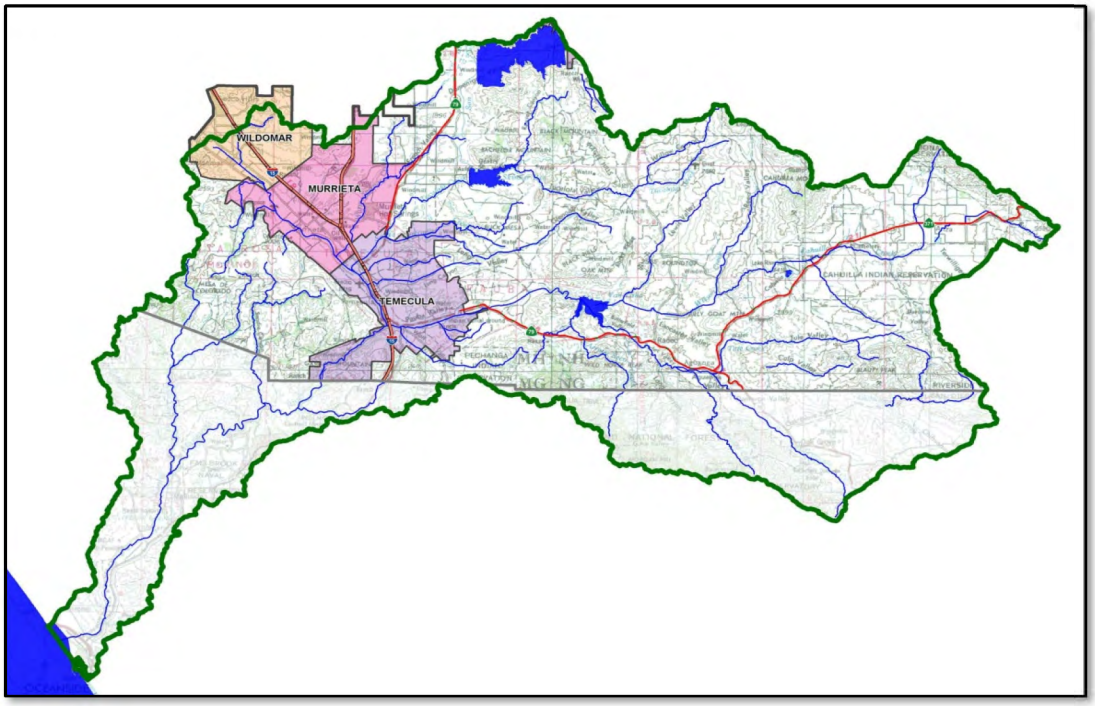
APPENDIX 10

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: Whitewood 29 Residential Development
Development No:
Design Review/Case No:
BMP$_i$ (Latitude, Longitude): 33°35'48.49"N, 117°09'31.96"W, 33°35'47.96"N, 117°09'45.04"W, 33°35'44.59"N, 117°09'45.82"W, 33°35'45.29"N, 117°09'30.16"W



☒ **Preliminary**
☐ **Final**

Original Date Prepared: 06/04/2021

Revision Date(s): Insert text here

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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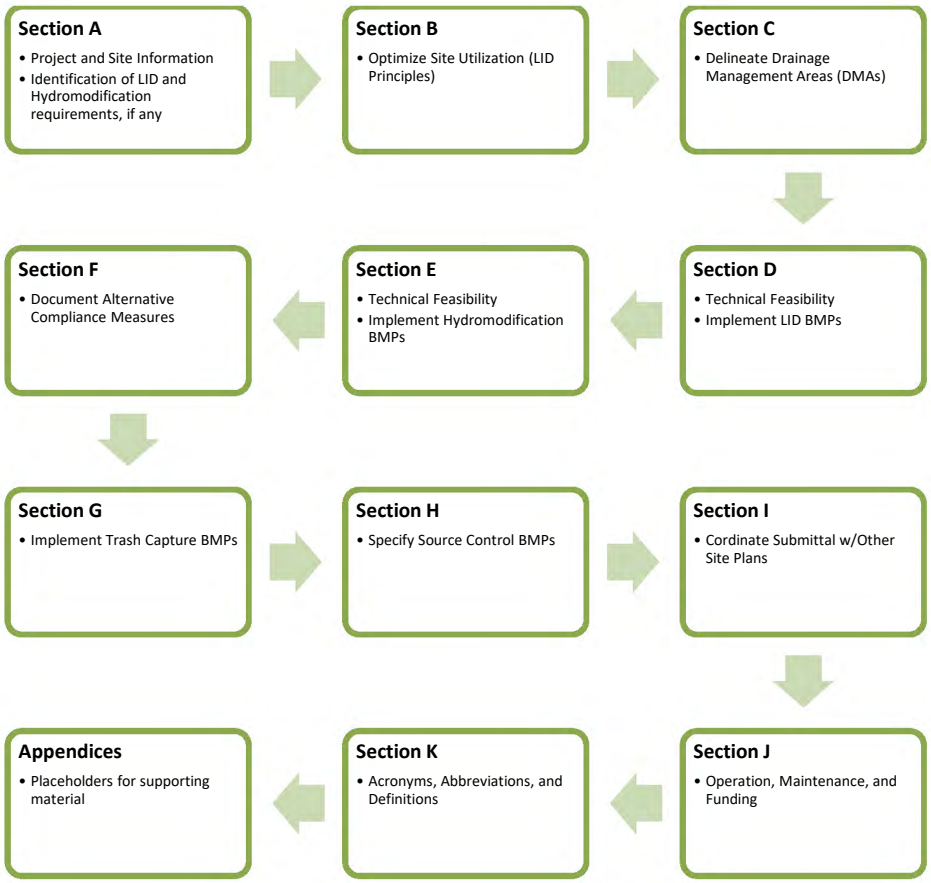
A Brief Introduction

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.



[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.

OWNER'S CERTIFICATION

This Project-Specific WQMP has been prepared for Whitewood 29, LLC by Blue Engineering & Consulting, Inc. for the Whitewood 29 Residential Development 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	Date
Preparer's Printed Name	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:	Residential	
Planning Case Number:	N/A	
Rough Grade Permit No.:	N/A	
Development Name:	Whitewood 29 Residential Development	
PROJECT LOCATION		
Latitude & Longitude (DMS):	N33.60, W117.16	
Project Watershed and Sub-Watershed:	Santa Margarita River, HAS 2.32	
24-Hour 85th Percentile Storm Depth (inches):	0.60	
Is project subject to Hydromodification requirements?	☐ Y ☒ N (Select based on Section A.3)	
APN(s):	900-030-037	
Map Book and Page No.:	BK 900 PG. 03	
PROJECT CHARACTERISTICS		
Proposed or Potential Land Use(s)		Residential
Proposed or Potential SIC Code(s)		Insert text here
Existing Impervious Area of Project Footprint (SF)		0
Total area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement		754,769
Total Project Area (ac)		28.87
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 If "Y" insert Cell Number
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)		D

Provide a brief description of the project:

Whitewood 29 Residential Development is a project of approximately 28.87 acres located at the corner of Whitewood Road and Clinton Keith Road in the Cito of Murrieta.

The site is sloped across the whole site at roughly 20% with the highest point being in the middle of the site. The site drains to the East and West from the center of the site draining into an existing public storm drain system along Clinton Keith Road. Storm water runoff from the proposed development will maintain the existing drainage pattern and will be collected by on-site drainage system and connect into the existing public storm drain system.

The on-site storm drain will include bioretention systems spread throughout the project site. The bioretention systems will be connected with an outfall pipe that will connect into the existing public storm drain system.

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
Warm Springs Creek	Chlorpyrios, Iron, Manganese, Nitrogen, Phosphorus	AGR, GWR,REC1, REC2, WARM, WILD	N/A
murrieta creek	Chlorpyrifos, Copper, Indicator Bacteria, Iron, Manganese, Nitrogen, Toxicity	AGR, GWR,REC1, REC2, WARM, WILD	N/A
santa margarita river (upper)	Indicator Bacteria, Iron, Manganese, Nitrogen	AGR, GWR,REC1, REC2, WARM, WILD	N/A
santa margarita river (lower)	Benthic Community Effects, Chlorpyrifos, Nitrogen, Phosphorus, Toxicity	AGR, GWR,REC1, REC2, WARM, WILD	N/A

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
Warm Springs Creek (6 Miles)	Natural Ground	None	☐ Y ☒ N
Murrieta Creek (5 Miles)	Natural Ground	None	☐ Y ☒ N
Santa Margarita River (upper) (18 Miles)	Natural Ground	None	☐ Y ☒ N
Santa Margarita River (lower) (19 Miles)	Natural Ground	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.			

[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.

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)*	☐ 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.
Insert discussion/justification here

☐ 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. *No trees exist on site. The planting of new vegitation will occur throughout the site to enhance vegitation.*

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. *Insert discussion/justification here*	
☒ 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. *Insert discussion/justification here*	

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. *Insert discussion/justification here*	
☒ 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. *Insert discussion/justification here*	

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. *Insert discussion/justification here*	
☒ 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. *Insert discussion/justification here*	

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-A	Mixed	404,832	To be Determined in Step 3
DMA-B	Mixed	511,090	
DMA-C	Mixed	274,997	
DMA-D	Mixed	66,639	

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

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)
DMA-D	66,639		

Step 3.B – Identify Type 'B' Self-Retaining Area and Type 'C' Areas Draining to 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] = $[B] + \frac{[B]\cdot[C]}{[A]}$
N/A				N/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]
N/A					N/A		

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:

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*
N/A		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No
*WQMP shall not be approved without calculations or documenting constraints for Green Street Exemption.		

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-A	Bioretention Basin
DMA-B	Bioretention Basin
DMA-C	Bioretention Basin

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 2.4 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 DMAs:	A,B,C,D	
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	N/A	
Expansive Soil		
Slopes		
Liquefaction		
Low Infiltration Rate		
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-A	Y	Infiltration rate is minimal due to soil classification
DMA-B	Y	Infiltration rate is minimal due to soil classification
DMA-C	Y	Infiltration rate is minimal due to soil classification

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
N/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. Insert date here
	☐ The BMP includes biological features including vegetation supported by engineered or other growing media.	Describe features here.

[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*	
N/A	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

*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?	N/A
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?	

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

d) What public health and safety requirements affected infiltration locations?	
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	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
N/A						*Design Storm Depth (in)*	*DCV, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]

[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.

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)
N/A				

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.

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)
N/A			☐			
			☐			
			☐			
			☐			

**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.

N/A

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.

N/A

☐ 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/

N/A

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]
Bioretention	Bacteria, Nutrients, Pesticides, Sediments, Trash & Debris, Oil & Grease	High (per Riverside Flood Control LID BMP Design Handbook)

[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.

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 Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Bioretention Basin A*	
	[A]		[B]	[C]	[A] x [C]		
A	*404,832*	*Mixed*	*0.69*	*0.48*	*194,319.2*	*Design Storm (in)*	*Design Flow Rate (cfs)*
	$A_T = \Sigma[A]$				*194,319.2*	0.60	2.68

[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,.

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Bioretention Basin B*	
	[A]		[B]	[C]	[A] x [C]		
B	*511,090*	*Mixed*	*0.66*	*0.46*	*235,101.3*	*Design Storm (in)*	*Design Flow Rate (cfs)*
	$A_T = \Sigma[A]$				*235,101.3*	0.60	3.24

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Bioretention Basin C*	
	[A]		[B]	[C]	[A] x [C]		
C	*274,997*	*Mixed*	*0.44*	*0.30*	*82,499.1*	*Design Storm (in)*	*Design Flow Rate (cfs)*
	$A_T = \Sigma[A]$				*82,499.1*	0.60	1.14

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

N/A

☐ In-Stream Restoration Project

Because the infiltration In the event the onsite bioretention basins overflow, the excess runoff will tie into the existing storm drain system along Clinton Keith road.

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)
Bioretention A	9.29	☒	1.26	0.314	
Bioretention B	11.73	☒	1.40	0.328	
Bioretention C	6.31	☒	1.23	0.307	
		☐			

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).

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	*Enter BMP Name / Identifier Here*	
	[A]		[B]	[C]	[A] x [C]		
N/A						*Trash Capture Design Storm Intensity (in)*	*Trash Capture Design Flow Rate (cubic feet or cfs)*
	$A_T = \Sigma[A]$				$\Sigma = [D]$	[E]	$[F] = \frac{[D]x[E]}{[G]}$

[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 (cfs)	Provided Trash Capture Flowrate (cfs)[1]
N/A				

[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 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."
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
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 wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.
Pools, spas, ponds, decorative fountains, and other water features	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://reflood.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)
Bioretention 'A'	Bioretention for DMA-A	33°35'48.49"N, 117°09'31.96"W
Bioretention 'B'	Bioretention for DMA-B	33°35'47.96"N, 117°09'45.04"W 33°35'44.59"N, 117°09'45.82"W
Bioretention 'C'	Bioretention for DMA-C	33°35'45.29"N, 117°09'30.16"W

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)*	☐ 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: HOA will mantain BMPs

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.

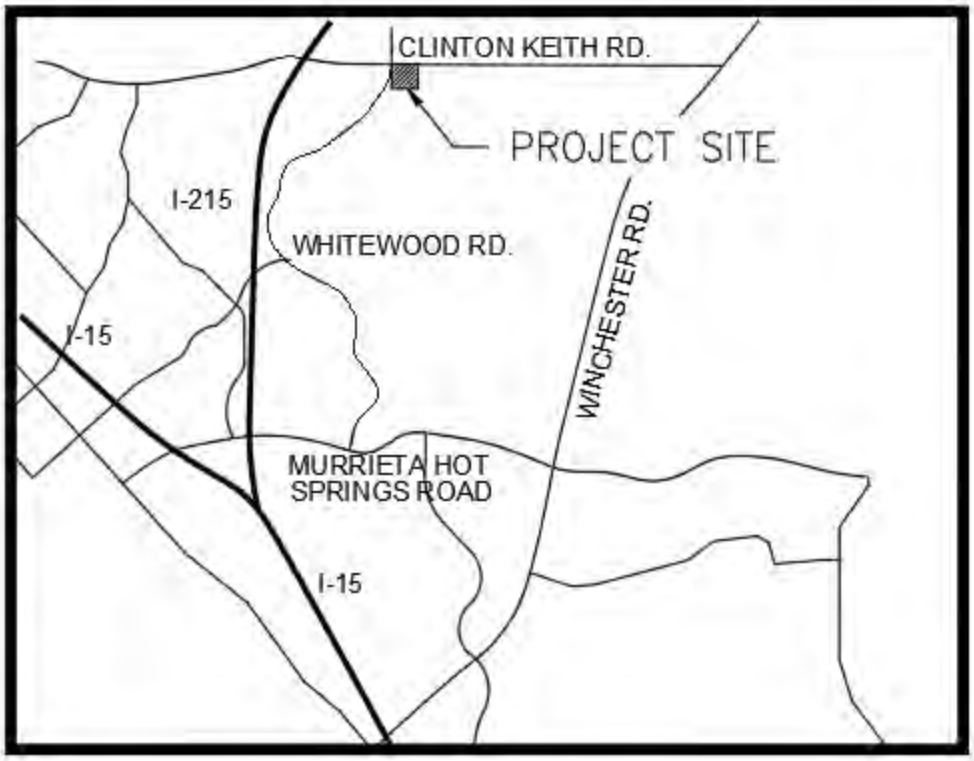
LID Harvest and Reuse BMP	BMPs used to facilitate capturing Stormwater Runoff for later use without negatively impacting downstream water rights or other Beneficial Uses.
LID Infiltration BMP	BMPs to reduce stormwater runoff by capturing and infiltrating the runoff into in-situ soils or amended onsite 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.

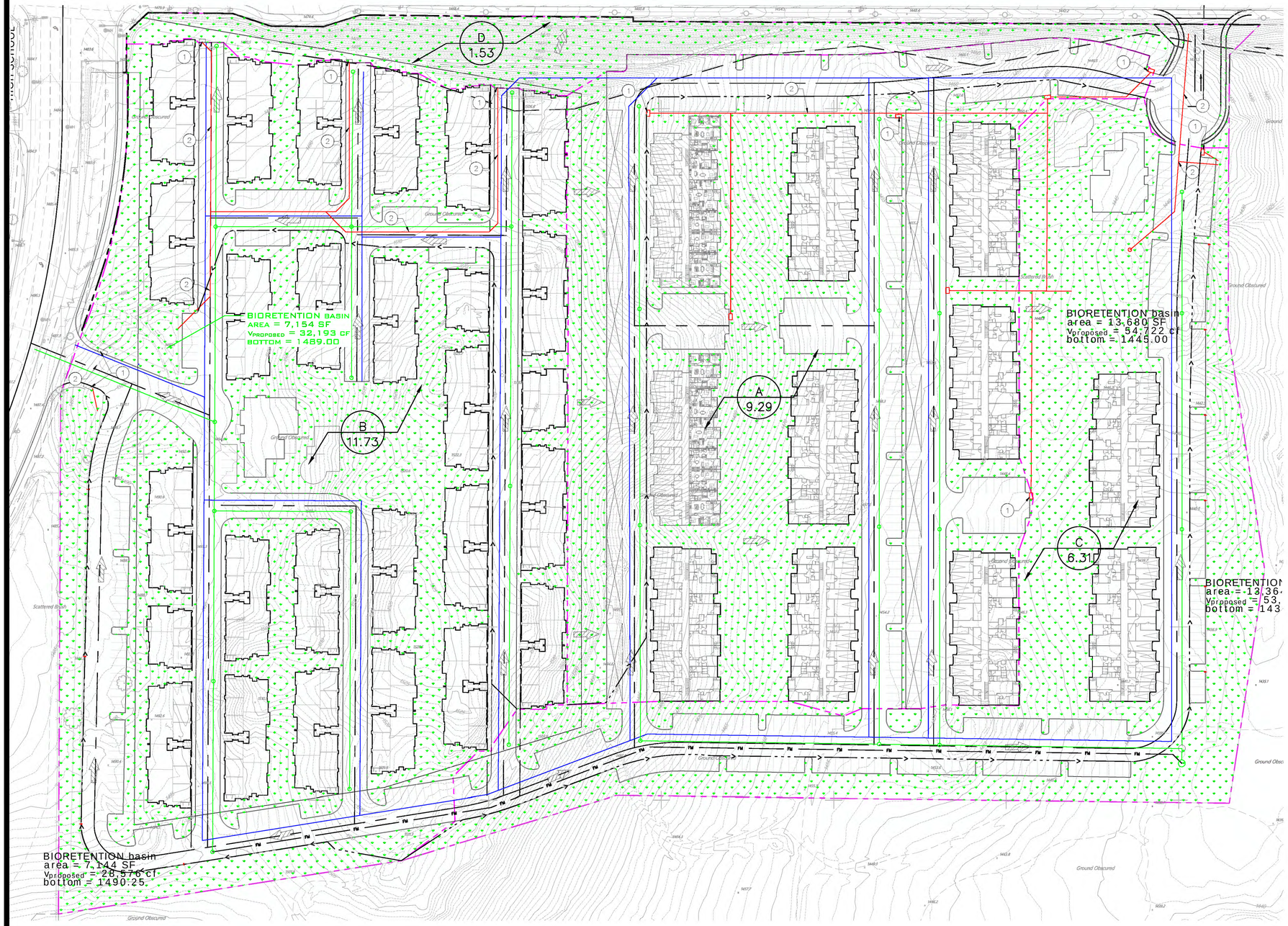
Appendix 1: Maps and Site Plans

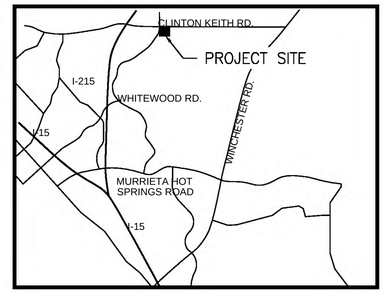
Location Map, WQMP Site Plan and Receiving Waters Map



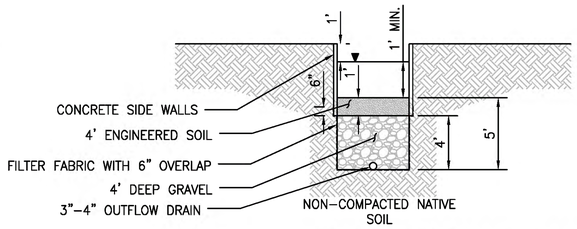
VICINITY MAP
N.T.S.

WATER QUALITY MANAGEMENT PLAN EXHIBIT





VICINITY MAP
N.T.S.



TYPICAL BIORETENTION SECTION

SCALE:
N.T.S.

LEGEND

- DRAINAGE MANAGEMENT AREA (DMA)
- SEWER MAIN
- DOMESTIC WATER
- STORM DRAIN
- CENTERLINE
- FLOW LINE
- MANHOLE
- CATCH BASIN
- LANDSCAPE
- DIRECTIONAL FLOW ARROW

GRADING, DRAINAGE & UTILITY NOTES:

1. PROPOSED CATCH BASIN
2. PROPOSED 18" H.D.P.E. @ MIN 0.5% SLOPE, OUTLET TO BASIN

PROJECT BMP CONFORMANCE ANALYSIS

NAME	AREA (SF)	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)	i	C	V_{BMP}	BMP	$A_{PROVIDED}$	$V_{PROVIDED}$
DMA A	404,832	280,476	124,355	0.69	0.48	9,780 cf	BIORETENTION BASIN	13,680 SF	54,722 cf
DMA B	511,090	337,465	173,625	0.66	0.46	11,497 cf	BIORETENTION BASIN	14,298 SF	60,769 cf
DMA C	274,997	119,895	155,105	0.44	0.30	4,123 cf	BIORETENTION BASIN	13,364 SF	53,457 cf
DMA D	66,639	49,706	49,706	0.25	0.20	666 cf	NATURAL	SELF TREAING	SELF TREATING

PROJECT AREA BREAKDOWN

PROJECT TOTAL AREA	1,257,557 SF
PROJECT ROOF AREA	335,516 SF
PROJECT PAVEMENT AREA	419,254 SF
PROJECT LANDSCAPE AREA	502,788 SF

DATE PREPARED: MAY 2021

REGISTERED PROFESSIONAL ENGINEER — ANGEL CESAR — No. 87222 — CIVIL — STATE OF CALIFORNIA

BLUE Engineering & Consulting, Inc
9320 BASELINE STE. D – RANCHO CUCAMONGA, CA 91701
PHONE: 909-248-6557 – WWW.BLUECIVILENG.COM

SCALE	UNDER THE SUPERVISION OF :
HORIZONTAL	
SEE ABOVE	ANGEL CESAR DATE
VERTICAL	RCE NO. 87222
N.A.	

DATE	INITIAL	ENGINEER OF WORK	REVISION DESCRIPTION	SHT. NO.	DATE	INITIAL	CITY APPROVAL

SHEET | **CITY OF MURRIETA** ENGINEERING DEPARTMENT | OF SHEET 4

TENTATIVE PARCEL MAP #
APN 9000-300-36

APPROVED
ROBERT K. MOEHLING _____ DATE _____
CITY ENGINEER
CITY OF MURRIETA RCE 63056 EXP. DATE 6/30/20

DWN BY: _____
CHKD BY: _____
FIELD BK: _____

PROJECT NO. | DRAWING NO.

Appendix 2: Construction Plans

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

Appendix 3: Soils Information

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

June 4, 2021

Earth Strata Geotechnical Services, Inc.
Geotechnical, Environmental and Materials Testing Consultants

Project No. 213503-12A

Mr. Jordan Bursch
Director of Acquisitions
CORMAN LEIGH
32823 Temecula Pkwy
Temecula, CA 92592

Subject: **Infiltration Testing for Water Quality Treatment Areas, Proposed Commercial and Residential Development, Assessor's Parcel Number 900-030-036, Located on the Southeast Corner of Whitewood Road and Clinton Keith Road, City of Murrieta, Riverside County, California**

INTRODUCTION

Earth Strata Geotechnical Services is pleased to present this infiltration feasibility report for the proposed commercial and residential development, located on the southeast corner of Whitewood Road and Clinton Keith Road, Assessor Parcel Number 900-030-036, in the City of Murrieta, Riverside County, California. The purpose of our study was to determine the infiltration rates and physical characteristics of the subsurface earth materials at the approximate depth of the proposed WQMP area within the proposed development. This feasibility report provides the infiltration rates to be used for the design and the development of the water quality management plan, where applicable.

PROPERTY DESCRIPTION

The subject property is located on the southeast corner of Whitewood Road and Clinton Keith Road in the City of Murrieta, Riverside County, California. The approximate location of the site is shown on the Vicinity Map, Figure 1.

The subject property is comprised of approximately 29 acres of undeveloped land. Topographic relief at the subject property is relatively varied with the terrain being generally hilly. Elevations at the site range from approximately 1560 to 1415 feet above mean sea level (msl), for a difference of about 145± feet across the entire site. Drainage within the subject property generally flows to the northeast.

The site is currently bordered by open land to the south and east, and Clinto Keith Road to the north, with Whitewood Road and Vista Murrieta High School to the west. Most of the vegetation on the site consists of dense amounts of annual weeds/grasses, along with small to large trees in the southeastern corner of the subject site.

PROPOSED CONSTRUCTION

The proposed multi-family residential and commercial development is expected to consist of concrete, wood or steel framed one- and/or two-story to three-story structures utilizing slab on grade construction with associated streets, landscape areas, utilities and onsite water quality treatment areas.

SUBSURFACE EXPLORATION

Subsurface Exploration

Subsurface exploration within the subject site was performed on January 15, 2021 for the exploratory excavations. A backhoe was utilized to excavate fifteen (15) test pits to a maximum depth of 13 feet. The exploratory holes were excavated for geotechnical evaluation purposes with respect to the proposed developments and to interpret whether groundwater or impermeable soil layers were present. An underground utilities clearance was obtained from Underground Service Alert of Southern California, prior to the subsurface exploration. The approximate locations of the exploratory excavations are shown on the attached Infiltration Location Map, Plate 1 and descriptive logs are presented in Appendix A.

Earth materials encountered during exploration were classified and logged in general accordance with the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) of ASTM D 2488. Upon completion of laboratory testing, exploratory logs and sample descriptions may have been reconciled to reflect laboratory test results with regard to ASTM D 2487.

Earth Materials

A general description of the earth materials observed on site is provided below.

- Topsoil (no map symbol): Residual topsoil, encountered in the upper 1 to 4 feet, blankets the site and underlying bedrock. These materials were noted to be generally reddish brown to yellow brown, silty sand which were very porous, dry to slightly moist and in a loose to medium dense state.

- Quaternary Alluvium Deposits (map symbol Qa): Quaternary alluvial deposits were encountered directly from the surface within the topographically low portions of the site to a maximum depth of 5 feet. These relatively young alluvial deposits consist predominately of yellowish brown, fine to coarse grained silty sand. These deposits were generally noted to be in a slightly moist, loose state.

- Cretaceous Gabbro (map symbol Kgb): Cretaceous age plutonic rock consisting of gabbro was mapped within the western portion of the site. The gabbro was observed to be olive brown to light gray, medium to very coarse grained, and in a moderately hard to very hard state. Typically, the upper 1 to 3 feet of this unit is more weathered and not as hard.

- Cretaceous Monzograntite/Granodiorite (map symbol Kpvg): Cretaceous age plutonic rock consisting of monzogranite was mapped in the eastern portion of the site with locally shallower depths. The monzogranite was observed to be light reddish brown to olive brown, medium to very coarse grained, and in a slightly moist to dry, moderately hard to very hard state. Typically, the upper 1 to 3 feet of this unit are more weathered and not as hard.

- Cretaceous Tonalite (map symbol Kpvt): Cretaceous age tonalite was mapped below 1½ feet within the eastern portion of the site, with locally shallower depths. Tonalite has a similar chemical composition to gabbro, but includes a higher percentage of quartz. The tonalite was generally noted to be yellowish brown to bluish gray, dry and was found to be in a moderately hard to very hard state. Typically, the upper 1 to 3 feet of this unit is more weathered and not as hard.

INFILTRATION TESTING

The double ring infiltrometer test method was utilized to perform a total of five (5) infiltration tests on March 24, 2021 to evaluate near surface infiltration rates in order to estimate the amount of storm water runoff that can infiltrate into the onsite water quality treatment plan areas. The infiltration tests were performed in general accordance with the requirements of double ring infiltration testing, ASTM D3385 and Appendix A of the Riverside County Flood Control and Water Conservation District.

The infiltration tests were performed using double ring infiltrometer and Mariotte tubes at a depth of 5 feet below existing grades. The locations of the infiltration tests are indicated on the attached infiltration Location Map, Plate 1. The double ring infiltrometer tests were located by property boundary measurement on the site plan and by using geographic features. Infiltration test data recorded in the field are summarized in the following table and is included within Appendix B including the graph of Infiltration Rate versus Elapsed Time.

Infiltration Test Summary

TEST NUMBER	INFILTRATION HOLE DEPTH (ft.)	INFILTRATION RATE (in/hr)	DESCRIPTION
DR-1	5	1.19	Silty SAND
DR-2	5	1.35	Silty SAND
DR-3	5	2.97	Silty SAND
DR-4	5	2.97	Silty SAND
DR-5	5	1.08	Silty SAND

The measured infiltration test rates ranged from 1.08 to 2.97 inches per hour (in/hr). A factor of safety of 3 should be applied to the measured infiltration rates.

CONCLUSIONS AND RECOMMENDATIONS

General

From geotechnical and engineering geologic points of view, the proposed WQMP areas, where tested, are considered suitable for infiltration for the proposed development, provided the following conclusions and recommendations are incorporated into the plans and are implemented during construction.

Groundwater

Groundwater was not observed during our subsurface exploration. Historic groundwater data from the California Geologic Survey indicates that no shallow groundwater is present in the subject area, which meets the minimum separation of 10 feet from the bottom of infiltration facility to the groundwater mark. Potential groundwater impact is considered very low

Geologic/ Geotechnical Screening

The proposed WQMP areas should be located away from and at a lower elevation than the proposed structures in competent native earth materials.

The proposed structures will be supported by compacted fill and competent earth materials, with no shallow groundwater present. According to the County of Riverside reports, the subject site is located in an area where liquefaction potential is considered very low. As such, the potential for earthquake induced liquefaction and lateral spreading beneath the proposed structures is considered very low due to the recommended compacted fill, lack of shallow groundwater, and the dense nature of the deeper onsite earth materials.

Preliminary laboratory test results indicate onsite earth materials exhibit an expansion potential of **VERY LOW** as classified in accordance with 2019 CBC Section 1803.5.3 and ASTM D4829.

Therefore, infiltration within the proposed WQMP areas will not encroach on any proposed structures and will not increase the risk of geologic hazards.

Recommended Factor of Safety/Design Rate

The recommended factor of safety for the infiltration design is 3. Based on the data presented in this report and the recommendations set forth herein, it is the opinion of Earth Strata Geotechnical Services that the WQMP areas can be designed, utilizing a factor of safety of 3 for an infiltration rate of 0.85 inches per hour in the vicinity of DR-1 and DR-2, 1.0 inches per hour in the vicinity of DR-3 and DR-4 and 0.36 inches per hour in the vicinity of DR-5.

PLAN REVIEW AND CONSTRUCTION SERVICES

This report has been prepared for the exclusive use of **Mr. Jordan Bursch** and their authorized representative. It likely does not contain sufficient information for other parties or other uses. Earth Strata should be engaged to review the final design plans and specifications prior to construction. This is to verify that the recommendations contained in this report have been properly incorporated into the project plans and specifications. Should Earth Strata not be accorded the opportunity to review the project plans and specifications, we are not responsibility for misinterpretation of our recommendations.

Earth Strata should be retained to provide observations during construction to validate this report. In order to allow for design changes in the event that the subsurface conditions differ from those anticipated prior to construction.

Earth Strata should review any changes in the project and modify and approve in writing the conclusions and recommendations of this report. This report and the drawings contained within are intended for design input purposes only and are not intended to act as construction drawings or specifications. In the event that conditions encountered during grading or construction operations appear to be different than those indicated in this report, this office should be notified immediately, as revisions may be required.

REPORT LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists, practicing at the time and location this report was prepared. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Earth materials vary in type, strength, and other geotechnical properties between points of observation and exploration. Groundwater and moisture conditions can also vary due to natural processes or the works of man on this or adjacent properties. As a result, we do not and cannot have complete knowledge of the subsurface conditions beneath the subject property. No practical study can completely eliminate uncertainty with regard to the anticipated geotechnical conditions in connection with a subject property.

The conclusions and recommendations within this report are based upon the findings at the points of observation and are subject to confirmation by Earth Strata during construction. This report is considered valid for a period of one year from the time the report was issued.

This report was prepared with the understanding that it is the responsibility of the owner or their representative, to ensure that the conclusions and recommendations contained herein are brought to the attention of the other project consultants and are incorporated into the plans and specifications. The owners' contractor should properly implement the conclusions and recommendations during grading and construction, and notify the owner if they consider any of the recommendations presented herein to be unsafe or unsuitable.

Respectfully submitted,

EARTH STRATA GEOTECHNICAL SERVICES

Stephen M. Poole

REGISTERED PROFESSIONAL ENGINEER
STEPHEN MICHAEL POOLE
No. 692
GEOTECHNICAL
STATE OF CALIFORNIA

Stephen M. Poole, PE 40219
President
Principal Engineer

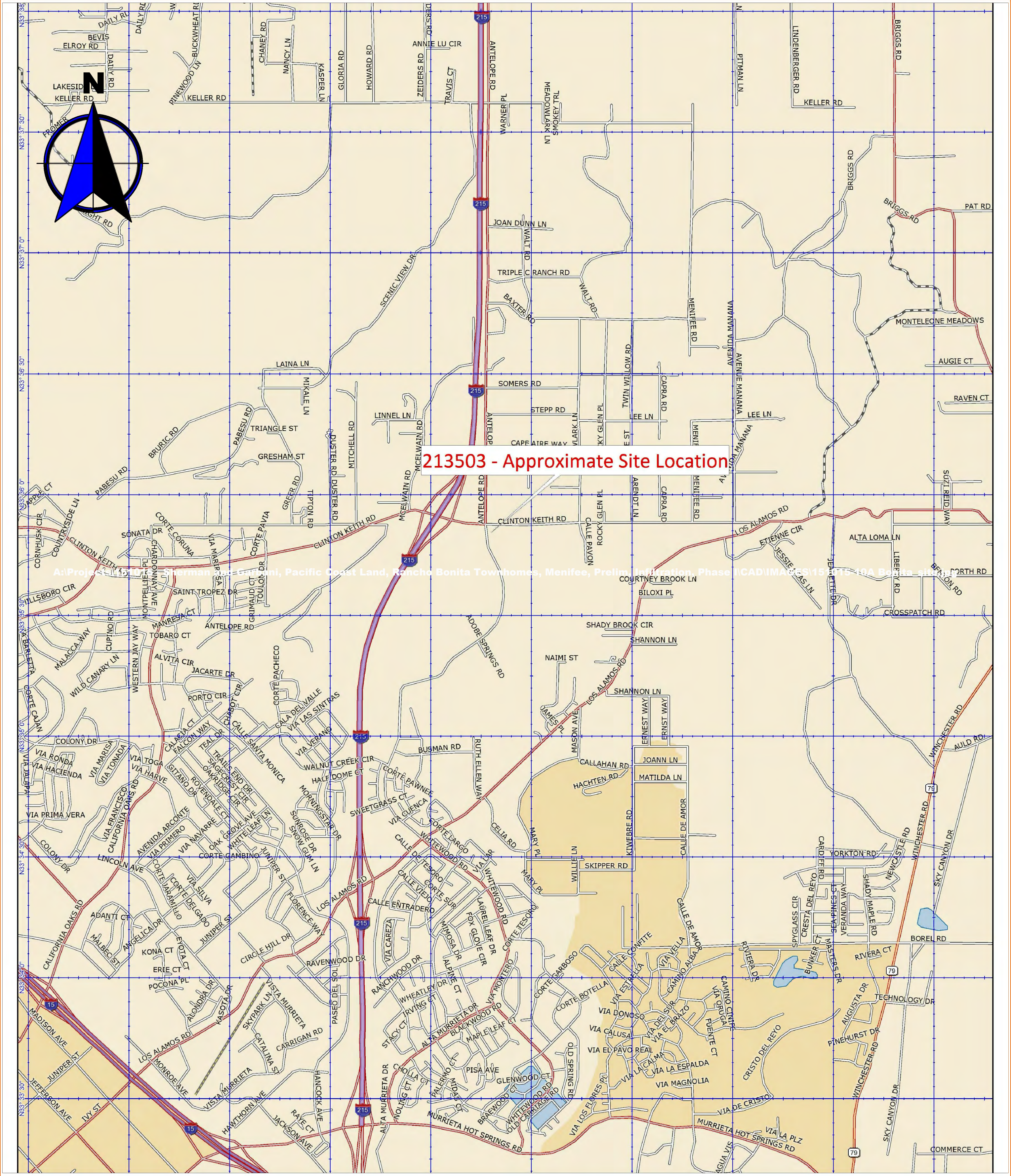
SMP/hr

Distribution: (1) Addressee

Attachments: Figure 1 – Vicinity Map *(Rear of Text)*
Appendix *A – Exploratory Logs *(Rear of Text)*
Appendix B – Infiltration Test Sheets *(Rear of Text)*
Plate 1 – Infiltration Location Map *(Rear of Text)*

FIGURE 1

VICINITY MAP



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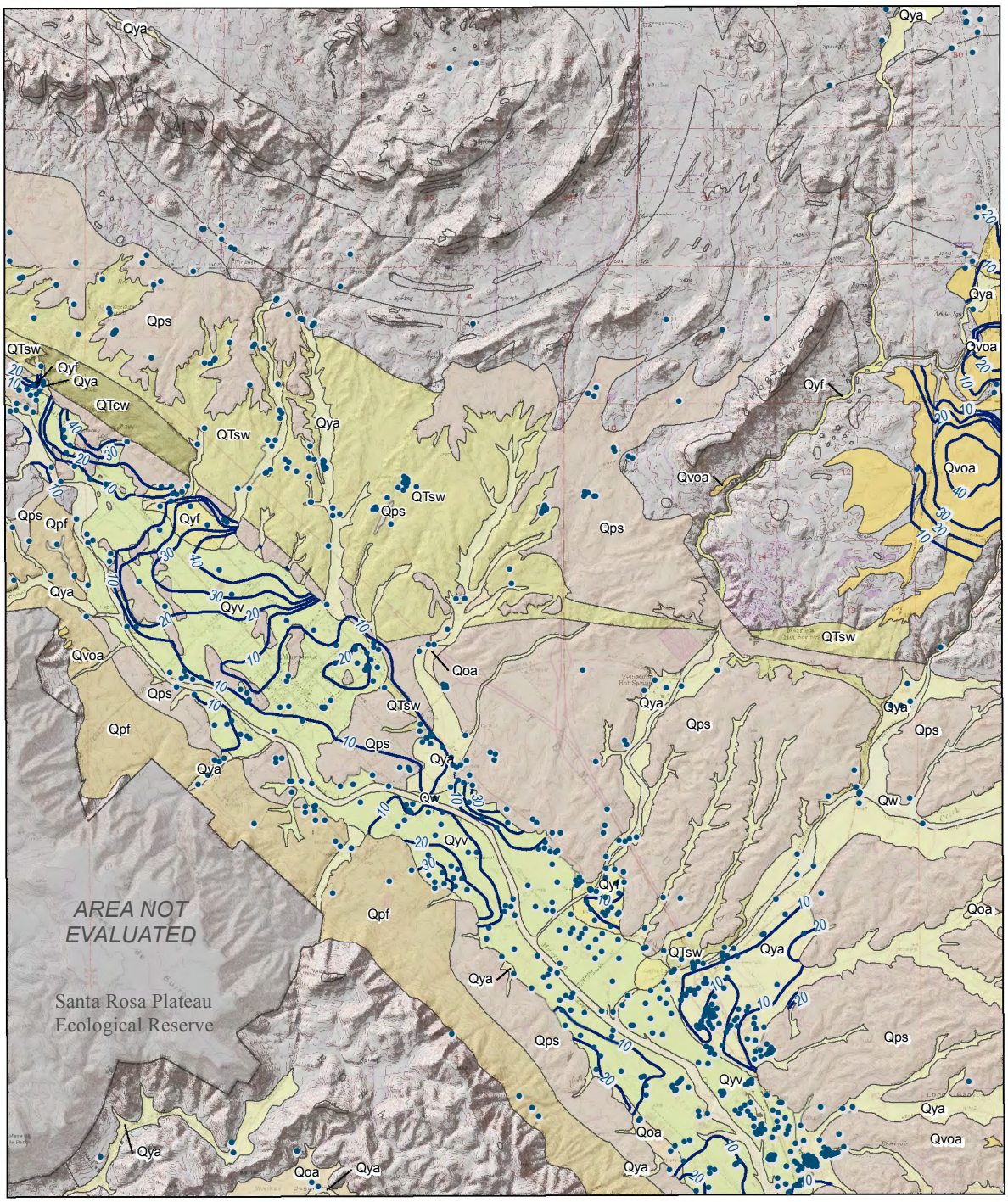
Earth Strata Geotechnical Services, Inc.

Geotechnical, Environmental and Materials Testing Consultants

www.ESGSINC.com (951) 397-8315

PROPOSED COMMERCIAL AND RESIDENTIAL DEVELOPMENT		213503-10A
VICINITY MAP	SCALE 1:40,625	
	JAN 2021	FIGURE 1



Topographic base map from USGS. Contour interval 20 feet. Scale 1:75,000. Map preparation by Janine Bird, CGS.

MURRIETA QUADRANGLE

N

1 0.5 0 1 2 Miles

5,000 2,500 0 5,000 10,000 Feet

1 0.5 0 1 2 Kilometers

See "Geology" in Section 1 of report for descriptions of units.
Pre-Quaternary bedrock units shown without color.

Groundwater measurement location

10 Depth to groundwater (in feet)

Plate 1.2 Depth to Historic-High Groundwater levels in Quaternary Alluvial Deposits and Groundwater Measurement Locations, Murrieta Quadrangle, California.

APPENDIX A

EXPLORATORY LOGS

Geotechnical Test Pit Log TP-1

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Topsoil:**
					SM	Silty SAND; brown, dry, medium dense, fine to medium sand
5						**Cretaceous Gabbro (Kgb):**
						GABBRO; olive brown, dry, hard, moderately weathered, breaks down to Silty SAND with gravel and cobbles
10						Slightly weathered below 9 feet
						Practical Refusal at 9 feet
						Total Depth: 9 feet
						No Groundwater
15						
20						
25						
30						

42184 Remington Avenue, Temecula, CA 92590

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Geotechnical Test Pit Log TP-2

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Topsoil:**
					SM	Silty SAND; reddish brown, dry to slightly moist, medium dense, fine to coarse sand
						Cretaceous Gabbro (Kgb):
5						GABBRO; olive to reddish brown, dry, hard, moderately weathered, breaks down into Silty SAND with gravel and cobbles
						Slightly weathered, very hard below 7 feet
						Practical Refusal at 7 feet
10						Total Depth: 7 feet
						No Groundwater
15						
20						
25						
30						

42184 Remington Avenue, Temecula, CA 92590

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Geotechnical, Environmental and Materials Testing Consultants
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Geotechnical Test Pit Log TP-3

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Topsoil:**
					SM	Silty SAND; reddish brown, dry, medium dense, fine to coarse sand
						Cretaceous Gabbro (Kgb):
						GABBRO; reddish brown to olive brown, dry, moderately hard, moderately
						weathered, breaks down to Silty SAND, fine to coarse sand w/gravel and cobbles (friable)
5						
10						
						Total Depth: 10.5 feet
						No Groundwater
15						
20						
25						
30						

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Geotechnical Test Pit Log TP-4

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Topsoil:**
					SM	Silty SAND; reddish brown, dry, medium dense, fine to coarse sand
						Cretaceous Gabbro (Kgb):
						GABBRO; light gray, dry, hard, slightly weathered, breaks down to Silty SAND,
5						fine to coarse sand with gravel and cobbles (friable)
						Practical Refusal at 6.75 feet
						Total Depth: 6.75 feet
10						No Groundwater
15						
20						
25						
30						

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Geotechnical Test Pit Log TP-5

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Quaternary Alluvium (Qa):**
					SM	Silty SAND; brown, slightly moist, loose, fine to coarse sand
5						**Cretaceous Monzogranite (Kpvg):**
						MONZOGRANITE; yellowish brown, dry, moderately hard, slightly weathered,
						breaks down to Silty SAND, fine to coarse sand with gravel and cobbles (friable)
10						Practical Refusal at 10 feet
						Total Depth: 10 feet
						No Groundwater
15						
20						
25						
30						

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Geotechnical Test Pit Log TP-6

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Topsoil:**
					SM	Silty SAND; reddish brown, slightly moist, medium dense, fine to coarse sand
						Cretaceous Gabbro (Kgb):
						GABBRO; olive gray, dry, moderately hard, moderately weathered, breaks down
						to Silty SAND, fine to coarse sand with gravel and cobble (friable)
5						
						Slightly weathered, hard below 7 feet
						Practical Refusal at 7 feet
						Total Depth: 7 feet
10						No Groundwater
15						
20						
25						
30						

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Geotechnical Test Pit Log TP-7

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Topsoil:**
					SM	Silty SAND; reddish brown, dry to slightly moist, medium dense, fine to coarse sand
						Cretaceous Gabbro (Kgb):
5						GABBRO; olive gray, dry, moderately hard, moderately weathered, breaks down to Silty SAND, fine to coarse sand
10						Slightly weathered, very hard below 13 feet
						Total Depth: 13 feet
15						No Groundwater
20						
25						
30						

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Geotechnical Test Pit Log TP-8

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Cretaceous Tonalite (Kpvt):**
						TONALITE; yellowish brown, dry, moderately hard, moderately weathered,
						breaks down to Silty SAND; fine to coarse sand
						Bluish gray below 5 feet, slightly weathered, very hard, breaks down to
5						Silty SAND with cobbles
						Practical Refusal at 5 feet
						Total Depth: 5 feet
						No Groundwater
10						
15						
20						
25						
30						

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Geotechnical Test Pit Log TP-9

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Cretaceous Tonalite (Kpvt):**
						TONALITE; olive gray, dry, moderately hard, moderately weathered, breaks
						down to Silty SAND, fine to coarse sand with gravel and cobbles (friable)
5						
						Slightly weathered, very hard below 8 feet
						Practical refusal at 8 feet
10						Total Depth: 8 feet
						No Groundwater
15						
20						
25						
30						

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Geotechnical Test Pit Log TP-10

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Cretaceous Tonalite (Kpvt):**
						TONALITE; yellowish brown, dry, moderately hard, moderately weathered
						breaks down to Silty SAND, fine to coarse sand with gravel and cobble (friable)
5						
						Slightly weathered, very hard below 9 feet
						Practical Refusal at 9 feet
10						Total Depth: 9 feet
						No Groundwater
15						
20						
25						
30						

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Geotechnical Test Pit Log TP-11

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Topsoil:**
					SM	Silty SAND; yellowish brown, dry, medium dense, fine to coarse sand
						Cretaceous Tonalite (Kpvt):
						TONALITE; yellowish brown, dry, hard, slighlty weathered, breaks down to
						Silty SAND
5						
						Very hard below 6 feet
						Practical Refusal at 6 feet
						Total Depth: 6 feet
						No Groundwater
10						
15						
20						
25						
30						

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Geotechnical Test Pit Log TP-12

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Cretaceous Tonalite (Kpvt):**
						TONALITE; yellowish brown, dry, moderately hard, moderately weathered, breaks
						down to Silty SAND; fine to coarse sand with gravel and cobble (friable)
5						
						Very hard below 8 feet
						Practical Refusal at 8.5 feet
10						Total Depth: 8.5 feet
						No Groundwater
15						
20						
25						
30						

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Geotechnical Test Pit Log TP-13

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Topsoil:**
					SM	Silty SAND; yellowish brown, moist, medium dense, breaks down into Silty
						SAND, fine to coarse sand with gravel and cobbles (friable)
						Cretaceous Monzogranite (Kpvg):
5						MONZOGRANITE; yellowish brown, slightly moist, moderately hard,
						moderately weathered, breaks down to Silty SAND, fine to coarse sand
						Slightly weathered, hard below 7 feet
						Practical refusal at 8 feet
10						Total Depth: 8 feet
						No Groundwater
15						
20						
25						
30						

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Geotechnical Test Pit Log TP-14

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Topsoil:**
					SM	Silty SAND; yellowish brown, dry, medium dense, fine to coarse sand
5						**Cretaceous Monzogranite (Kpvg):**
						MonzoGRANITE; yellowish brown, dry, moderately hard, moderately weathered, breaks down to Silty SAND, fine to coarse sand
10						
						Total Depth: 12 feet
						No Groundwater
15						
20						
25						
30						

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Geotechnical Test Pit TP-15

Date: January 15, 2021	**Project Name: SE Corner Clinton Keith / Whitewood Rd, Murrieta** **Page: 1 of 1**
Project Number: 213503-10A	**Logged By: JF**
Drilling Company: Drilling It	**Type of Rig:CAT 315F L Excavator**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Cretaceous Monzogranite (Kpvg):**
						MONZOGRANITE; yellowish brown to olive brown, dry, moderately hard,
						moderately weathered, breaks down to Silty SAND, fine to coarse sand with
						gravel and cobble (friable)
5						
						Slightly weathered below 9 feet, very hard
10						Practical Refusal at 9 feet
						Total Depth: 9 feet
						No Groundwater
15						
20						
25						
30						

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APPENDIX B

INFILTRATION TEST SHEETS

Test No.	DR-1	Location	See Map	Turf-Tec International - Record Chart for IN10-W - (12 & 24 Inch Infiltration Rings)

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Project Identification:	213503-12A				Constants	Area cm2	Depth of Liquid (cm)	Liquid Container Number		Marriotte Tube Volume		
Test Location:	DR-1				Inner Ring	729	10.0	1		10000		
Liquid Used:	TAP WATE	pH:	8.0		Annular Ring	2189	10.0	2		10000		
Tested By:	JMR		Date	3/24/2021	Liquid level maintained	(X) Flow Valve	( ) Float Valve	( ) Mariotte Tubes				
Depth to water table:			Depth of Test	5'	Penetration Depth of Outer Ring:	9 cm		Other				

Trial #	Start / End	Date MM/DD/YY	Time HR:MIN	Time Increment /(Total)	Elapsed Time (Min)	Flow Readings				Liquid Temp °F	Infiltration Rates				Ground Temperature		Remarks
						Inner Ring Reading cm	Inner Maroitte Tube Flow (ml)	Annular Space Reading cm	Annular Space Marriotte Tube Flow (ml)		Inner Infiltration Rate cm/h	Inner Infiltration Rate In/h	Annular Infiltration Rate cm/h	Annular Infiltration Rate In/h	Ground Temp Depth (cm)	Temp at Depth (c)	Weather conditions Etc...
1	Start Test	3/24/2021	11:20	0:30	30												
	End Test	3/24/2021	11:50	0:30			2250		8500		6.17	**2.43**	7.77	**3.06**			
2	Start Test	3/24/2021	12:05	0:30	60												
	End Test	3/24/2021	12:35	1:00			1500		7250		4.12	**1.62**	6.62	**2.61**			
3	Start Test	3/24/2021	12:43	0:30	90												
	End Test	3/24/2021	13:13	1:30			1250		4000		3.43	**1.35**	3.65	**1.44**			
4	Start Test	3/24/2021	13:18	0:30	120												
	End Test	3/24/2021	13:48	2:00			1100		5000		3.02	**1.19**	4.57	**1.80**			
5	Start Test	3/24/2021	13:52	0:30	150												
	End Test	3/24/2021	14:22	2:30			1100		5500		3.02	**1.19**	5.03	**1.98**			
6	Start Test	3/24/2021	14:28	0:30	180												
	End Test	3/24/2021	14:58	3:00			1000		5100		2.74	**1.08**	4.66	**1.83**			
7	Start Test	3/24/2021	15:05	0:30	210												
	End Test	3/24/2021	15:35	3:30			1100		6000		3.02	**1.19**	5.48	**2.16**			
8	Start Test	3/24/2021	15:39	0:30	240												
	End Test	3/24/2021	16:09	4:00			1100		5000		3.02	**1.19**	4.57	**1.80**			
9	Start Test	3/24/2021	16:14	0:30	270												
	End Test	3/24/2021	16:44	4:30			1100		5500		3.02	**1.19**	5.03	**1.98**			
10	Start Test	3/24/2021	16:50	0:30	300												
	End Test	3/24/2021	17:20	5:00			1100		5250		3.02	**1.19**	4.80	**1.89**			

Turf-Tec International

Project Identification:	213503-12A		
Test Location:	DR-1		
Liquid Used:	TAP WAT	**pH:**	8.0
Tested By:	JMR		
Depth to water table:			0

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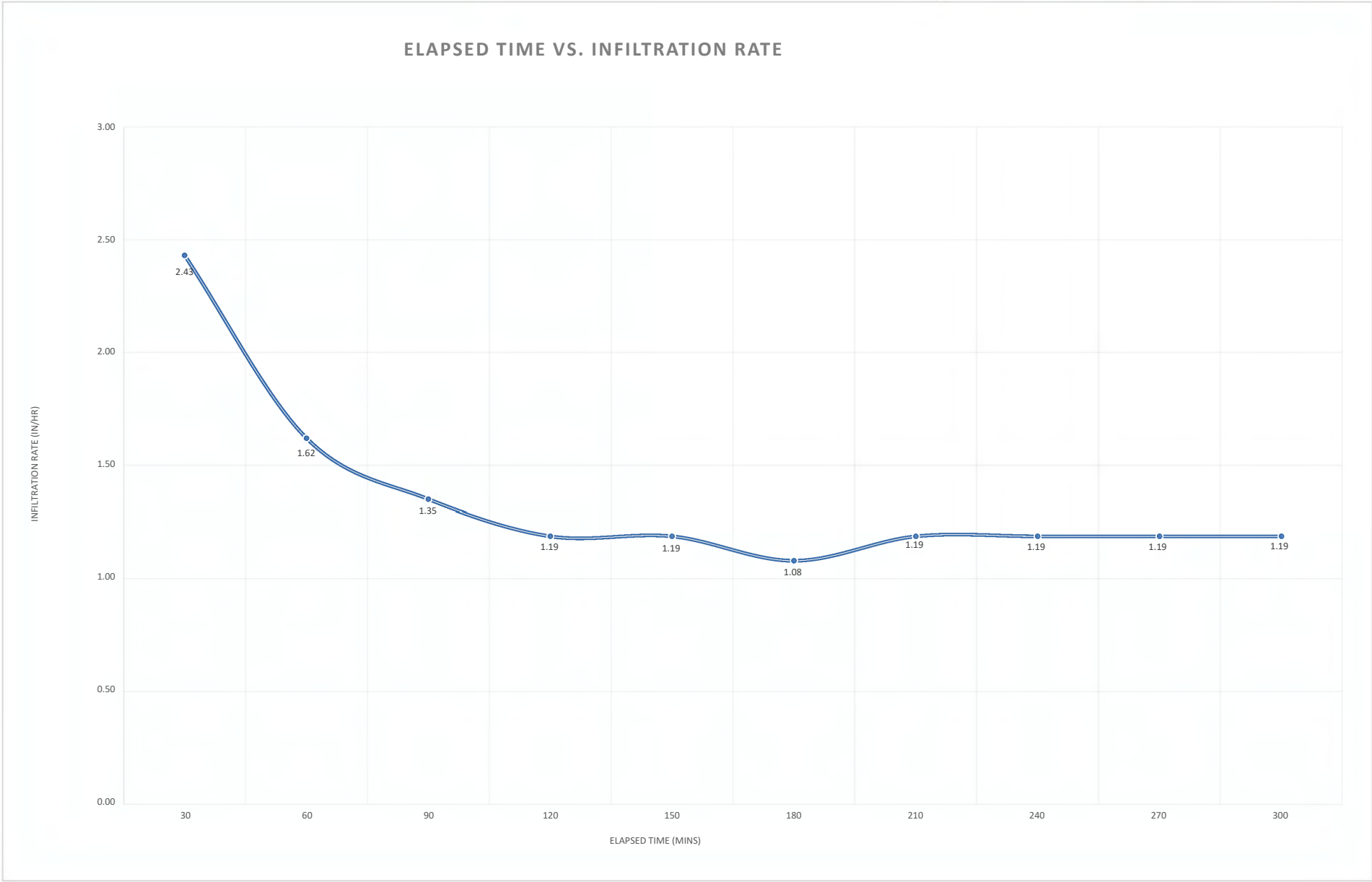

Test No.	DR-2	Location	See Map	Turf-Tec International - Record Chart for IN10-W - (12 & 24 Inch Infiltration Rings)

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Project Identification:	213503-12A				Constants	Area cm2	Depth of Liquid (cm)	Liquid Container Number		Marriotte Tube Volume			
Test Location:	DR-2				Inner Ring	729	10.0	1		10000			
Liquid Used:	TAP WATE	pH:	8.0		Annular Ring	2189	10.0	2		10000			
Tested By:	JMR		Date	3/24/2021	Liquid level maintained	(X) Flow Valve	( ) Float Valve	( ) Mariotte Tubes					
Depth to water table:			Depth of Test	5'	Penetration Depth of Outer Ring:	9 cm		Other					

Trial #	Start / End	Date MM/DD/YY	Time HR:MIN	Time Increment /(Total)	Elapsed Time (Min)	Flow Readings				Liquid Temp °F	Infiltration Rates				Ground Temperature		Remarks
						Inner Ring Reading cm	Inner Maroitte Tube Flow (ml)	Annular Space Reading cm	Annular Space Marriotte Tube Flow (ml)		Inner Infiltration Rate cm/h	Inner Infiltration Rate In/h	Annular Infiltration Rate cm/h	Annular Infiltration Rate In/h	Ground Temp Depth (cm)	Temp at Depth (c)	Weather conditions Etc...
1	Start Test	3/24/2021	11:25	0:30	30												
	End Test	3/24/2021	11:55	0:30			2750		7500		7.54	**2.97**	6.85	**2.70**			
2	Start Test	3/24/2021	12:08	0:30	60												
	End Test	3/24/2021	12:38	1:00			1600		5250		4.39	**1.73**	4.80	**1.89**			
3	Start Test	3/24/2021	12:45	0:30	90												
	End Test	3/24/2021	13:15	1:30			1250		5000		3.43	**1.35**	4.57	**1.80**			
4	Start Test	3/24/2021	13:21	0:30	120												
	End Test	3/24/2021	13:51	2:00			1250		5750		3.43	**1.35**	5.25	**2.07**			
5	Start Test	3/24/2021	13:55	0:30	150												
	End Test	3/24/2021	14:25	2:30			1250		4750		3.43	**1.35**	4.34	**1.71**			
6	Start Test	3/24/2021	14:30	0:30	180												
	End Test	3/24/2021	15:00	3:00			1000		5250		2.74	**1.08**	4.80	**1.89**			
7	Start Test	3/24/2021	15:08	0:30	210												
	End Test	3/24/2021	15:38	3:30			1250		5000		3.43	**1.35**	4.57	**1.80**			
8	Start Test	3/24/2021	15:40	0:30	240												
	End Test	3/24/2021	16:10	4:00			1250		4750		3.43	**1.35**	4.34	**1.71**			
9	Start Test	3/24/2021	16:16	0:30	270												
	End Test	3/24/2021	16:46	4:30			1000		4750		2.74	**1.08**	4.34	**1.71**			
10	Start Test	3/24/2021	16:54	0:30	300												
	End Test	3/24/2021	17:24	5:00			1250		4750		3.43	**1.35**	4.34	**1.71**			

Turf-Tec International

Project Identification:	213503-12A		
Test Location:	DR-2		
Liquid Used:	TAP WAT	**pH:**	8.0
Tested By:	JMR		
Depth to water table:			0

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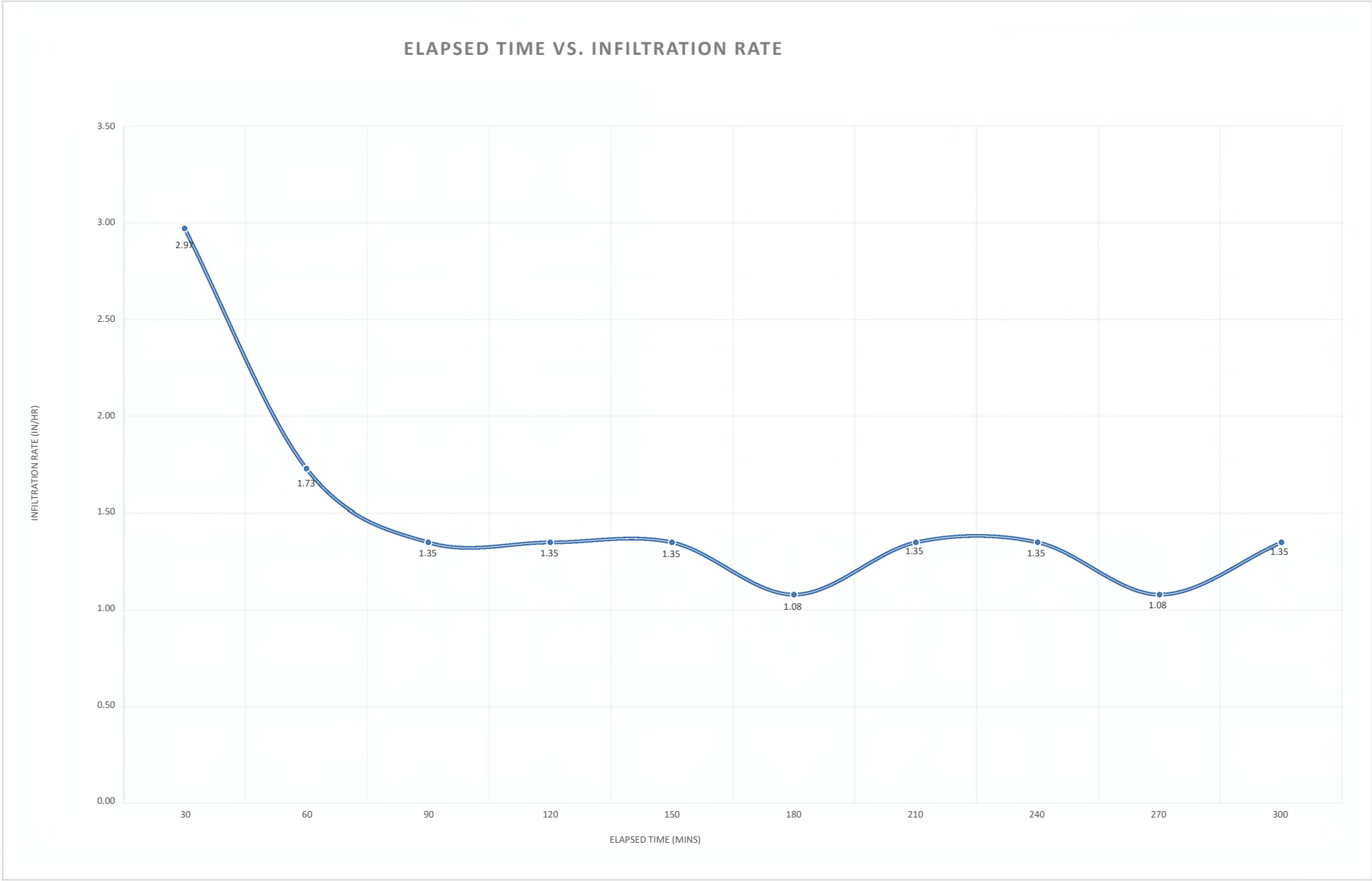

Test No.	DR-3	Location	See Map

Turf-Tec International - Record Chart for IN10-W - (12 & 24 Inch Infiltration Rings)

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Project Identification:	213503-12A					**Constants**	**Area cm2**	**Depth of Liquid (cm)**	**Liquid Container Number**		**Marriotte Tube Volume**		
Test Location:	DR-3					**Inner Ring**	729	10.0	1		10000		
Liquid Used:	TAP WATE	**pH:**	8.0			**Annular Ring**	2189	10.0	2		10000		
Tested By:	JMR		**Date**	3/24/2021		**Liquid level maintained**	(X) Flow Valve	( ) Float Valve	( ) Mariotte Tubes				
Depth to water table:			**Depth of Test**	5'		**Penetration Depth of Outer Ring:**	9 cm		**Other**				

Trial #	Start / End	Date MM/DD/YY	Time HR:MIN	Time Increment /(Total)	Elapsed Time (Min)	Flow Readings: Inner Ring Reading cm	Inner Maroitte Tube Flow (ml)	Annular Space Reading cm	Annular Space Marriotte Tube Flow (ml)	Liquid Temp °F	Infiltration Rates: Inner Infiltration Rate cm/h	Inner Infiltration Rate In/h	Annular Infiltration Rate cm/h	Annular Infiltration Rate In/h	Ground Temperature: Ground Temp Depth (cm)	Temp at Depth (c)	Remarks: Weather conditions Etc...
1	Start Test	3/24/2021	12:29	0:30	30												
	End Test	3/24/2021	12:59	0:30			5750		11500		15.78	**6.21**	10.51	**4.14**			
2	Start Test	3/24/2021	13:01	0:30	60												
	End Test	3/24/2021	13:31	1:00			5500		11250		15.09	**5.94**	10.28	**4.05**			
3	Start Test	3/24/2021	13:48	0:30	90												
	End Test	3/24/2021	14:18	1:30			4000		10000		10.97	**4.32**	9.14	**3.60**			
4	Start Test	3/24/2021	14:20	0:30	120												
	End Test	3/24/2021	14:50	2:00			3000		9500		8.23	**3.24**	8.68	**3.42**			
5	Start Test	3/24/2021	14:52	0:30	150												
	End Test	3/24/2021	15:22	2:30			2500		9000		6.86	**2.70**	8.22	**3.24**			
6	Start Test	3/24/2021	15:28	0:30	180												
	End Test	3/24/2021	15:58	3:00			2750		8000		7.54	**2.97**	7.31	**2.88**			
7	Start Test	3/24/2021	15:59	0:30	210												
	End Test	3/24/2021	16:29	3:30			2750		8250		7.54	**2.97**	7.54	**2.97**			
8	Start Test	3/24/2021	16:35	0:30	240												
	End Test	3/24/2021	17:05	4:00			2750		8250		7.54	**2.97**	7.54	**2.97**			

Turf-Tec International

Project Identification:	213503-12A		
Test Location:	DR-3		
Liquid Used:	TAP WAT	**pH:**	8.0
Tested By:	JMR		
Depth to water table:			0

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Test No.	DR-4	Location	See Map

Turf-Tec International - Record Chart for IN10-W - (12 & 24 Inch Infiltration Rings)

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				Constants	Area cm2	Depth of Liquid (cm)	Liquid Container Number	Marriotte Tube Volume
Project Identification:	213503-12A							
Test Location:	DR-4			Inner Ring	729	10.0	1	10000
Liquid Used:	TAP WATE	pH:	8.0	Annular Ring	2189	10.0	2	10000
Tested By:	JMR	Date	3/24/2021	Liquid level maintained	(X) Flow Valve ( ) Float Valve ( ) Mariotte Tubes			
Depth to water table:		Depth of Test	5'	Penetration Depth of Outer Ring:	9 cm	Other		

Trial #	Start / End	Date MM/DD/YY	Time HR:MIN	Time Increment /(Total)	Elapsed Time (Min)	Flow Readings: Inner Ring Reading cm	Inner Maroitte Tube Flow (ml)	Annular Space Reading cm	Annular Space Marriotte Tube Flow (ml)	Liquid Temp ºF	Infiltration Rates: Inner Infiltration Rate cm/h	Inner Infiltration Rate In/h	Annular Infiltration Rate cm/h	Annular Infiltration Rate In/h	Ground Temperature: Ground Temp Depth (cm)	Temp at Depth (c)	Remarks: Weather conditions Etc...
	Start Test	3/24/2021	12:34	0:30	30												
1	End Test	3/24/2021	13:04	0:30			2000		7500		5.49	**2.16**	6.85	**2.70**			
	Start Test	3/24/2021	13:05	0:30	60												
2	End Test	3/24/2021	13:35	1:00			2750		5250		7.54	**2.97**	4.80	**1.89**			
	Start Test	3/24/2021	13:50	0:30	90												
3	End Test	3/24/2021	14:20	1:30			2750		5000		7.54	**2.97**	4.57	**1.80**			
	Start Test	3/24/2021	14:22	0:30	120												
4	End Test	3/24/2021	14:52	2:00			1400		5750		3.84	**1.51**	5.25	**2.07**			
	Start Test	3/24/2021	14:54	0:30	150												
5	End Test	3/24/2021	15:24	2:30			2750		4750		7.54	**2.97**	4.34	**1.71**			
	Start Test	3/24/2021	15:34	0:30	180												
6	End Test	3/24/2021	16:04	3:00			2750		5250		7.54	**2.97**	4.80	**1.89**			
	Start Test	3/24/2021	16:05	0:30	210												
7	End Test	3/24/2021	16:35	3:30			2750		5000		7.54	**2.97**	4.57	**1.80**			
	Start Test	3/24/2021	16:39	0:30	240												
8	End Test	3/24/2021	17:09	4:00			2750		4750		7.54	**2.97**	4.34	**1.71**			

Turf-Tec International

Project Identification:	213503-12A		
Test Location:	DR-4		
Liquid Used:	TAP WAT	**pH:**	8.0
Tested By:	JMR		
Depth to water table:			0

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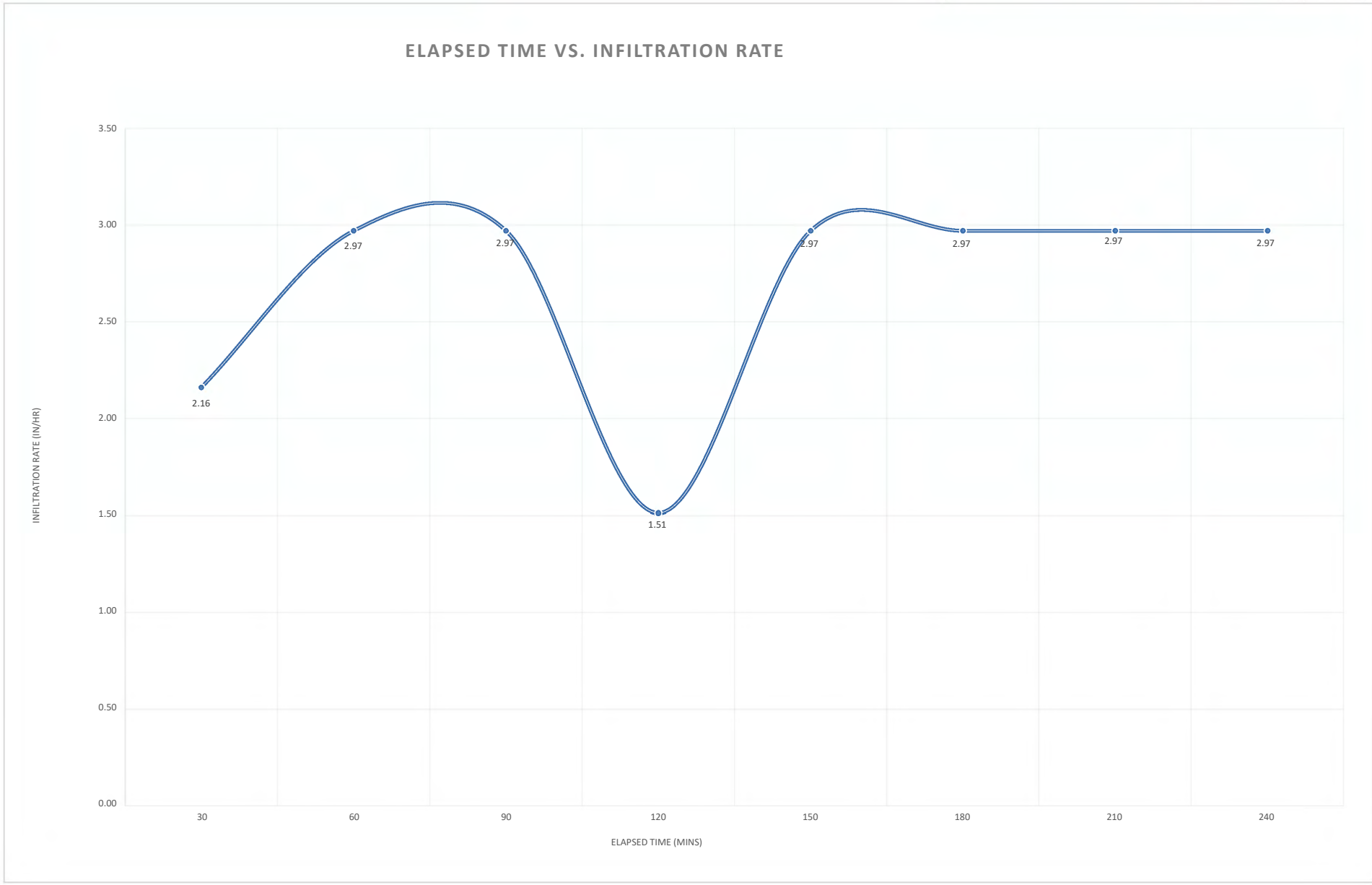

Test No.	DR-5	Location	See Map

Turf-Tec International - Record Chart for IN10-W - (12 & 24 Inch Infiltration Rings)

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Project Identification:	213503-12A				**Constants**	**Area cm2**	**Depth of Liquid (cm)**	**Liquid Container Number**		**Marriotte Tube Volume**		
Test Location:	DR-5				**Inner Ring**	729	10.0	1		10000		
Liquid Used:	TAP WATE	**pH:**	8.0		**Annular Ring**	2189	10.0	2		10000		
Tested By:	JMR		**Date**	3/24/2021	**Liquid level maintained**	(X) Flow Valve	( ) Float Valve	( ) Mariotte Tubes				
Depth to water table:			**Depth of Test**	5'	**Penetration Depth of Outer Ring:**	9 cm		**Other**				

						Flow Readings					Infiltration Rates				Ground Temperature		Remarks
Trial #	**Start / End**	**Date MM/DD/YY**	**Time HR:MIN**	**Time Increment /(Total)**	**Elapsed Time (Min)**	**Inner Ring Reading cm**	**Inner Maroitte Tube Flow (ml)**	**Annular Space Reading cm**	**Annular Space Marriotte Tube Flow (ml)**	**Liquid Temp °F**	**Inner Infiltration Rate cm/h**	**Inner Infiltration Rate In/h**	**Annular Infiltration Rate cm/h**	**Annular Infiltration Rate In/h**	**Ground Temp Depth (cm)**	**Temp at Depth (c)**	**Weather conditions Etc...**
	Start Test	3/24/2021	10:00	0:30	30												
1	End Test	3/24/2021	10:30	0:30			2120		8500		5.82	**2.29**	7.77	**3.06**			
	Start Test	3/24/2021	10:35	0:30	60												
2	End Test	3/24/2021	11:05	1:00			1525		7250		4.18	**1.65**	6.62	**2.61**			
	Start Test	3/24/2021	11:05	0:30	90												
3	End Test	3/24/2021	11:35	1:30			1265		4000		3.47	**1.37**	3.65	**1.44**			
	Start Test	3/24/2021	11:35	0:30	120												
4	End Test	3/24/2021	12:05	2:00			1100		5000		3.02	**1.19**	4.57	**1.80**			
	Start Test	3/24/2021	12:05	0:30	150												
5	End Test	3/24/2021	12:35	2:30			1100		5500		3.02	**1.19**	5.03	**1.98**			
	Start Test	3/24/2021	12:40	0:30	180												
6	End Test	3/24/2021	13:10	3:00			1000		5100		2.74	**1.08**	4.66	**1.83**			
	Start Test	3/24/2021	13:15	0:30	210												
7	End Test	3/24/2021	13:45	3:30			1000		6000		2.74	**1.08**	5.48	**2.16**			
	Start Test	3/24/2021	13:45	0:30	240												
8	End Test	3/24/2021	14:15	4:00			1000		5000		2.74	**1.08**	4.57	**1.80**			
	Start Test	3/24/2021	14:15	0:30	270												
9	End Test	3/24/2021	14:45	4:30			1000		5500		2.74	**1.08**	5.03	**1.98**			
	Start Test	3/24/2021	14:50	0:30	300												
10	End Test	3/24/2021	15:20	5:00			1000		5250		2.74	**1.08**	4.80	**1.89**			

Turf-Tec International

Project Identification:	213503-12A		
Test Location:	DR-5		
Liquid Used:	TAP WATI	**pH:**	8.0
Tested By:	JMR		
Depth to water table:			0

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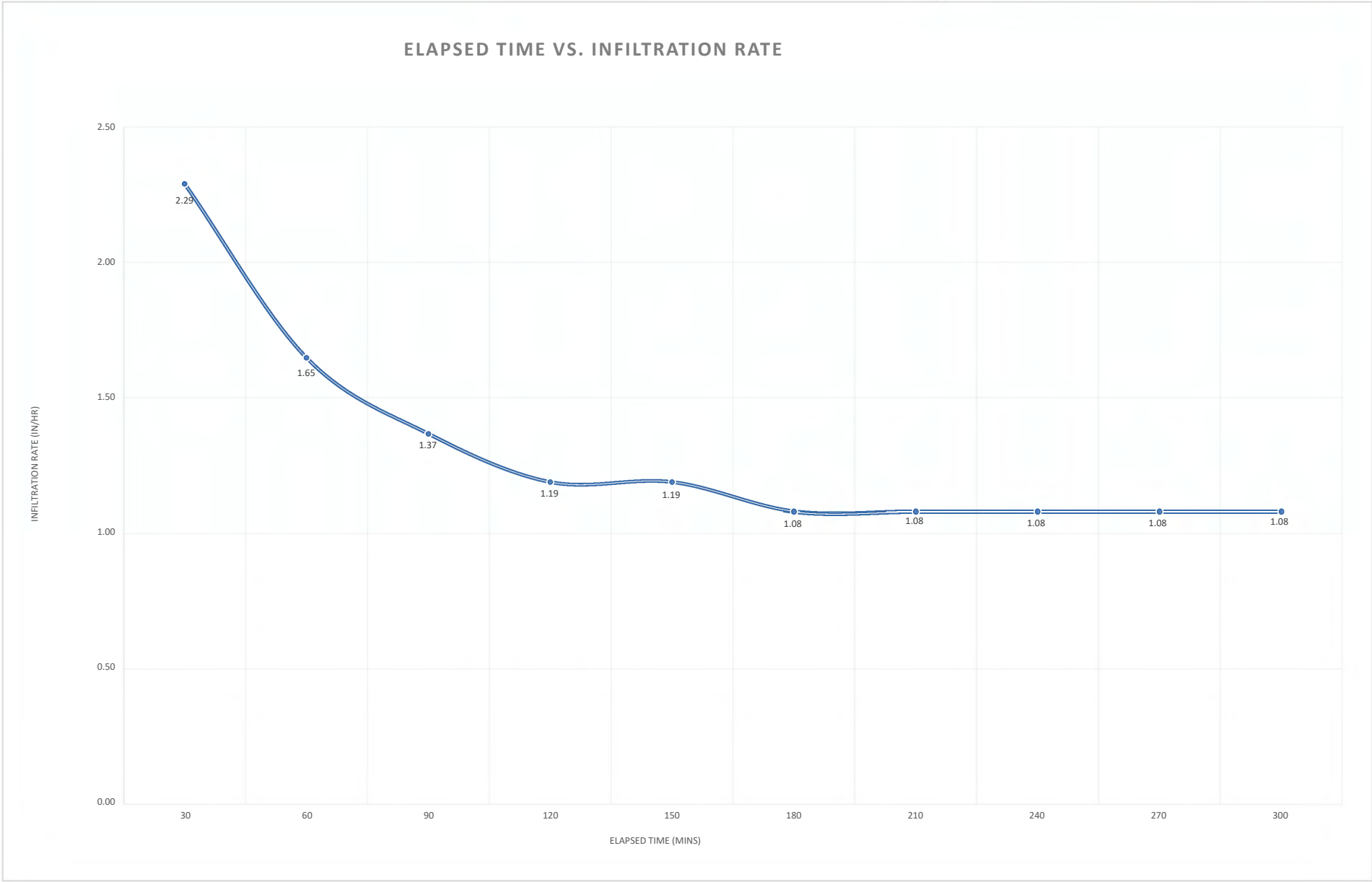

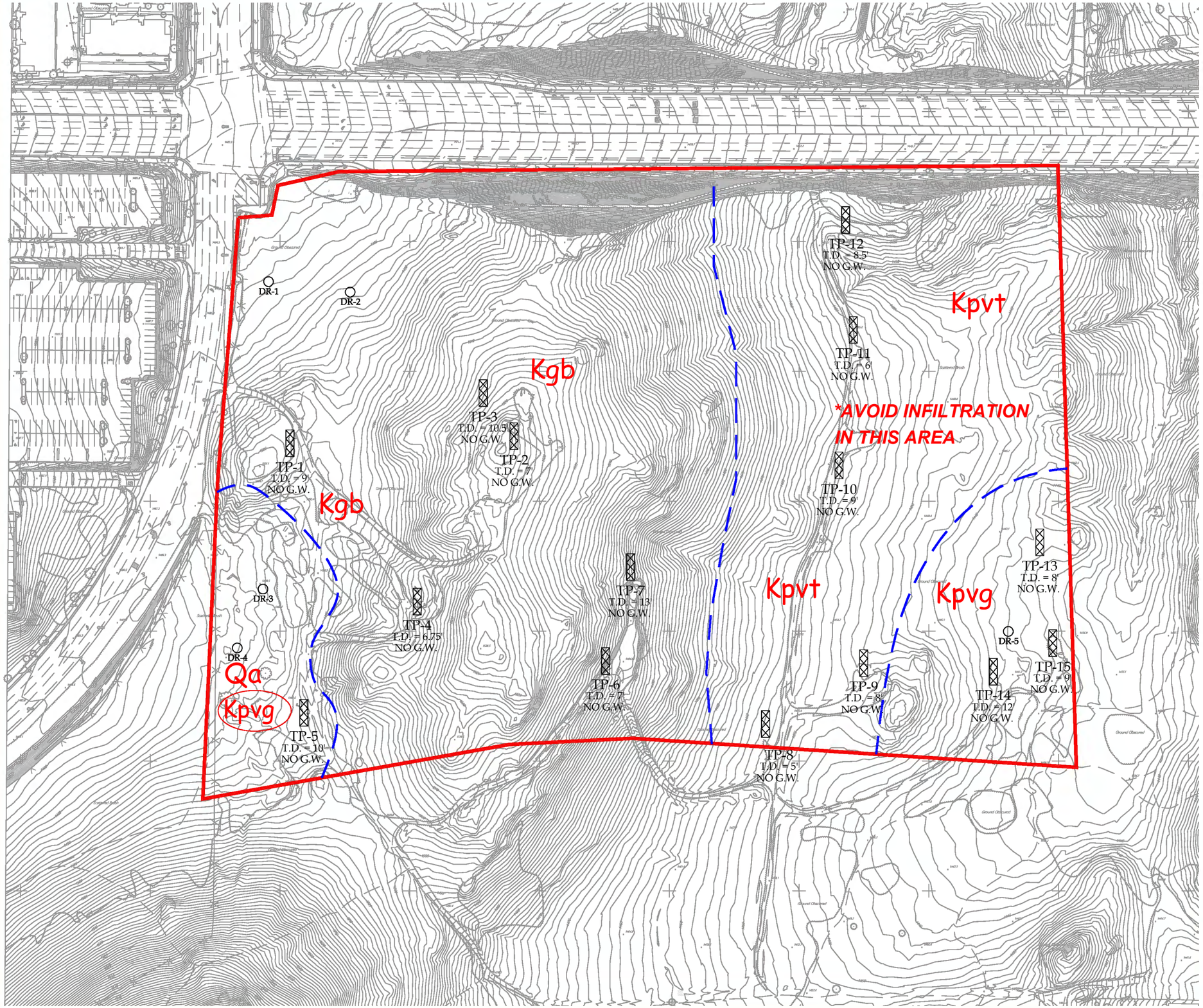

LEGEND

Locations are Approximate

Geologic Units

Qa	-	Quaternary Alluvium
Kgb	-	Cretaceous Gabbro
Kpvg	-	Cretaceous Monzogranite to Granodiorite (Circled where buried)
Kpvt	-	Cretaceous Tonalite

Symbols

- Limits of Report
- Geologic Contacts
- Test Pit Location (Including Total Depth and Depth to Groundwater) — e.g. TP-15, T.D. = 9', NO G.W.
- DR-5 — Double Ring test Loation

North

INFILTRATION MAP

LOCATED ON THE SOUTHEAST CORNER OF WHITEWOOD ROAD AND CLINTON KEITH ROAD

CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA

APN 900-030-036

PROJECT	PROPOSED COMMERCIAL AND RESIDENTIAL DEVELOPMENT		
CLIENT	MR. JORDAN BURSCH		
PROJECT NO.	213503-12A		
DATE	JUNE 2021		
SCALE	1:150		
DWG XREFS			
REVISION			
DRAWN BY	JDG	**PLATE**	1 OF 1

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Appendix 4: Historical Site Conditions

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

The site appears to have always been a vacant site. No previous Past Site Uses apply.

The project site has been vacant in its recent history. Below is an image from 2104 from Work Imagery Wayback:

Appendix 5: LID Feasibility Supplemental Information

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

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.	Raw ungraded land
1b	History of design discussions/coordination for the site proposed project, resulting in the final design determination (i.e. infiltration vs. flow-thru):	Infiltration
1c	The consideration of site design alternatives to achieve infiltration or partial infiltration on site;	To infiltrate and retain all onsite water flow
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);	Roads, residential buildings, water lines, sewer lines, curb, sidewalk, and storm drain lines
1e	The extent low impact development BMP requirements were included in the project site design (site design worksheets can be attached).	Site design worksheets attached in appendix 6
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?	Entitlement, June 4, 2021
1g	What was the scope of the geotechnical testing?	Infiltration Testing

[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.

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 infiltrating/retaining on-site or allowing some or all of the flows to flow-thru as a proprietary BMP?	Infiltration is feasible and will not increase the risk of geologic hazards
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?	evapotranspiration and infiltration with any overflow being directed into the public storm drain system

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.	N/A
2b	Attached Active Technology Acceptance Protocol-Ecology (TAPE) certification, with General Use Level Designation (GULD) for all of applicable pollutants of concern	N/A
2c	The most restrictive loading rates outlined in TAPE GULD approval[8] for all of the pollutants of concern.	
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).	N/A
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.	N/A
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?	N/A

[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.P

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?	vegetated buffers, catch basin inserts
4b	Adequate scour protection has been provided for both sheet flow and pipe inflows to the BMP.	Yes
4c	Where scour protection has not been provided, flows into and within the BMP are kept to non-erosive velocities.	3.24 cfs
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.).	N/A

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

4e	To preserve permeability, the media should have substantial void ratios and avoidance of choking layers.	40% voids

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, media above gravel that has 40% voids to store and infiltrate
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.	BMPs to be maintained by HOA
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
5e	Describe all portions of the BMP that may potentially clog or present an O&M issue.	Trash and debris preventing water to infiltrate into the through media into gravel storage
5f	Describe design features to address each of the potential clogging or O&M issues.	HOA to maintain and clean BMPs

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: _____

Table 3–4: LID BMP Selection Matrix

Infiltration Feasibility and Infiltration Rate Conditions of the DMA See Infiltration Feasibility Criteria (Section 2.3.3).	**BMP Selection**
Factored infiltration rate > 0.8 in/hr **and** Other feasibility considerations allow for full infiltration.	Full Infiltration BMPs: • Infiltration Basins • Infiltration Trenches • Permeable Pavements • Bioretention

Factored infiltration between 0.1 and 0.8 in/hr **and** Other feasibility considerations allow for partial infiltration.	Biofiltration BMPs designed to maximize incidental infiltration: • Biofiltration with Partial Infiltration • Proprietary Biofiltration with Supplemental Retention
Factored infiltration less than 0.1 in/hr **or** Other feasibility considerations preclude full or partial infiltration	Biofiltration BMPs not designed to maximize incidental infiltration: • Biofiltration with No Infiltration • Proprietary Biofiltration

Appendix 6: LID BMP Design Details

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

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.68 PigeonPass
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.90 HurkeyCreek
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed
Santa Margarita Watershed

PROJECT LOCATION

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | CANYON LAKE | LAKE ELSINORE | WILDOMAR | MENIFEE | HEMET | MURRIETA | TEMECULA

N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

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	Blue Engineering & Consulting, Inc.	Date	6/2/2021
Designed by	Angel Cesar	County/City Case No	
Company Project Number/Name	Whitewood 29 Residential Development		
Drainage Area Number/Name	A		

Enter the Area Tributary to this Feature A_T = 9.29 acres

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

Site Location

Township 7S

Range 3W

Section 2

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.60

Determine the Effective Impervious Fraction

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

Effective Impervious Fraction I_f = 0.69

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 = 0.48

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$

V_u = 0.29 (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} = 9,780 ft^3

Notes:

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	Blue Engineering & Consulting, Inc.	Date	6/2/2021
Designed by	Angel Cesar	County/City Case No	
Company Project Number/Name	Whitewood 29 Residential Development		
Drainage Area Number/Name	B		

Enter the Area Tributary to this Feature A_T = 11.73 acres

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

Site Location

Township: 7S

Range: 3W

Section: 2

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.60

Determine the Effective Impervious Fraction

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

Effective Impervious Fraction I_f = 0.66

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 = 0.46

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} = 11,497 ft^3

Notes:

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	Blue Engineering & Consulting, Inc.	Date	6/2/2021
Designed by	Angel Cesar	County/City Case No	
Company Project Number/Name	Whitewood 29 Residential Development		
Drainage Area Number/Name	C		

Enter the Area Tributary to this Feature A_T = 6.31 acres

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

Site Location

Township 7S

Range 3W

Section 2

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.60

Determine the Effective Impervious Fraction

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

Effective Impervious Fraction I_f = 0.44

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 = 0.30

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$

V_u = 0.18 (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} = 4,123 ft^3

Notes:

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	Blue Engineering & Consulting, Inc.	Date	6/2/2021
Designed by	Angel Cesar	County/City Case No	
Company Project Number/Name	Whitewood 29 Residential Development		
Drainage Area Number/Name	D		

Enter the Area Tributary to this Feature A_T = 1.53 acres

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

Site Location

Township: 7S

Range: 3W

Section: 2

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.60

Determine the Effective Impervious Fraction

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

Effective Impervious Fraction I_f = 0.25

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 = 0.20

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$

V_u = 0.12 (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} = 666 ft^3

Notes:

Bioretention Facility - Design Procedure (Rev. 06-2014)	BMP ID	Legend:	Required Entries
			Calculated Cells

Company Name: Blue Engineering & Consulting, Inc. Date: 6/3/2021

Designed by: Angel Cesar County/City Case No.:

Design Volume

Enter the area tributary to this feature A_{TRIB}= 9.29 acres

Enter V_{BMP} determined from Section 4.3 of this Handbook V_{BMP}= 9,780 ft^3

Type of Bioretention Facility Design

○ Side slopes required (parallel to parking spaces or adjacent to walkways)

◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 5.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 93.0 ft

Total Effective Depth, d_E

$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$ d_E = 1.80 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_M = 5,434 ft^2

Proposed Surface Area A= 13,680 ft^2

Minimum Required Length of Landscaped Retention Facility, L L = 58.4 ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 0 :1

Diameter of Underdrain 18 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Landscaping:

Notes: DMA-A

Bioretention Facility - Design Procedure (Rev. 06-2014)	BMP ID	Legend:	Required Entries
			Calculated Cells

Company Name: Blue Engineering & Consulting, Inc. Date: 6/3/2021

Designed by: Angel Cesar County/City Case No.:

Design Volume

Enter the area tributary to this feature A_{TRIB}= 11.73 acres

Enter V_{BMP} determined from Section 4.3 of this Handbook V_{BMP}= 11,497 ft^3

Type of Bioretention Facility Design

○ Side slopes required (parallel to parking spaces or adjacent to walkways)

◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer d_S = 5.0 ft

Top Width of Bioretention Facility, excluding curb w_T = 59.0 ft

Total Effective Depth, d_E

$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$ d_E = 1.80 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$

A_M = 6,388 ft^2

Proposed Surface Area A= 14,298 ft^2

Minimum Required Length of Landscaped Retention Facility, L L = 108.3 ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility z = 0 :1

Diameter of Underdrain 18 inches

Longitudinal Slope of Site (3% maximum) 0 %

6" Check Dam Spacing 0 feet

Describe Landscaping:

Notes: DMA-B

Bioretention Facility - Design Procedure (Rev. 06-2014)	BMP ID	Legend:	Required Entries
			Calculated Cells

Company Name: Blue Engineering & Consulting, Inc. Date: 6/3/2021

Designed by: Angel Cesar County/City Case No.:

Design Volume

Enter the area tributary to this feature	A_{TRIB}=	6.31	acres
Enter V_{BMP} determined from Section 4.3 of this Handbook	V_{BMP}=	4,123	ft^3

Type of Bioretention Facility Design

- ○ Side slopes required (parallel to parking spaces or adjacent to walkways)
- ◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	5.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	41.0	ft
Total Effective Depth, d_E			
$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$	d_E =	1.80	ft
Minimum Surface Area, A_m			
$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$	A_M =	2,291	ft^2
Proposed Surface Area	A=	13,364	ft^2
Minimum Required Length of Landscaped Retention Facility, L	L =	55.9	ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =	0	:1
Diameter of Underdrain		18	inches
Longitudinal Slope of Site (3% maximum)		0	%
6" Check Dam Spacing		0	feet
Describe Landscaping:			

Notes: DMA-C

3.4 Bioretention Facility

Type of BMP	LID – Bioretention
Priority Level	Priority 1 – Full Retention
Treatment Mechanisms	Infiltration, Evapotranspiration, Evaporation,
Infiltration Rate Range	> 0.8 in/hr factored design infiltration rate
Maximum Drainage Area	This BMP is intended to be integrated into a project's landscaped area in a distributed manner. Typically, contributing drainage areas to Bioretention Facilities range from less than 1 acre to a maximum of around 5 acres. For facilities treating larger drainage basins, see Fact Sheet 3.7 for additional guidance on design of larger scale facilities.

Description

Bioretention Facilities are shallow, vegetated basins underlain by an engineered soil media designed to retain the design capture volume V_{BMP}. Bioretention Facilities function similarly to infiltration basins but have a shallower ponding depth and provide additional treatment through the inclusion of the soil media. Stormwater infiltrates through soil media and the bottom of the basin. Healthy plant and biological activity in the root zone maintain and renew the macro-pore space in the soil media and maximize plant uptake of pollutants and runoff. This helps extend the lifespan before clogging occurs and allows more of the soil column to function as both a sponge (retaining water) and a biofilter. In all cases, the bottom of a Bioretention Facility is unlined as the primary treatment process is infiltration. Flows exceeding V_{BMP} must discharge to a downstream conveyance system. Biofiltration basins can be effective in removing targeted pollutants from stormwater runoff. Low-nutrient soil media (see Fact Sheet 3.8) is necessary to provide treatment and avoid leaching of nutrients.

Siting Considerations

These facilities generally work best when they are designed in a relatively level area. Unlike other BMPs, Bioretention Facilities can be used in smaller landscaped spaces on the site, such as, parking islands, medians, and site entrances. Identification of opportunities for siting bioretention facilities should begin with the initial layout of the site. Landscaped areas on the site (such as may otherwise be required through minimum landscaping ordinances), can often be designed as Bioretention Facilities. This can be accomplished by:

- *Depressing* landscaped areas below adjacent impervious surfaces, rather than elevating those areas
- Grading the site to direct runoff from those impervious surfaces *into* the Bioretention Facility, rather than away from the landscaping
- Sizing and designing the depressed landscaped area as a Bioretention Facility.

For systems treating larger areas also consult Fact Sheet 3.7.

Bioretention Facilities should not be used downstream of areas where large amounts of sediment can clog the system. Placing a Bioretention Facility at the toe of a steep slope should also be avoided due to the potential for clogging the engineered soil media with erosion from the slope, as well as the potential for damaging the vegetation. Inclusion of additional design components such as pretreatment may be included to mitigate clogging potential at the discretion of the local jurisdiction.

The use of bioretention facilities may be restricted by risk of groundwater contamination, low soil permeability, and elevated potential for clogging at the site. Refer to Section 2.3.3 of the SMR WQMP for feasibility considerations for using bioretention BMPs. These BMPs may not be appropriate for the following site conditions:

- Industrial sites or locations where spills of toxic materials may occur, except where spill containment and/or hydrologic isolation is provided to mitigate the risk of groundwater contamination the satisfaction of the local jurisdiction
- Sites with very low soil infiltration rates or rates that cannot be reliably estimated prior to construction (e.g., deeper fills or deeper cuts)
- Sites with high groundwater tables where pollutants can affect groundwater quality
- Sites with unstabilized soil or construction activity upstream
- On steeply sloping terrain

Setbacks

Always consult your geotechnical engineer for site specific recommendations regarding setbacks for Bioretention Facilities. Recommended setbacks are needed to protect buildings, existing trees, walls, onsite or nearby wells, streams, and tanks. Setbacks should be considered early in the design process since they can affect where Biofiltration Facilities may be placed and how deep they are allowed to be.

Bioretention Facilities typically should be set back:

- 10 feet from the historic high groundwater (measured vertically from the bottom of the basin, as shown in Figure 1
- 5 feet from bedrock or impermeable surface layer (measured vertically from the bottom of the basin, as shown in Figure 1.
- From all existing mature tree drip lines as indicated in Figure 1 (to protect their root structure)
- 100 feet horizontally from wells, tanks or springs

Setbacks to walls and foundations must be included as part of the Geotechnical Report. All other setbacks shall be in accordance with applicable standards of the District's *Basin Guidelines* (Appendix C).

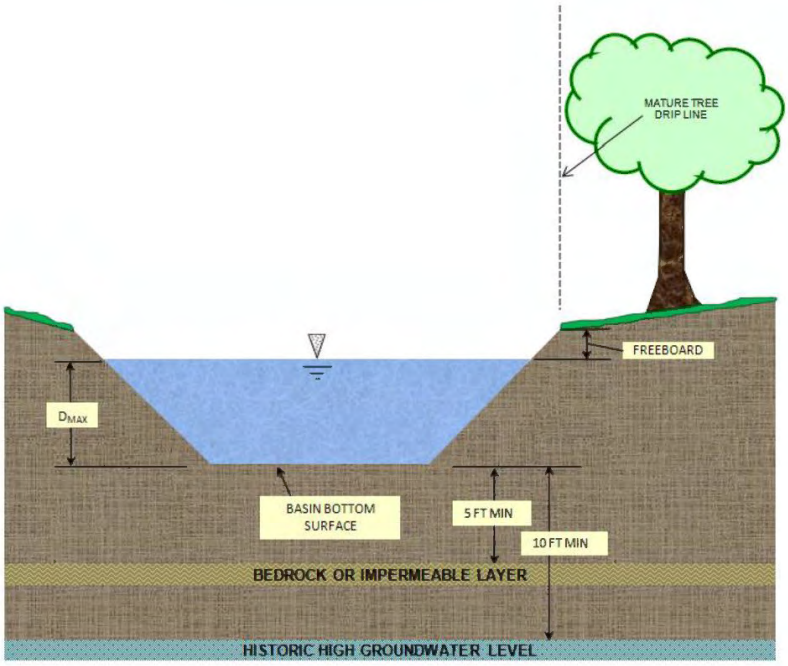

Figure 1 : Setback Recommendations for a Bioretention Facility

Pretreatment

Pretreatment should be considered to prevent premature clogging of bioretention BMPs. Pretreatment is strongly encouraged where the BMP will receive runoff from high traffic parking lots or roads, mixed land uses (with some erodible areas), or other land uses likely to generate elevated sediment.

For BMPs receiving overland flow, pretreatment may be provided using forebays with a volume equivalent to at least 10 percent (preferably 20 percent) of V_{BMP}. A forebay is effectively the first cell in the bioretention system, separated from the remaining area by a berm or cross plate. The forebay is designed to maximize sedimentation and will require more frequent, but more spatially-focused maintenance. This portion of the system can be concrete lined to facilitate simpler maintenance.

For BMPs with piped inlets, a forebay or sedimentation manhole may be applicable. In these systems, it is also necessary to consider energy dissipation near the inlet pipe, such as via a gravel/rock pad and berm system or concrete splash block, to avoid erosion of the bioretention media bed.

If the BMP will receive runoff primarily from roofs, low-traffic impervious surface, or similar low sediment generating surfaces, then pre-treatment is not necessary, but energy dissipation should still be considered, particularly if there is a piped inflow such as a downspout.

Design and Sizing Criteria

This section summarizes the recommended design parameters for Bioretention Facilities. Use of the recommended parameters will help provide the expected treatment and long term performance of the BMP. Deviations from the recommended parameters may be warranted and approved by the local jurisdiction based on site specific considerations. The recommended cross section for a Bioretention Facility includes:

- Vegetated area
- 6" minimum, 12" maximum, surface ponding, measured from the top of the mulch layer (for designs with deeper depths, consult Fact Sheet 3.7)
- Mulch layer (non-floating organic mulch or rock mulch)
- 24" recommended minimum depth of engineered soil media (36" preferred; 18" allowed in vertically-constrained conditions at the discretion of the local jurisdiction)
- Engineered soil media design filtration rate of 2.5 inches per hour (initial filtration rate should be higher).
- 6" optional filter course layer (required if aggregate storage layer is included)
- Optional gravel storage layer below media
- Optional capped underdrain pipe (see Resilient Design Features section below for specific criteria and conditions related to this option)

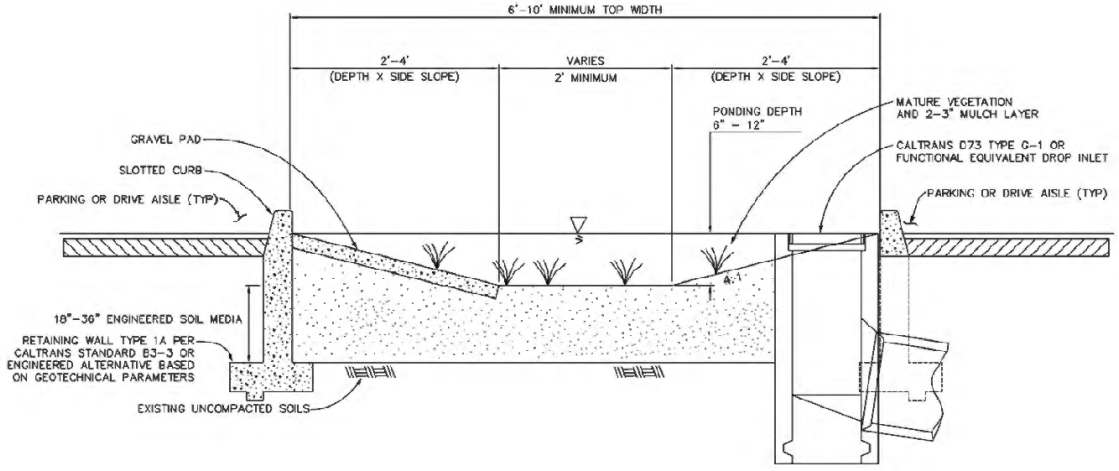

Figure 2: Standard Cross Section for a Bioretention Facility

Pore space in the soil and gravel layer can be credited as storage volume. However, several considerations must be noted:

- Ponding depth above the soil surface (6 to 12 inches) is important to assure that design flows do not bypass the BMP when runoff exceeds the soil infiltration rate.
- In cases where the Bioretention Facility contains engineered soil media deeper than 36 inches, the pore space within the engineered soil media can only be counted to the 36-inch depth.
- A maximum of 30 percent pore space can be used for the soil media whereas a maximum of 40 percent pore space can be used for the gravel and filter course layers.
- Additional depth below the storage layer (via gravel) may be used to increase retention storage, under the following conditions:
    - The total system infiltrates the stored water in less than 72 hours
    - The depth below the media does not exceed the amount of water that can be filtered through the media during a typical DCV storm duration (5 hours, unless otherwise documented).

Adaptable/Resilient Design Option

At the discretion of the engineer and with the approval of the local jurisdiction, bioretention BMPs may be designed with a gravel drainage layer and a **capped** underdrain. This is effectively a biofiltration design (Fact Sheet 3.5), but there is no design discharge from the underdrains. The benefit of this configuration is that it allows simpler adaptation to a biofiltration BMP if this is warranted, documented, and approved.

This option **may only** be approved for use under the conditions described in Section 2.3.3.g of the WQMP, including:

1) The BMP must meet applicable infiltration BMP sizing standards without any discharge through the underdrain.

2) The Project-Specific WQMP must also meet all applicable sizing standards (biofiltration sizing, hydromodification, if applicable) standards if the underdrain is uncapped.

3) The underdrain must remain capped. Inspections conducted as part of the O&M Plan must corroborate that the underdrain remains capped.

4) If conditions are identified that require the underdrain to be uncapped to allow the BMP to be enlarged or otherwise modified to remedy the documented unacceptable performance, this must include: (a) documentation of the conditions that prompt and justify the require design revision, (b) revision of the Project-Specific WQMP to reflect the revised configuration, and (c) jurisdictional review, approval, and recordation of the revised Project Specific WQMP with commensurate updates to the O&M Plan.

See Section 5.3.6 for guidance on Project-Specific WQMP updates. Note that this is the same process that would be required to wholly redesign and reconstruct an underperforming BMP. However, if adaptable design features are included, the actual physical change could be limited to uncapping the underdrain.

Design Adaptations

Bioretention facilities can be designed to meet both pollutant control and hydromodification control performance standards. Combined facilities typically include increased storage (surface and or subsurface) and flow control devices (i.e. outlet orifices and/or weirs). Outlets elevations must be set above the V_{BMP} ponding level and the facilities must satisfy both the pollutant control and hydromodification control performance standards.

For systems exceeding 12 inches ponding depth and/or 5 acres tributary area, see additional design considerations in Fact Sheet 3.7.

Subsurface storage is not required but may be provided in the form of a gravel storage layer. Refer to the Subsurface Storage Requirements section for additional information and criteria.

Engineered Soil Media and Filter Course Aggregate Requirements

Refer to Fact Sheet 3.8 for specifications for engineered soil media and aggregate layers serving as filter course and drain rock in bioretention BMPs.

Subsurface Storage Requirements

Applicants may choose to provide a portion of the BMP storage volume as subsurface storage in a gravel storage layer. Use of subsurface storage instead of surface storage can be useful when the available surface ponding depth is limited or when a deeper profile is desired to reduce footprint requirements.

The gravel storage layer shall not provide a greater storage volume than can be routed through the soil media during the typical design storm duration (i.e. 2.5 inches/hour x 5 hours = 12 inches effective water depth). Alternatively, a separate routing calculation may be performed by the applicant to demonstrate that the provided volume does not result in surface overflow (bypass of the BMP) before the gravel storage layer is full.

When gravel storage layers are used, the filter course layer should be specifically designed to prevent migration of the engineered soil media into the storage layer. Refer to Fact Sheet 3.8 for filter course requirements. Inclusion of a filter course layer is mandatory unless filter fabric is allowed per manufacturer's recommendation and is acceptable to the local jurisdiction.

Vegetation Requirements

Vegetative cover is important to minimize erosion and ensure that treatment occurs in the Bioretention Facility. The area should be designed for at least 70 percent mature coverage throughout the Bioretention Facility. To prevent the BMP from being used as walkways,

Bioretention Facilities shall be planted with densely planted shrubs and grasses. Grasses shall be shall be compatible with periodic inundation, preferably ones that do not need to be mowed. The application of fertilizers and pesticides should be minimal. To maintain oxygen levels for the vegetation and promote biodegradation, it is important that vegetation not be completely submerged for any extended period of time. Vegetation should be selected to withstand the anticipated drawdown time and ponding depths. Trees should only be used where they can be rooted into underlying native soil.

A 2 to 3-inch layer of standard shredded aged hardwood mulch shall be placed as the top layer inside the Bioretention Facility. Rounded stone mulch may be considered. A sacrificial layer of coarse sand could be considered between the bioretention soil and stone mulch to reduce surface compaction. The ponding depth shown in Figure 2 above shall be measured from the top surface of the 2 to 3-inch mulch layer.

Curb Cuts and Energy Dissipation

If the Bioretention Facility is sited to receive runoff from adjacent impervious areas, 1-foot-wide (minimum) curb cuts should be placed approximately every 10 feet around the perimeter of the Bioretention Facility. Figure 3 shows a curb cut in a Bioretention Facility. Curb cut flow lines must be at or above the V_{BMP} water surface ponding level. Additionally, vertical curb cuts may be a tripping hazard. Where feasible, curb cuts should be tapered from the bottom to top of curb as shown below. When tapered cuts are used, the minimum bottom cut width remains 1 foot.

Figure 3: Curb Cut located in a Bioretention Facility

To reduce erosion, a gravel or riprap pad shall be placed at each inlet point to the Bioretention Facility. The pad inside the Bioretention Facility should be flush with the finished surface at the curb cut and extend to the bottom of the slope. The size of gravel or riprap should be selected to withstand the expected peak flows into the basin.

In addition, an apron of stone or concrete, a foot square or larger should be placed inside each inlet to prevent vegetation from growing up and blocking the inlet. See Figure 4.

When runoff is routed to the facility via a pipe, gutter, ditch or other conveyance structure, the conveyance should outlet to the forebay portion of the BMP and include appropriate energy dissipation devices to prevent erosion and scouring of the forebay (i.e. limit outlet velocities to less than 2 feet per second).

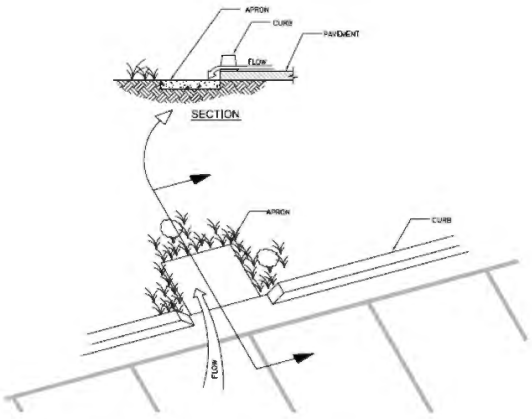

Figure 4: Apron located in a Bioretention Facility

Terracing the Facility

It is recommended that Bioretention Facilities be level. In the event the facility site slopes and lacks proper design, water would fill the lowest point of the BMP and then discharge from the basin without being treated. To ensure that the water will be held within the Bioretention Facility on sloped sites, the BMP must be terraced with nonporous check dams to provide the required storage and treatment capacity.

The terraced version of this BMP shall be used on non-flat sites with no more than a 3 percent slope. The surcharge depth cannot exceed 0.5 feet, and side slopes shall not exceed 4:1. Table 1 below shows the spacing of the check dams, and slopes shall be rounded up (i.e., 2.5 percent slope shall use 10' spacing for check dams).

Table 1: Check Dam Spacing

6" Check Dam Spacing	
Slope	Spacing
1%	25'
2%	15'
3%	10'

Roof Runoff

Roof downspouts may be directed towards Bioretention Facilities. However, the downspouts must discharge onto a concrete splash block or other appropriate energy dissipation device to protect the Bioretention Facility from erosion.

Retaining Walls

When Bioretention facilities are located adjacent to structures, walkways, roadways, parking lots, etc., it is recommended that Retaining Wall Type 1A, per Caltrans Standard B3-3 or equivalent, be constructed around the entire perimeter of the Bioretention Facility. This practice will protect the sides of the Bioretention Facility from collapsing during construction and maintenance or

from high service loads adjacent to the BMP. Where such service loads would not exist adjacent to the BMP, an engineered alternative may be used if signed by a licensed civil engineer.

Side Slope Requirements

Bioretention Facilities Requiring Side Slopes

The design should assure that the Bioretention Facility does not present a tripping hazard. Bioretention Facilities proposed near pedestrian areas, such as areas parallel to parking spaces or along a walkway, should have a gentle slope to the bottom of the facility. Side slopes inside of a Bioretention Facility should generally be 4:1 unless steeper is approved by the local jurisdiction. A typical cross section for the Bioretention Facility is shown in Figure 2.

Bioretention Facilities Not Requiring Side Slopes

Where cars park perpendicular to the Bioretention Facility, side slopes are not required. A 12-inch maximum drop may be used for vertical walls, and the Bioretention Facility should be planted with shrubs to prevent pedestrian access. In this case, a curb is not placed around the Bioretention Facility, but wheel stops shall be used to prevent vehicles from entering the Bioretention Facility, as shown in Figure 5: Bioretention Facility Layout without Side Slopes

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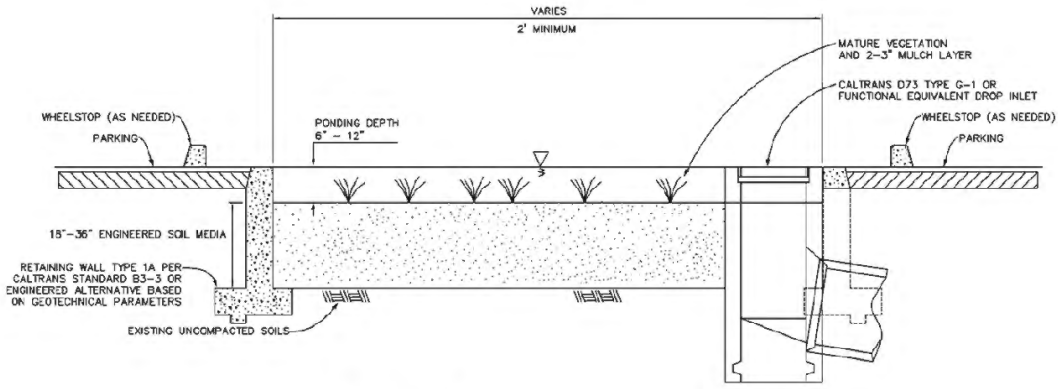

Figure 5: Bioretention Facility Layout without Side Slopes

Overflow

An overflow route is needed in the Bioretention Facility design to bypass stored runoff from storm events larger than V_{BMP} or in the event of facility clogging. Overflow systems must connect to an acceptable discharge point, such as a downstream conveyance system as shown in Figure 2 and Figure 6.. The inlet to the overflow structure shall be elevated inside the Bioretention Facility to be flush with the ponding surface for the design capture volume (V_{BMP}) as shown in Figure 6. This will allow the design capture volume to be fully infiltrated by the Bioretention Facility, and for larger events to safely be conveyed to downstream systems. The overflow inlet shall **not** be located in the entrance of a Bioretention Facility, as shown in Figure 6.

Figure 6: Incorrect Placement of an Overflow Inlet

Underdrain Gravel and Pipes

An underdrain gravel layer and capped perforated pipes may be provided in accordance with Appendix B – Underdrains. This is an optional configuration that is recommended when the design infiltration rate is between 0.8 and 2inches per hour. When the BMP is installed, the underdrain must be capped, such that no water is discharged. The underdrain serves only as a backup plan, which allows the facility to be converted to a biofiltration with partial infiltration facility if the post-construction infiltration rate is significantly less than measured during planning and design. Removal of the underdrain cap and conversion of the bioretention facility to a biofiltration with partial infiltration facility must be approved by the local jurisdiction with appropriate modifications to the Project-Specific WQMP and O&M Plan, as applicable.

Inspection and Maintenance Schedule

Inspection and maintenance of Bioretention Facilities is required to provide long term performance of these systems. Table 2 below provides a summary of the typical maintenance activities that may be applicable. Project specific activities and schedules may vary and are required to be included as part of the applicant's O&M Plan. At a minimum, the Bioretention Facility area shall be inspected for erosion, dead vegetation, soggy soils, or standing water. The use of fertilizers and pesticides on the plants inside the Bioretention Facility should be minimized.

Table 2: Maintenance Summary

Activity

• Maintain vegetation as needed. Use of fertilizers, pesticides and herbicides should be avoided as much as possible to ensure they do not contribute to water pollution. If appropriate native plant selections and other IPM methods are used, such products should not be needed. If such projects are used,
  ○ Products should be applied in accordance with their labeling, especially in relation to application to water, and in areas subjected to flooding.
  ○ Fertilizers should not be applied within 15 days before, after, or during the rainy season.
• Remove debris and litter from the entire basin to minimize clogging and improve aesthetics.
• Check for obvious problems and repair as needed. Address odor, insects, and overgrowth issues associated with stagnant or standing water in the basin bottom.
• Check for erosion and sediment laden areas in the basin. Repair as needed. Clean forebay if needed.
• Revegetate side slopes where needed.
• Inspect areas for ponding
• Inspect for erosion and clogging, repair as needed.
• Inspect of hydraulic and structural facilities: examine the inlet for blockage, the embankment and spillway for integrity, and damage to any structural element.
• Check for erosion, slumping and overgrowth. Repair as needed.
• Check basin depth for sediment build up and reduced total capacity. Scrape bottom as needed and remove sediment. Restore to original cross-section and infiltration rate. Replant basin vegetation.
• Verify the basin bottom is allowing acceptable infiltration. Scarify the surface using a rake, etc., to restore infiltration, working to avoid damage to plants if possible.
• No water should be present 72 hours after an event. No long term standing water should be present at all. No algae formation should be visible. Correct problem as needed.

Bioretention Facility Sizing and Design Procedure

1) Enter the area tributary, A_T, to the Bioretention Facility.

2) Enter the Design Capture Volume, V_{BMP}, determined from Section 2.1 of this Handbook.

3) Select the type of design used. There are two types of Bioretention Facility designs: the standard design used for most project sites that include side slopes, and the modified design used when the BMP does not use side slopes.

4) Enter the depth of the engineered soil media, d_S. The recommended minimum depth is 24". A depth of 36" is preferred to provide a enhanced root zone. Engineered soil media deeper than 36" will only get credit for the pore space in the first 36".

5) Enter the depth of the gravel storage layer, d_g (if included). This dimension includes the associated 6-inch filter course layer (do not double count this dimension).

6) Calculate the total effective depth, d_E, within the Bioretention Facility. The maximum allowable pore space of the soil media is 30% while the maximum allowable pore space for the gravel layer is 40%.

   This is calculated as:

$$d_E(\text{ft}) = d_P(\text{ft}) + [(0.3) \times d_S(\text{ft}) + (0.4) \times dg(\text{ft})]$$

   Where:

   d_p = ponding depth
   d_s = soil depth
   d_g = gravel depth

7) Check that drawdown time is acceptable (72 hours, or shorter if needed to support selected vegetation):
   a. Drawdown Time = d_E / K_{design}

   Where:

   K_{design} = design infiltration rate (factored) determined per Section 2.3 of the WQMP and Appendix A of this LID-BMP Manual.

8) Check that storage in gravel does not exceed the amount that can enter these systems during a typical storm event. The depth of effective stored water should be less than 12 inches unless higher permeability media is used to allow faster filling of this layer.

9) Calculate the required effective footprint area, this shall be measured at the mid-ponding depth of the BMP. For systems with side slopes, this should be the contour that is midway between the floor of the basin and the overflow elevation of the basin. The footprint of

the underlying gravel storage should extend to this contour. For systems with vertical walls, the effective footprint area is the full footprint.

This is calculated as:

$$A_{BMP}(\text{sq ft}) = V_{BMP}(cu\ ft)/d_E(ft)$$

10) Enter the proposed effective surface area. This area shall not be less than the minimum required effective surface area.

11) Verify that side slopes are no steeper than 4:1 in the standard design, and are not required in the modified design.

12) Provide the slope of the site around the Bioretention Facility, if used. The maximum slope is 3 percent for a standard design.

13) Provide the check dam spacing, if the site around the Bioretention Facility is sloped.

14) Describe the vegetation used within the Bioretention Facility.

If the underdrain is proposed to be capped, the project shall provide a Capped Underdrain Checklist and provide supporting documentation, include design worksheets to demonstrate the BMP is sized appropriately to work as a Biofiltration BMP.

References Used to Develop this Fact Sheet

Anderson, Dale V. "Landscaped Filter Basin Soil Requirements." Riverside, May 2010.

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Kim, Hunho, Eric A. Seagren and Allen P. Davis. "Engineered Bioretention for Removal of Nitrate from Stormwater Runoff." Water Environment Research 75.4 (2003): 355-366.

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Montgomery County Maryland Department of Permitting Services Water Resources Section. Biofiltration (BF). Montgomery County, 2005.

Orange County Technical Guidance Document, September 2017.

San Diego Model BMP Design Manual, June 2015.

City of San Diego Stormwater Standards Manual. 2017.

Ventura Countywide Stormwater Quality Management. Technical Guidance Manual for Stormwater Quality Control Measures. Ventura, 2002.

United States Environmental Protection Agency. Storm Water Technology Fact Sheet Bioretention. Washington D.C, 1999.

Urban Drainage and Flood Control District. Urban Storm Drainage Criteria Manual Volume 3 - Best Management Practices. Vol. 3. Denver, 2008. 3 vols.

Urbonas, Ben R. Stormwater Sand Filter Sizing and Design: A Unit Operations Approach. Denver: Urban Drainage and Flood Control District, 2002.

Appendix 7:
Hydromodification & Critical Coarse Sediment

Supporting Detail for Hydromodification compliance & Exhibit G - CCSY & PSS Areas with the project location.

Proposed basins will treat all post-development runoff; therefore project is exempt.

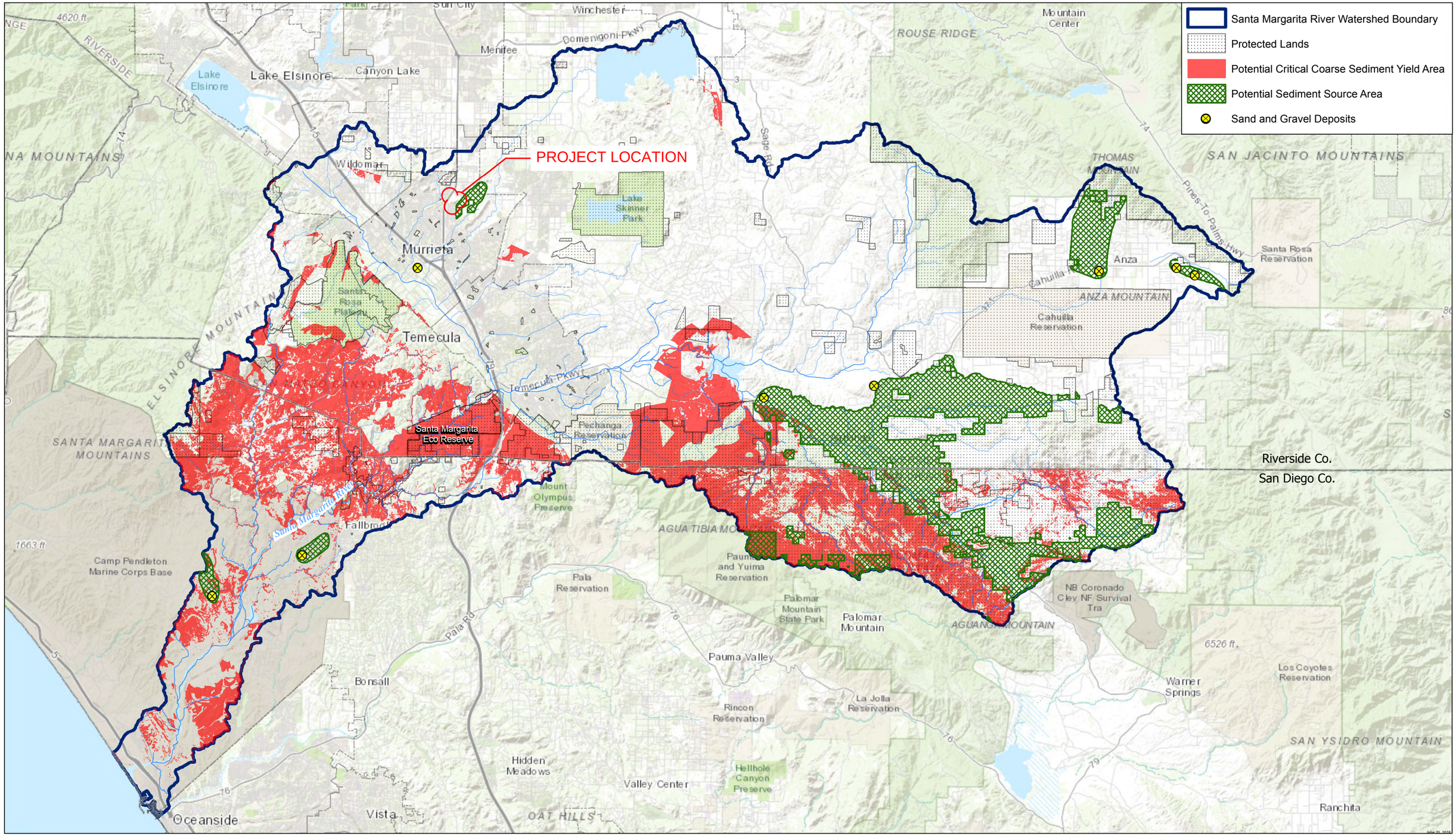

Exhibit G-1

SANTA MARGARITA RIVER WATERSHED

POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREAS AND POTENTIAL SEDIMENT SOURCE AREAS

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Appendix 8
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section H of the 2018 SMR 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 II.1 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.

Appendix 8
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**
❑ **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.	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://www.rcwatershed.org/about/materials-library/#1450469138395-bb76dd39-d810 ❑ Provide IPM information to new owners, lessees and operators.

Appendix 8

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**
❑ **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://www.rcwatershed.org/about/materials-library/#1450469201433-f5f358c9-6008
❑ **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://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9 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

Appendix 8
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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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://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9
❑ **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

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❑ **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://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9 ❑ Car dealerships and similar may rinse cars with water only.

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STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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❑ **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; "Outdoor Cleaning Activities;" and "Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants. Brochures can be found at: http://www.rewatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9

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❑ **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.

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STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

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❑ 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

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❑ **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.	

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❑ **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

Recorded at the request of:
COUNTY OF RIVERSIDE
TRANSPORTATION DEPARTMENT

THIS INSTRUMENT IS FOR THE BENEFIT
OF THE COUNTY OF RIVERSIDE AND
ENTITLED TO BE RECORDED WITHOUT
FEE.(GOV. CODE 6103)

RETURN TO:
RIVERSIDE COUNTY TRANSPORTATION
DEPARTMENT. **STOP NO. 1080**
4080 LEMON STREET
RIVERSIDE, CA 92501

COVENANT AND AGREEMENT REGARDING WATER QUALITY MANAGEMENT PLAN BMP, CONSENT TO INSPECT, MAINTENANCE AND INDEMNIFICATION

APN:_____ **PROJECT No.**_____ **IP No.**_____

OWNER(S):_____

PROPERTY ADDRESS:_____

LEGAL DESCRIPTION:_____
_____
_____

THIS AGREEMENT is made and entered into in Riverside County, California, this _____ day of _____ Year_____, by and between_____, (hereinafter referred to as "Covenantor" or "Owner") and the COUNTY OF RIVERSIDE via its Department of Transportation, a political subdivision of the State of California (hereinafter referred to as "County").

RECITALS

WHEREAS, the Covenantor owns real property ("Property") in the County of Riverside, State of California, more specifically described in Exhibit "A" and depicted in Exhibit "B", each of these exhibits is attached, and incorporated herein by this reference;

WHEREAS, the County is the owner of interests in that certain real property within the unincorporated area of the County of Riverside, State of California, containing storm drains, pipelines, and related appurtenances constituting the County's municipal separate storm sewer system (the County's "MS4");

WHEREAS, Covenantor intends to develop, improve, and/or use the Property is such a way that approval by the County for such development, improvement, and/or use is required pursuant to applicable laws;

WHEREAS, As a condition for said approval by the County, County required Covenantor, and Covenantor desires to, restrict the use of the Property according to the conditions, covenants, equitable servitudes, and restrictions contained herein for the express benefit of the County's MS4, which include requirements that the Property incorporate post construction on-site stormwater quality control measures;

WHEREAS, the Covenantor/Owner has chosen to install one or more _____, hereinafter referred to as "Device", as the on-site control measure to minimize pollutants in urban runoff;

WHEREAS, said Device has been installed in accordance with plans and specifications accepted by the County;

WHEREAS, said Device, with installation on private property and draining only private property, is a private facility with all maintenance or replacement, therefore, the sole responsibility of the Covenantor/Owner in accordance with the terms of this Agreement;

WHEREAS, the Covenantor/Owner is aware that periodic and continuous maintenance, including, but not necessarily limited to, filter material replacement and sediment removal, is required to assure peak performance of Device and that, furthermore, such maintenance activity will require compliance with all Local, State, or Federal laws and regulations, including those pertaining; to confined space and waste disposal methods, in effect at the time such maintenance occurs;

NOW THEREFORE, incorporating the foregoing Recitals and in consideration of the covenants and conditions contained herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, and expressly for the benefit of, and to bind, their sucessors in interest, the parties hereto agree as follows:

1. Covenantor/Owner hereby provides the County or County's designee complete access to the Device and its immediate vicinity and such access onto the property to permit access to the devise at any time, upon twenty-four *(24)* hour advance notice in writing, of any duration for the purpose of inspection, sampling and testing of the Device. County shall make every effort at all times to minimize or avoid interference with Owner's use of the Property.

2. Covenantor/Owner shall use its best efforts diligently to maintain the Device in a manner assuring peak performance at all times. All reasonable precautions shall be exercised by Owner and Owner's representative or contractor in the removal and extraction of material(s) from the Device and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested

from time to time by the County / Regional Water Quality Control Board (RWQCB), the Owner shall provide the RWQCB with documentation identifying the material(s) removed, the quantity, and disposal destination.

3. In the event Covenantor/Owner, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this Agreement, within five (5) days of being given written notice by the County, the County is hereby authorized to cause any maintenance necessary to be done and charge the entire cost and expense to the Owner or Owner's successors or assigns, including administrative costs and interest thereon at the maximum rate authorized by the Civil Code from the date of notice of expense until paid in full.

4. The County may require the Covenantor/Owner to post security in a form and for a time period satisfactory to the County to guarantee the performance of the obligations stated herein. Should the Owner fail to perform the obligations under this Agreement, the County may, in the case of a cash deposit, certificate of deposit or letter of credit, act for the Owner using the proceeds from it, or in the case of a surety bond, require the sureties to perform the obligations of the Agreement.

5. The County may, but shall not be obligated to, enforce this Agreement by a proceeding at law or in equity against any person or persons violating or attempting to violate any condition, covenant, equitable servitude, or restriction provided for herein, either to restrain such violation or to recover damages.

6. This Agreement constitutes the entire agreement and understanding between the parties with respect to the subject matter of this Agreement and supersedes all prior or contemporaneous agreements and understandings with respect to the subject matter hereof, whether oral or written.

7. If any part of this Agreement is declared by a final decision of a court of competent jurisdiction to be invalid for any reason, such shall not affect the validity of the rest of the Agreement. The other parts of this Agreement shall remain in effect as if this Agreement had been executed without the invalid parts(s). The parties declare that they intend and desire that the remaining parts of this Agreement continue to be effective without any part(s) that have been declared invalid.

8. This Agreement may be executed in counterparts, each of which so executed shall, irrespective of the date of its execution and delivery, be deemed an orginal, and all such counterparts together shall constitute one and the same instrument.

9. This Agreement shall be recorded in the Office of the Recorder of Riverside County, California and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth.

10. In the event of legal action occasioned by any default or action of the Covenantor/Owner, or its successors or assigns, then the Covenantor/Owner and its

successors or assigns agree(s) to pay all costs incurred by the County in enforcing the terms of this Agreement, including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.

11. Covenantor/Owner agrees to indemnify, defend, and hold harmless the County, its elected officers, employees, agents, and contractors from and against any and all liability, expense, including costs and reasonable legal fees, and claims of damage of any nature whatsoever including, but not limited to, death, bodily injury, personal injury, or property damage arising from or connected with the County inspection of the Property except where such liability, expense, or claim for damage results from the sole negligence or willful misconduct of the County.

12. It is the intent of the parties hereto that burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien thereon against.

13. The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto and any other present or future interest holders or estate holders in the property. The term "Owner" shall include not only the present Owner, but also its heirs, successors in interest and in title to the property, executors, administrators, and assigns. Owner shall notify any successor to title of all or part of the Property about the existence of this Agreement. Owner shall provide such notice prior to such successor obtaining an interest in all or part of the Property. Owner shall provide a copy of such notice to the County at the same time such notice is provided to the successor.

14. Time is of the essence in the performance of this Agreement.

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15. Any notice to a party required or called for in this Agreement shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two *(72)* hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.

COVENANTOR/OWNER NAME:

COUNTY:

Riverside County Department of Transportation
Attn: Transportation Director
4080 Lemon Street
Riverside, CA

COUNTY OF RIVERSIDE
TRANSPORTATION DEPARTMENT

Patricia Romo, P.E.
Director of Transportation

Date

(Attest)

Date

COVENANTOR/OWNER

Signature of Covenantor/Owner

(Print Name)

(Print Title)

Attach Notary

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information