-effective to prevent pollution than it is to try to correct problems later. Installing and maintaining simple BMPs and pollution prevention techniques on site can greatly reduce the potential for stormwater pollution and can also save you money!

Visit www.epa.gov/npdes/stormwater for more information.

StormWater CleanWater PROTECTION PROGRAM

Resources

State Water Resources Control Board
Division of Water Quality
1001 I Street
Sacramento CA 95814
(916) 341-5455
www.swrcb.ca.gov/stormwtr/

Colorado River Basin Regional Water
Quality Control Board - Region 7
73-720 Fred Waring Drive, Suite 100
Palm Desert, CA 92260
(760) 346-7491
www.swrcb.ca.gov/~rwqcb7/

Santa Ana Regional Water
Quality Control Board - Region 8
3737 Main Street, Suite 500
Riverside, CA 92501-3348
(909) 782-4130
www.swrcb.ca.gov/~rwqcb8/

San Diego Regional Water
Quality Control Board - Region 9
9771 Clairemont Mesa Blvd., Suite A
San Diego, CA 92124
(858) 467-2952
www.swrcb.ca.gov/~rwqcb9/

To report a hazardous materials spill, call:

Riverside County Hazardous Materials
Emergency Response Team
(909) 358-5055 8:00 a.m. – 5:00 p.m.
(909) 358-5245 after 5:00 p.m.

In an emergency call: **911**

For recycling and hazardous waste disposal, call:

(909) 358-5055

To report an illegal dumping or a clogged storm drain, call:

1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, please call (909) 955-1200 or visit the StormWater/CleanWater Protection Program website at:
www.co.riverside.ca.us/depts/flood/waterquality npdes.asp

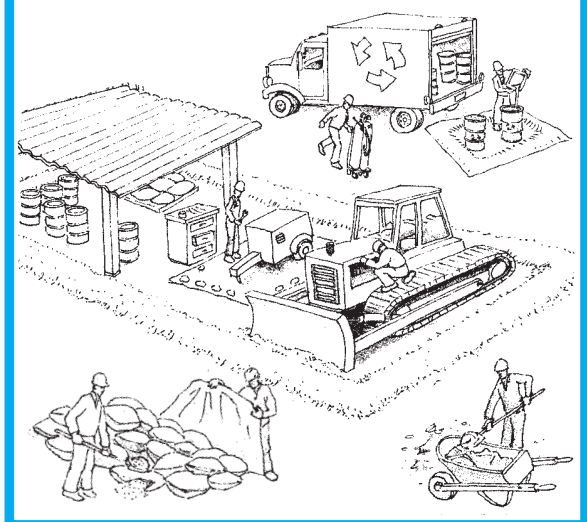
StormWater CleanWater
PROTECTION PROGRAM

The StormWater/CleanWater Protection Program gratefully acknowledges the Santa Clara Valley Nonpoint Pollution Control Program, Alameda Countywide CleanWater Program and the City of Los Angeles Stormwater Management Division for information provided in this brochure.

StormWater Pollution

What you should know for...

GENERAL CONSTRUCTION & SITE SUPERVISION



Best Management Practices (BMPs) for:

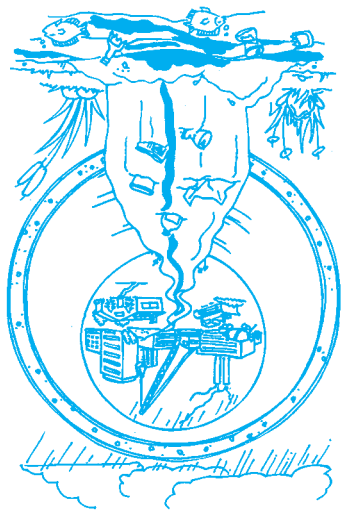
- Developers
- General Contractors
- Home Builders
- Construction Inspectors
- Anyone in the construction business

StormWater Pollution . . . What You Should Know

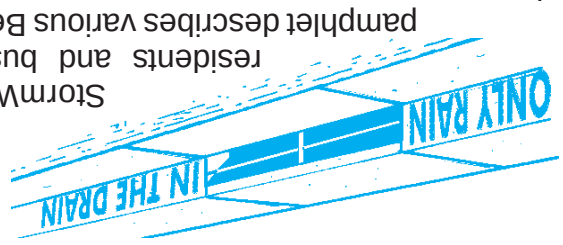
Riverside County has two drainage systems - sewers and storm drains. The storm drain system was designed to reduce flooding by carrying excess rainwater away from streets and developed areas. Since the storm drain system does not provide for water treatment, it also serves the *unintended* function of transporting pollutants directly to our local waterways.

Unlike sanitary sewers, storm drains are not connected to a wastewater treatment plant – they flow directly to our local streams, rivers and lakes.

Stormwater runoff is a part of the natural hydrologic process. However, land development and construction activities can significantly alter natural drainage processes and introduce pollutants into stormwater runoff. Polluted stormwater runoff from construction sites has been identified as a major source of water pollution in California. It jeopardizes the quality of our local waterways and can pose a serious threat to the health of our aquatic ecosystems.



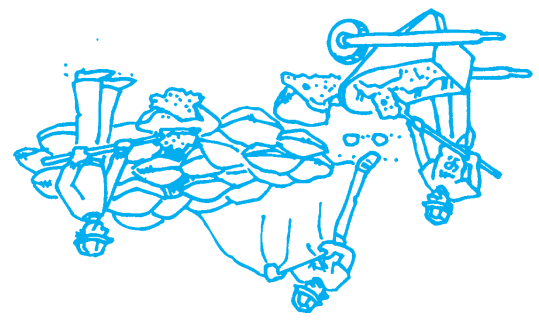
The Cities and County of Riverside StormWater/CleanWater Protection Program

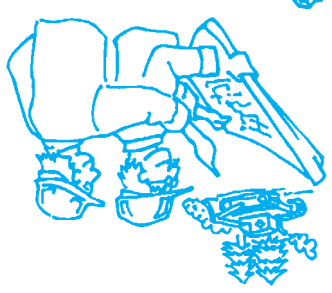


Because preventing pollution is much easier and less costly than cleaning up "after the fact," the Cities and County of Riverside StormWater/CleanWater Protection Program informs residents and businesses on pollution prevention activities. This pamphlet describes various Best Management Practices (BMPs) that construction site operators can use to prevent stormwater pollution.

In accordance with applicable federal and state law, the Cities and County of Riverside have adopted ordinances for stormwater management and discharge control that **prohibit** the discharge of pollutants into the storm drain system or local surface water. This includes discharges from construction sites containing sediment, concrete, mortar, paint, solvents, lubricants, vehicle fluids, fuel, pesticides, and construction debris.

PLEASE NOTE: The Federal, State and local regulations strictly prohibit the discharge of sediment and pollutants into the streets, the storm drain system or waterways. As an owner, operator or supervisor of a construction site, you may be held financially responsible for any environmental damage caused by your subcontractors or employees.





STORMWATER POLLUTION FROM CONSTRUCTION ACTIVITIES

The two most common sources of stormwater pollution problems associated with construction activities are ***erosion*** and ***sedimentation***. Failure to maintain adequate erosion and sediment controls at construction sites often results in sediment discharges into the storm drain system, creating multiple problems once it enters local waterways.

Construction vehicles and heavy equipment can also track significant amounts of mud and sediment onto adjacent streets. Additionally, wind may transport construction materials and wastes into streets storm drains, or directly into our local waterways.

What Should You Do?

Advance Planning to Prevent Pollution

- ❑ Remove existing vegetation only as needed.
- ❑ Schedule excavation, grading, and paving operations for dry weather periods, if possible.
- ❑ Designate a specific area of the construction site, well away from storm drain inlets or watercourses, for material storage and equipment maintenance.
- ❑ Develop and implement an effective combination of erosion and sediment controls for the construction site.
- ❑ Practice source reduction by ordering only the amount of materials that are needed to finish the project.
- ❑ Educate your employees and subcontractors about stormwater management requirements and their pollution prevention responsibilities.
- ❑ Control the amount of surface runoff at the construction site by impeding internally generated flows and using berms or drainage ditches to direct incoming offsite flows to go around the site. ***Note:*** *Consult local drainage policies for more information.*

Best Management Practices

The following Best Management Practices (BMPs) can significantly reduce pollutant discharges from your construction site. Compliance with stormwater regulations can be as simple as minimizing stormwater contact with potential pollutants by providing covers and secondary containment for construction materials, designating areas away from storm drain systems for storing equipment and materials and implementing good housekeeping practices at the construction site.

- ❑ Protect all storm drain inlets and streams located near the construction site to prevent sediment-laden water from entering the storm drain system.
- ❑ Limit access to and from the site. Stabilize construction entrances/exits to minimize the track out of dirt and mud onto adjacent streets. Conduct frequent street sweeping.
- ❑ Protect stockpiles and construction materials from winds and rain by storing them under a roof, secured impermeable tarp or plastic sheeting.
- ❑ Avoid storing or stockpiling materials near storm drain inlets, gullies or streams.
- ❑ Phase grading operations to limit disturbed areas and duration of exposure.
- ❑ Perform major maintenance and repairs of vehicles and equipment offsite.
- ❑ Wash out concrete mixers only in designated washout areas at the construction site.
- ❑ Set-up and operate small concrete mixers on tarps or heavy plastic drop cloths.
- ❑ Keep construction sites clean by removing trash, debris, wastes, etc. on a regular basis.
- ❑ Clean-up spills immediately using dry clean-up methods (e.g., absorbent materials such as cat litter, sand or rags for liquid spills; sweeping for dry spills such as cement, mortar or fertilizer) and by removing the contaminated soil from spills on dirt areas. .
- ❑ Prevent erosion by implementing any or a combination of soil stabilization practices such as mulching, surface roughening, permanent or temporary seeding.
- ❑ Maintain all vehicles and equipment in good working condition. Inspect frequently for leaks, and repair promptly.
- ❑ Practice proper waste disposal. Many construction materials and wastes, including solvents, water-based paint, vehicle fluids, broken asphalt and concrete, wood, and cleared vegetation can be recycled. Materials that cannot be recycled must be taken to an appropriate landfill or disposed of as hazardous waste.
- ❑ Cover open dumpsters with secured tarps or plastic sheeting. Never clean out a dumpster by washing it down on the construction site.
- ❑ Arrange for an adequate debris disposal schedule to insure that dumpsters do not overflow.

General Construction Activities Stormwater Permit

(Construction Activities General Permit)

The State Water Resources Control Board (SWRCB) adopted a new Construction Activities General Permit (WQ Order No. 99-08DWQ) on August 19, 1999, superseding the now expired SWRCB statewide General Permit (WQ Order No. 92-08DWQ). This permit is administered and enforced by the SWRCB and the local Regional Water Quality Control Boards (RWQCB). The updated Construction Activities General Permit establishes a number of new stormwater management requirements for construction site operator.

NOTE: *Some construction activies stormwater permits are issued on a regional basis. Consult your local RWQCB to find out if your project requires coverage under any of these permits.*

Frequently Asked Questions:

Does my construction site require coverage under the Construction Activities General Permit?

Yes, if construction activity results in the disturbance of five or more acres of total land area or is part of a common plan of development that results in the disturbance of five or more acres.

How do I obtain coverage under the Construction Activities General Permit?

Obtain the permit package and submit the completed Notice of Intent (NOI) form to the SWRCB prior to grading or disturbing soil at the construction site. For ongoing construction activity involving a change of ownership, the new owner must submit a new NOI within 30 days of the date of change of ownership. The completed NOI along with the required fee should be mailed to the SWRCB.

What must I do to comply with the requirements of the Construction Activities General Permit?

- ● Implement BMPs for non-stormwater discharges year-round.
- ● Prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) prior to commencing construction activities.
- ● Keep a copy of the SWPPP at the construction site for the entire duration of the project.
- ● Calculate the anticipated stormwater run-off.
- ● Implement an effective combination of erosion and sediment control on all soil disturbed areas.
- ● Conduct site inspections prior to anticipated storm events, every 24-hours during extended storm events, and after actual storm event.
- ● Perform repair and maintenance of BMPs as soon as possible after storm events depending upon worker safety.
- ● Update the SWPPP as needed, to manage pollutants or reflect changes in site conditions.
- ● Include description of post construction BMPs at the construction site, including parties responsible for long-term maintenance.

NOTE: *Please refer to the Construction Activities General Permit for detailed information. You may contact the SWRCB, your local RWQCB, or visit the SWRCB website at www.swrcb.ca.gov/stormwtr/ to obtain a State Construction Activities Stormwater General Permit packet.*

How long is this Construction Activities General Permit in effect?

The Permit coverage stays in effect untilyou submit a Notice of Termination (NOT) to the SWRCB. For the purpose of submitting a NOT, all soil disturbing activities have to be completed and one of the three following criteria has to be met:

1. Change of ownership;
2. A uniform vegetative cover with 70 percent coverage has been established; or,
3. Equivalent stabilization measures such as the use of reinforced channel liners, soil cement, fiber matrices, geotextiles, etc., have been employed.



Landscaping and garden maintenance activities can be major contributors to water pollution. Soils, yard wastes, over-watering and garden chemicals become part of the urban runoff mix that winds its way through streets, gutters and storm drains before entering lakes, rivers, streams, etc. Urban runoff pollution contaminates water and harms aquatic life!

In Riverside County, report illegal discharges into the storm drain, call
1-800-506-2555
"Only Rain Down the Storm Drain"

Important Links:

Riverside County Household Hazardous Waste Collection Information
1-800-304-2226 or www.rivcowm.org

Riverside County Backyard Composting Program
1-800-366-SAVE

Integrated Pest Management (IPM) Solutions
www.ipm.ucdavis.edu

California Master Gardener Programs
www.mastergardeners.org
www.camastergardeners.ucdavis.edu

California Native Plant Society
www.cnps.org

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

...Only Rain Down ...the Storm Drain

What you should know for... Landscape and Gardening

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators



Tips for Landscape & Gardening

This brochure will help you to get the most of your lawn and gardening efforts and keep our waterways clean. Clean waterways provide recreation, establish thriving fish habitats, secure safe sanctuaries for wildlife, and add beauty to our communities. NEVER allow gardening products or waste 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 pesticides 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.



- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- 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 or sewers. 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.
- Try natural long-term common sense solutions first. Integrated Pest Management (IPM) can provide landscaping guidance and solutions, such as:
  - **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
  - **Biological Controls** - Use predatory insects to control harmful pests.
  - **Chemical Controls** - Check out www.ipm.ucdavis.edu before using chemicals. Remember, all chemicals should be used cautiously and in moderation.
- 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 Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

www.bewaterwise.com Great water conservation tips and drought tolerant garden designs.

www.ourwaterourworld.com Learn how to safely manage home and garden pests.

Additional information can also be found on the back of this brochure.



Living on the Edge

Your community preserves habitat for important native plants and animals. By habitat, we mean homes; food, water, and places with space to live. The habitat is managed as part of a ***biological conservation easement*****,** a legal agreement that permanently limits its use.

Many conservation easements include a waterway or wetland because plants and animals need clean, fresh water, the most limited resource in our dry Southern California climate. A waterway (also called watercourse, arroyo, wash) conveys a flowing creek, stream, or river, which provides drinking water for local and migrating wildlife.

Not all of our waterways have visible flowing water year-round. Some creeks and streams continue to flow underground, while others flow for a short time after a storm (ephemeral). The small, and often dry washes are important to wildlife because they provide habitat and their periodic flows drain into larger waterways. It's essential that people do not degrade the quality of any water that reaches local waterways.

Water supports an abundance of vegetation and a variety of life, or *biodiversity.* Streamside vegetation, along dry or flowing waterways, is referred to as *riparian.* **Native** riparian plants provide **native** animals with suitable food, shelter, nesting sites and escape-cover from predators.

Help Your Wild Next-Door Neighbors

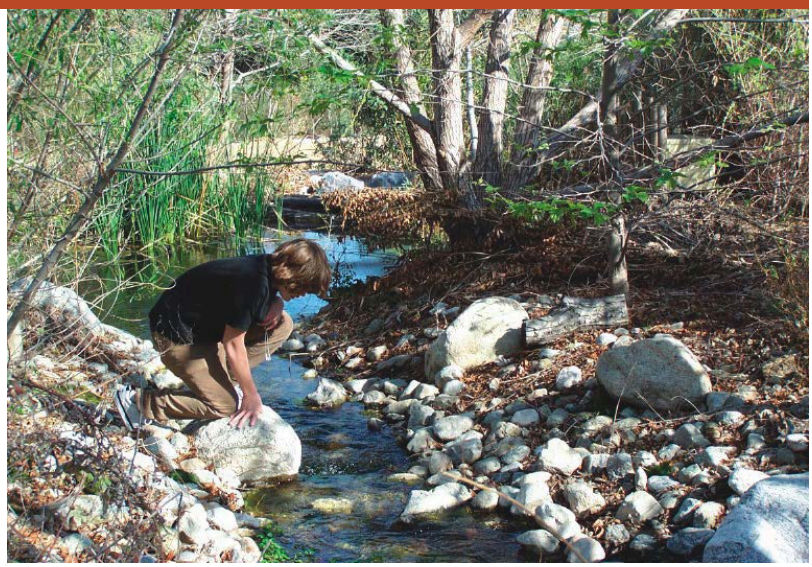
The purpose of this publication is to help homeowners become *habitat-friendly* neighbors for nearby habitat lands. The *Resources Directory*, inserted inside this booklet, provides helpful websites and contact information for agencies, organizations, gardens, and native plant nurseries.



Gerald & Buff Corsi, California Academy of Sciences

Unfortunately, our modern-day lifestyles have negative impacts on the environment around us. Human activity in, or near waterways can damage the capacity of the habitat to support some kinds of plant and animal life, especially species that do not adapt to urban/suburban conditions. Here are some ways to prevent and reduce negative impacts and help restore habitat to healthy conditions.

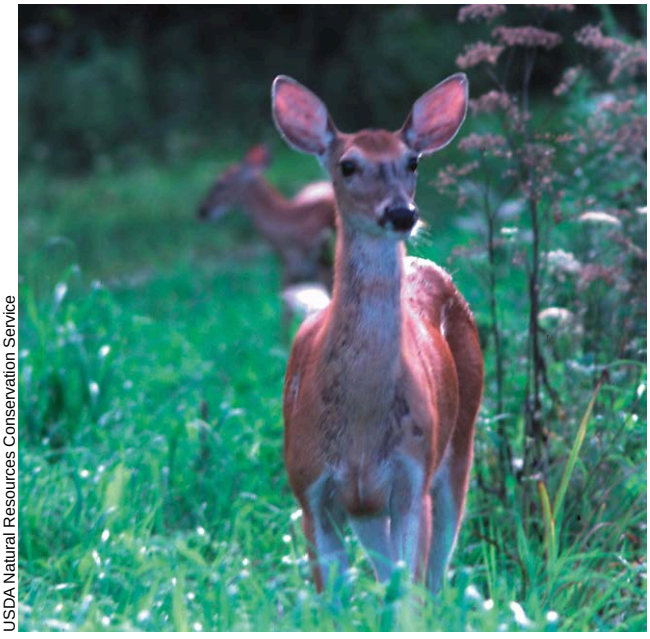
Reduce Impacts on Native Wildlife



Diana Ruiz

Prevent light, noise, and activity in, and adjacent to wetlands.

- If you wish to observe wildlife, please watch from afar, especially during the breeding and nesting season, from March to September. Most wild animals are naturally fearful of human contact. Human activity near a nest or den may frighten adult animals away from young and jeopardize their survival.
- When visiting natural areas, disturb as little as possible. Avoid walking or riding in a stream course or on channel banks. Heavy foot traffic, horses, and off-road vehicles may cause channel banks to collapse, accelerating erosion and increasing water-born sediment and turbidity.
- Help control entry into habitat areas. Close unessential roadways to prevent access for illegal dumping, trespass, and off-road vehicle use.
- Leave nothing behind.
- Focus necessary lighting downward and inward toward your home, yard, and buildings.
- To report poaching or polluting call CalTIP, Californians Turn In Poachers and Polluters, a confidential secret witness program. The toll free telephone number operates 24 hours a day, 7 days a week. (See the *Resources Directory* insert for contact information.)



USDA Natural Resources Conservation Service

Do not allow pets to roam in habitat land where they will disturb and hunt native wildlife. Keep pets on a leash and droppings out of waterways. Cats and dogs stress or kill wildlife and prevent natural ecosystems from supporting their own predators, such as hawks, coyotes, foxes, and bobcats. Conversely, domesticated animals face hazards in wild areas. Pets may be attacked by predators, such as coyotes and rattlesnakes, or may contract disease, fleas, and ticks.

Do not release unwanted animals into the wild. Abandoned cats, dogs, birds, reptiles and fish can have significant impacts on populations of native species, either through disease, predation or competition for food and space.



Lee Karney/ U.S. Fish and Wildlife Service

Brown-headed Cowbird

- Exotic invaders crowd out native species both on land and in water. Do not place fish, frogs, crayfish, turtles, or aquatic plants into creeks, streams or lakes. Some non-native species are not only able to survive, but also reproduce explosively due to a lack of natural predators. For example, the brown-headed cowbird is overwhelming riparian habitats. The cowbird lays its eggs in another bird's nest to the detriment of the host's young.



Mark A. Chappell

The endangered Least Bell's Vireo is threatened by the Brown-headed Cowbird.

- Pets are usually unable to survive in wildlands. They starve to death or are eaten. If you cannot find a home for a pet, contact animal control, your local animal shelter, or the Humane Society.

Respect and protect wild animals by keeping them wild. In some instances, being a good neighbor means protecting your living area by excluding certain kinds of wildlife, mainly mammals. The *human habitat* includes home sites, buildings, yards, gardens, and regularly used outdoor areas. Install fencing around the human habitat portion of your property and secure enclosures to protect children, pets, and farm animals.

- Do not take small animals, such as tortoises, tadpoles, frogs, snakes, birds, lizards or eggs from the wild. Never attempt to "adopt" or domesticate a wild animal.

- Discourage dangerous predators from penetrating human habitat areas. Install fencing that will exclude predators. Place sensors that trigger sprinklers and lights to deter predators and mammals from entering areas of human activity.

- Prevent mammals from living in and near your home by closing entries, filling holes, and removing brush, junk, and woodpiles near buildings.

- Don't feed human food to wildlife. Do not leave pet food outside. Prevent garbage from becoming a food source for wild mammals by sealing trash can lids. If you compost, use closed-containers or turn piles regularly. Compost plant material only; meat scraps should not be mixed in a compost pile.



R. H. Barrett/ U. S. Fish and Wildlife Service

For more information, contact the California Department of Fish and Game.
(See the *Resources Directory* insert for contact information.)

Reduce Impacts on Native Plants

Remove invasive, non-native plants from home landscaping and adjacent habitat lands, especially those that quickly spread through waterways, displacing important native species.


Diana Ruiz

Invasive Giant Reed (*Arrundo donax)* is being removed from Temescal Creek.

DO NOT PLANT

Giant reed	*Arundo donax*
Salt Cedar	*Tamarix chinensis*
Tree of Heaven	*Ailanthus altissima*
Red apple, heartleaf iceplant	*Aptenia cordifolia*
Fountain grass (yellow)	*Pennisetum setaceum*
Castor bean	*Ricinus communis*
Periwinkle	*Vinca major*
Peruvian (Calif.) pepper tree	*Schinus molle*
Brazilian pepper tree	*Schinus terebinthifolius*
Mexican fan palm	*Washingtonia robusta*
Sweet fennel	*Foeniculum vulgare*
Pampas grass/Jubata grass	*Cortaderia jubata/selloana*
Common iceplant	*Mesembryanthemum crystallinum*
Myoporum species	

Contact your local Resource Conservation District for help identifying invasive species and for removal of exotic weeds from waterways. Visit the California Invasive Plant Council web site for suggested plants to replace invasives. (See the *Resources Directory* insert for contact information.)

Protect Water Quality


Diana Ruiz

Make sure that the water that flows off your property is clean.

- Prevent trash, debris, and waste of any kind from washing off homesites and streets into gutters, storm drains, and dry washes. These drainage-ways empty into streams that flow to the Santa Ana River, and ultimately, the ocean.
- Evaluate the flow of runoff over your property. Place manure, barnyard bedding, and debris in areas where water does not pool or flow, or reuse the waste as fertilizer or mulch. Check with your local municipality for ordinances concerning the disposal of manure and bedding.
- Use care when applying fertilizers, pesticides, and herbicides on your property. Read labels “before you buy and before you apply” for directions, application rates, and disposal. Apply the correct amount at the proper time, for example, not during plant dormancy.



Praying mantis



Ladybird beetle



Lacewing

Photos by Greg Balmer

- Reduce or eliminate the use of pesticides by using “beneficial insects” (ladybugs, praying mantids, lacewings, etc.) If you must use a pesticide, use one with a *least-toxic* rating, such as insecticidal soaps, horticultural oils, pyrethrin-based insecticides, and insect growth regulators.
- Control erosion to prevent sediment from entering runoff.
- If you have a septic system, inspect and maintain it. Poorly placed and neglected septic systems contaminate groundwater and streams.

Pollutants that flow from residential and urban areas contaminate surface water and the water that percolates into underground water basins (aquifers). Much of our local water supply is pumped from underground aquifers, so keeping runoff clean is essential.

To report any non-emergency crime, such as dumping, please call your City Police or County Sheriff Departments. To report illegal grading or dumping in waterways, contact your City or County Code Enforcement Department. (See the *Resources Directory* insert for contact numbers.)

Dispose of waste in its proper place.

- Read product labels, and dispose of household hazardous wastes (oil based paints, pesticides, antifreeze, motor oil, batteries, flourescent bulbs, etc.) in prescribed ways and at designated disposal sites or community collection events, not on the ground or in a storm drain inlet. Whenever possible, reduce the use of hazardous materials in and around your home. Call the *Only Rain Down the Storm Drain* program for disposal dates and locations. (See the *Resources Directory* insert for contact numbers.) You can also recycle automotive fluids, tires, and batteries at car repair businesses.
- Dispose of trash at sanitary landfills.
- Compost yard and other organic wastes.

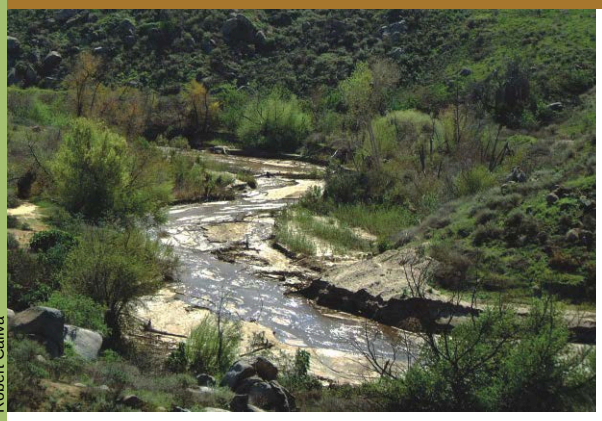


Diana Ruiz

Better yet:

Reduce,
Reuse,
Recycle.

Provide Space for Habitat, Fire, and Flood Protection



Robert Calvo

Siting Homes Near Waterways
If you are building next to a waterway, leave a buffer between the waterway and your *human habitat* area of graded pads, structures, and ornamental landscaping. *Wildlife habitat* land includes areas beyond buildings, yards, and defensible space (fire safety zones), generally to be left undisturbed for wildlife. A buffer between the human habitat and a waterway provides space for habitat, flood waters, and for wildlife escape during high water.

The buffer or "setback" distance will vary according to site conditions, however a minimum 100-foot setback from the **top edge** of a waterway, not from the water itself, is recommended. This allows space for creek/stream meander and high water flows. The banks of creeks and streams "meander", which means they are constantly "wandering" or relocating. Meander naturally occurs when flows cause erosion of channel banks and deposition of sediment.

As land is converted to urban uses, the volume of flow in waterways increases. Impervious surfaces from streets, roofs, and parking lots increase the amount of runoff, erosion and pollutants that degrade water quality.



Frank Heyming

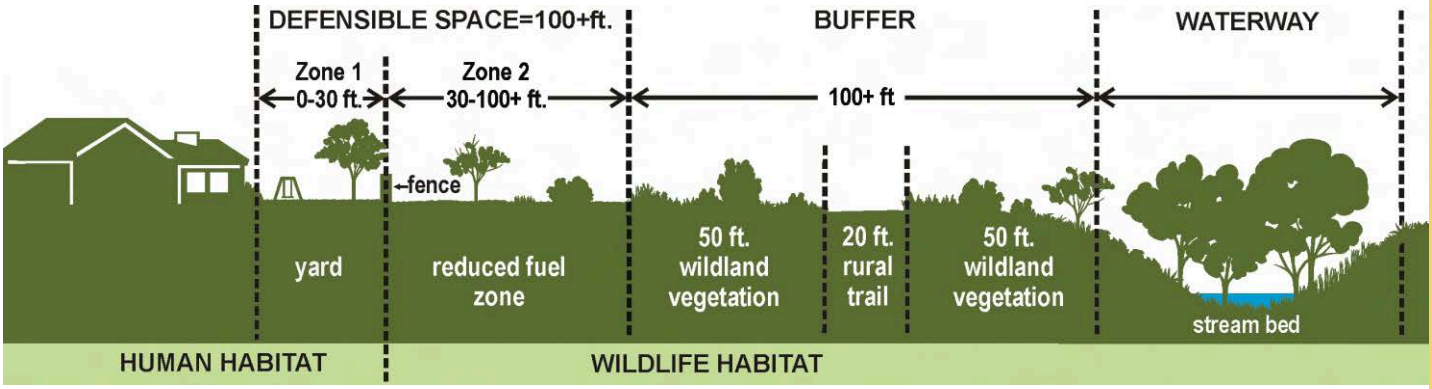
A house pad fills an important tributary to an waterway.

Many people are not aware of the vulnerability of natural ecosystems, nor are they aware that it is illegal to grade or alter a waterway without an assessment and permits from resource agencies and municipalities. If you propose an activity that will impact a stream, river, or lake, the California Department of Fish and Game (DFG) requires completion of a Streambed Alteration Agreement. Depending on the activity you are proposing, you may need to obtain a permit, agreement, or other authorization from one or more government agencies. Notify DFG, U.S. Army Corps of Engineers, and the Santa Ana Regional Water Quality Control Board during early planning, prior to beginning a project that will:

- use material from a streambed;
- divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake;
- result in the disposal or deposition of debris, waste, or other natural material where it can pass into any river, stream, or lake.

A Streambed Alteration Agreement is also required for streams that flow intermittently, such as dry washes and waterways with subsurface flow.

It is essential that landowners do not confine, or encroach on waterways. Keep buildings, septic systems, horses, livestock, fencing, agricultural and ornamental plantings out of waterways and away from channel banks.



When building homes In fire-prone areas, avoid ridge tops and canyons. Set buildings back from the edge of steep slopes. Create a minimum distance of 100-feet of *defensible space,* a managed area around a home, where the amount of fuel (dead plants, dry leaves, wood) has been reduced. Consult with your local fire department or the California Department of Forestry and Fire Protection for fire safety and weed abatement information.
(Please see *Resources Directory* insert).

Habitat-friendly Yards


Len Nunney

Landscape with Locals. Not just any California native plant is suitable for landscapes near habitat lands. Local native plants are the safest because they have unique characteristics that have helped them survive in their specific environments. Gardening with local flora helps maintain the *genetic integrity* of local plants and ecosystems. It helps maintain regional variation in vegetation and wildlife.

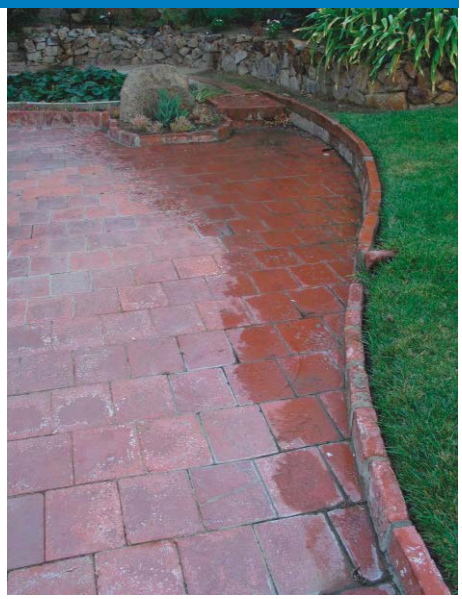
Why is regional variation important? If plants from other areas crossbreed with local natives, scientists fear that local populations would lose some of the unique characteristics that are important for success in this region. Their genetic material would no longer be unique and regionally identifiable. Plant interbreeding could reduce biological diversity, *biodiversity*, in the gene pool. There are important interactions between native plants, microorganisms, and the animals that use them, some of which are critical to the reproduction and survival of native plants and animals.

Create habitat in your yard for urban-adapted wildlife. Even if you live in the heart of a city, consider gardening for urban-adapted wildlife by providing a reliable water source and **local** native plants that provide food, shelter, and nesting sites. Each small patch of yard provides a stepping-stone of habitat from wildlands across the city. A patchwork of *habitat-yards* creates an urban ecosystem that more closely mimics our predevelopment, native landscape. When linked together, those patches cumulatively support biodiversity. To host a variety of native birds and butterflies in your yard, select plants that flower and fruit at different times of the year. Prune trees and shrubs in fall and early winter, rather than spring, to avoid destroying bird nests.

Benefits of landscaping with local native plants:

- **Most native plants are drought tolerant, so they require less water.**
- **Natives rarely require fertilizers.**
- **Patches of habitat support urban-adapted wildlife, such as birds, bats and insects that help pollinate plants.**
- **Natives rarely require pesticides. Native plants provide their own natural pest control by attracting beneficial insects that prey on troublesome bugs.**
- **Local natives help preserve *genetic diversity* and the integrity of local ecosystems.**

Water-wise Landscapes Conserve Water



Diana Ruiz

Reduce water-use by replacing unnecessary lawn areas with native or drought-tolerant plants and with hardscape (hard surfaces), such as walkways and patios of concrete, brick, stone, decomposed granite, and permeable paving. For places where you do need a lawn, such as play areas, plant a low water-use turf variety.

When selecting a plant, find out:

- Is it water-thirsty or drought-tolerant?
- When is its growing season; when will it need water?

Most* local native plants are dormant or slow-growing during the hot, dry summers; their growth occurs during our rainy season. Once established, many survive with rainfall alone. This is the opposite for non-native, ornamental landscapes that grow slowly, or not at all during winter, but require irrigation throughout the summer.

- Group plants with similar watering needs together, and install water-saving irrigation systems (drip, micro-sprayers) to apply the correct amount for each *hydro-zone* or plant grouping. Trees require deep irrigation and may need separate irrigation lines.
- Readjust your irrigation schedule for season and weather conditions. Turn off automatic systems when it's raining. Don't run sprinklers when the wind is blowing. Water deeply and only when needed. Water plants in the early morning or evening. Adjust irrigation systems to water soil, not concrete and pavement.
- Apply mulch (bark, compost, sawdust, gravel) to reduce evaporation from the soil surface and to control weeds.

For information about conserving water in landscapes and using native and drought tolerant plants, refer to plant databases, such as the one at bewaterwise.com. The website will also help you create a customized watering schedule for your yard. (See the *Resources Directory* insert for booklist and websites.)

*Not all native plants are dormant during summer: local riparian plants are the exception. They need water year round, as they are suited for waterways. Streamside vegetation, along dry or flowing waterways, is referred to as riparian.

Fire-wise Landscaping

Create a minimum distance of 100 ft. of *defensible space*, a landscape that deprives fire of fuel. Use fire-resistant plants and remove plants that are highly volatile.

Zone 1: Lean, Clean and Green

Zone 1 is from 0-30 ft. out from buildings. (See diagram on prior page.)
Grow plants that are small or succulent, such as irrigated lawns or ground covers and low growing, high-moisture shrubs. If you use native plants, use those that can be trimmed back during the dry season or that stay small with little trimming. Native plants that tolerate summer watering (see native plant lists) should be kept well hydrated.*

- Keep plants well hydrated to help them resist fire. Well-trimmed and watered plants are less likely to ignite than desiccated plants that have a buildup of dry stems and leaves.
- Fire needs fuel to burn, so remove any unnecessary plant materials. Prune dead wood and clean the landscape of dead plants, dry leaves, dry brush, firewood, and combustibles.
- Strategically place hard surfaces in your landscape, such as concrete, brick, or stone patios, driveways, pools, walls, and non-flammable decks, to interrupt the spread of fire to buildings.

Zone 2: Reduced Fuel

Create the reduced fuel zone beginning 30 ft. from buildings and extending 100 ft. or more, depending on steepness of slope and type/density of vegetation.

- Selectively remove large shrubby plants and dense groupings. Thin overcrowded plants. Mow grasses and weedy vegetation while they are green.
- Carefully remove excess plants without disturbing the soil; mow instead of disc, to prevent erosion and invasion of non-native plants.
- In chaparral plant communities, after thinning, reduce old, woody growth by cutting plants to their bases every few years, during the summer dormancy. Young plant tissues have higher moisture content and are less flammable. The heavy pruning eliminates mature, highly flammable vegetation but maintains root systems to protect the soil from erosion.
- Low branches and plants growing under trees create “ladders” for fire to climb. Eliminate ladder fuels, plants that serve as a link between grass and treetops. Prune the lower branches from the lower 1/3 of trees and shrubs. For trees or shrubs taller than 18 feet, prune the lower branches 6 feet above the ground. Remove dead leaves, twigs, and branches.
- In general, remove shrubs that are growing below trees, unless there is a space between the top of the shrub to the lowest branch of the tree that is three times the height of the shrub.

Remove plants that ignite easily and burn hot, such as those with volatile oils (sages) and those that accumulate fine woody branches or many small, dry leaves (chamise). In Zone 1, remove highly volatile plants (partial list below). In Zone 2, remove or widely space volatile plant types, including:

Chamise, *Adenostoma fasciculata*
Brittlebrush, *Encelia farinosa*
California buckwheat, *Eriogonum fasciculatum*
White sage, *Salvia apiana*
Some Eucalyptus and Acacia

Black sage, *Salvia mellifera*
Woolly blue curls, *Trichostema lanatum*
Mountain blue curls, *Trichostema parishii*
Red Shank, *Adenostoma sparsifolium*
All Pine, Cypress, Juniper, and Cedar species.

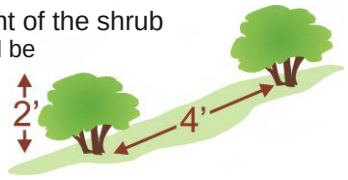
*For best results with native plants, water on overcast days during summer and fall.

Create Space Between Plants

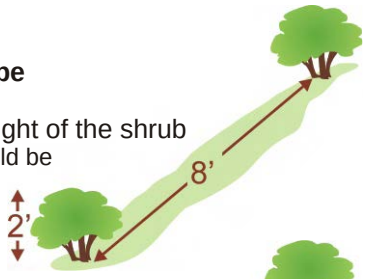
Shrubs

From edge of one shrub to the edge of the next.

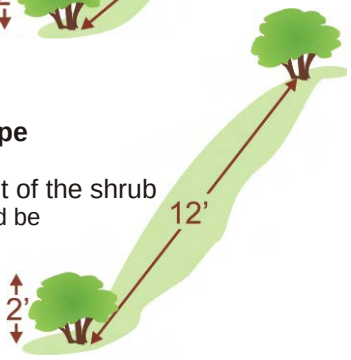
Flat to mild slope
(0% to 20% slope)
Two times (2x) the height of the shrub
(Two shrubs 2' high should be spaced 4' apart)



Mild to moderate slope
(20% to 40% slope)
Four times (4x) the height of the shrub
(Two shrubs 2' high should be spaced 8' apart)



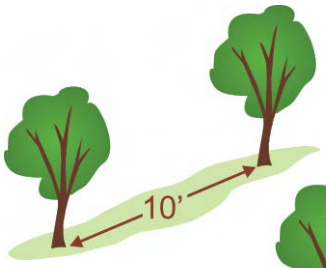
Moderate to steep slope
(greater than 40% slope)
Six times (6x) the height of the shrub
(Two shrubs 2' high should be spaced 12' apart)



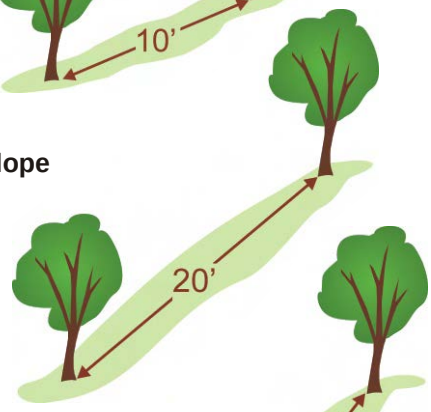
Trees

From edge of one tree canopy to the edge of the next.

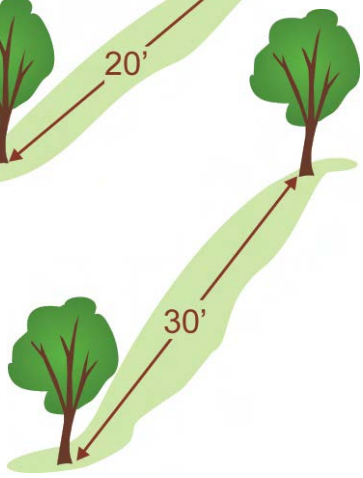
Flat to mild slope
(0% to 20% slope)



Mild to moderate slope
(20% to 40% slope)



Moderate to steep slope
(greater than 40% slope)



Horizontal clearance information from the California Department of Forestry and Fire Protection.

Prevent erosion and stabilize eroding areas. If you have exposed soil surfaces, cover with mulch, and landscape as soon as possible. (Plants break the impact of falling rain, and their roots hold soil in place.) Eroding soil becomes sediment in runoff water, which pollutes waterways. Disturbed soil also encourages the growth of non-native weed species.

Retain thinned, deep-rooted native plants to anchor the soil and maintain slope stability. Generally, tall plants have deep, broad root systems. A goal of fire-wise landscaping is to maximize rooting depth while minimizing fuel volume.


Diana Ruiz

For site-specific advice, contact your local Resource Conservation District (RCD) or the USDA Natural Resources Conservation Service (NRCS). For recommendations of native grasses for erosion control, contact the California Native Grasslands Society. (See the *Resources Directory* insert for contact information.)

Native Plants for Defensible Space Landscaping in the Inland Empire

If you prefer to create a landscape of native, low water-use plants, use these lists to design a yard that is fire-wise. Maintenance is essential; dead and dry plant material must be removed during dry, summer dormancy. Some native plants cannot tolerate irrigation during their summer dormancy, so may die if watered too frequently. Some need only infrequent, deep watering to remain hydrated during the dry summer and fall. The low-growing, low-fuel volume plants are suitable for Zone 1 (0-30 ft.) and beyond. Larger shrubs and trees, for Zone 2 (30-100+ ft.), must be widely spaced (see diagram on previous page).

Shrubs for Zone 2

Shrubs that need or tolerate water during summer.

Carpenteria, *Carpenteria californica*
Western redbud, *Cercis occidentalis*
Toyon, *Heteromeles arbutifolia*
Nevin's barberry, *Mahonia nevinii*
Coffeeberry, *Rhamnus californica*
Golden current, *Ribes aureum.*
California wild rose, *Rosa californica*
Western bridalwreath, *Spiraea douglasii*
Squawbush, *Rhus trilobata*


UDSA-NRCS PLANTS Database
Coffeeberry

Shrubs that do not usually tolerate water during summer.

Low shrubs

Bladder pod, *Isomeris arborea*
Bush monkeyflower, *Mimulus aurantiacus*
Chaparral honeysuckle, *Lonicera subspicata*
Hollyleaf redberry, *Rhamnus illicifolia*
Redberry, *Rhamnus crocea*
Yellow bush-penstemon, *Keckiella antirrhinoides*


Paul Aigner
Yellow bush-penstemon

Tall, deep-rooted shrubs that stay green during summer.

Bigberry manzanita, *Arctostaphylos glauca*
Thick-leaved lilac, *Ceanothus crassifolius*
Buck brush, *Ceanothus cuneatus*
Hairy California lilac, *Ceanothus oliganthus*
Mountain mahogany, *Cercocarpus betuloides*
Laurel sumac, *Malosma laurina*
Scrub oak, *Quercus berberidifolia*
Sugarbush, *Rhus ovata*
Lemonade berry, *Rhus integrifolia*
California Flannel bush, *Fremontodendron californicum*


Arlee M.Montalvo
Sugarbush

Trees for Zone 2

Trees that tolerate occasional water during summer.

Catalina cherry, *Prunus illicifolia* ssp. *Lyonii*
Coast live oak, *Quercus agrifolia*
Valley oak, *Quercus lobata*
Engelman oak, *Quercus engelmannii*

Trees that need water during summer.

Big leaf maple, *Acer macrophyllum*
White alder, *Alnus rombifolia*
So. California walnut, *Juglans californica*
California sycamore, *Platanus racemosa*
California black oak, *Quercus kelloggii*
Canyon live oak, *Quercus chrysolepis*
Willows: *Salix laevigata, S. gooddingii*
California bay laurel, *Umbellularia californica*


J. S. Peterson @ UDSA-NRCS
Big leaf maple

Low-growing, (low fuel volume) Plants for Zones 1 and 2

Perennial herbs that tolerate or need water during summer

Yarrow, *Achillea millifolium*
Columbine, *Aquilegia formosa*
Douglas iris, *Iris douglasiana*
Deer grass, *Muhlenbergia rigens*
Calif. blue-eyed grass, *Sisyrinchium bellum*
Meadow rue, *Thalictrum fendleri* var. *polycarpum*
Yerba mansa, *Anemopsis californica*
Coral bells, *Heuchera* ssp.
Common monkey flower, *Mimulus guttatus*
Scarlet bugler, *Penstemon centranthifolius*
California goldenrod, *Solidago californica*
Hedge nettle, *Stachys bullata*
Slender sedge, *Carex praegracilis*
Narrow-leaved milkweed, *Asclepias fascicularis*


Arlee M.Montalvo
Narrow-leaved milkweed

Succulents, Ground Covers, and Low Shrubs

Keep hydrated; if needed, water monthly during summer.

San Diego sedge, *Carex spissa*
Wild lilac, *Ceanothus griseus 'horizontalis'*
California fuchsia, *Epilobium canum =Zauschneria*
Golden yarrow, *Eriophyllum confertiflorum*
Lance-leaved live-forever, *Dudleya lanceolata*
Chalk dudleya, *Dudleya pulverulenta*
Parry's nolina, *Nolina parryi*
Creeping sage, *Salvia sonomensis*
Creeping snowberry, *Symphoricarpos mollis*
Chaparral yucca, *Yucca whipplei = Hesperoyucca whipplei*
Valley cholla, *Opuntia parryi*
Coastal prickly pear, *Opuntia littoralis*


Arlee M.Montalvo
Chaparral yucca

Annuals or summer-dormant perennials

No need for water during summer. There is little, if any, plant material above ground to burn.

California poppy, *Eschscholzia californica*
Larkspurs, delphinium, *Delphinium parryi, D.cardinale*
Wild Canterbury-bell, *Phacelia minor*
California figwort, *Scrophularia californica*
Baby blue eyes, *Nemophila menziesii*
Royal penstemon, *Penstemon spectabilis*
Lupine, *Lupinus* species *(L. bicolor, L. succulentus, L. truncatus, L. sparsiflorus*)


Arlee M.Montalvo
Baby blue eyes

Habitat Land Stewards

If you live near conservation easement land or a waterway, there are ways that you can help. Be observant of activities that might be harmful to your nearby habitat lands, or form a *habitat-watch* group in your neighborhood. Like a neighborhood-watch, property owners help look out for neighborhood habitat and waterways, report illegal activity, and help educate neighbors about human impacts. For help forming a *habitat-watch* group, contact your local Resource Conservation District or the Riverside Land Conservancy.

RCRCD
RIVERSIDE-CORONA RESOURCE CONSERVATION DISTRICT

This publication was developed by the Riverside-Corona Resource Conservation District. www.RCRCD.com
1-07

All programs and services are provided without regard for race, religion, gender, national origin, and handicap.
Printed on recycled paper

Helpful telephone numbers and links:

Riverside County Water Agencies

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
City of Corona	(951) 736-2263
City of Hemet	(951) 765-3710
City of Norco	(951) 270 5607
City of Riverside Public Works	(951) 351-6140
City of San Jacinto	(951) 654-4041
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Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
Riverside Co. Service Area #51	(760) 227-3203
Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

REPORT ILLEGAL STORM DRAIN DISPOSAL

1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers



Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

Do you know where street flows actually go?

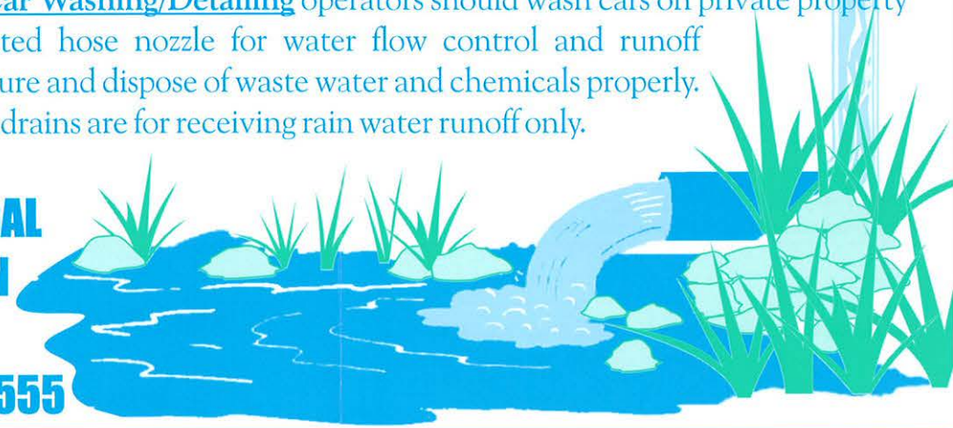
Storm drains are NOT connected to sanitary sewer systems and treatment plants!



The primary purpose of storm drains is to carry rain water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555



Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. ***Each of us*** can do our part to keep storm water clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing wash water to the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.



Report illegal storm drain disposal,
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them for being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.



When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlet by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.

Helpful telephone numbers and links:

Riverside County Stormwater Protection Partners

Flood Control District	(951) 955-1200
County of Riverside	(951) 955-1000
City of Banning	(951) 922-3105
City of Beaumont	(951) 769-8520
City of Calimesa	(909) 795-9801
City of Canyon Lake	(951) 244-2955
Cathedral City	(760) 770-0327
City of Coachella	(760) 398-4978
City of Corona	(951) 736-2447
City of Desert Hot Springs	(760) 329-6411
City of Eastvale	(951) 361-0900
City of Hemet	(951) 765-2300
City of Indian Wells	(760) 346-2489
City of Indio	(760) 391-4000
City of Lake Elsinore	(951) 674-3124
City of La Quinta	(760) 777-7000
City of Menifee	(951) 672-6777
City of Moreno Valley	(951) 413-3000
City of Murrieta	(951) 304-2489
City of Norco	(951) 270-5607
City of Palm Desert	(760) 346-0611
City of Palm Springs	(760) 323-8299
City of Perris	(951) 943-6100
City of Rancho Mirage	(760) 324-4511
City of Riverside	(951) 361-0900
City of San Jacinto	(951) 654-7337
City of Temecula	(951) 694-6444
City of Wildomar	(951) 677-7751

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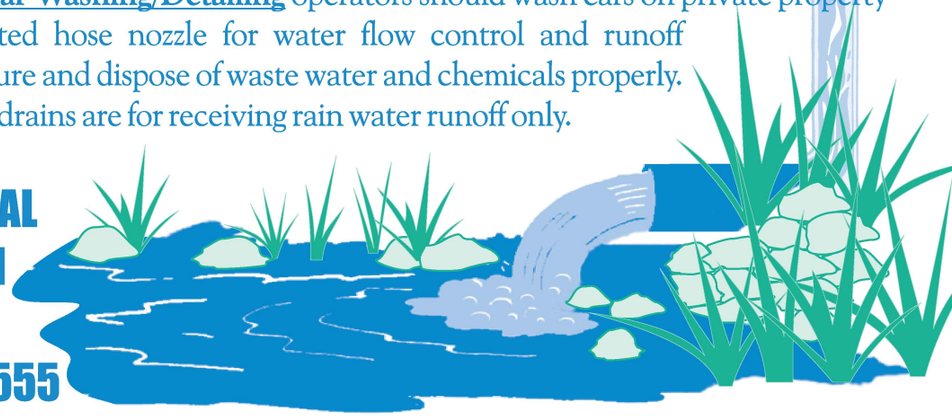
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Saltwater Pools

- Salt water pools, although different from regular pools, are in fact, sanitized using chlorine. A salt-chlorine generator separates the chlorine and sodium molecules in salt and reintroduces them into the pool water. The same harmful effects of chlorine still apply.
- A salt water pool is still maintained with chemicals such as Muriatic acid, soda ash and sodium carbonate to help keep a proper pH, total Alkalinity, Calcium Hardness and Stabilizer levels.



- It may be illegal to discharge salt water to land. The salt may kill plants and the build-up of salt in soil puts animals, plants, and groundwater at risk. Consult your city representatives to determine local requirements regarding salt water drainage.

NEVER put unused chemicals into the trash, onto the ground or down a storm drain.

IMPORTANT: The discharge of pollutants into the street, gutter, storm drain system or waterways - without a permit or waiver - **is strictly prohibited by local ordinances, state and federal law**. Violations may result in monetary fines and enforcement actions.

Helpful telephone numbers and links

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Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

CALL 1-800-506-2555 to:

- Report clogged storm drains or illegal storm drain disposal from residential, industrial, construction and commercial sites into public streets, storm drains and/or water bodies.
- Find out about our various storm drain pollution prevention materials.
- Locate the dates and times of Household Hazardous Waste (HHW) Collection Events.
- Request adult, neighborhood, or classroom presentations.
- Locate other County environmental services.
- Receive grasscycling information and composting workshop information.

Or visit our
Riverside County Flood Control and Water Conservation District
website at: www.rcflood.org

Other links to additional storm drain pollution information:

- County of Riverside Environmental Health: www.rivcoeh.org
- State Water Resources Control Board: www.waterboards.ca.gov
- California Stormwater Quality Association: www.casqa.org
- United States Environmental Protection Agency (EPA): www.epa.gov/compliance/assistance (compliance assistance information)

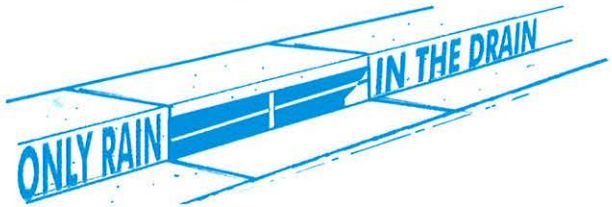
Riverside County's, "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

Guidelines for Maintaining your...



Swimming Pool, Jacuzzi and Garden Fountain

Where does the water go?



Pool, Jacuzzi and Fountain wastewater and rain water runoff (also called stormwater) that reach streets can enter the storm drain and be conveyed directly into local streams, rivers and lakes.



A storm drain's purpose is to prevent flooding by carrying rain water away from developed areas. Storm drains are not connected to sanitary sewers systems and treatment plants!

Wastewater, from residential swimming pools, Jacuzzis, fishponds and fountains, often contains chemicals used for sanitizing or cleansing purposes. Toxic chemicals (such as chlorine or copper-based algaecides) may pollute the environment when discharged into a storm drain system.

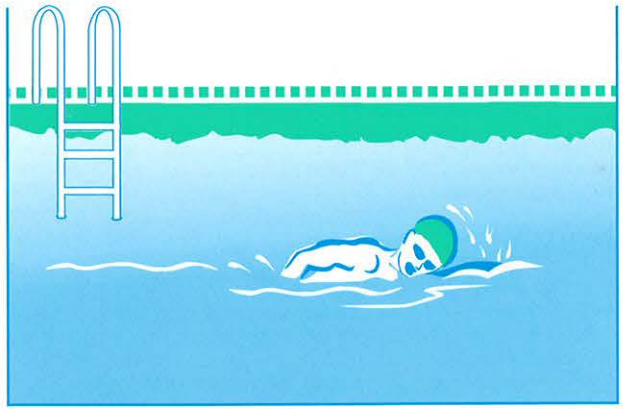
The Cities and County of Riverside have adopted ordinances that prohibit the discharge of wastewater to the street and storm drain system.



Discharge Regulations

Regulatory requirements for discharging wastewater from your pool may differ from city to city. Chlorinated water should not be discharged into the street, storm drain or surface waters. Check with your water agency to see if disposal to the sanitary sewer line is allowed for pool discharges (see reverse for Riverside County sewer agencies).

If allowed, a hose can be run from the pool Jacuzzi, or fountain to the private sewer cleanout, washing machine drain or a sink or bathtub.

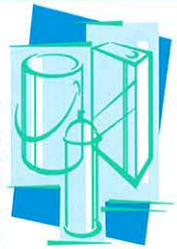


If you cannot discharge to the sewer, you may drain your fountain, pool, or jacuzzi to your landscaping by following these guidelines:

First, reduce or eliminate solids (e.g. debris, leaves or dirt) in the pool water and allow the chemicals in the pool water to dissipate before draining the pool (this could take up to 7 days, verify using a home pool test kit).

Second, slowly drain to a landscaped area away from buildings or structures. Control the flow to prevent soil erosion; it may take more than one day to empty. Do not allow sediment to enter the street, gutter or storm drain.

Maintenance & Chemicals



Cleaning Filters

Filter rinse water and backwash must be discharged to the sanitary sewer, on-site septic tank and drain field system (if properly designed and adequately sized), or a seepage pit. Alternatively, rinse water or backwash may be diverted to landscaped or dirt areas. Filter media and other non-hazardous solids should be picked up and disposed of in the trash.

Algaecides

Avoid using copper-based algaecides unless absolutely necessary. Control algae with chlorine, organic polymers or other alternatives to copper-based pool chemicals. Copper is a heavy metal that can be toxic to aquatic life when you drain your pool.

Chemical Storage and Handling

- Use only the amount indicated on product labels
- Store chlorine and other chemicals in a covered area to prevent runoff. Keep out of reach of children and pets.
- Chlorine kits, available at retail swimming pool equipment and supply stores, should be used to monitor the chlorine and pH levels before draining your pool.
- Chlorine and other pool chemicals should never be allowed to flow into the gutter or storm drain system.

Take unwanted chemicals to a Household Hazardous Waste (HHW) Collection Event. There's no cost for taking HHW items to collection events – it's FREE! Call **1-800-506-2555** for a schedule of HHW events in your community.





For more information,
please call the
Riverside County's
"Only Rain Down the Storm Drain"
Pollution Prevention Program
at 1-800-506-2555 or
www.rcflood.org

or

To Report A Sewage Spill:
During normal business hours
(8:00 a.m to 5:00 p.m), call
Riverside County Department of
Environmental Health
at 951-358-5172 or 1-800-304-2226
www.rivcoeh.org

After business hours, on weekends
or holidays, call toll free
1-800-506-2555

For emergencies, dial 911.

www.NOWRA.ORG - A website providing resources and education on the design and maintenance of septic tank systems.

www.epa.gov/owm/septic - Including septic tank information, the Environmental Protection Agency has a large E-vault of environmental information and resources.

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

Stormwater Pollution

What you should know...

Tips for Maintaining a Septic Tank System



Water quality responsibility begins at YOUR front door.

Tips for Maintaining a Septic Tank System

Households that are not served by public sewers usually depend on a septic tank system* to treat and dispose of wastewater. A well designed, installed and regularly maintained septic system can provide years of reliable service. However, when these systems fail to operate properly, significant damage can occur to property and the environment. The homeowner is responsible for these damages and may be subject to fines. Therefore, it is important to follow these simple tips when using a septic tank system:

Conserve Water

The more wastewater produced, the more the soil must absorb. By conserving water, the life of the drain field will be extended and the chance of a system failure is decreased.

Reduce your water use by:

- Using water saving devices
- Repairing leaky faucets and plumbing fixtures
- Reducing toilet reservoir volume or flow
- Taking shorter showers
- Washing only full loads of dishes and laundry
- Limit the number of highwater use activities done at the same time.

Never Flush Harmful Materials Into The Septic Tank

Grease, cooking oils, newspaper, paper towels, rags, coffee grounds, sanitary napkins and cigarettes do not easily decompose in the tank. Chemicals such as solvents, soils, unused prescriptions, over-the-counter medications, paints and pesticides are harmful to the system's operation and may pollute the groundwater. For information on the proper disposal of household hazardous waste, call toll free 1-800-506-2555. Also, never use septic tank additives, commercial septic tank cleaners, yeast, sugar, etc. These products are not necessary and some may be harmful to your system.

Keep Runoff Away From The System

Water from surfaces such as roofs, driveways or patios should be diverted away from the septic tank and drain field area.

Protect The System From Damage

Don't park, pave or put livestock or heavy objects, equipment or machinery over the drainfield. The pressure can compact the soil or damage pipes. Also check your septic system map prior to constructing buildings or a pool on the property. The area over the absorption field and tank should be left undisturbed with only grass on top. Trees or shrubs, which may clog and damage the drain, should be removed from the area.

Keep Records

Chart the location of your septic tank and keep up-to-date service and repair records for future reference.

Inspect The System

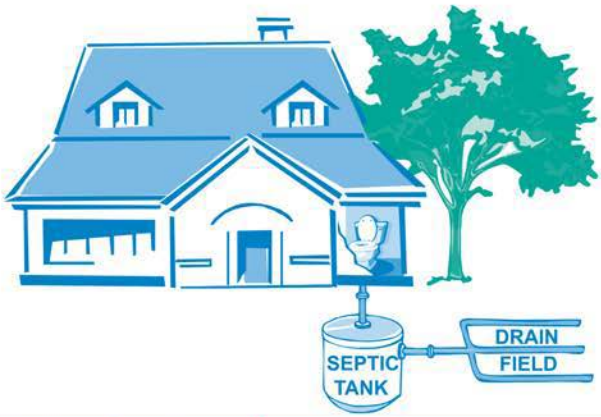
Monitor the system yearly to ensure it is not at an "early warning level." Inspect the drain field and down slope areas for odors, wet spots, or surfacing of sewage. This may be an early indication of a problem with the system. Also, have the system inspected by a licensed septic tank professional every three to five years.

Pump The Tank When Needed

Routine pumping can prevent failures, such as clogging and backup into the home. Never pump full or failing septic systems to the street or storm drain.

Never Enter The Septic Tank

Poisonous gases or the lack of air can be fatal. A certified professional should complete any work to the tank.



* Contact your local collection agency or city for assistance in determining if your home is served by a septic tank.

Stormwater Pollution Found in Your Area!

This is not a citation.

This is to inform you that our staff found the following pollutants in the storm sewer system in your area. This storm sewer system leads directly to

_____ .

- ❑ Motor oil
- ❑ Oil filters
- ❑ Antifreeze/ transmission fluid
- ❑ Paint
- ❑ Solvent/degreaser
- ❑ Cooking grease
- ❑ Detergent
- ❑ Home improvement waste (concrete, mortar)
- ❑ Pet waste
- ❑ Yard waste (leaves, grass, mulch)
- ❑ Excessive dirt and gravel
- ❑ Trash
- ❑ Construction debris
- ❑ Pesticides and fertilizers
- ❑ Other

_____





For more information or to report an illegal discharge of pollutants, please call:

Riverside County Residents, Call . . .
1-800-506-2555

WHEN IT RAINS
IT DRAINS

EPA
United States
Environmental Protection
Agency

www.epa.gov/npdes/stormwater

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Stormwater runoff is precipitation from rain or snowmelt that flows over the ground. As it flows, it can pick up debris, chemicals, dirt, and other pollutants and deposit them into a storm sewer system or waterbody.

Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

Remember: Only Rain Down the Drain

To keep the stormwater leaving your home or workplace clean, follow these simple guidelines:



- Use pesticides and fertilizers sparingly
- Repair auto leaks.
- Dispose of household hazardous waste, used auto fluids (antifreeze, oil, etc.), and batteries at designated collection or recycling locations.
- Clean up after your pet.
- Use a commercial car wash or wash your car on a lawn or other unpaved surface.
- Sweep up yard debris rather than hosing down areas. Compost or recycle yard waste when possible.
- Clean paint brushes in a sink, not outdoors. Properly dispose of excess paints through a household hazardous waste collection program.
- Sweep up and properly dispose of construction debris like concrete and mortar.



FACTS

for Home and Property Owners

on Stream Stabilization

Homeowners living adjacent to streams, lakes and rivers may be impacted by stream bank erosion or sediment deposition that can occur due to natural processes or man-made causes. However, efforts to mitigate these impacts in, or adjacent to watercourses can negatively affect native plants and animals, lessen a watercourse's ability to convey storm flows, and cause flooding. Below are some facts to keep our watercourses free of obstructions and information on actions a homeowner should take before attempting to protect their property:

- In some cases, alteration of a watercourse may be prohibited by local land-use regulations, e.g., a "drainage easement", "flowage easement", "floodplain" or "Environmental Constraint Sheet." You should contact your local City or County Building Agency or Grading Department to determine if these limitations apply to you.

- In cases where alterations are not prohibited, grading, filling-in or otherwise altering a watercourse-even those that flow intermittently, such as dry washes that only flow when it rains – may require approval from one or more of the following agencies:

REGULATING AGENCY	APPROVAL	CONTACT
Local (City, County) land use authority *	• Grading Permit, • Floodplain Review	White pages under City/County Government
California Department of Fish and Game*	• Fish and Game Section 1602 Agreements	www.dfg.ca.gov
US Army Corps of Engineers*	• Clean Water Act Section 404 Permit	www.usace.army.mil
California State Water Resources Control Board*	• Clean Water Act Section 401 Water Quality Certification or Waste Discharge Requirements	www.swrcb.ca.gov

- Property owners should **CONTACT EACH REGULATING AGENCY** (listed above) for the necessary approval(s) **BEFORE:**

1. ***Removing*** soil, rock or plant material from a streambed or the bank of a stream;
2. ***Placing*** any waste, material (dirt, rubble) or structures (dams, revetments) within or on the bank of a stream;
3. ***Diverting, obstructing***, or otherwise modifying the bed, channel, or bank of any river, stream or lake;
4. ***Disposing*** *or* ***depositing*** debris, liquid or solid waste, soil or other material that may be conveyed into a wash, stream, river or lake; or
5. ***Armoring*** *or* ***stabilizing*** a stream bank against stream bank erosion.

More ..... Stream Stabilization

Some other examples of regulated activities include construction of road crossings, vegetation removal, construction of corrals and storing manure. Property owners are responsible for obtaining all necessary approvals prior to commencing any of the aforementioned activities.

- The Natural Resources Conservation Service (NRCS) makes onsite recommendations (as of this writing, free of charge) to private land owners for effective erosion controls. For help in protecting your property from natural watercourses please contact:

Natural Resources Conservation Service (NRCS)	PHONE NO.
Moreno Valley	(951) 656-6800
Blythe service Center	(760) 922-3446
Indio Service Center	(760) 347-7658

*Service fees may be applicable.

- ***YOU*** **can help:**

Protect water quality - prevent trash, debris and waste of any kind from washing off home sites and streets into gutters, storm drains and dry washes. These watercourses empty into streams that flow to rivers.

County-wide Service Information

- Household hazardous wastes (oil-based paints, pesticides, antifreeze, motor oil, batteries and fluorescent bulbs) must never be disposed of in or near watercourses. You may find your nearest household hazardous waste disposal site by calling **(800) 304-2226 or** on the web **at www.rivcowm.org**



- Report illegal grading or dumping in watercourses by contacting your City or County Code Enforcement Department, or call **(800) 506-2555.**

- Report a non-emergency crime such as dumping by contacting your City Police or County Sherriff's Department, or call **(800) 506-2555.**