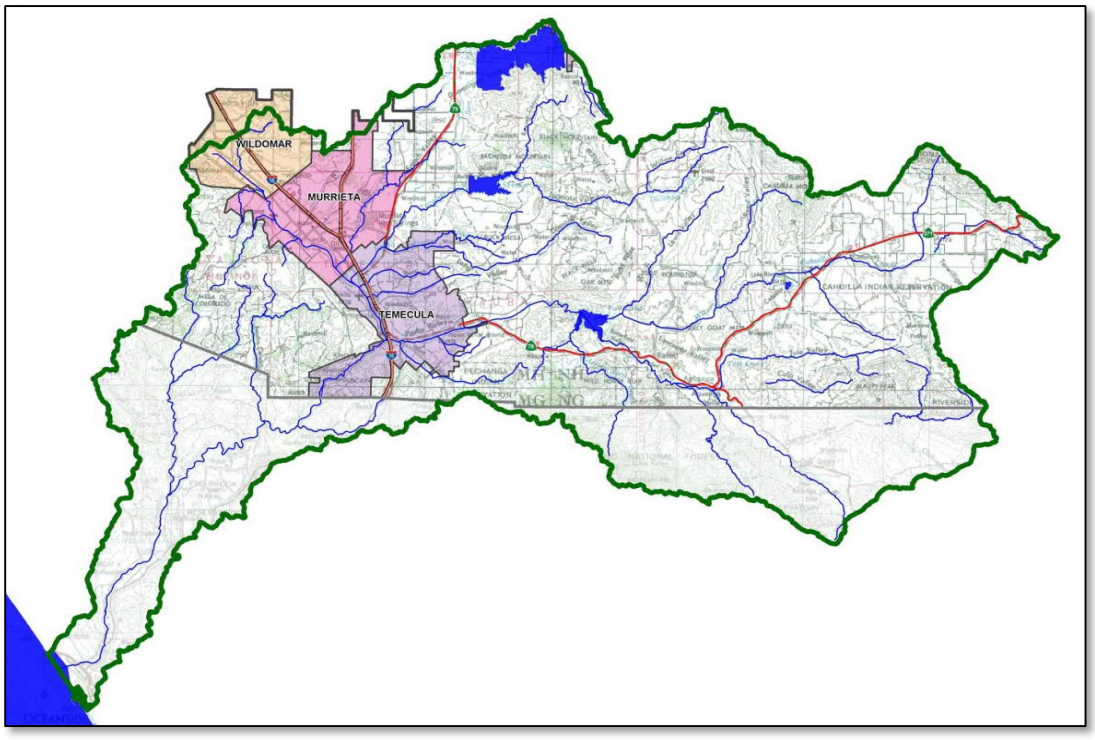
County Project Specific Water Quality Management Plan

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: Winery Development
Development No: CUP XX-XXXX
Design Review/Case No: PPT220010
BMP_i (Latitude, Longitude): 33°31'45.7"N, 117°4'1.1"W



☒ Preliminary
☐ Final

Original Date Prepared: 07/05/2022

Revision Date(s): 11/17/2022

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

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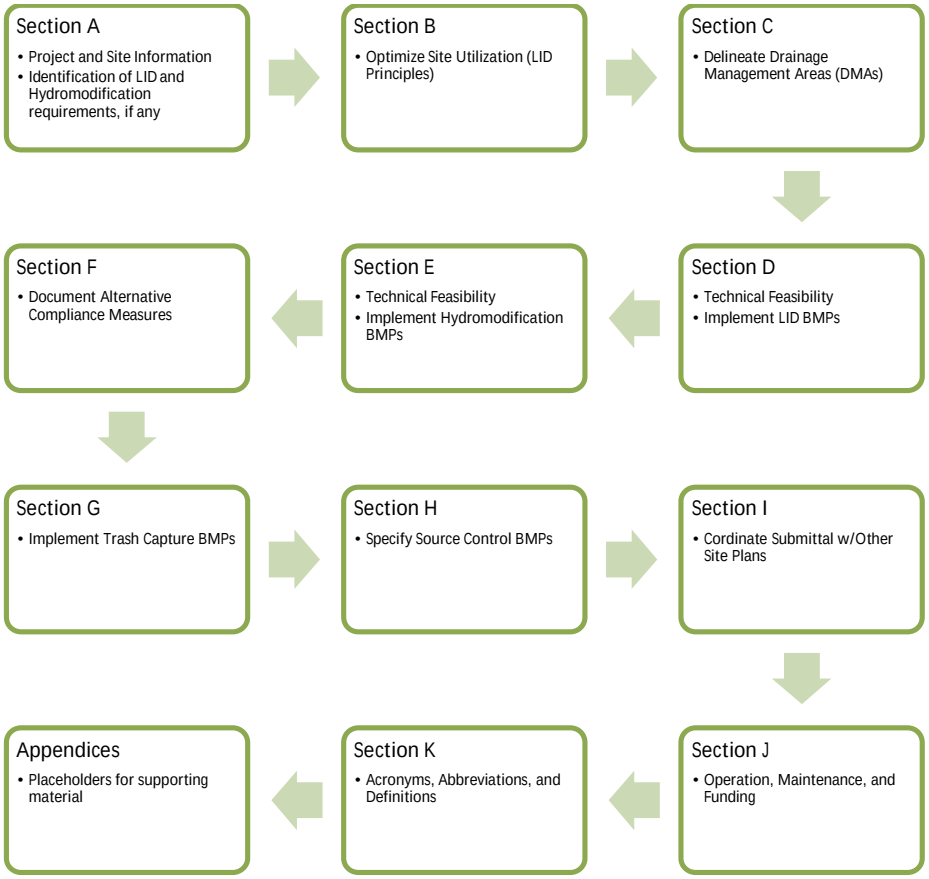
A Brief Introduction

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 Mexin Temecula Agriculture Development, Inc by Valued Engineering, Inc for the Winery 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:	Agriculture/Winery
Planning Case Number:	T.B.D.
Rough Grade Permit No.:	N/A
Development Name:	Winery
PROJECT LOCATION	
Latitude & Longitude (DMS):	33°31'45.7"N, 117°4'1.1"W
Project Watershed and Sub-Watershed:	Santa Margarita River, 902.32 (see Section A.2)
24-Hour 85th Percentile Storm Depth (inches):	0.72
Is project subject to Hydromodification requirements?	☒ Y ☐ N (Select based on Section A.3)
APN(s):	943-250-019
Map Book and Page No.:	129
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Agriculture/Winery
Proposed or Potential SIC Code(s)	0172
Existing Impervious Area of Project Footprint (SF)	0
Total area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	88,207 SF
Total Project Area (ac)	121,900 SF
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)	A & C

Provide a brief description of the project:

Mexin Teme Agriculture Development, Inc proposes to develop 2.8 acres (121,900 square feet) of existing vacant land located in the City of Temecula, CA. This development is located near the intersection of Rancho California Road and Calle Encantado Road in the unincorporated portion of the County Riverside. The project proposes the construction of a building and underground storage vault for harvest and use for water quality

treatment and other improvements will include parking lot, landscape and curbs. The runoff from these subareas will be collected in the underground storage pipe cistern which is sized for 10-year, 24-hour storm to comply with HCOC Management to filter the stormwater runoff. The stormwater beyond the WQMP and HCOC captured volume, will be release in an outlet pipe. Gravel rip-rap will be installed at the end of the outlet pipe to minimize erosion and sediments. The flow will than continue to the Long Canyon Creek to mimic the historical flow pattern.

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
Santa Gertudis Creek	Chlorpyrifos, Enterococcus, Escherichia Coli, FecalColiform,Iron, Manganese	MUN,AGR, IND, PROC, REC2, WARM, WILD	None
murrieta creek	Chlorpyrifos,Copper,Iron, Manganese,Nitrogen,Phosphorus, Toxicity	MUN, AGR, IND, PROC, REC2, WARM, WILD	3.98 MILES

Santa Margarita (Upper)	Phosphorus, Toxicity	MUN, AGR, IND, REC-1, REC-2, WARM, COLD, MILD & RARE	14.2 MILES
Santa Margarita (Lower)	Phosphorus, Toxicity	MUN, AGR, IND, REC-1, REC-2, WARM, COLD, MILD & RARE	14.2 MILES

A.3 Drainage System Susceptibility to Hydromodification

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

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

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

Table A-2 Identification of Susceptibility to Hydromodification

Drainage System	Drainage System Material	Hydromodification Exemption	Hydromodification Exempt
Santa Gertrudis Creek	Earthen channel	None	☐ Y ☒ N
Murrieta Creek	Earthen channel	None	☒ Y ☐ N
Summary of Performance Standards			
☐ Hydromodification Exempt – Select if "Y" is selected in the Hydromodification Exempt column above, project is exempt from hydromodification requirements. ☒ Not Exempt-Select if "N" is selected in any row of the Hydromodification Exempt column above. Project is subject to hydrologic control requirements and may be subject to sediment supply requirements.			

[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) County of Riverside Grading Permit	☒ Y	☐ N

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

Section B: Optimize Site Utilization (LID Principles)

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

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

Site Optimization

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

Project- Specific WQMP Site Design BMP Checklist

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

SITE DESIGN REQUIREMENTS

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

☒ Yes ☐ No ☐ N/A

Did you identify and preserve existing drainage patterns?

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

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

Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer.
The runoff from the whole project site will preserve existing drainage patterns. The existing drainage patterns consist of sheetflow from northerly to southerly of the property. The proposed site will consist of various flow directions towards proposed underground rainwater cistern. Then the site will continue to discharge at historic points to maintain downstream drainage patterns on Calle Contento Road.

☐ Yes ☒ No ☐ N/A

Did you identify and protect existing vegetation?

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

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

Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer.
The project site is barren with no existing vegetation. The proposed development will utilized all the available lot but will maximize the proposed pervious area as possible.

Project- Specific WQMP Site Design BMP Checklist	
☒ Yes ☐ No ☐ N/A	Did you identify and preserve natural infiltration capacity? A key component of LID is taking advantage of a site's natural infiltration and storage capacity. A site survey and geotechnical investigation can help define areas with high potential for infiltration and surface storage. • Identify opportunities to locate LID Principles and Structural BMPs in highly pervious areas. Doing so will maximize infiltration and limit the amount of runoff generated. • Concentrate development on portions of the site with less permeable soils, and preserve areas that can promote infiltration.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. The underground storage vault identify and preserve infiltration capacity. Therefore, the BMP will maximize infiltration and limit the amount of runoff generated.	
☐ 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. No. The project consists of the commercial building, parking lot and sidewalk consisting over 50% of the project site. Approximately 40% of the site will will be landscaped and remain pervious.	

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. Runoff from impervious areas will be drained to the adjacent pervious landscaping and then into the storage vault for harvest and use.	
☒ 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. Yes. Drought tolerant species are utilized in site landscaping.	

Project- Specific WQMP Site Design BMP Checklist	
☒ Yes ☐ No ☐ N/A	Did implement harvest and use of runoff? Under the Regional MS4 Permit, Harvest and Use BMPs must be employed to reduce runoff on any site where they are applicable and feasible. However, Harvest and Use BMPs are effective for retention of stormwater runoff only when there is adequate demand for non-potable water during the wet season. If demand for non-potable water is not sufficiently large, the actual retention of stormwater runoff will be diminished during larger storms or during back-to-back storms. For the purposes of planning level Harvest and Use BMP feasibility screening, Harvest and Use is only considered to be a feasible if the total average wet season demand for non-potable water is sufficiently large to use the entire DCV within 72 hours. If the average wet season demand for non-potable water is not sufficiently large to use the entire DCV within 72 hours, then Harvest and Use is not considered to be feasible and need not be considered further. The general feasibility and applicability of Harvest and Use BMPs should consider: • Any downstream impacts related to water rights that could arise from capturing stormwater (not common). • Conflicts with recycled water used – where the project is conditioned to use recycled water for irrigation, this should be given priority over stormwater capture as it is a year-round supply of water. • Code Compliance - If a particular use of captured stormwater, and/or available methods for storage of captured stormwater would be contrary to building codes in effect at the time of approval of the preliminary Project-Specific WQMP, then an evaluation of harvesting and use for that use would not be required. • Wet season demand – the applicant shall demonstrate, to the acceptance of the County of Riverside, that there is adequate demand for harvested water during the wet season to drain the system in a reasonable amount of time.
Discuss how this was included or provide a discussion/justification for "No" or "N/A" answer. The project implemented harvest and use of runoff. Because the minimum required irrigated area is 2.93 acres and the available irrigated landscape area is 16.4 acres. Therefore the proposed project meets the minimum ratio of effective irrigated area per tributary impervious area (EIATIA) that is required to achieve the minimum 40 percent long-term retention of runoff.	
☒ 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. The project contains the pervious area that qualify as self-treating areas and the runoff will be kept from sediment producing pervious areas.	

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
DA1 - DMA A	Compacted Natural Ground	12,741	To be Determined in Step 3
DA2 - DMA B1-1	Roof, Pavement	88,207	
DA2 - DMA B1-2	Landscaping	20,952	

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 A	12,741	Compacted Natural Ground	N/A

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] = $[B] + \frac{[B]\cdot[C]}{[A]}$

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

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

(Tributary Area: Self-Retaining Area)

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

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

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

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

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

3.11.4 BMP Sizing Targets for Applicable Green Streets Projects

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

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

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

Table C-4.1 – Green Streets

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

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]?	☐	☒
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?	☐	☒
If Yes, list affected DMAs:		
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?	☐	☒
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet horizontally of a water supply well?	☐	☒
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?	☐	☒
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?	☐	☒
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?	☐	☒
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.	☐	☒
If Yes, list affected DMAs:		
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?	☐	☒
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?	☐	☒
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

[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.

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.

Table D-2 Geotechnical Concerns for Onsite Infiltration

Type of Geotechnical Concern	DMAs Feasible (By Name or ID)	DMAs Infeasible (By Name or ID)
Collapsible Soil		
Expansive Soil		
Slopes		
Liquefaction		
Low Infiltration Rate		
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)

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
	BMP Design worksheets and Proprietary Biofiltration Criteria are completed in Appendix 5	☐ Yes or ☐ No
	Proposed BMP has an active TAPE GULD Certification for the project pollutants of concern[4] or equivalent 3rd party demonstrated performance.	☐ Yes or ☐ No
	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.
	☐ The BMP includes biological features including vegetation supported by engineered or other growing media.	

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

D.3 Feasibility Assessment Summaries

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

Table D-5 LID Prioritization Summary Matrix

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

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

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

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

Table D-6 Summary of Infeasibility Documentation

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

[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	Rainwater Cistern – DMA B		
	[A]		[B]	[C]	[A] x [C]			
DMA B1-1	88,207	Asphalt/Concrete and Building	1.0	0.892	78,681	Design Storm Depth (in)	DCV, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
DMA B1-2	20,952	Landscape	0.1	0.110	2,305			
	A_T = Σ[A]	109,159			Σ= [D] 80,986	[E] 0.77	[F] = $\frac{[D]x[E]}{12}$ 5,197	[G] 17,315

SEE APPENDIX 6 FOR COMPLETE DCV CALCULATION

[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)
Rainwater Cistern	DMA B	Harvest & Use	5,197	17,315

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)
Rainwater Cistern	DMA B	Harvest & Use	☒	0.397	0.140	72
			☐			
			☐			
			☐			

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.

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

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

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

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

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

Rate the similarity: ☐ High
☐ Medium
☐ Low

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

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

Rate the potential: ☐ High
☐ Medium
☐ Low

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

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

Rate the need for bed sediment supply:

☐ High
☐ Medium
☐ Low

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

☐ Step 1.D – Summary of Step 1

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

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

Table E-2 Triad Assessment Summary

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

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

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

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

Check those that apply:

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

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

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

Or -

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

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

Identified Channel #1 - Insert narrative description here

Identified Channel #2 - Insert narrative description here

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

OR

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

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

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

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

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

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

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

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

Section F: Alternative Compliance

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

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

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

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

F.1 Identify Pollutants of Concern

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

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

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

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

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

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

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

Table F-2 Potential Pollutants by Land Use Type

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

P = Potential

N = Not Potential

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

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

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

(4) Including petroleum hydrocarbons

(5) Including solvents

(6) Bacterial indicators are routinely detected in pavement runoff

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

F.2 Treatment Control BMP Selection

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

Table F-3 Treatment Control BMP Selection

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

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Copermittee Approved Study and provided in Appendix 6.

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	Enter BMP Name / Identifier Here	
	[A]		[B]	[C]	[A] x [C]		
						Design Storm (in)	Design Flow Rate (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
[E] either 0.2 inches or 2 times the 85th percentile hourly rainfall intensity
[G] = 43,560,.

F.4 Hydrologic Performance Standard – Alternative Compliance Approach

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

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

☐ Offsite Hydrologic Control Management within the same channel system

Insert narrative description here

☐ In-Stream Restoration Project

Insert narrative description here

For Offsite Hydrologic Control BMP Option

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

Table F-5 Offsite Hydrologic Control BMP Sizing

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

For Instream Restoration Option

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

Section G: Implement Trash Capture BMPs

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

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

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

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

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	DA 2, DMA B	
	[A]		[B]	[C]	[A] x [C]		
DMA B1-1	88,207	ASPHALT/CONCRETE & ROOFING	1.0	0.892	78,680		
DMA B1-2	20,952	LANDSCAPE	0.1	0.110	2,305		
						Trash Capture Design Storm Intensity (in)	Trash Capture Design Flow Rate (cubic feet or cfs)
	A_T = Σ[A] 109,159				Σ= [D] 80,985	[E] 0.50	[F] = $\frac{[D]x[E]}{[G]}$ 0.929

[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]
Bio-Grate-Full	DMA-B	Drop Inlet Filters for Full Capture	0.929	1.55

[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
On-site Storm Drain Inlet	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."
Floor Drains	Interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	Inspect and maintain drains to prevent blockages and overflows.
Pest Control/Herbicide Application	Landscape plans will include: Note building design features that discourage entry of pests. Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Maintain landscaping using minimum or no pesticides. See applicable operational BMPs in "What you should know for Landscape and Gardening" at http://rcflood.org/stormwater.com Provide IPM information to new owner, lessees and operators.
Food Service	Designated cleaning areas shall be in enclosed outside areas behind the restaurants near the trash enclosures. Items to be cleaned in this facility shall be dishes, floors, containers, and other items relevant to food preparation and service. Sinks shall be sized to accommodate dishes.	See the brochure. "The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater

Trash Storage Areas	Site refuse will be deposited into on-site trash receptacles. Trash receptacles. Trash receptacles will be emptied out by city garbage service on a weekly basis. Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping 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 Disposale" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Harvest and Use BMP: Rainwater Cistern	Have provisions for mosquito prevention and abatement and safe overflow of runoff. And mechanisms to keep debris and animals from entering the cistern. Design in a manner that allows for supplemental potable water to be used when there is insufficient harvested water to fully meet required demands. Include measures acceptable to the local water supplier to prevent harvested stormwater from being introduced into the potable water supply.	Check debris and sediment on screens and overflow facilities and remove where observed. Verify proper operation of all pumps. Check integrity of downspout connections to harvest and use BMPs. Check locking mechanisms on facility entry covers and integrity of mosquito screens. Remove debris and sediment from screens and overflow facilities.
Roofing, Gutter and Trim	Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
Plaza, sidewalks, and parking lots		Sweep plazas, sidwalks, 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.

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)
DMA B	Rainwater Cistern	WQMP Site Plan: 33°31'47.9"N 117°04'00.9"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)County of Riverside Grading Permit	☒ Y	☐ N

Section J: Operation, Maintenance and Funding

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

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

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

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

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

Maintenance Mechanism: Property Owners

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

☒ Y ☐ N

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

Section K: Acronyms, Abbreviations and Definitions

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

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

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

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

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

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

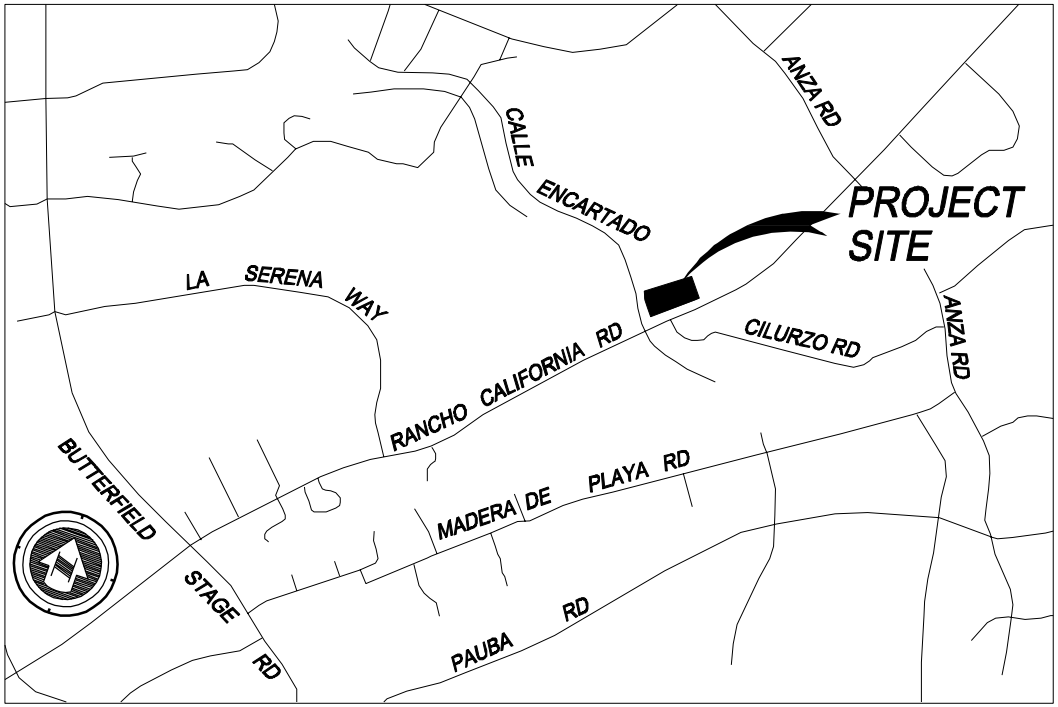
Source Control BMP	Source Control BMPs land use or site planning practices, or structural or nonstructural measures that aim to prevent runoff pollution by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between Pollutants and runoff.
Structural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

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map

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

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



VICINITY MAP

NOT TO SCALE

REGION 9 INDEX

501.00 SAN JUAN HYDROLOGIC UNIT
901.10 Laguna HA
1.11 San Joaquin Hills HSA
1.12 Laguna Beach HSA
1.13 Aliso HSA
1.14 Dana Point HSA
901.20 Mission Viejo HA
1.21 Oso HSA
1.22 Upper Trabuco HSA
1.23 Middle Trabuco HSA
1.24 Gobernadora HSA
1.25 Upper San Juan HSA
1.26 Middle San Juan HSA
1.27 Lower San Juan HSA
1.28 Ortega HSA
901.30 San Clemente HA
1.31 Prima Deshecha HSA
1.32 Segunda Deshecha HSA
901.40 San Mateo Canyon HA
901.50 San Onofre HA
1.51 San Onofre Valley HSA
1.52 Las Pulgas HSA
1.53 Stuart HSA

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

903.00 SAN LUIS REY HYDROLOGIC UNIT
903.10 Lower San Luis HA
3.11 Mission HSA
3.12 Bonsall HSA
3.13 Moosa HSA
3.14 Valley Center HSA
3.15 Woods HSA
3.16 Rincon HSA
903.20 Monserate HA
3.21 Pala HSA
3.22 Pauma HSA
3.23 La Jolla Amago HSA
903.30 Warner Valley HA
3.31 Warner HSA
3.32 Combs HSA

904.00 CARLSBAD HYDROLOGIC UNIT
904.10 Loma Alta HA
904.20 Buena Vista Creek HA
4.21 El Salto HSA
4.22 Vista HSA
904.30 Agua Hedionda HA
4.31 Los Monos HSA
4.32 Buena HSA
904.40 Encinas HA
904.50 San Marcos HA
4.51 Batiquitos HSA
4.52 Richland HSA
4.53 Twin Oaks HSA
904.60 Escondido Creek HA
4.61 San Elijo HSA
4.62 Escondido HSA
4.63 Lake Wohlford HSA

905.00 SAN DIEGUITO HYDROLOGIC UNIT
905.10 Solana Beach HA
5.11 Rancho Santa Fe HSA
5.12 La Jolla HSA
905.20 Hodges HA
5.21 Del Dios HSA
5.22 Green HSA
5.23 Felicita HSA
5.24 Bear HSA
905.30 San Pasqual HA
5.31 Highland HSA
5.32 Las Lomas Muertas HSA
5.33 Reed HSA
5.34 Hidden HSA
5.35 Guejito HSA
5.36 Vineyard HSA
905.40 Santa Maria Valley HA
5.41 Ramona HSA
5.42 Lower Hatfield HSA
5.43 Wash Hollow HSA
5.44 Upper Hatfield HSA
5.45 Ballena HSA
5.46 East Santa Teresa HSA
5.47 West Santa Teresa HSA
905.50 Santa Ysabel HA
5.51 Boden HSA
5.52 Pamo HSA
5.53 Sutherland HSA
5.54 Witch Creek HSA

906.00 PENASQUITOS HYDROLOGIC UNIT
906.10 Miramar Reservoir HA
906.20 Poway HA
906.30 Scripps HA
906.40 Miramar HA
906.50 Tecolote HA

907.00 SAN DIEGO HYDROLOGIC UNIT
907.10 Lower San Diego HA
7.11 Mission San Diego HSA
7.12 Santee HSA
7.13 El Cajon HSA
7.14 Coches HSA
7.15 El Monte HSA
907.20 San Vicente HA
7.21 Fernbrook HSA
7.22 Kimball HSA
7.23 Gower HSA
7.24 Barona HSA
907.30 El Capitan HA
7.31 Conejos Creek HSA
7.32 Glen Oaks HSA
7.33 Alpine HSA
907.40 Boulder Creek HA
7.41 Inaja HSA
7.42 Spencer HSA
7.43 Cuyamaca HSA

908.00 PUEBLO SAN DIEGO HYDROLOGIC UNIT
908.10 Point Loma HA
908.20 San Diego Mesa HA
8.21 Lindbergh HSA
8.22 Chollas HSA
National City HA
8.31 El Toyan HSA
8.32 Paradise HSA

909.00 SWEETWATER HYDROLOGIC UNIT
909.10 Lower Sweetwater HA
9.11 Telegraph HSA
9.12 La Nacion HSA
909.20 Middle Sweetwater HA
9.21 Jamacha HSA
9.22 Hillsdale HSA
9.23 Dehesa HSA
9.24 Galloway HSA
9.25 Sequan HSA
9.26 Alpine Heights HSA
909.30 Upper Sweetwater HA
9.31 Loveland HSA
9.32 Japatul HSA
9.33 Viejas HSA
9.34 Descanso HSA
9.35 Garnet HSA

910.00 OTAY HYDROLOGIC UNIT
910.10 Coronado HA
910.20 Otay Valley HA
910.30 Dulzura HA
10.31 Savage HSA
10.32 Proctor HSA
10.33 Jamul HSA
10.34 Lee HSA
10.35 Lyon HSA
10.36 Hollenbeck HSA
10.37 Engineer Springs HSA

911.00 TIJUANA HYDROLOGIC UNIT
911.10 Tijuana Valley HA
11.11 San Ysidro HSA
11.12 Water Tanks HSA
911.20 Potrero HA
11.21 Marron HSA
11.22 Bee Canyon HSA
11.23 Barrett HSA
11.24 Round Potrero HSA
11.25 Long Potrero HSA
911.30 Barrett Lake HA
911.40 Monument HA
11.41 Pine HSA
11.42 Mount Laguna HSA
911.50 Morena HA
911.60 Cottonwood HA
911.70 Cameron HA
911.80 Campo HA
11.81 Tecate HSA
11.82 Canyon City HSA
11.83 Clover Flat HSA
11.84 Hill HSA
11.85 Hipass HSA

NOTE:

1. ***The names and areas shown on this map are the same as used by the Department of Water Resources (DWR) in their Bulletin 130 Series.***
2. ***The numbering system used on this map is an adaption of the numbering system used in the 130 Series.***
3. ***The 1986 updated names and boundaries shown on the map are in accordance with an agreement with DWR and US Geological Survey.***
4. ***The 1995 revision of this map includes newly recognized hydrologic subareas within the Mission Viejo HA (901.20). Notes 1 & 3 do not apply to these subareas.***

LEGEND

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

SITE LOCATION

REGION 8

REGION 7

N

KEY TO REGION

REGION NO. 9 | 07 | 4 | 1
HYDROLOGIC UNIT
HYDROLOGIC AREA
HYDROLOGIC SUBAREA

April 1973
Revised: July 1976
Revised: August 1986
State Water Resources Control Board
Surveillance and Monitoring Section
T.E. Lavenda, P.E.

Revised: April 1995
Regional Water Quality Control Board - San Diego Region
Water Quality Standards Unit
D.F. Hoirup Jr.

State of California

REGIONAL WATER QUALITY CONTROL BOARD

San Diego Region (9)

SAN DIEGO HYDROLOGIC BASIN PLANNING AREA (SD)

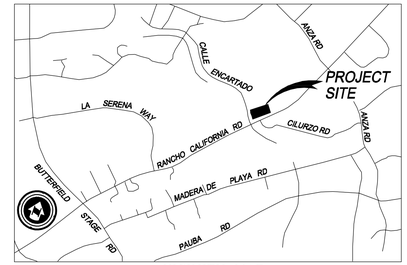
Scale 1:250,000

5 0 5 10 15 20 Miles

MEXICO

NO DUMPING
DRAINS TO RIVER

B/1 STENCIL
LETTERS 2" HIGH
NOT TO SCALE



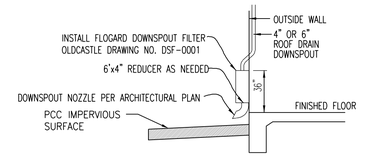
VICINITY MAP
NOT TO SCALE

SOURCE CONTROL BMPS

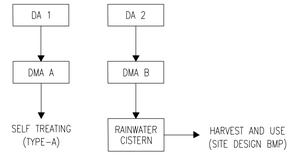
- (A) ON-SITE STORM DRAIN INLET
- (B) FLOOR DRAINS
- (C) PEST CONTROL/HERBICIDE APPLICATION
- (D) FOOD SERVICE
- (E) TRASH STORAGE AREA
- (F) ROOFING, GUTTER AND TRIM
- (G) PLAZA, SIDEWALKS AND PARKING LOTS SWEEPING

WQMP ITEMS

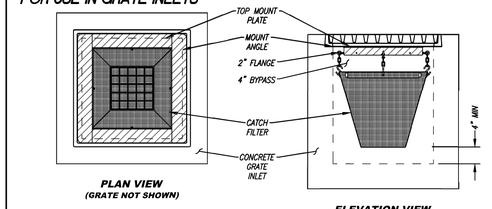
1. 24"X24" STORM DRAIN INLET WITH STORMFLEX INLET INSERT
2. #57 RIP-RAP VELOCITY REDUCER
3. ROOF DRAIN DOWNSPOUT FILTER PER DETAIL 'A' HEREON
4. STORM DRAIN STENCILING PER DETAIL 'B' HERE ON
5. RAINWATER HARVESTING WITH HDPE PIPE CISTERNS PER DETAIL 'C' ON HEREON
6. IRRIGATED LANDSCAPE
7. BIO CLEAN FULL CAPTURE FILTER IN GRATE INLET PER DETAIL 'D' HEREON

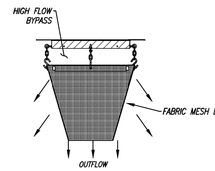


A/1 ROOF DRAIN DOWNSPOUT FILTER
NOT TO SCALE



BIO CLEAN FABRIC FILTER
FOR USE IN GRATE INLETS





MODEL #	TREATMENT FLOW RATE (CFS)	BYPASS FLOW (CFS)	SOLIDS STORAGE CAPACITY (CF)
BIO-GRATE-FABRIC 12-12-12	0.19	1.24	0.15
BIO-GRATE-FABRIC 18-18-12	0.32	2.79	0.35
BIO-GRATE-FABRIC 24-24-12	0.47	4.96	0.59
BIO-GRATE-FABRIC 24-40-12	0.64	6.35	0.88
BIO-GRATE-FABRIC 24-24-24	1.37	4.96	1.22
BIO-GRATE-FABRIC 24-40-24	1.78	6.35	1.82
BIO-GRATE-FABRIC 36-36-24	2.22	7.74	2.73

INSTALLATION NOTES:

1. ALL HARDWARE, FLANGE, FRAME, SHALL BE STAINLESS STEEL.
2. CATCH FILTER SHALL BE US FABRICS - US 1540.
3. OPTIONAL HYDROCARBON BOOM SHALL BE 2" DIAMETER.
4. SEE PERFORMANCE REPORTS IN MANUFACTURES SPECIFICATIONS.
5. OTHER STANDARD AND CUSTOM MODEL SIZES AVAILABLE - CONTACT BIO CLEAN FOR MORE INFORMATION.
6. BASED ON 100% OPEN AREA.
7. CONSIDERS A SAFETY FACTOR OF 2.0.
8. CONSIDERS A LOCAL DEPRESSION PONDING DEPTH OF 6 INCHES.
9. STORAGE CAPACITY BASED ON THE BASKET HALF FULL.
10. CONCRETE STRUCTURES SOLD SEPARATELY.

NOT TO SCALE

BioClean A Forterra Company

GRATE INLET FILTER FABRIC STANDARD DETAIL

D/1 BIOCLEAN FILTER FOR SEDIMENT
MODEL #BIO-GRATE-FABRIC 12-12-12

BMP LEGEND

		QUANTITY
	DRAINAGE AREA BOUNDARY	5 EA
	FLOW LINE	5 EA
	LANDSCAPE (PERVIOUS)	23,93 SF
	PCC PAVEMENT (IMPERVIOUS)	4,628 SF
	AC PAVEMENT (IMPERVIOUS)	49,766 SF
	#57 RIP-RAP	1 EA
	CATCH BASIN/STORM DRAIN INLET	3 EA
DMA X X.XX	DMA DESIGNATION ACRES	
	DMA A (COMPACTED NATURAL GROUND)	12,741 SF
	DMA B (ROOF, PAVEMENT, IRRIGATED TURF)	109,159 SF
	IRRIGATION LANDSCAPE FOR HARVEST AND USE (750,855 SF/17.24 AC)	750,855 SF

WQMP SUMMARY

EXISTING
IMPERV AREA: 0 FT^2
PERV. AREA: 121,900 FT^2

PROPOSED
TOTAL AREA: 121,900 FT^2
IMPERV. AREA: 88,207 FT^2
PERV. AREA: 33,693 FT^2
V_{BMP}: 4,574 FT^3

POST-DEVELOPED DMA TYPE

DRAINAGE AREA	TYPE	AREA (SF)	% OF SITE
DMA A	A - SELF-TREATING AREA	12741	10.5%
DMA B	D - ROUTED TO BMP	109159	89.5%

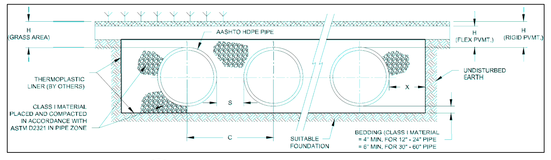
POST-DEVELOPED IMPERVIOUS RATIO

DRAINAGE AREA	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)	TOTAL (SF)	% IMP
SITE (FULL)	88207	33693	121900	72.4

BMP - UNDERGROUND TANK (RAINWATER CISTERN)

DRAINAGE AREA	REQUIRED DCV (FT^3)	REQUIRED HCOC VOLUME (FT^3)	PROVIDED VOLUME (FT^3)	PROVIDED VOLUME (GAL)
DMA B	5,197	5,258	17,315	129,525

NOTE: SEE APPENDIX 6 IN WQMP REPORT FOR LID BMP SIZING CALCULATION FOR THE RAINWATER HARVESTING WITH HDPE PIPE CISTERN SPECIFICATION DETAIL



C/1 CISTERN CROSS SECTION
NOT TO SCALE

VALUED ENGINEERING, INC
CIVIL ENGINEERING • LAND SURVEYING • LAND PLANNING
600 N. MOUNTAIN AVE, STE C102, UPLAND, CA 91786
PHONE: (909) 982-4601

COUNTY OF RIVERSIDE

WQMP EXIHIBIT
PPT220010
MEXIN WINERY

SHEET 1 OF 1

DATE: MARCH 2021
PREPARED BY: VEI
REVIEWED BY: JDM
FOR: MEXIN WINERY
W.O.

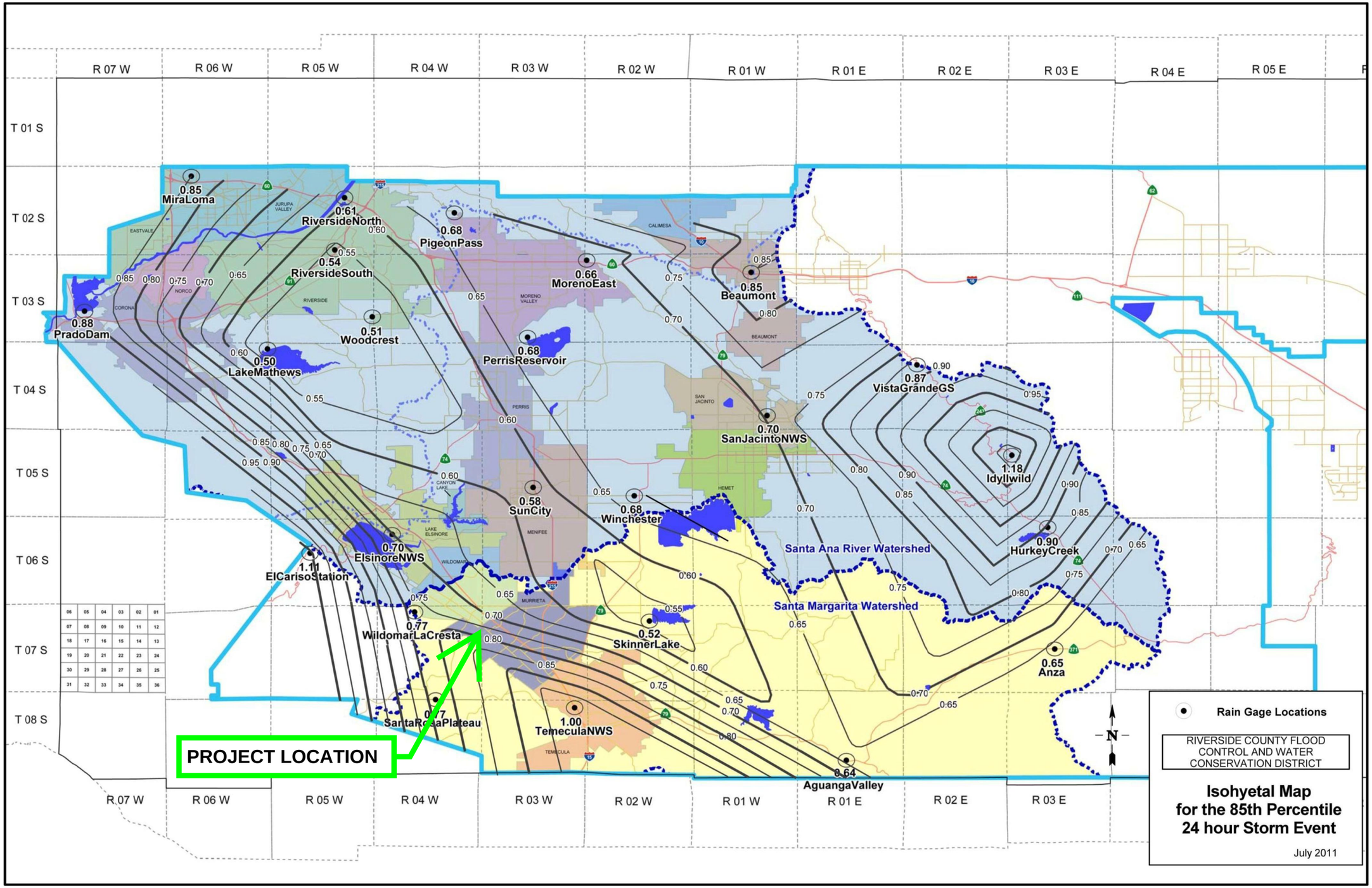


Figure B.1-1: 85th Percentile 24-hour Isohyetal Map

Appendix 2: Construction Plans

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

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

1. The Engineer shall furnish to the County a copy of the source testing and a signed certification that the fully blended Bioretention/Biofiltration Soil Media (BSM) material meets all of the WQMP requirements before material is imported or if the material is mixed onsite prior to installation.
2. As BSM material is being installed, Quality Assurance (QA) tests shall be conducted or for every 1,200 tons or 800 cubic yards mixed on-site from a completely mixed stockpile or windrow, with a minimum of three tests. For imported material from a supplier with a quality control program the QA tests shall be conducted 2,400 tons or 1,600 cubic yards from the supplier.
3. The Engineer conducting the Quality Control testing shall furnish to the County copy of the QA testing and a certification that the BSM for the project meets all of the following requirements. Certified mitigation plans can be used for exceedances, as long as all requirements are designed to be met.
    a. BSM shall not be compacted. BSM shall consist of 60-80% clean sand, up to 20% clean topsoil, and 20% of a nutrient-stabilized organic amendment. The initial infiltration rate shall be greater than 8 inches per hour per laboratory test.
    b. pH: 6.0 – 8.5; Salinity: 0.5 to 3.0 mmho/cm as electrical conductivity; Sodium absorption ratio: < 6.0; Chloride: < 800 ppm in saturated extract; Cation Exchange Capacity (CEC): > 10 meq/100 g; Organic Matter: 2 to 5-percent on a dry weight basis; Carbon: Nitrogen Ratio: 12 to 40, preferably 15 to 40; Gravel larger than 2mm: 0 to 25-percent of the total sample; Clay smaller than 0.005mm: 0 to 5 percent of the non-gravel fraction.
    c. BSM shall be tested to limit the leaching of potential inherent pollutants. BSM used in Biofiltration BMPs shall conform to the following limits for pollutant concentrations in saturated extract: Phosphorus: < 1 mg/L; Nitrate < 3 mg/L, Copper < 0.025 mg/L. These pollutant limits are for the amount that is leached from the sample, not from the soil sample itself. Testing may be performed after laboratory rinsing of media with up to 15 pore volumes of water. Equivalent test results will be accepted if certified by a laboratory or appropriate testing facility.
    d. Low nutrient compost used in BSM shall be sourced from a facility permitted through CalRecycle, preferably through USCC STA program. Compost shall conform to the following requirements: Physical contaminants <1% by dry weight; Carbon:Nitrogen ratio: 12:1 to 40:1; Maturity/Stability shall conform to either: Solvita Maturity Index: ≥ 5.5, CO_2 Evolution: < 2.5 mg CO_2-C per g compost organic matter per day, or < 5 mg CO_2-C per g compost C per day; Select Pathogens and Trace metals shall pass US EPA Class A Standard. Testing shall be no more than 6 months old and representative of current stockpiles.
    e. Coconut coir pith used in BSM shall be thoroughly rinsed with freshwater and screened to remove coarse fibers as part of production and aged > 6 months. Peat used in BSM shall be sphagnum peat.

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

Appendix 3: Soils Information

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

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

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

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

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

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Western Riverside Area, California

July 6, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 7, 2021—Jan 14, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	11.4	54.1%
RmE3	Ramona and Buren sandy loams, 15 to 25 percent slopes, severely eroded	9.7	45.9%
Totals for Area of Interest		**21.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Western Riverside Area, California

GyC2—Greenfield sandy loam, 2 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcvw
Elevation: 100 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Greenfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Greenfield

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 26 inches: sandy loam
H2 - 26 to 43 inches: fine sandy loam
H3 - 43 to 60 inches: loam
H4 - 60 to 72 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 3 percent

Hydric soil rating: No

Pachappa

Percent of map unit: 3 percent
Hydric soil rating: No

Arlington

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Ramona

Percent of map unit: 3 percent
Hydric soil rating: No

RmE3—Ramona and Buren sandy loams, 15 to 25 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: hcyj
Elevation: 250 to 3,500 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Ramona and similar soils: 45 percent
Buren and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramona

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 8 inches: sandy loam
H2 - 8 to 17 inches: fine sandy loam
H3 - 17 to 68 inches: sandy clay loam
H4 - 68 to 74 inches: gravelly sandy loam

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Description of Buren

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear, convex
Parent material: Alluvium

Typical profile

H1 - 0 to 12 inches: sandy loam
H2 - 12 to 28 inches: loam
H3 - 28 to 37 inches: loam
H4 - 37 to 52 inches: cemented

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 37 to 40 inches to duripan
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Buren

Percent of map unit: 5 percent
Hydric soil rating: No

Ramona

Percent of map unit: 5 percent
Hydric soil rating: No

Hanford

Percent of map unit: 5 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Saturated Hydraulic Conductivity (Ksat), Standard Classes

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits. The classes are:

Very low: 0.00 to 0.01

Low: 0.01 to 0.1

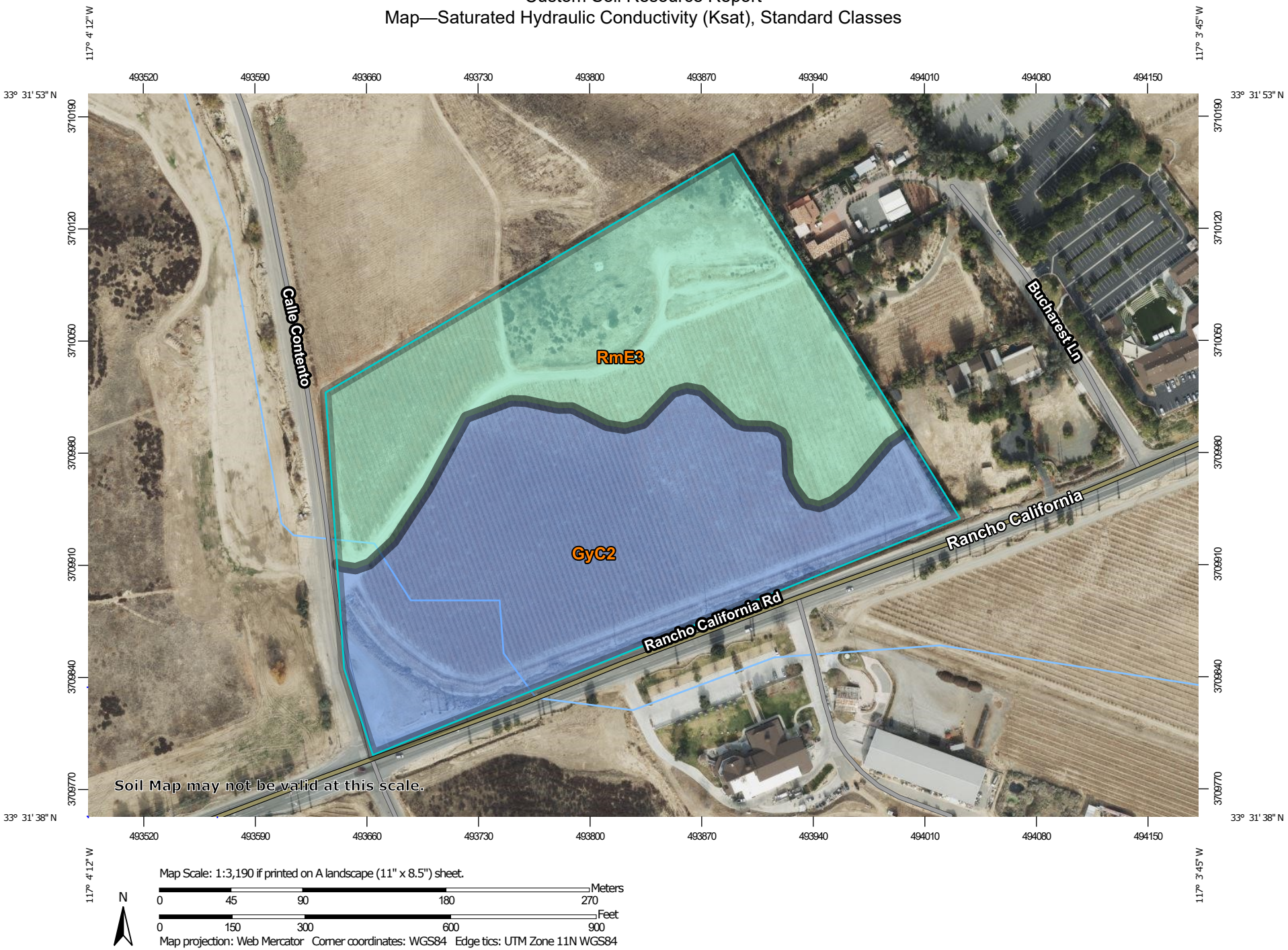
Moderately low: 0.1 to 1.0

Moderately high: 1 to 10

High: 10 to 100

Very high: 100 to 705

Map—Saturated Hydraulic Conductivity (Ksat), Standard Classes



Map Scale: 1:3,190 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Soil Rating Lines

- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Soil Rating Points

- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 7, 2021—Jan 14, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Saturated Hydraulic Conductivity (Ksat), Standard Classes

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	23.5355	11.4	54.1%
RmE3	Ramona and Buren sandy loams, 15 to 25 percent slopes, severely eroded	4.1410	9.7	45.9%
Totals for Area of Interest			**21.0**	**100.0%**

Rating Options—Saturated Hydraulic Conductivity (Ksat), Standard Classes

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): All Layers (Weighted Average)

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties–Western Riverside Area, California														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
GyC2—Greenfield sandy loam, 2 to 8 percent slopes, eroded														
Greenfield	0-26	-66-	-23-	7-11- 15	1.45-1.50-1.55	14.00-28.00-42.00	0.10-0.13-0.15	0.0- 1.5- 2.9	0.5- 0.8-1.0	.28	.28	5	3	86
	26-43	-70-	-16-	10-14- 18	1.50-1.55-1.60	14.00-28.00-42.00	0.11-0.14-0.16	0.0- 1.5- 2.9	0.0- 0.0-0.0	.28	.28			
	43-60	-41-	-37-	18-22- 25	1.45-1.50-1.55	4.00-9.00-14.00	0.14-0.15-0.16	0.0- 1.5- 2.9	0.0- 0.0-0.0	.37	.37			
	60-72	-66-	-23-	7-11- 15	-1.50-	14.00-28.00-42.00	0.07-0.10-0.12	0.0- 1.5- 2.9	0.0- 0.0-0.0	.17	.28			

Physical Soil Properties–Western Riverside Area, California														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
RmE3—Ramona and Buren sandy loams, 15 to 25 percent slopes, severely eroded														
Ramona	0-8	-69-	-24-	5- 8- 10	1.60-1.63-1.65	4.00-9.00-14.00	0.09-0.10-0.11	0.0- 1.5- 2.9	0.5- 0.8-1.0	.32	.32	5	3	86
	8-17	-68-	-21-	8-12- 15	1.50-1.58-1.65	4.00-9.00-14.00	0.10-0.13-0.15	0.0- 1.5- 2.9	0.0- 0.3-0.5	.37	.37			
	17-68	-60-	-18-	18-23- 27	1.70-1.80-1.90	1.40-2.70-4.00	0.12-0.15-0.17	0.0- 1.5- 2.9	0.0- 0.3-0.5	.28	.28			
	68-74	-68-	-20-	10-13- 15	1.50-1.55-1.60	1.40-2.70-4.00	0.05-0.08-0.10	0.0- 1.5- 2.9	0.0- 0.3-0.5	.28	.28			
Buren	0-12	-66-	-19-	10-15- 20	1.50-1.55-1.60	14.00-28.00-42.00	0.12-0.13-0.14	0.0- 1.5- 2.9	0.5- 0.8-1.0	.24	.24	4	3	86
	12-28	-39-	-37-	20-25- 30	1.35-1.43-1.50	1.40-2.70-4.00	0.15-0.17-0.18	3.0- 4.5- 5.9	0.0- 0.0-0.0	.37	.37			
	28-37	-42-	-37-	15-21- 27	1.45-1.50-1.55	4.00-9.00-14.00	0.13-0.14-0.15	0.0- 1.5- 2.9	0.0- 0.0-0.0	.43	.43			
	37-52	—	—	—	—	0.01-0.21-0.42	—	—	—					

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Appendix 4: Historical Site Conditions

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

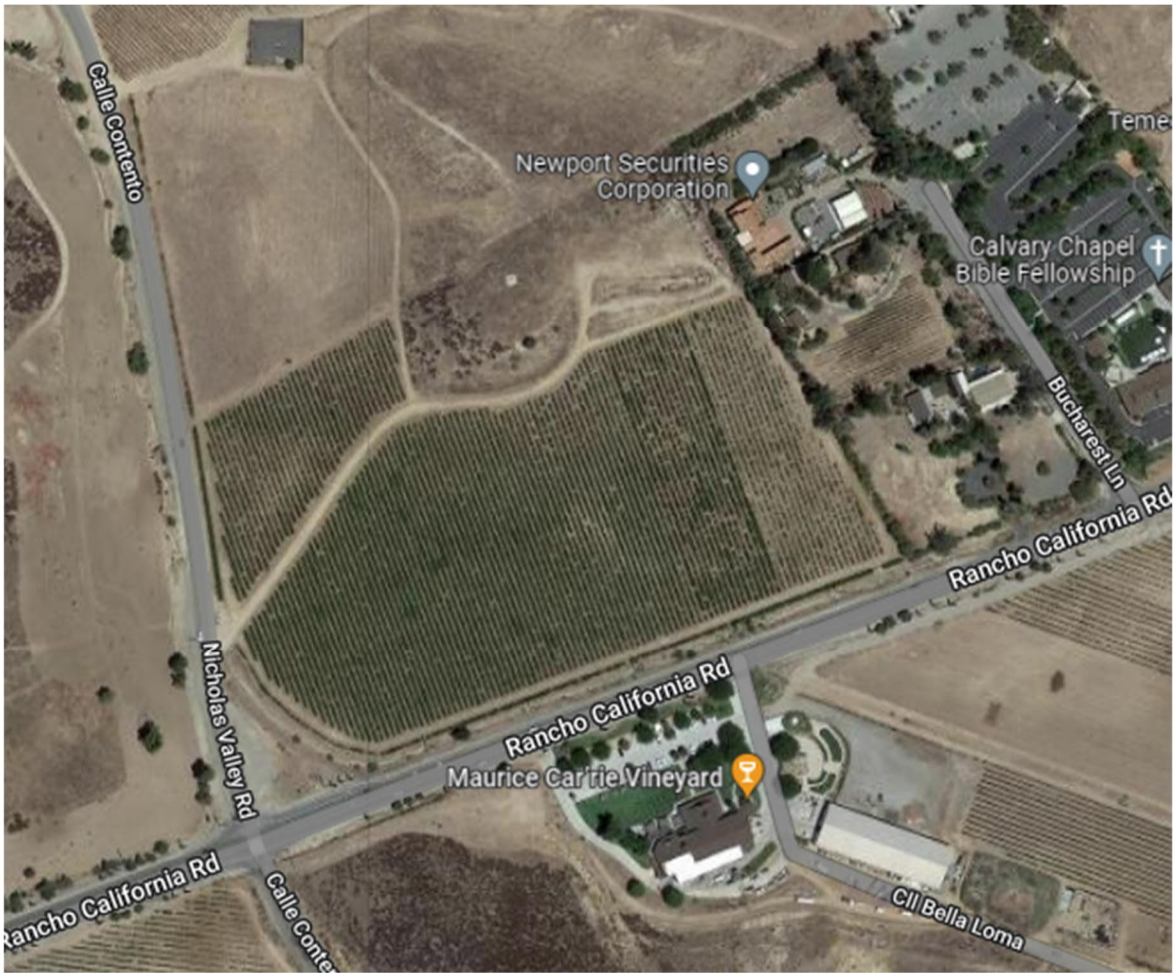
Examples of material to provide in Appendix 4 may include but are not limited to the following:

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

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

Appendix 4: Historical Site Conditions

Ariel View



Appendix 5: LID Feasibility Supplemental Information

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

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

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

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

*Site design LID principles fully retain the DCV. Therefore, the assessment of the feasibility of utilizing full infiltration BMPs is not required for this project. *

Appendix 6: LID BMP Design Details

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

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

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

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

* Site design LID principles fully retain the DCV*

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	VALUED ENGINEERING	Date	10/13/2022
Designed by	VEI	County/City Case No	PPT220010
Company Project Number/Name	MEXIN WINERY		
Drainage Area Number/Name	DMA B		

Enter the Area Tributary to this Feature A_T = 2.5 acres

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

Site Location

Township

Range

Section

Enter the 85th Percentile, 24-hour Rainfall Depth D_{85} = 0.77

Determine the Effective Impervious Fraction

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

Effective Impervious Fraction I_f = 0.91

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 = 0.74

Determine Design Storage Volume, V_{BMP}

Calculate V_U, the 85% Unit Storage Volume $V_U = D_{85} \times C$ V_u = 0.57 (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} = 5,197 ft^3

Notes:

CONTECH ENGINEERED SOLUTIONS

CMP: Underground Detention System Storage Volume Estimation

Date: 7/11/2022
Project Name: MEXIN WINERY

City / County: TEMECULA
State: CA

Designed By: VEI
Company: VALUED ENGINEERING, INC
Telephone: 909-982-4601

=Adjustable Input Cells

Contech Engineered Solutions, LLC is pleased to offer the following estimate of storage volume for the above named project. The results are submitted as an estimate only, without liability on the part of Contech Engineered Solutions, LLC for accuracy or suitability to any particular applicaton and are subject to verification of the Engineer of Record. This tool is only applicable for rectangular shaped systems.

Summary of Inputs

System Information		Backfill Information		Pipe & Analysis Information	
Out-to-out length (ft):	94.0	Backfill Porosity (%):	0%	System Diameter (in):	60
Out-to-out width (ft):	65.0	Depth Above Pipe (in):	0.0	Pipe Spacing (in):	30
Number of Manifolds (ea):	2.0	Depth Below Pipe (in):	0.0	Incremental Analysis (in):	2
Number of Barrels (ea):	9.0	Width At Ends (ft):	1.0	System Invert (Elevation):	0
		Width At Sides (ft):	1.0		

Storage Volume Estimation

System		Pipe		Stone		Total System		Miscellaneous	
Depth (ft)	Elevation (ft)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Incremental Storage (cf)	Cumulative Storage (cf)	Percent Open Storage (%)	Ave. Surface Area (sf)
0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0
0.17	0.16	177.9	177.9	0.0	0.0	177.9	177.9	100.0%	1,590.4
0.33	0.33	320.1	498.1	0.0	0.0	320.1	498.1	100.0%	2,210.1
0.50	0.50	407.3	905.4	0.0	0.0	407.3	905.4	100.0%	2,658.0
0.67	0.66	473.5	1,378.9	0.0	0.0	473.5	1,378.9	100.0%	3,011.8
0.83	0.83	526.9	1,905.8	0.0	0.0	526.9	1,905.8	100.0%	3,301.9
1.00	1.00	571.1	2,476.9	0.0	0.0	571.1	2,476.9	100.0%	3,544.0
1.17	1.16	608.1	3,085.0	0.0	0.0	608.1	3,085.0	100.0%	3,747.4
1.33	1.33	639.2	3,724.2	0.0	0.0	639.2	3,724.2	100.0%	3,918.0
1.50	1.50	665.2	4,389.4	0.0	0.0	665.2	4,389.4	100.0%	4,060.2
1.67	1.66	686.7	5,076.2	0.0	0.0	686.7	5,076.2	100.0%	4,176.6
1.83	1.83	704.2	5,780.3	0.0	0.0	704.2	5,780.3	100.0%	4,269.6
2.00	2.00	717.8	6,498.1	0.0	0.0	717.8	6,498.1	100.0%	4,340.5
2.17	2.16	727.9	7,226.0	0.0	0.0	727.9	7,226.0	100.0%	4,390.4
2.33	2.33	734.5	7,960.5	0.0	0.0	734.5	7,960.5	100.0%	4,420.1
2.50	2.50	737.8	8,698.3	0.0	0.0	737.8	8,698.3	100.0%	4,430.0
2.67	2.66	737.8	9,436.1	0.0	0.0	737.8	9,436.1	100.0%	4,420.1
2.83	2.83	734.5	10,170.6	0.0	0.0	734.5	10,170.6	100.0%	4,390.4
3.00	3.00	727.9	10,898.4	0.0	0.0	727.9	10,898.4	100.0%	4,340.5
3.17	3.16	717.8	11,616.2	0.0	0.0	717.8	11,616.2	100.0%	4,269.6
3.33	3.33	704.2	12,320.4	0.0	0.0	704.2	12,320.4	100.0%	4,176.6
3.50	3.50	686.7	13,007.1	0.0	0.0	686.7	13,007.1	100.0%	4,060.2
3.67	3.66	665.2	13,672.4	0.0	0.0	665.2	13,672.4	100.0%	3,918.0
3.83	3.83	639.2	14,311.6	0.0	0.0	639.2	14,311.6	100.0%	3,747.4
4.00	4.00	608.1	14,919.7	0.0	0.0	608.1	14,919.7	100.0%	3,544.0
4.17	4.16	571.1	15,490.8	0.0	0.0	571.1	15,490.8	100.0%	3,301.9
4.33	4.33	526.9	16,017.7	0.0	0.0	526.9	16,017.7	100.0%	3,011.8
4.50	4.50	473.5	16,491.2	0.0	0.0	473.5	16,491.2	100.0%	2,658.0
4.67	4.66	407.3	16,898.5	0.0	0.0	407.3	16,898.5	100.0%	2,210.1
4.83	4.83	320.1	17,218.6	0.0	0.0	320.1	17,218.6	100.0%	1,590.4
5.00	5.00	177.9	17,396.6	0.0	0.0	177.9	17,396.6	100.0%	0.0

RAINWATER HARVESTING WITH HDPE PIPE CISTERNS

With the growing demand for both usable water and storm water control, ADS N-12® HDPE pipe cistern systems are a valuable, cost-effective solution. The storage and reuse of rainwater is especially valuable in areas where water resources are at a premium. Rainwater harvesting takes advantage of run-off from lawns, roofs and pavement, collecting and storing it in underground cisterns—out of sight until needed.

ADS HDPE pipe is the building block of our cisterns. In combination with INSERTA TEE®, manifold fittings and other tap connections, it creates a reclamation solution for any location and layout. In some situations, water reuse is being driven by regulatory requirements and the demand is increasing, especially in arid regions of the country. The economic and environmental benefits go hand-in-hand, making the ADS rainwater harvesting system an advantageous addition to any development.

APPLICATIONS:

- Storm water storage and reuse
- Residential & Commercial run-off control
- Lawn, landscape, turf and garden irrigation

FEATURES:

- Durable High-Density Polyethylene plastic
- Structurally sound to withstand H-20 traffic loading
- Lightweight, easy to install
- Chemically resistant
- Layouts are customizable and expandable for every location
- Unlimited capacity—can be constructed to hold any volume required.

BENEFITS:

- Won't corrode, long service life
- Provides water resource management
- Easy installation provides cost-efficiency
- Underground installation supports multiple land uses

ADS Service: ADS representatives are committed to providing you with the answers to all your questions, including specifications, installation and more.

HDPE PIPE CISTERNS FOR RAINWATER HARVESTING

SCOPE

This specification describes 36” through 60” (900-1500mm) ADS N-12 Rainwater Harvesting Cistern for use in gravity-flow (non-pressure) rainwater harvesting applications. See ADS HP Rainwater Harvesting Cistern when using multiple cisterns or cisterns longer than 20 feet (6m).

MATERIAL PROPERTIES

Cistern shall be constructed of polyethylene pipe material meeting the requirements of ASTM F2306, and AASHTO M294.

CISTERN REQUIREMENTS

ADS 36” through 60” (900-1500mm) N-12 Rainwater Harvesting Cistern shall be fabricated from pipe meeting the meeting the requirements of ASTM F2306 and AASHTO M294. The inlet and by-pass outlet shall be 4”-12” (100–300mm) diameter INSERTA TEE® tap connections as specified and located in the field. INSERTA TEE tap connections may only be used at or near the top of the bulkhead to function as an inlet or overflow. For water equalization between multiple cisterns, or for installing tap connections below the water storage level, the installer may use a commercially available threaded bulk head tank fitting at the bottom invert of the cistern. Cistern shall have at least one 24” diameter riser for maintenance purposes. Cisterns are available in configurations of 20 foot (6 m) lengths.

QUALITY

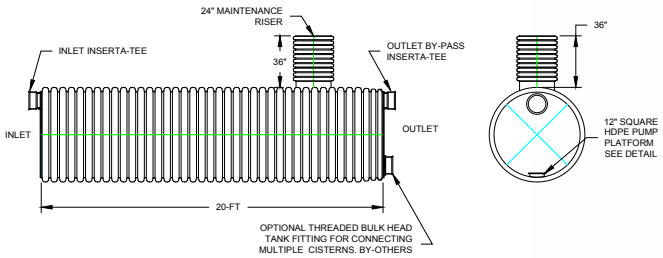
Cisterns shall be pressure or vacuum tested by the manufacturer prior to shipment to ensure weld quality. Testing report may be available by request prior to order.

PERFORMANCE TESTING

In lieu of an engineer’s written specification, the integrity of the N-12 Rainwater Harvesting Cistern may be tested in accordance with ASTM F2487, with the exception that the cistern may not be filled past the invert of the by-pass outlet pipe. A maximum allowable leakage allowance of 0.12 gallons/ft-dia/ft-pipe/24-hour may be applied to the cistern in lieu of written specification. Performance not meeting the requirements of this or the engineer’s written specifications shall be remedied by the installer or other party. Appropriate safety precautions must be used when field testing any pipe material.

INSTALLATION

Installation shall be in accordance with ASTM D2321 and ADS recommended installation guidelines utilizing Class 1 or 2 (ASTM D2321) structural backfill materials. Minimum cover in traffic areas shall be 2 ft (0.6m) as measured from top of pipe to top of rigid pavement or to bottom of flexible pavement, and utilize a class 1 (ASTM D2321) backfill material. Maximum fill heights shall not exceed 8 feet. INSERTA TEE bulk head tap connection as well as threaded bulk head tank fittings shall be installed by the installer as specified on the plans. For single or multiple parallel cisterns; connection pipes, valve boxes, pumps and accessories, shall be as specified on the plans and supplied by others. Contact your local ADS representative or visit www.ads-pipe.com for a copy of the latest installation guidelines.



ADS N-12 RAINWATER HARVESTING CISTERN DIMENSIONS AND SPECIFICATIONS (capacity assumes 12” of free board)

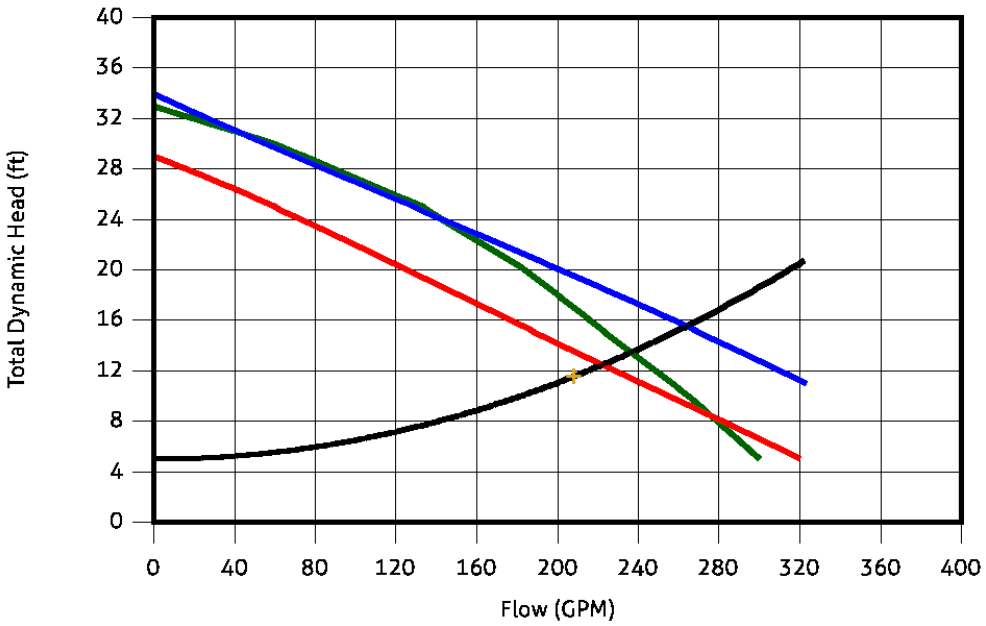
I.D. (in.)	Length		Cistern Capacity		
	ft	m	gal	cu ft	L
36	20	6	737	99	2790
42	20	6	1083	145	4100
48	20	6	1489	199	5636
60	20	6	2479	331	9384

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

Known Flow and TDH

Dewatering

Sizing ID: 28U-PNU-C4T



Curve	Models	Eq. Flow	Eq. Head
	621	222.28	12.49
	404	236.46	13.48
	631	263.62	15.54

System Curve

GPM	TDH (ft)
0.00	5.00
66.00	5.66
132.00	7.64
198.00	10.95
264.00	15.57
330.00	21.52
396.00	28.78

Flow (GPM)*: 207.81

TDH (ft)*: 11.55

***Per user data**

Fittings

None Selected

Pump Specs

Electrical	230 volt, 3 phase, 60 Hertz
Physical	
Discharge Size	4.00" NPT
Solids Handling (in.)	0.63
Static Head (ft)	5.0000
TDH (ft)	11.55

Trusted. Tested. Tough.™

Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

ZOELLER® PUMP COMPANY

SECTION: 2.20.080
FM2794
0818
Supersedes
0318

TECHNICAL DATA SHEET
SEWAGE WASTE SERIES
Models 611, 621, 631, 641, 651, 661 Submersible Sewage Pumps

PRODUCT SPECIFICATIONS

MOTOR	Horse Power	1 (611), 1-1/2 (621), 2 (631), 3 (641), 5 (651), 7-1/2 (661)
	Voltage	230, 200 - 575
	Phase	1, 3 Ph
	Hertz	60 Hz
	RPM	1750
	Type	Capacitor start capacitor run or 3 Ph
	Insulation	Class F
	Amps	1.7 - 28.0
PUMP	Operation	Nonautomatic
	Discharge Size	3" NPT (optional 3" or 4" flange available)
	Solids Handling	2-1/2" (63 mm) spherical solids
	Cord Length	25' (8 m) standard
	Cord Type	UL listed 3-wire cord
	Max. Head	65' (19.8 m)
	Max. Flow Rate	590 GPM (2,233 LPM)
	Max. Operating Temp.	104 °F (40 °C)
	Cooling	Oil filled
	Motor Protection	Thermal sensors with automatic reset

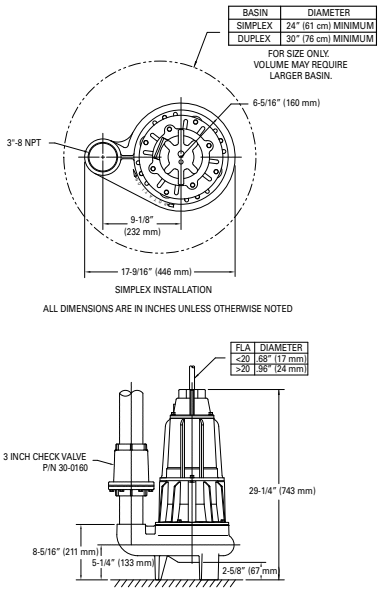
MATERIALS	Upper Bearing	Ball bearing
	Lower Bearing	Ball bearing
	Mechanical Seals	Tandem carbon and ceramic
	Impeller Type	Semi-open
	Impeller	Ductile iron
	Hardware	Stainless steel
	Motor Shaft	Stainless steel
	Gasket	Buna-N square ring seals

All Class 30 cast iron construction.

NOTE: See model comparison chart for specific details.

C US
Tested to UL 778 and CSA C22.2 No. 108

3" NPT DISCHARGE



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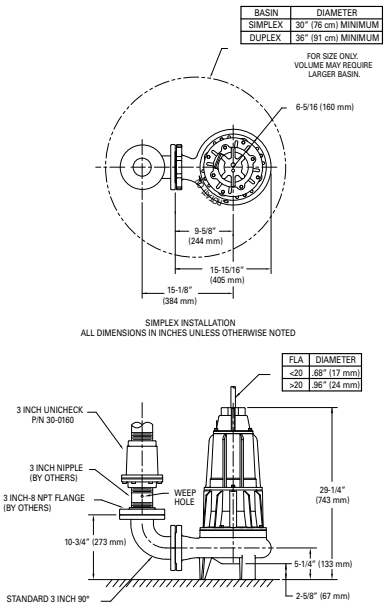
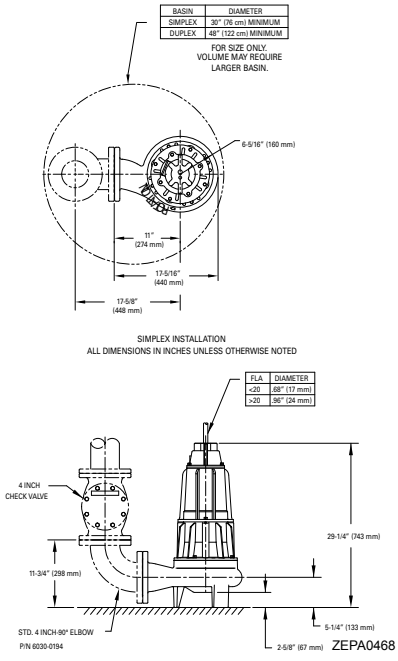
3" FLANGED DISCHARGE



ZEPA0470

4" FLANGED DISCHARGE



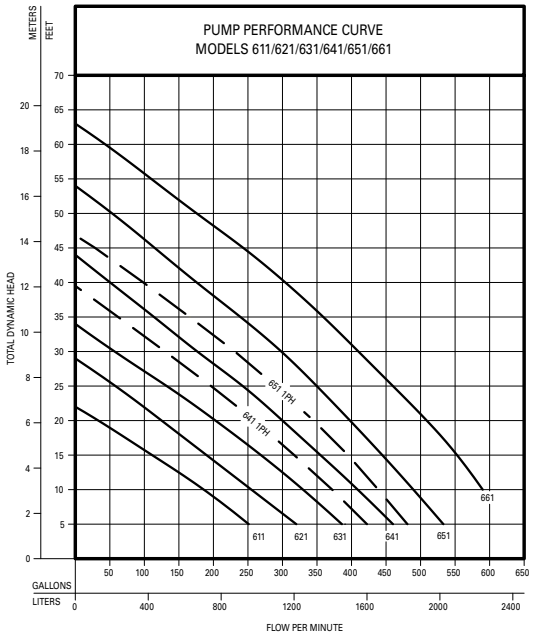
ZEPA0468

502-778-2731 | 800-928-7867 | 3649 Cane Run Road | Louisville, KY 40211-1961 | zoeller.com

TOTAL DYNAMIC HEAD FLOW PER MINUTE

MODEL		611		621		631		641 (1PH)	
Feet	Meters	Gal.	Liters	Gal.	Liters	Gal.	Liters	Gal.	Liters
5	1.5	250	946	320	1211	390	1476	420	1590
10	3.0	185	700	255	965	335	1268	370	1401
15	4.6	110	416	190	719	272	1030	319	1208
20	6.1	35	132	125	473	200	757	260	984
25	7.6	--	--	60	227	130	492	198	750
30	9.1	--	--	--	--	55	208	130	492
35	10.7	--	--	--	--	--	--	62	235
40	12.2	--	--	--	--	--	--	--	--
45	13.7	--	--	--	--	--	--	--	--
50	15.2	--	--	--	--	--	--	--	--
55	16.7	--	--	--	--	--	--	--	--
60	18.2	--	--	--	--	--	--	--	--
Shut-off Head:		22 ft.(6.7m)		29 ft.(8.8m)		34 ft.(10.4m)		39.5 ft.(12.0m)	

MODEL		641		651 (1PH)		651		661	
Feet	Meters	Gal.	Liters	Gal.	Liters	Gal.	Liters	Gal.	Liters
5	1.5	460	1741	475	1798	533	2018	--	--
10	3.0	410	1552	440	1666	490	1855	590	2233
15	4.6	355	1343	395	1495	445	1685	555	2101
20	6.1	300	1136	345	1306	398	1507	510	1931
25	7.6	245	927	290	1098	350	1325	460	1741
30	9.1	175	662	232	878	300	1136	410	1552
35	10.7	115	435	165	625	240	908	360	1363
40	12.2	50	189	95	360	175	662	305	1155
45	13.7	--	--	25	95	115	435	245	927
50	15.2	--	--	--	--	55	208	175	662
55	16.7	--	--	--	--	--	--	110	416
60	18.2	--	--	--	--	--	--	45	170
Shut-off Head:		44 ft.(13.4m)		46.5 ft.(14.2m)		54 ft.(16.5m)		63 ft.(19.2m)	



013859

Model	MODEL COMPARISON								
	Seal	Mode	Volts	Ph	Amps	HP	Hz	Lbs	Kg
*E611	Double	Non	230	1	6.9	1	60	245	111
J611	Double	Non	200	3	4.8	1	60	245	111
F611	Double	Non	230	3	4.2	1	60	245	111
G611	Double	Non	460	3	2.1	1	60	245	111
BA611	Double	Non	575	3	1.7	1	60	245	111
*E621	Double	Non	230	1	8.9	1-1/2	60	245	111
J621	Double	Non	200	3	5.9	1-1/2	60	245	111
F621	Double	Non	230	3	5.1	1-1/2	60	245	111
G621	Double	Non	460	3	2.6	1-1/2	60	245	111
BA621	Double	Non	575	3	2.0	1-1/2	60	245	111
*E631	Double	Non	230	1	14.5	2	60	245	111
J631	Double	Non	200	3	7.8	2	60	245	111
F631	Double	Non	230	3	6.8	2	60	245	111
G631	Double	Non	460	3	3.4	2	60	245	111
BA631	Double	Non	575	3	2.7	2	60	245	111
*E641	Double	Non	230	1	17.0	3	60	245	111
J641	Double	Non	200	3	11.0	3	60	245	111
F641	Double	Non	230	3	9.6	3	60	245	111
G641	Double	Non	460	3	4.8	3	60	245	111
BA641	Double	Non	575	3	3.9	3	60	245	111
*E651	Double	Non	230	1	28.0	5	60	245	111
J651	Double	Non	200	3	17.5	5	60	245	111
F651	Double	Non	230	3	15.2	5	60	245	111
G651	Double	Non	460	3	7.6	5	60	245	111
BA651	Double	Non	575	3	6.1	5	60	245	111
J661	Double	Non	200	3	25.3	7-1/2	60	245	111
F661	Double	Non	230	3	22.0	7-1/2	60	245	111
G661	Double	Non	460	3	11.0	7-1/2	60	245	111
BA661	Double	Non	575	3	9.0	7-1/2	60	245	111

* All single phase units require external starting capacitor and relay circuits.
Additional cord lengths are available in 35' (11 m) and 50' (15 m).

⚠ CAUTION All installation of controls, protection devices and wiring should be done by a qualified licensed electrician. All electrical and safety codes should be followed including the most recent National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

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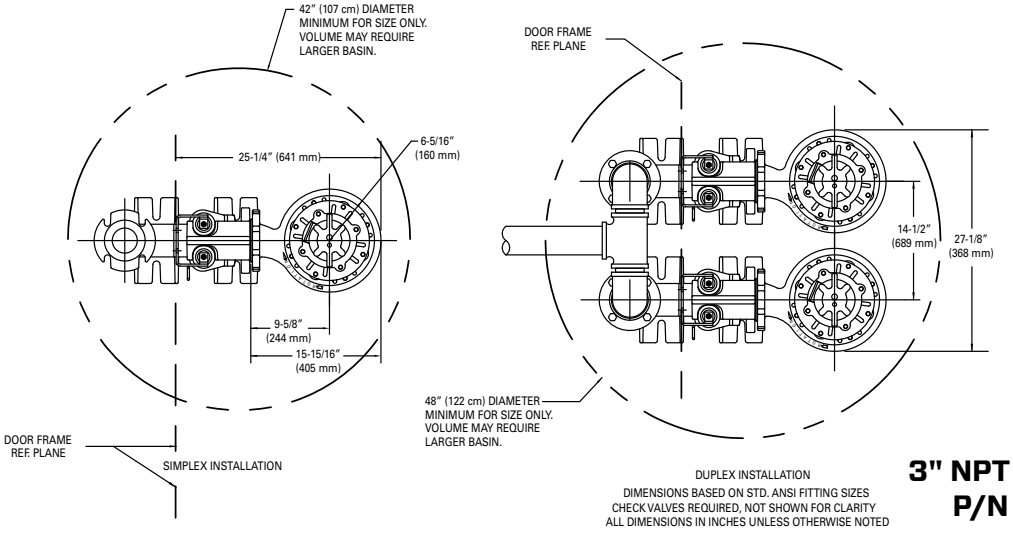
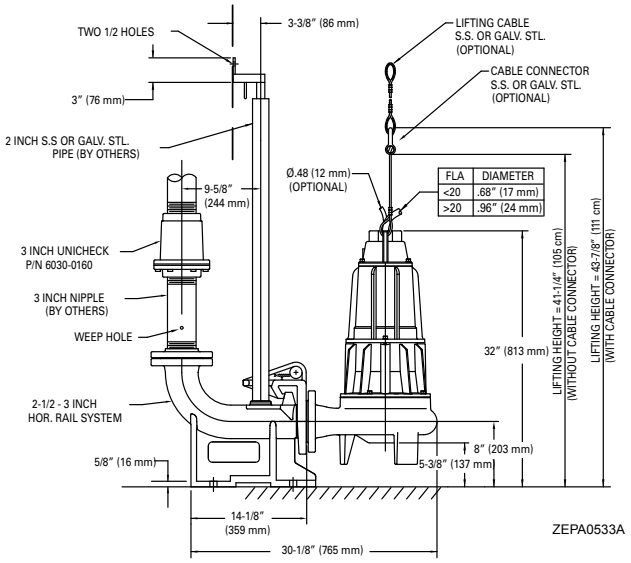
RAIL SYSTEM DIMENSIONAL DATA

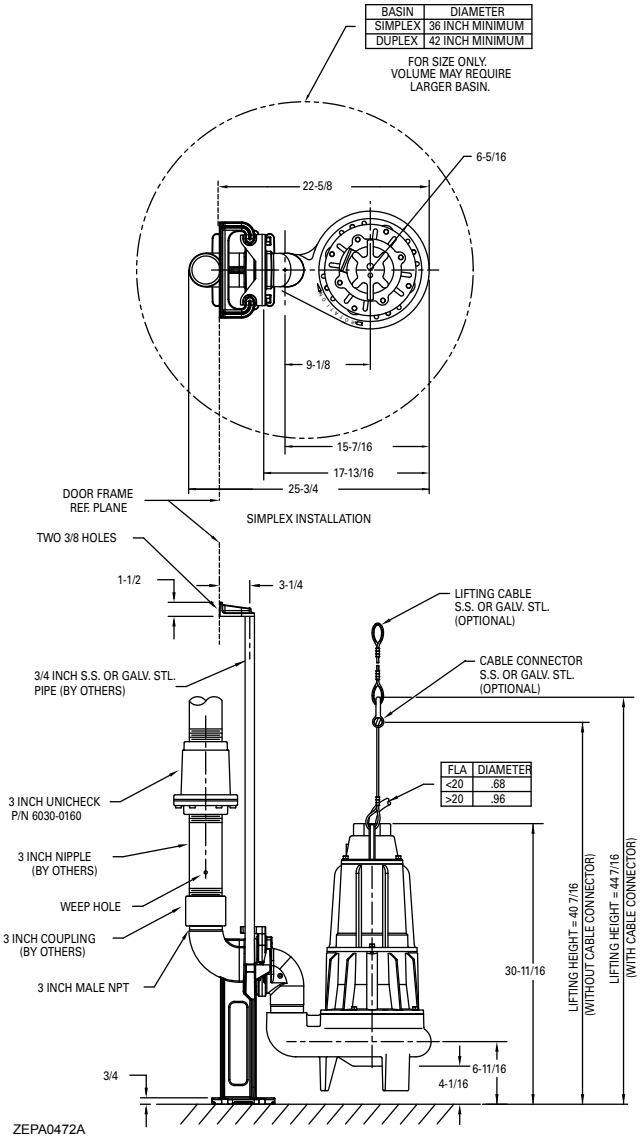
3" FLANGED HORIZONTAL DISCHARGE
P/N 39-0094 RAIL SYSTEM



DIMENSIONS BASED ON STD. ANSI FITTING SIZES
CHECK VALVES REQUIRED, NOT SHOWN FOR CLARITY
ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED

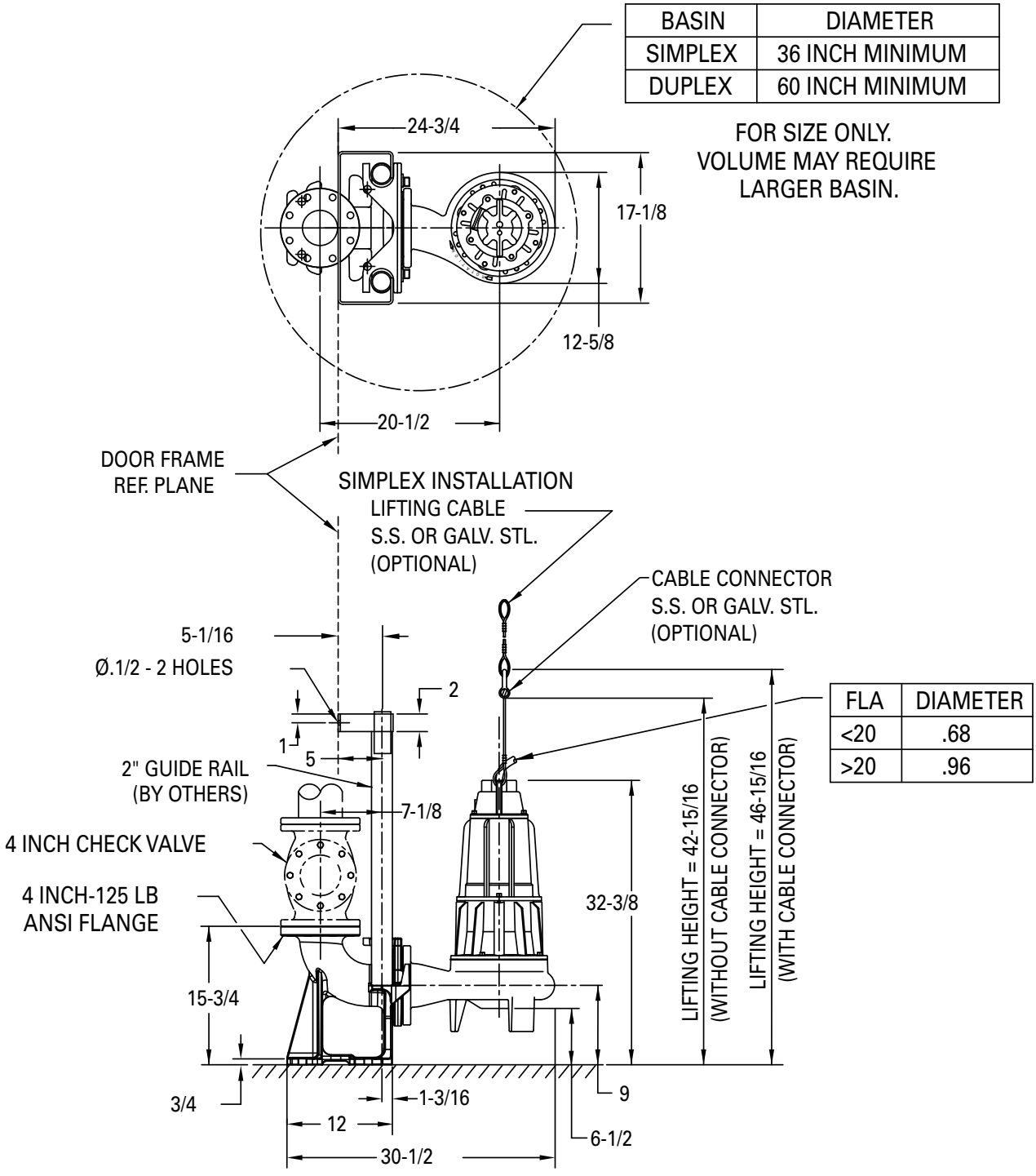


3" NPT VERTICAL DISCHARGE
P/N 39-0122 & 39-0123
RAIL SYSTEMS



RAIL SYSTEM DIMENSIONAL DATA, continued

4" FLANGED HORIZONTAL DISCHARGE
P/N 39-0154 RAIL SYSTEM



ZEPA0469A

D.2 Harvest and Use Assessment

Please check what applies:

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 16.4

Type of Landscaping (Conservation Design or Active Turf): Active Turf

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 2.02

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 1.45

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 2.93

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
2.93	16.4

Appendix 7:
Hydromodification & Critical Coarse Sediment

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

The preparer shall include the following in this Appendix (Refer to Section 2.4 and 3.6 of the SMR WQMP and Sections E of this Template):

- Hydromodification Exemption Exhibit (if the project is in an area exempt from Hydromod)
- Potential Critical Coarse Sediment Yield Area Mapping (to show if the site is out of a CCSYA)
- Hydromodification BMP sizing calculations (i.e. County Hydromod Spreadsheet – Hydromod, and BMP Design tabs, SMRHM report files, or other acceptable Hydromod calculations)
- Site-Specific Critical Coarse Sediment Analysis (if a project impacts a CCSYA)
- Design details/drawings from manufacturers for proprietary BMPs (if proprietary BMPs are proposed)

In addition, the project shall comply with drainage law and good practices:

- Protect the Site and Roads from Q100yr, without impacting adjacent property owners.
- Pad elevations must be above the Q100yr water surface at all locations.

I. Identify Offsite Hydrology
   A. If the project intends to allow the flows to pass through the project uninterrupted, the flows must remain along its natural flow-path and natural condition. The project must also:
      (1) Ensure that the existing stream is stable. If not, the design must include stabilization.
      (2) Does the 100 year flow path affect proposed project elements, such as streets and fill slopes? If so, the project must properly design for impingements, provide revetment, etc. If the water surface changes due to impingements on neighbor's properties, Permission to pond letters must be provided.
   B. If the project intends to collect and convey the offsite flows, see the next section:

II. Hydraulics
   A. Project must provide collection inlets that can be accessed for maintenance. If located outside of the project boundary, the project must provide a Permission Letter or drainage easement. If the inlet creates new ponding on private property, the project must provide a Permission to Pond letter or easement.
   B. The project should not divert watershed areas over 1 acre. If so, Permission Letter to accept project's diversion and drainage concept must be received by the project.
   C. The project should have an adequate outlet. If not, include Permission Letters and implement Increased Runoff criteria (2, 5,10 year storm events and the 1, 3, 6 and 24 hour durations). 100 year storm routing is not to be used. Runoff from the offsite plus onsite must be returned to its natural (existing) condition of velocity, peak flow-rate, flow-width and location/right of way, if permission letters have not been obtained.
   D. The project must adequately convey the 100 year storm between the combination of street flow and pipe flow per County Ordinance.
   E. The project should use the downstream connection as the Q100yr water surface control elevation, to ensure 6 inches minimum of freeboard in proposed drainage system.

III. Basin Layout
   A. Implement Basin Guidelines as best as possible from Appendix C, Design Handbook for LID BMPs.


HEMET
MENIFEE
CANYON LAKE
LAKE ELSINORE
WILDOMAR
MURRIETA
LAKE SKINNER
PROJECT LOCATION
TEMECULA
VAIL LAKE
Legend
Lakes/Reservoirs
Stream Type
Not Susceptible
Not Susceptible (Over 20,000 cfs)
Susceptible
Watershed Areas
Not Applicable Area
Applicable Area
Applicable Area Watershed Boundaries
Santa Margarita Watershed
County Boundary
Study Area
Miles

HCOC Applicability Map

Hydromodification Susceptibility Documentation Report and Mapping
Riverside County Flood Control and Water Conservation District

Santa Margarita Region - Map 2

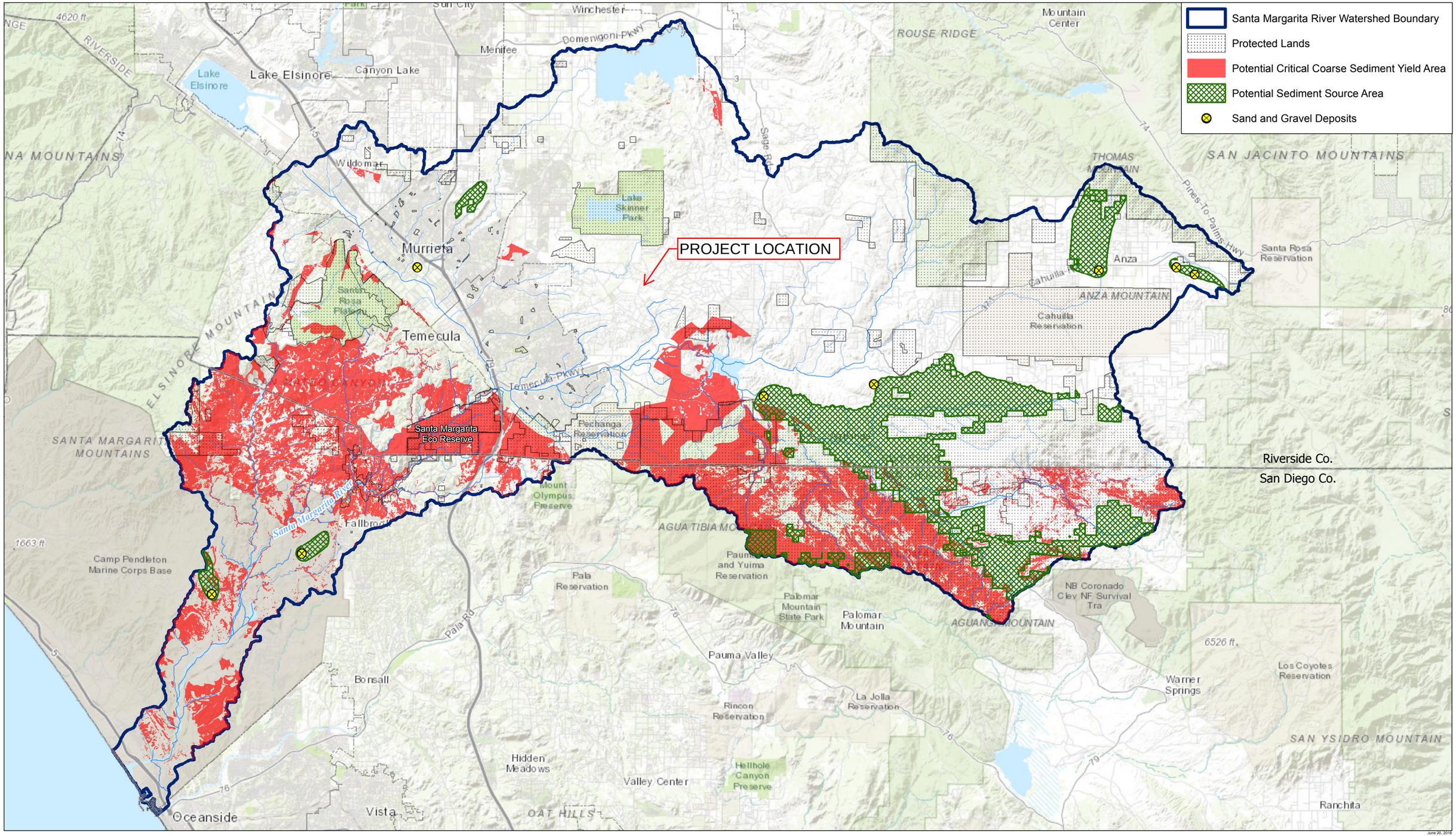


Exhibit G-1

SANTA MARGARITA RIVER WATERSHED

POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREAS AND POTENTIAL SEDIMENT SOURCE AREAS

Santa Margarita Region - County HydroMod Iterative Spreadsheet Model

Only for use the unincorporated portions of Riverside County, unless otherwise approved by the Co-Permittee

Development Project Number(s):	1162007 WINERY	Rain Gauge	Temecula Valley
Latitude (decimal format):	33.529839 N	BMP Type (per WQMP):	HARVEST AND USE
Longitude (decimal format):	117.066075 W	BMP Number (Sequential):	

Pre-Development - Hydrology Information

DRAINAGE AREA (ACRES) - 10 acre max[1]	2.5	2-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.3	0.514
LONGEST WATERCOURSE (FT) - 1,000' max[1]	601	10-YEAR, 1-HOUR INTENSITY (IN/HR) - Plate D-4.1	0.972
UPSTREAM ELEVATION OF WATERCOURSE (FT)	1367	SLOPE OF THE INTENSITY DURATION - Plate D-4.6	0.55
DOWNSTREAM ELEV. OF WATERCOURSE (FT)	1346	CLOSEST IMPERVIOUS PERCENTAGE (%)	0% Undeveloped - Good Cover
EXISTING IMPERVIOUS PERCENTAGE (%)	0		
Use 10% of Q2 to avoid Field Screening requirements	Yes		

Pre-Development - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
15	2.5 Ac.	Open Brush	Good Cover	54		46		37	**57**	75
								0	**0**	0
								0	**0**	0
	2.50 Ac.						**Weighted Average RI Numbers =**	**37.0**	**57.0**	**75.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Pre-Development - Calculated Range of Flow Rates analyzed for Hydromod (Suceptible Range of Flows)

Calculated Upper Flow-rate limit	Calculated Lower Flow-rate limit
Ex. 10-year Flowrate[1] = **1.348** cfs	Ex. 10% of the 2-year Flowrate[1] = **0.088** cfs
(Co-Permitte Approval is required) User-Defined Discharge Values with accompanying Hydrology Study[1]	
Ex. 10-year Flowrate (Attach Study) = cfs	Ex. 2-year Flowrate (Attach Study) = cfs

[1]The equations used to determine the 10-year and 10% of the 2-yr are limited to 10-acres and 1,000'. Flowrates from a separate study can be used to over-ride the calculated values so that larger areas (up to 20 acres) and longer watercourse lengths can be used. All values still need to be filled out, even when there is a user-defined discharge value entered.

Post-Project - Hydrograph Information

DRAINAGE AREA (ACRES)	2.5
LONGEST WATERCOURSE (FT)	601
DIFFERENCE IN ELEV (FT) - along watercourse	8.5
PROPOSED IMPERVIOUS PERCENTAGE (%)	72

Go to "BMP Design" tab to design your BMP, then check results below.
Print both this "HydroMod" Sheet and the "BMP Design" sheet for your submittal.

Post-Project - Soils Information

Cover Type #	Subarea Acreage	Cover Type	Vegetative Cover	Soil A %	Soil B %	Soil C %	Soil D %	RI Index AMC I	RI Index AMC II	RI Index AMC III
22	2.5 Ac.	Urban Landscaping	Good Cover	54		46		30	**49**	69
								0	**0**	0
								0	**0**	0
	2.50 Ac.						**Weighted Average RI Numbers =**	**30.0**	**49.0**	**69.0**

Per Dr. Luis Parra, the AMC condition is based on the rainfall record. Applying NEH-4 (1964) for the non-freezing conditions in Riverside County the AMC conditions are: AMC-I for less than 0.5" of rain the previous 5 days; AMC-II for between 0.5" to 1.1" of rain the previous 5 days; or AMC-III for more than 1.1" for the previous 5 days.

Results

		First result out of compliance in the rainfall record				See below for the Height in the Basin (Stage) that is causing a non-compliant result	
Hydromod Ponded depth							
Hydromod Drain Time (unclogged)	**#DIV/0!**	Requirement		Proposed			
Is the HydroMod BMP properly sized?	**Yes, this is acceptable**	---	---	---	---		
Mitigated Q < 110% of Pre-Dev. Q?	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---
Mitigated Duration < 110% of Pre-Dev?*	**Yes, this is acceptable**	---	---	---	---	Issue @ Stage =	---

Responsible-in-charge: _____ Date: _____

Signature: _____ Spreadsheet Developed by: Benjie Cho, P.E.

BMP Design

Fill in **blue** shaded areas

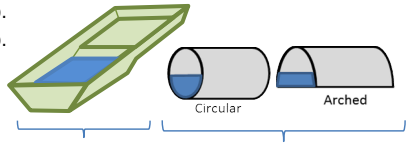
BMP Geometry & Detention Calculations

0.1	feet, Stage Intervals

PROPOSED BMP DIMENSIONS

STEP1: Size the BMP, so that the Total Volume > Max HydroMod Vol. (Deeper is ok, it will be refined in the Design Geometry)

Tank BMP	Is the BMP a Tank shape?	1	1 for yes; 2 for no.
	Is the BMP Arched shape?	2	1 for yes; 2 for no.
	How many cells together?	4	
	Diameter (Hortz. for arch) =	60	IN
	Length =	80	FT

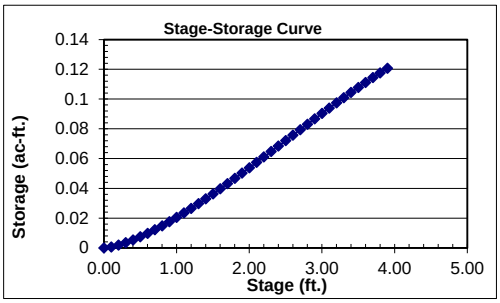


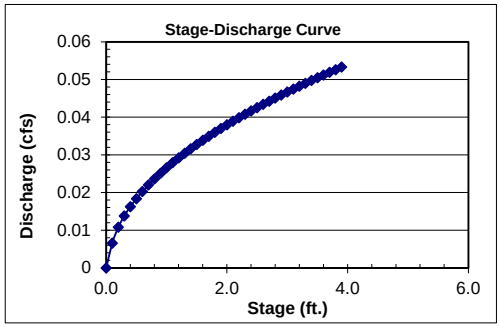
Prop Multi-Circular Vol =	5,258	FT3
Total Prop. Volume[1] =	5,258	FT3
Max HydroMod Volume =	3,405	FT3
Total Acreage[2] =	1,710	FT2
BMP % of Site =	1.57%	
Max HydroMod Depth[3] =		FT

[1]Does not include forebay, or low flow trench

[2]Does not account for freeboard or access roads

[3]Does not consider Increased Runoff





MINIMUM DESIGN GEOMETRY

STEP3: Delete outlets, then propose the largest lowest orifice that does not, exceed the ex. Q or Duration. If the Q is acceptable, but the duration is exceeded, try decreasing orifice, then adding a weir slightly below the stage that has an issue.

OUTLETS (for Stage-Discharge)

Hydromod Depth =	
+ 1' Freeboard =	#VALUE!

Orifice Outlets			Weir Outlets		
Invert Height (ft)	Diameter (inches)	No. of Orifices	Crest Height (ft)	Crest Width (ft)	No. of Weirs
0	1.00	1			

STEP4: Complete an increased runoff analysis, if the project can impact downstream properties. Incorporate these designs into the WQMP site plan. Add emergency overflow weir, for flows that exceed the Hydromod volumes, sized to the 100-year peak flow rate. Add access roads (< 10% longitudnal slope) with enough width & turn around access for equipment that would be needed to scarify the bottom or remove Bioretention soil media.

Stage-Storage-Discharge*

Stage (FT)	Storage (AC-FT)	Storage (FT3)	Q (CFS)
0	0	0	0
0.10	0.001	30	0.01
0.20	0.002	84	0.01
0.30	0.004	154	0.01
0.40	0.005	235	0.02
0.50	0.008	327	0.02
0.60	0.010	427	0.02
0.70	0.012	535	0.02
0.80	0.015	649	0.02
0.90	0.018	769	0.03
1.00	0.021	895	0.03
1.10	0.024	1025	0.03
1.20	0.027	1160	0.03
1.30	0.030	1298	0.03
1.40	0.033	1440	0.03
1.50	0.036	1585	0.03
1.60	0.040	1733	0.03
1.70	0.043	1884	0.03
1.80	0.047	2036	0.04
1.90	0.050	2191	0.04
2.00	0.054	2347	0.04
2.10	0.057	2504	0.04
2.20	0.061	2663	0.04
2.30	0.065	2822	0.04
2.40	0.068	2982	0.04
2.50	0.072	3142	0.04
2.60	0.076	3302	0.04
2.70	0.079	3461	0.04
2.80	0.083	3620	0.05
2.90	0.087	3779	0.05
3.00	0.090	3936	0.05
3.10	0.094	4092	0.05
3.20	0.097	4247	0.05
3.30	0.101	4399	0.05
3.40	0.104	4550	0.05
3.50	0.108	4698	0.05
3.60	0.111	4843	0.05
3.70	0.114	4985	0.05
3.80	0.118	5124	0.05
3.90	0.121	5258	0.05
	0.121	5,258	

Add Infiltration

Enter information from actual infiltration tests

No	Consider Infiltration (Yes or No)?		
	Infiltration rate (in/hr) [3]	-	ft3/sec, Infiltration (over entire bottom)
3	Factor of Safety (3 or greater) [3]	-	ft3/sec, Infiltration / Factor of Safety
	mins, Max. Time represented by tests		

[3]Per the RC LID Manual, Appendix A.

Only if allowed by the Co-Permittee, these infiltration inputs can be used to simulate Bioretention/Biofiltration rates with Backup Calcs and Data.

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

For Final WQMP, include a copy of the completed Pollutant Sources/Source Control Checklist in the subsequent pages and summarize Source Control BMPs in Section H of this Template.

Appendix 8

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section **H** of the 20**18** 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 H.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.**

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.**

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**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at: **http://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**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at: http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9** ❑ **Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** **Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations; "Outdoor Cleaning Activities;" and "Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants. Brochures can be found at: http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ M. **Loading Docks**	❑ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ❑ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ❑ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		❑ **Move loaded and unloaded items indoors as soon as possible.** ❑ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE …	… THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ N. **Fire Sprinkler Test Water**		❑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	❑ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ❑ **Boiler drain lines** ❑ **Condensate drain lines** ❑ **Rooftop equipment** ❑ **Drainage sumps** ☑ **Roofing, gutters, and trim.** ❑ **Other sources**		❑ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ❑ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ❑ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ❑ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ☑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** ❑ **Include controls for other sources as specified by local reviewer.**	

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ P. **Plazas, sidewalks, and parking lots.**			☑ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

For the Final WQMP the following information shall be provided:

1. Maintenance Plan per Section 5.3.5 of the WQMP Guidance Document. County will regularly inspect BMPs, so BMPs without access (e.g. backyards, etc) will be rejected. Due to liability, the County does not allow for overlapping private maintenance in the public right-of-way.
2. For all projects, include one wet-signed and notarized hardcopy of the BMP Maintenance agreement. Please note, references to Exhibit A and B on Page 1can be struck out if the entire parcel is mentioned in the "Legal Description" on Page 1 of the agreement. Otherwise see below for Exhibit A and B standards. For BMP agreement, ensure that the name on the agreement matches throughout and the notary sheet, Notary shall be the latest California format, the date of the agreement is the date of the notary, all text does not exceed the margins, then the County will sign, attest & record
3. For Tracts, contact County EDA regarding maintenance determinations/formations. Include a completed Exhibit B.9 - WQMP O&M Cost Sheet.xlsx that is signed by both the preparer (to ensure quantities are correct) and the owner (to understand the maintenance obligations in perpetuity) & an Approved Maintenance Exhibit from EDA.
4. For Tracts or any project , written documentation from the maintenance entity that they are willing to maintain (e.g. CFD, CSA, L&LMD, etc.)

BMP EXHIBIT "A" STANDARDS

1. Use the legal description of the parcel as shown on the tentative exhibit. If not available, use the one in the most current title report.
2. As a backup, if the project is a map the description of the future lot may be included for reference

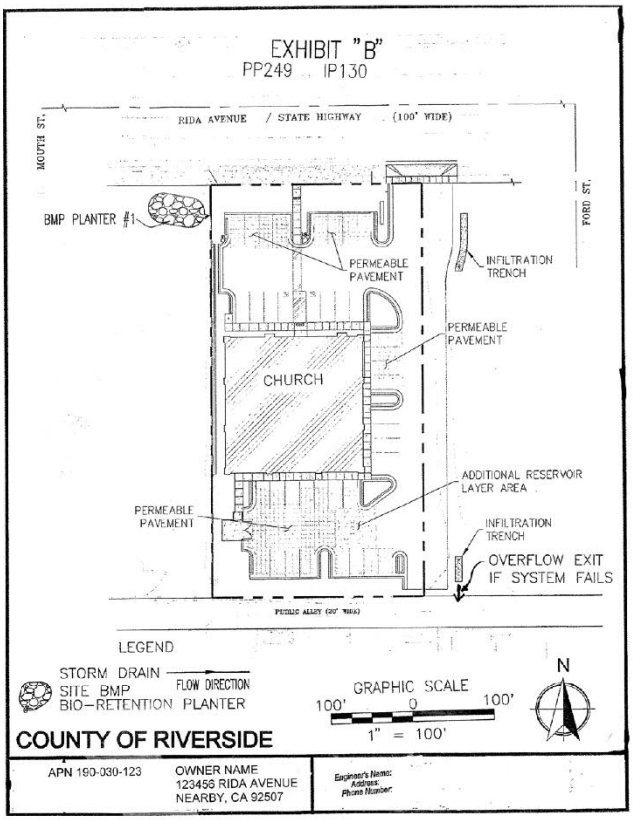
BMP EXHIBIT "B" STANDARDS

1. 0.12" minimum lettering
2. Sheet size must be 8.5" x 11"
3. Show Street names, north arrow
4. Indicate point of flow exit into street if basin system fails
5. Indicate Q100 of flow exit into street
6. Indicate direction of flow exit into street
7. Indicate by notation and/or show nearest downstream drainage facility (catch basin, culvert, riser, etc)
8. Show "Exhibit A", IP and project number (TR, PM, PUP, PP etc)
9. Title block, signature block, engineer seals, USA note is not necessary on Exhibit
10. Show scale used for drawing, provide 4" graphic scale

MAINTENANCE EXHIBIT "B" STANDARDS

1. 0.12" minimum lettering
2. Sheet size must be 8.5" x 11"
3. Show street names, north arrow
4. Show "Exhibit A", IP and project number (TR, PM, PUP, PP etc)
5. Title block, signature block, engineer seals, USA note is not necessary on Exhibit
6. Show scale used for drawing, provide 4" graphic scale

BMP EXHIBIT B EXAMPLE



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: 959-250-019 **PROJECT No.**_____ **IP No.**_____

OWNER(S): MEXIN TEME AGRICULTURE

PROPERTY ADDRESS: 41325 CLL ENCANTADO, TEMECULA, CA 92592

LEGAL DESCRIPTION: PARCEL 1, A PORTION OF LOT 'A', AND LOT 'B' OF PARCEL MAP 8811, IN THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS PER MAP RECORDED IN BOOK 34, PAGES 65 AND 66 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER SAID COUNTY

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

Operation and Maintenance			
Responsible Party	BMP	Description of BMP and Method of Implementation	Maintenance Schedule
Owner	Education for Property Owners and Tenants	The property owner shall familiarize him/herself with the WQMP document and content, including BMP educational materials in Appendix 6 of this WQMP and shall ensure that all occupants are also educated on stormwater BMPs.	Yearly
Owner	Activity Restrictions	Owner shall control site activities to prevent or reduce runoff pollutant. Activity restriction listed per attachment in this WQMP and owner or owner's representative shall monitor all activities on site during business hours to prevent pollutants in site runoff.	N/A
Owner	Employee Training	The owner will ensure that tenants are also familiar with onsite BMPs and necessary maintenance required by the tenants/employees. Owner will check with City and County at least once a year to obtain new or updated educational materials and provide these materials to tenants/employees. Employees shall be trained to cleanup spills and participate in ongoing maintenance. The WQMP requires annual employee training and new hires within 2 months.	Weekly
Owner	Landscape Management	Maintenance shall be conducted by a landscape contractor on a weekly basis to verify that the irrigation system is functioning properly and to repair as needed. Landscape contractor will also verify that there are no leaks or run-off from landscape areas. Adjust irrigation heads and systems run times as necessary to prevent overwatering of vegetation, overspray or run-off from landscape areas to ensure the health and aesthetic quality of the landscape. Mowing and trimming waste shall be properly removed from the site and herbicides, pesticides and fertillizers shall be properly applied to prevent storm drainage contamination.	Weekly
Owner	Litter/Debris Control Program	Litter and debris will be collected and deposited in appropriate covered receptacles as part of the regular sweeping/cleaning program. Any accumulated trash or debris onsite will be removed and disposed of properly on a weekly basis.	Weekly or As Needed
Owner	BMP Maintenance	The owner and/or his maintenance contractor shall regularly inspect the proposed BMP systems for signs of erosion or sediment and debris buildup and clean/repiar as needed.	As Needed

Operation and Maintenance			
Responsible Party	BMP	Description of BMP and Method of Implementation	Maintenance Schedule
Owner	Catch Basin Inspection Program	On-site catch basin drains and drain filters shall be inspected monthly for debris/trash accumulation evidence of illegal dumping into these drains and cleaned as necessary. Illegal dumping incidents shall be investigated.	Inspect Semi-Annually (by Oct 1 and Feb 1) and after Major storm events
Owner	Storm Drain Signage	All on-site drainage inlets will be stenciled or signage will be provided that indicates "NO DUMPING, DRAINS TO RIVER" or equivalent.	Annually or as needed to maintain legibility
Owner	Drain Inserts	Owner shall hire maintenance crew to inspect before the wet season ad after each major rain event. Inspection will include checking for build-up of sediment, trash/debris and general clogging that prevents insert from filtering.	Before Wet Season (October 1) and After Each Major Rain Event
Owner	Efficient Irrigation	The irrigation system will include devices to prevent low head drainage, overspray and runoff through the use of pressure regulating devices, check valves, flow sensors, proper spacing, low precipitation emission devices and ET or weather based controllers. Landscaping and irrigation shall be consistent with the State Model Water Efficient Landscape Ordinance and the City of Temecula Landscape Development Standards. Plants installed will be arranged according to similar hydro-zones an meet the required water budget for the site. Landscape areas used for water quality swales or infiltration areas shall have proper plants for saturated soils, drought tolerance and erosion control qualities. Shade trees shall be used to intercept rainwater and reduce heat gain on paving.	Weekly or as needed for repair
Owner	On-site storms drain inlet	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.	Before Wet Season (October 1) and After Each Major Rain Event
Owner	Landscape / Outdoor Pesticide Use	Landscape plans will include: 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	Weekly

Operation and Maintenance			
Responsible Party	BMP	Description of BMP and Method of Implementation	Maintenance Schedule
		minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Consider using pest-resistant plants, especially adjacent to hardscape. To ensure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	
Owner	Outdoor storage of equipment or materials	Project site includes a gas station that will have underground tanks of fuel. A Hazardous Materials Management Plan will be prepared as part of a separate study.	Weekly
Owner	Roofing, gutters, and trim	Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.	
Owner	Plazas, sidewalks and parking lots	Sweep plazas, sidewalks, and parking lots regularly to prevent a 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.	Weekly or As Needed
Owner	Harvest and Use (Private)	Check for debris and sediment on screens and overflow facilities and remove where observed. Check integrity of downspout connections to harvest and use BMPs. Check locking mechanisms on facility entry covers and integrity of mosquito screens. Check for long-term standing water in the facility. If standing water is observed more than 72 hours after the last storm event, monitor water levels, and verify that the water is being drawn down through the intended use of the water. Remove debris and sediment from screens and overflow facilities.	Before Wet Season (October 1) and After Each Major Rain Event

			Maintenance Responsibility				Funding Mechanism for Maintenance			Maintenance Costs	
BMP	Used	Not Used	Owner **	City	County	Flood District	Owner	Developer	Public *	1-year ($)	2-year ($)

Hydro seeding & Mulching Private	☐	☒	☐	☐	☐	☐	☐	☐	☐	N/A	N/A
Landscape Private	☒	☐	☒	☐	☐	☐	☒	☐	☐	1000	2000
Landscape Public	☐	☒	☐	☐	☐	☐	☐	☐	☐		
Lawns	☐	☒	☐	☐	☐	☐	☐	☐	☐	N/A	N/A
Impervious permanent cover (concrete/ asphalt) Private	☒	☐	☒	☐	☐	☐	☒	☐	☐	1,000	2,000
Impervious permanent cover (concrete/ asphalt) Public	☐	☒	☐	☐	☐	☐	☐	☐	☐	N/A	N/A
Pervious permanent cover (gravel)	☐	☒	☐	☐	☐	☐	☐	☐	☐	N/A	N/A
Down drains	☒	☐	☒	☐	☐	☐	☒	☐	☐	100	200
Ribbon Gutter Private	☒	☐	☒	☐	☐	☐	☒	☐	☐	250	500
Ribbon Gutter Public	☐	☒	☐	☐	☐	☐	☐	☐	☐	N/A	N/A
Curb & gutter Private	☒	☐	☒	☐	☐	☐	☒	☐	☐	250	500
Curb & gutter Public	☐	☒	☐	☐	☐	☐	☐	☐	☐	N/A	N/A
Storm Drain Private	☒	☐	☒	☐	☐	☐	☒	☐	☐	500	1000
Storm Drain Public	☒	☐	☐	☒	☐	☐	☐	☐	☒	200	400

Underground Detention Chambers	☐	☒	☐	☐	☐	☐	☐	☐	☐	N/A	N/A
Bioretention Basins	☐	☒	☐	☐	☐	☐	☐	☐	☐	N/A	N/A
Modular Wetlands	☐	☒	☐	☐	☐	☐	☐	☐	☐	N/A	N/A
Education Materials	☒	☐	☒	☐	☐	☐	☒	☐	☐	Free	Free
Vehicle Wash Area	☐	☒	☐	☐	☐	☐	☐	☐	☐	N/A	N/A
Catch Basin/Inlet Stenciling	☒	☐	☒	☐	☐	☐	☒	☐	☐	100	200
FlexStorm Inlet Filters	☒	☐	☒	☐	☐	☐	☒	☐	☐	200	400

3.12 Harvest and Use BMPs

Type of BMP	Site Design – Harvest and Use
Treatment Mechanisms	Volume Reduction
Infiltration Rate Range	Any infiltration rate, when applicable and feasible
Maximum Drainage Area	This BMP is generally limited by the cistern / detention storage volume

Description

Harvest and use BMPs include both above-ground and underground cisterns / vaults. Such BMPs collect and temporarily store runoff for later non-potable uses including the following:

- Irrigation
- Toilet flushing
- Other non-potable uses, such as industrial processes

Above-ground cisterns collect and temporarily store runoff from rooftops or other above-ground impervious surfaces. Underground cisterns include subsurface tanks, vaults and oversized pipes that temporarily store runoff for later use. These systems can include pipes that divert runoff to the cistern, an overflow system for when the cistern is full, a pump, and a distribution system to supply the intended uses.

Siting Considerations

- The primary feasibility consideration for harvest and use BMPs is the presence of a consistent and reliable demand that is sufficient to drain the BMPs between storms. When designing harvest and use systems for stormwater management, a reliable method of quickly regenerating storage capacity (through the use of the captured stormwater) must exist to ensure that there will be adequate storage capacity for subsequent storms in the wet season.
- Other feasibility considerations include potential conflicts with health and plumbing codes. Applicable health codes focus mainly on the potential impacts of long-term standing water in the BMP facility.
- For above-ground cisterns, the facilities should be installed on a level surface, either on consolidated and stable native soil, or on a concrete pad. A geotechnical analysis is required to ensure stability.
- For underground detention facilities, **pretreatment** must be provided where necessary or as directed by the Engineering Authority, to prevent accumulation of sediments within the BMP. These facilities should be installed on consolidated and stable native soil. A geotechnical analysis is required to ensure stability.

Key Design Elements

- All cisterns must:
  - Have provisions for mosquito prevention and abatement.
  - Have mechanisms to keep debris and animals from entering the cistern, and have a mechanism to easily clean any/all screens.
  - Have provisions for safe overflow of runoff when the cistern is full. Overflow shall be directed to an appropriate area as approved by the Engineering Authority. Dispersion within vegetated areas is preferred.
  - Have adequate access to maintain and/or replace the cistern and all associated equipment such as pumps. For underground cisterns / vaults, this includes access adequate to remove any/all accumulated sediment.
  - Be designed in a manner that allows for supplemental potable water to be used when there is insufficient harvested water to fully meet required demands.
  - Include measures acceptable to the local water supplier to prevent harvested storm water from being introduced into the potable water supply.

See the following figures for *examples* of common elements of above-ground and underground cisterns. The proposed design elements and configurations must be approved by the Engineering Authority.

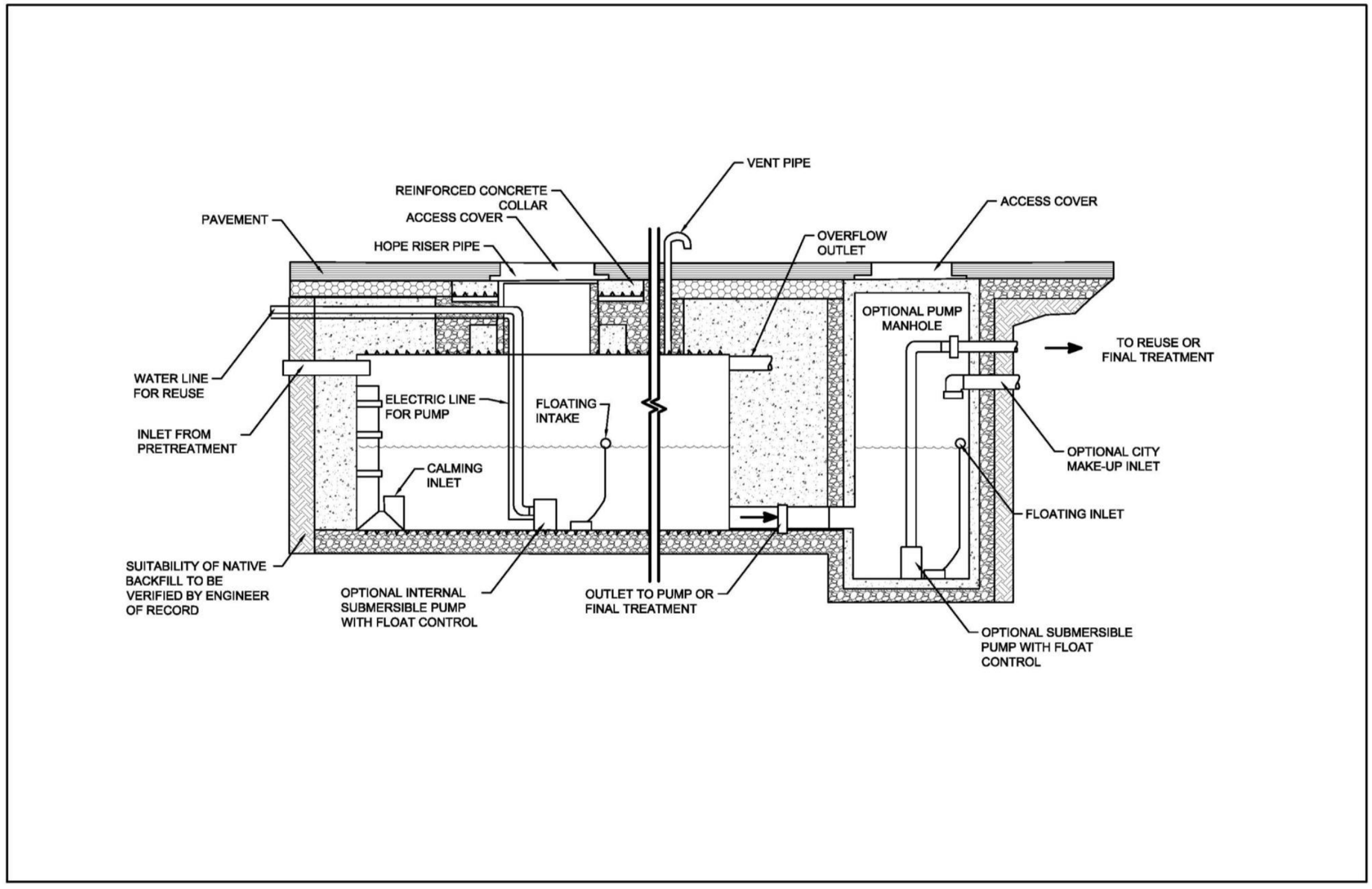


Figure 1 – Common Design Elements of Underground Cistern

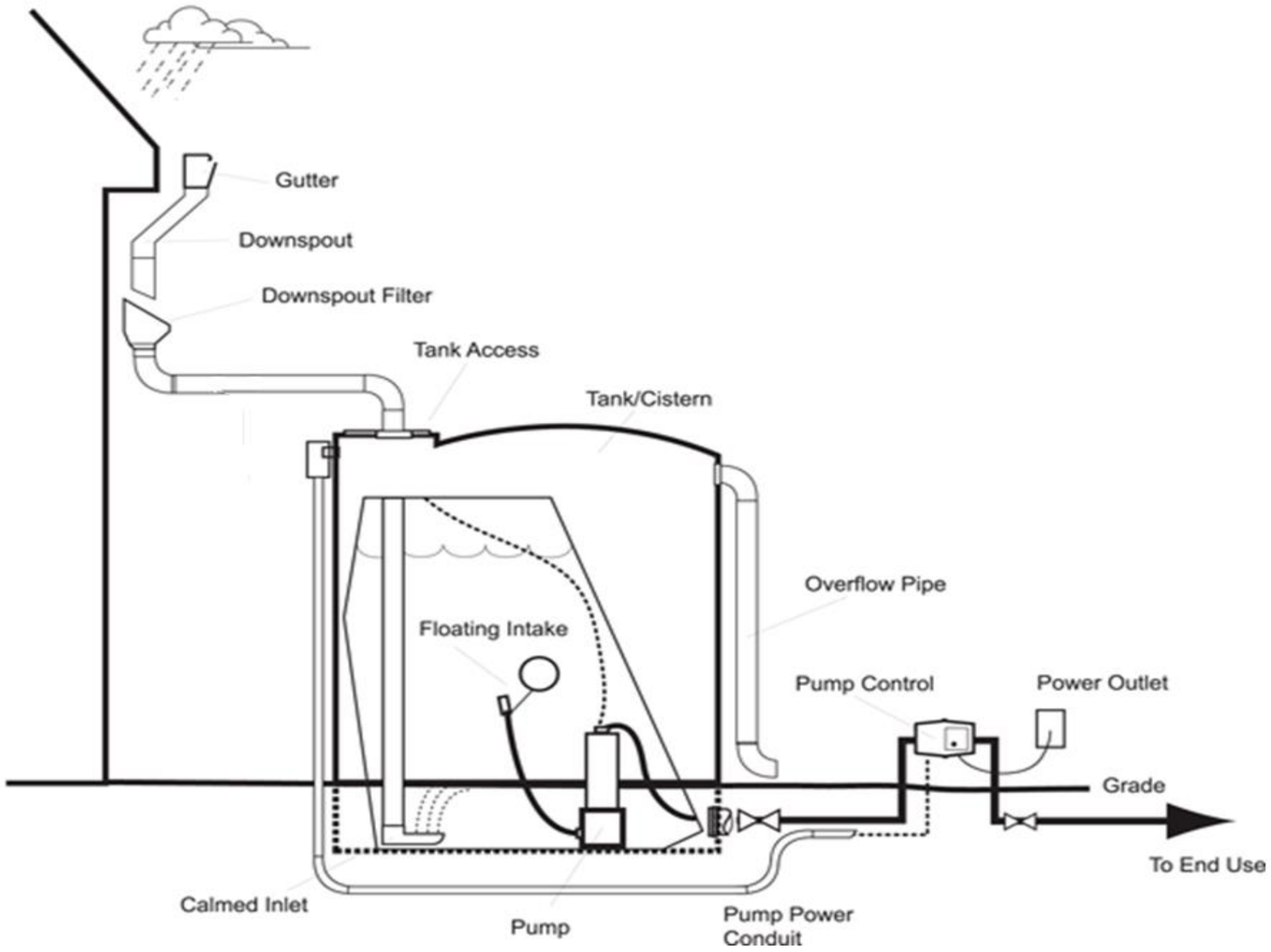


Figure 2 – Common Design Elements of Above-ground Cistern
Graphic courtesy of BRAE

Design and Sizing Criteria

1. Assess whether there is sufficient and reliable (year-round) demand for non-potable use of the runoff from the area tributary to the BMP. Consider seasonal variations in demand for harvested water, such as irrigation needs during the wet season, periodic facility closures (such as for schools), etc. Verify with the Engineering Authority (EA) and the Santa Margarita Region (SMR) Water Quality Management Plan (WQMP) for applicability requirements / restrictions for this BMP. The following potential on-site uses for harvested rainwater are typically assessed:

    a. Irrigation use
    b. Toilet use
    c. Other non-potable uses (i.e. industrial use)

2. If there is a sufficient on-site demand for harvested rainwater acceptable to the Engineering Authority, determine the Design Capture Volume, V_{BMP}, determined from Section 2.1 of this Handbook.

3. Size the cistern to hold and allow for the use of the Design Capture Volume, in accordance with any manufacturer specifications.

Inspection and Maintenance Schedule

Schedule	Activity
Annually before the wet season	• Check for debris and sediment on screens and overflow facilities and remove where observed. • Verify proper operation of all pumps. • Check integrity of downspout connections to harvest and use BMPs • Check locking mechanisms on facility entry covers • Check integrity of mosquito screens
After storm events	• Check for long-term standing water in the facility. If standing water is observed more than 72 hours after the last storm event, monitor water levels, and verify that the water is being drawn down through the intended use of the water. If water is not properly being drawn down ensure that all pumps distribution systems are functioning correctly. Under no circumstances shall water retained within a cistern be pumped or otherwise drained in a manner that could allow a discharge to a street or storm drain. • Remove debris and sediment from screens and overflow facilities

TECHNICAL NOTE

Rainwater Harvesting with HDPE Pipe Cisterns

TN 7.01
January 2009

Introduction

For the past several years, the use of smooth interior corrugated high density polyethylene (HDPE) pipe has been a viable alternative for the control of stormwater quality through underground systems. Typically, stormwater has either been infiltrated through perforated pipe or detained in solid pipe and then discharged at a controlled rate to the local storm sewer system or tributary. In both situations, the design did not provide for the potential reuse of stormwater. There is a growing demand for the construction industry to provide for resource reuse. In some situations, the reuse is being driven by a regulatory requirement. In many cases, the reuse of resources can provide an economic benefit. This is especially applicable to stormwater in areas where water resources are at a premium. Water reclamation should be considered in situations where infiltration is not feasible due to site constraints. This document provides information on the installation, storage capacity and system layouts for rainwater harvesting systems using ADS HDPE pipe cisterns.

HDPE Pipe Cisterns

ADS HDPE N-12 pipe is the building block of our cisterns. The Specifications section of the Drainage Handbook provides additional information on pipe dimensions and properties. The pipe has a smooth inner wall and a corrugated outer wall. The smooth inner wall combines superior hydraulics and the ability to resist abrasion and corrosion. The corrugated outer wall provides the strength necessary to withstand heavy traffic loads with varying cover heights. In addition to pipe, the ADS cistern uses specially designed manifolds and other fittings to complete the pipe component of the cistern. ADS can assist with system layout including pipe and necessary components for the cistern.

System Layout

A typical cistern layout includes at least one inlet into the system. This inlet can be on the cistern manifold as shown below or can be done on a lateral. Further, the inlet can be accomplished via a pre-fabricated stub or with a reducer and tee fittings in the system corner. Both inlet types are shown below. When designing system inlets, attention should be given to the hydraulic grade line of the site to limit or prevent conveyance system surcharging.

The outlet of the cistern should be directed to a reinforced concrete manhole. The manhole should be reinforced to limit the effects of vibration from the pump system. The outlet invert should be the same as the pipe invert elevation to ensure that the entire system is able to drain. An underdrain should be installed within the stone backfill of the cistern. The invert of the underdrain should be at the bottom of the stone backfill envelope. The underdrain from the stone backfill should be directed to the outlet manhole so that the stone backfill can be completely drained.

The outlet manhole serves multiple purposes. In addition to acting as an outlet structure, the manhole also houses a discharge pump (designed by others) to remove stormwater from the cistern. Installing a pump within the system piping or pumping directly from piping is not recommended for hydraulic reasons. The manhole should be located outside the footprint of the thermoplastic liner as shown in the detail below.

The outlet manhole will also include the cistern overflow. It is recommended that an overflow be incorporated into the system in the event that the cistern is not completely emptied between storm events. If the cistern is not completely empty and there is no overflow, the potential exists for the entire system to be surcharged and flooding could occur. The invert of the overflow should be set at the top of the cistern.

Lastly, the outlet manhole can also include a vent from the system. System venting is recommended to allow adequate airflow through the cistern and equalize air pressures within the cistern. If not vented, there can be issue with cistern pressures under some circumstances. In the sample layout shown below, the system includes a 4-inch HDPE vent line leading from the cistern to the outlet manhole. To prevent backflow into the cistern through the vent, it is recommended that the vent be located above the crown of the overflow pipe. The use of a vent is recommended for installations in which the cistern is encased within the thermoplastic liner. For cisterns that are not completely encased within the thermoplastic liner, the use of a vent is at the engineer's discretion.

Figure 1
Example Cistern Layout

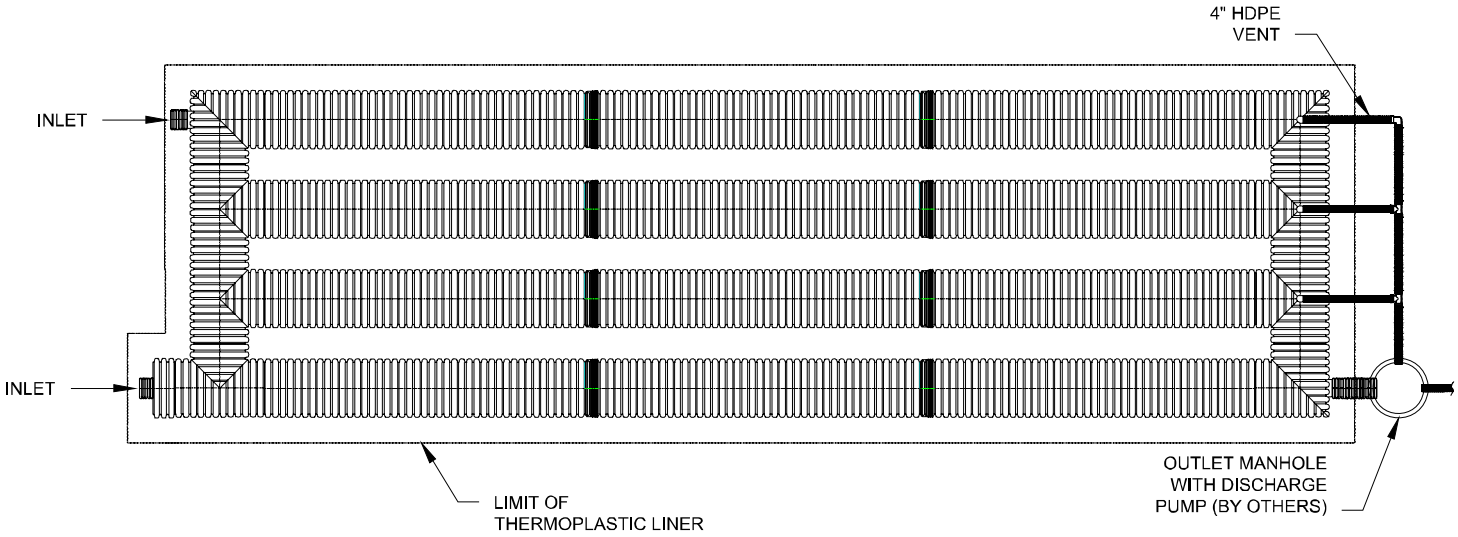
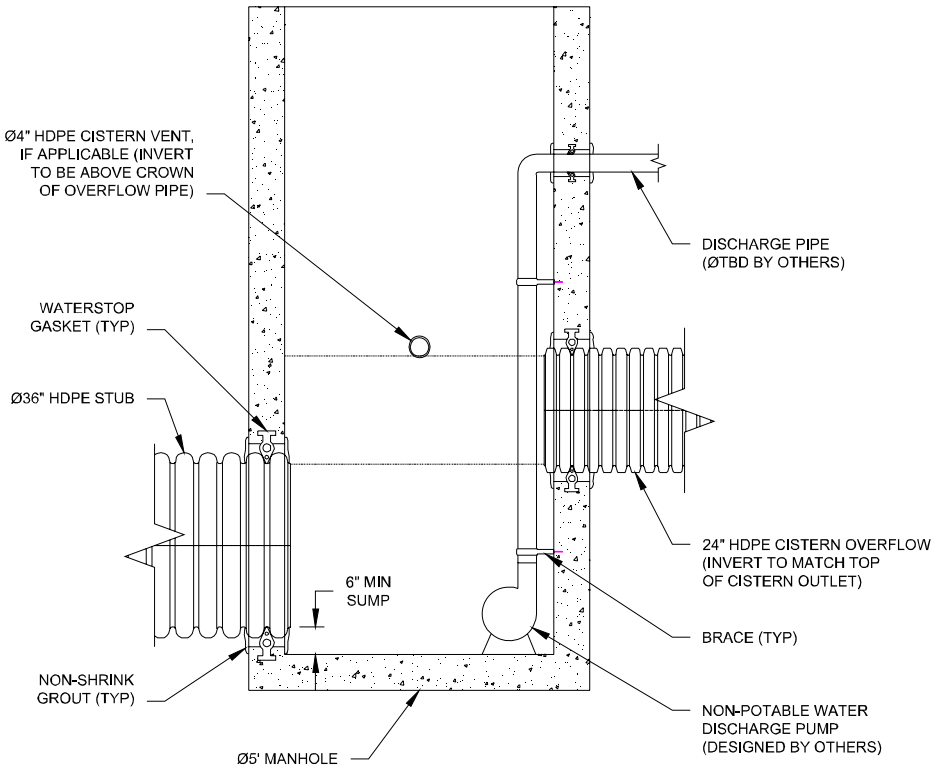


Figure 2
Outlet Manhole Typical Detail



Storage Capacity

ADS cisterns maximize storage capacity by using pipe and stone voids together for total system storage. Table 1 lists storage volume per pipe diameter, stone void volume per pipe diameter and total storage volume for pipe and stone together.

Table 1
Pipe Storage Capacity

Nominal Inside Diameter	Average Outside Diameter	"X" Spacing	"S" Spacing[1]	"C" Spacing[1]	Pipe Volume[2]	Stone Void Volume[3,4,5]	Total Storage
in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	ft^3/ft (m^3/m)	ft^3/ft (m^3/m)	ft^3/ft (m^3/m)
12 (300)	14.5 (368)	8 (200)	11 (279)	25.4 (645)	0.79 (0.07)	1.1 (0.10)	1.8 (0.16)
15 (375)	18 (457)	8 (200)	12 (305)	28.9 (734)	1.2 (0.11)	1.4 (0.13)	2.6 (0.24)
18 (450)	21 (533)	9 (230)	17 (434)	33.9 (862)	1.8 (0.16)	1.7 (0.15)	3.5 (0.32)
24 (600)	28 (711)	10 (250)	13 (330)	40.7 (1034)	3.1 (0.29)	2.6 (0.24)	5.7 (0.52)
30 (750)	36 (914)	18 (450)	18 (457)	53.1 (1347)	4.9 (0.46)	3.7 (0.34)	8.6 (0.79)
36 (900)	42 (1067)	18 (450)	22 (559)	63 (1600)	7.1 (0.66)	4.7 (0.43)	11.8 (1.08)
42 (1050)	48 (1219)	18 (450)	24 (610)	71.9 (1826)	9.3 (0.87)	5.8 (0.53)	15.1 (1.38)
48 (1200)	54 (1372)	18 (450)	25 (1219)	78.5 (1994)	12.4 (1.15)	7.0 (0.64)	19.4 (1.78)
60 (1500)	67 (1702)	18 (450)	24 (1524)	90 (2286)	19.3 (1.79)	9.7 (0.89)	29.0 (2.66)

Notes:
See Figure 3 for typical cross section used in volume calculations
Bedding depth assumed 4" for 12"-24" pipe and 6" for 30"-60" pipe.
1. *Based on A-profile pipe.*
2. *Actual ID values used in calculation.*
3. *Stone Porosity assumed 40%.*
4. *Stone height above crown of pipe is not included in void volume calculations.*
5. *Calculation is based on the average OD of the pipe.*

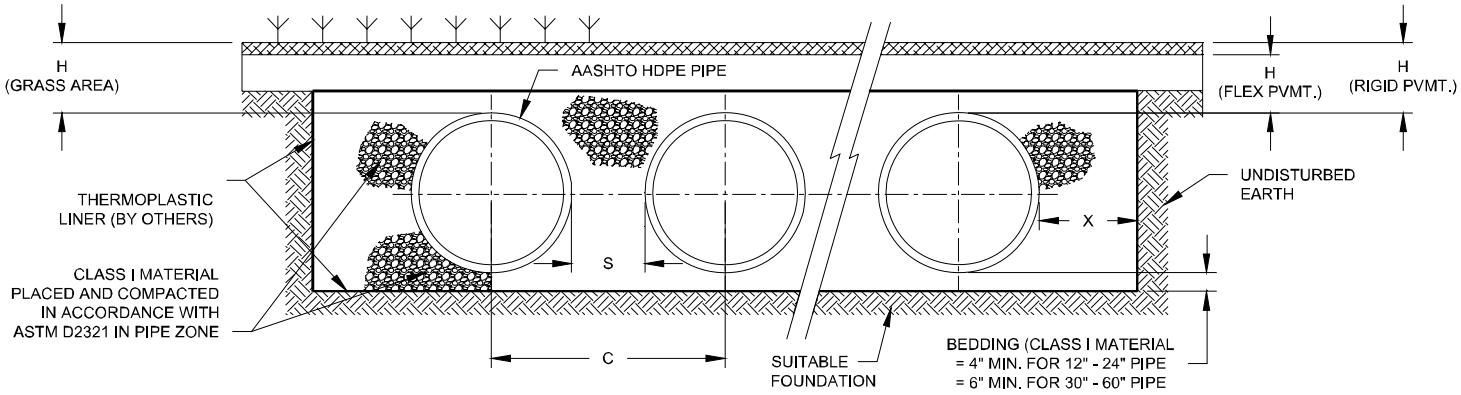
Installation

For a cistern application, ADS N-12 perforated pipe embedded in a Class I crushed stone backfill is recommended. See Figure 3 for minimum recommended cover heights for standard installations. A maximum of 1 ½" aggregate size is preferred and the stone should be clean with no fines. The stone backfill provides two critical elements to the cistern design. First, the stone provides necessary structural support for the system to withstand dead loads and vehicular loading. Secondly, the stone provides a certain void volume which can be incorporated into the total storage volume that the cistern can provide. This can help with the reduction of the cistern size and keep the overall footprint to a minimum.

Up to this point, the design is no different than the traditional ADS HDPE pipe infiltration system. The traditional infiltration system would include the use of a geotextile to separate the stone backfill from the native material. For a cistern, a thermoplastic liner shall be used in place of the geotextile as shown in Figure 1. The liner will maintain the water tight integrity of the cistern and hold the stormwater in place before it is reclaimed. Because of the use of a thermoplastic liner, installation of cisterns below groundwater is not recommended due to potential issues with buoyancy and hydrostatic head. To prevent issues with groundwater, an underdrain can be placed under the liner so long as gravity discharge is available. Additional consultation with a geotechnical engineer may be necessary to address groundwater concerns.

Figure 3
Typical Cistern Cross Section

Note: This is a typical cross section only. See Structures, Section 2, or Installation, Section 5, of the Drainage Handbook for specific installation guidelines.

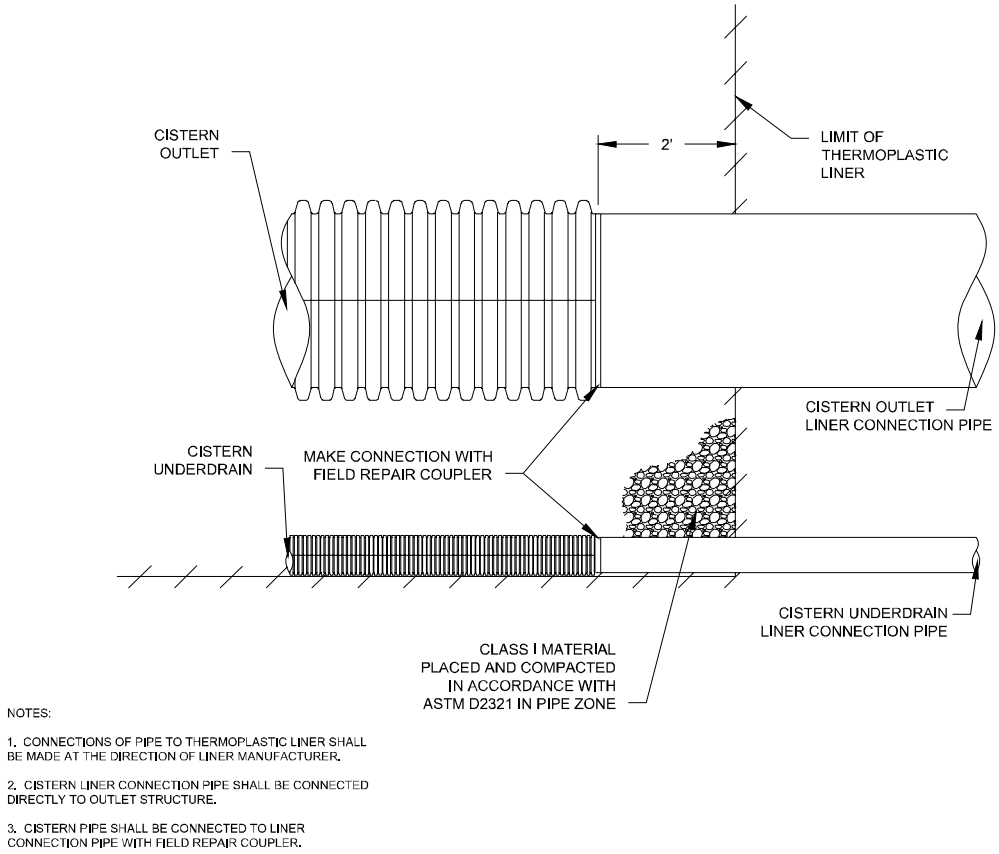


Thermoplastic Liner

ADS does not design, fabricate, install or sell thermoplastic liners. The following product details are based on information supplied and published by thermoplastic liner manufacturers. Generally speaking, there are two liner materials that are suitable for this application: polyvinyl chloride (PVC) and linear low density polyethylene (LLDPE). PVC liners are easy to install making it a low cost alternative. Some PVC liners contain fillers and plasticizers. Under prolonged exposure to sunlight, these compounds can leach from the liner. With use in a cistern application, exposure from sunlight is not a concern since the system is located underground. The LLDPE is an inert material that is suitable for the storage of stormwater and would be acceptable for this application. Medium and high density liners are also available but are not as flexible as the low density product and are typically higher in cost.

For any liner, puncture resistance needs to be considered. This can be addressed by the placement of non-woven geotextile on either side of the membrane. The liner seam, if applicable, should be watertight to maintain the integrity of the system. Pipe "boots" need to be pre or field fabricated for locations where system piping is either entering or exiting the cistern footprint, i.e. inlet and outlet piping. A detail depicting the liner "boot" is shown as Figure 4. The other factor that needs to be considered when using a thermoplastic liner is the seasonal high water table. High water tables can create excessive hydrostatic pressure and potentially damage the liner.

Figure 4
Liner Pipe Connection Detail



Installation of liners should be in accordance with the manufacturer's recommendations. ADS recommends consulting with the liner manufacturers for final design, installation and cost information regarding the liner component of the cistern design.

Cistern Design

Due to the similarity of the cistern to an infiltration system, the ADS Retention/Detention Calculator can be used to size the pipe, fittings and stone component of the cistern. The Calculator can be accessed via the ADS website at www.ads-pipe.com.

The required bed size is indicated in the excavation section of the Calculator. The required amount of thermoplastic liner can be calculated from these bed dimensions as follows:

((H * L * 2) + (H * W * 2) + (L * W * 2)) = required amount of liner in square feet

where:

H = height of cistern section

L = length of cistern section
W = width of cistern section.

This calculation is based on a design in which the cistern is completely encased within the thermoplastic liner which is at the engineer's discretion. In the event that the system is not completely encased and the liner extends below and along the sides of the cistern, the caluculation is as follows:

((H * L * 2) + (H * W * 2) + (L * W)) = required amount of liner in square feet

where:

H = height of cistern section
L = length of cistern section
W = width of cistern section.

Technical Assistance

Throughout cistern design, ADS can assist with a variety of technical issues on the use of our HDPE pipe and fittings, including:

- Product performance information and suggested product usage
- Manifold pipe configuration and design
- Number and spacing of system laterals (based on provided design storage)
- Existing product modifications; custom product fabrication
- Suggestions to maximize cost effectiveness

Please contact an ADS representative for further information.

Note: The use of cisterns is not recommended as a fire suppression source due to impact of weather variations on water supply and ultimately availability.

Operation & Maintenance

Maintenance Logs and Inspection Records

Inspection Checklist Log

Date(s) of Inspection (MM/DD/YYYY)	BMP Identifier	Inspections Performed and Recommendations

Preventative Maintenance Log

Date(s) of Inspection (MM/DD/YYYY)	BMP Identifier	Maintenance Performed and Recommendations

Corrective Maintenance Log

Date(s) of Inspection (MM/DD/YYYY)	BMP Identifier	Maintenance Performed and Recommendations

RAINWATER HARVESTING WITH HDPE PIPE CISTERNS

With the growing demand for both usable water and storm water control, ADS N-12® HDPE pipe cistern systems are a valuable, cost-effective solution. The storage and reuse of rainwater is especially valuable in areas where water resources are at a premium. Rainwater harvesting takes advantage of run-off from lawns, roofs and pavement, collecting and storing it in underground cisterns—out of sight until needed.

ADS HDPE pipe is the building block of our cisterns. In combination with INSERTA TEE®, manifold fittings and other tap connections, it creates a reclamation solution for any location and layout. In some situations, water reuse is being driven by regulatory requirements and the demand is increasing, especially in arid regions of the country. The economic and environmental benefits go hand-in-hand, making the ADS rainwater harvesting system an advantageous addition to any development.

APPLICATIONS:

- Storm water storage and reuse
- Residential & Commercial run-off control
- Lawn, landscape, turf and garden irrigation

FEATURES:

- Durable High-Density Polyethylene plastic
- Structurally sound to withstand H-20 traffic loading
- Lightweight, easy to install
- Chemically resistant
- Layouts are customizable and expandable for every location
- Unlimited capacity—can be constructed to hold any volume required.

BENEFITS:

- Won't corrode, long service life
- Provides water resource management
- Easy installation provides cost-efficiency
- Underground installation supports multiple land uses

ADS Service: ADS representatives are committed to providing you with the answers to all your questions, including specifications, installation and more.

HDPE PIPE CISTERNS FOR RAINWATER HARVESTING

SCOPE

This specification describes 36” through 60” (900-1500mm) ADS N-12 Rainwater Harvesting Cistern for use in gravity-flow (non-pressure) rainwater harvesting applications. See ADS HP Rainwater Harvesting Cistern when using multiple cisterns or cisterns longer than 20 feet (6m).

MATERIAL PROPERTIES

Cistern shall be constructed of polyethylene pipe material meeting the requirements of ASTM F2306, and AASHTO M294.

CISTERN REQUIREMENTS

ADS 36” through 60” (900-1500mm) N-12 Rainwater Harvesting Cistern shall be fabricated from pipe meeting the meeting the requirements of ASTM F2306 and AASHTO M294. The inlet and by-pass outlet shall be 4”-12” (100–300mm) diameter INSERTA TEE® tap connections as specified and located in the field. INSERTA TEE tap connections may only be used at or near the top of the bulkhead to function as an inlet or overflow. For water equalization between multiple cisterns, or for installing tap connections below the water storage level, the installer may use a commercially available threaded bulk head tank fitting at the bottom invert of the cistern. Cistern shall have at least one 24” diameter riser for maintenance purposes. Cisterns are available in configurations of 20 foot (6 m) lengths.

QUALITY

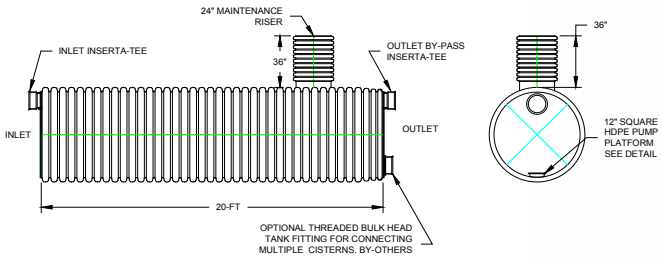
Cisterns shall be pressure or vacuum tested by the manufacturer prior to shipment to ensure weld quality. Testing report may be available by request prior to order.

PERFORMANCE TESTING

In lieu of an engineer’s written specification, the integrity of the N-12 Rainwater Harvesting Cistern may be tested in accordance with ASTM F2487, with the exception that the cistern may not be filled past the invert of the by-pass outlet pipe. A maximum allowable leakage allowance of 0.12 gallons/ft-dia/ft-pipe/24-hour may be applied to the cistern in lieu of written specification. Performance not meeting the requirements of this or the engineer’s written specifications shall be remedied by the installer or other party. Appropriate safety precautions must be used when field testing any pipe material.

INSTALLATION

Installation shall be in accordance with ASTM D2321 and ADS recommended installation guidelines utilizing Class 1 or 2 (ASTM D2321) structural backfill materials. Minimum cover in traffic areas shall be 2 ft (0.6m) as measured from top of pipe to top of rigid pavement or to bottom of flexible pavement, and utilize a class 1 (ASTM D2321) backfill material. Maximum fill heights shall not exceed 8 feet. INSERTA TEE bulk head tap connection as well as threaded bulk head tank fittings shall be installed by the installer as specified on the plans. For single or multiple parallel cisterns; connection pipes, valve boxes, pumps and accessories, shall be as specified on the plans and supplied by others. Contact your local ADS representative or visit www.ads-pipe.com for a copy of the latest installation guidelines.



ADS N-12 RAINWATER HARVESTING CISTERN DIMENSIONS AND SPECIFICATIONS (capacity assumes 12” of free board)

I.D. (in.)	Length		Cistern Capacity		
	ft	m	gal	cu ft	L
36	20	6	737	99	2790
42	20	6	1083	145	4100
48	20	6	1489	199	5636
60	20	6	2479	331	9384

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

Operation & Maintenance

Maintenance Logs and Inspection Records

Inspection Checklist Log

Date(s) of Inspection (MM/DD/YYYY)	BMP Identifier	Inspections Performed and Recommendations

Preventative Maintenance Log

Date(s) of Inspection (MM/DD/YYYY)	BMP Identifier	Maintenance Performed and Recommendations

Corrective Maintenance Log

Date(s) of Inspection (MM/DD/YYYY)	BMP Identifier	Maintenance Performed and Recommendations

NOTICE TO INSTALLER: Instructions must remain with installation.

Your Peace of Mind is Our Top Priority®

FM1798
0717
Supersedes
0417

Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

Register your Zoeller Pump Company Product on our website: http://reg.zoellerpumps.com/

ZOELLER® PUMP COMPANY

MAIL TO: *P.O. BOX 16347 • Louisville, KY 40256-0347*
SHIP TO: *3649 Cane Run Road • Louisville, KY 40211-1961*
TEL: *(502) 778-2731 • 1 (800) 928-PUMP •* ***FAX:*** *(502) 774-3624*

Visit our web site: www.zoellerpumps.com

DESIGNED • MACHINED • ASSEMBLED IN THE USA

OWNER'S MANUAL

P/N 013558

600 SERIES SUBMERSIBLE NON-CLOG UNITS

Congratulations on the purchase of the Zoeller Pump Company 600 Series submersible pump. Since 1939 the name Zoeller has represented the standard for submersible dewatering and sewage pumps. The same high quality workmanship and easy maintenance design has been incorporated into this line of heavy-duty solids-handling submersible sewage pumps. This Zoeller Pump Company pump will provide years of trouble-free service when installed according to the manufacturers' recommendations.

This manual incorporates the installation, operation, maintenance, and service instructions into one document to aid in the ownership of a Zoeller Pump Company submersible non-clog wastewater product. Please read and review this manual before installing the product. Follow the steps and procedures listed on FM0990 for a proper start-up. Many items contained within, when followed correctly, will not only ensure a long and problem-free life for the pump, but also save time and money during installation. Reference FM1799 for repair manual on 600 Series pumps. Should further assistance be necessary please call our Product Support Department at 1-800-928-PUMP (7867).

Table of Contents

Owner's Information

Model Number: _____ **Date Code:** _____

Serial Number: Pump 1_____ **Pump 2**_____

☐ **Simplex** ☐ **Panel P/N** _____

☐ **Duplex** ☐ **Rail System P/N** _____

Job Name: _____

Distributor: _____

Sales Order Number: _____

Contractor: _____

Date of Installation: _____

System Readings During Operation: Voltage _____ **Amps** _____

Safety Instructions

TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND ON THE PUMP.

THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT AND MUST BE KEPT WITH THE PUMP.

This is a **SAFETY ALERT SYMBOL.** When you see this symbol on the pump or in the manual, look for one of the following signal words and be alert to the potential for personal injury or property damage.

⚠ DANGER — Warns of hazards that **WILL** cause serious personal injury, death or major property damage.

⚠ WARNING — Warns of hazards that **CAN** cause serious personal injury, death or major property damage.

⚠ CAUTION — Warns of hazards that **CAN** cause personal injury or property damage.

⚠ NOTICE — INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.

THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

MAINTAIN ALL SAFETY DECALS.

REFER TO WARRANTY ON PAGE 2.

Limited Warranty

Manufacturer warrants, to the purchaser and subsequent owner during the warranty period, every new product to be free from defects in material and workmanship under normal use and service, when properly used and maintained, for a period of one year from date of purchase by the end user, or 18 months from date of original manufacture of the product, whichever comes first. Parts that fail within the warranty period, one year from date of purchase by the end user, or 18 months from the date of original manufacture of the product, whichever comes first, that inspections determine to be defective in material or workmanship, will be repaired, replaced or remanufactured at Manufacturer's option, provided however, that by so doing we will not be obligated to replace an entire assembly, the entire mechanism or the complete unit. No allowance will be made for shipping charges, damages, labor or other charges that may occur due to product failure, repair or replacement.

This warranty does not apply to and there shall be no warranty for any material or product that has been disassembled without prior approval of Manufacturer, subjected to misuse, misapplication, neglect, alteration, accident or act of nature; that has not been installed, operated or maintained in accordance with Manufacturer's installation instructions; that has been exposed to outside substances including but not limited to the following: sand, gravel, cement, mud, tar, hydrocarbons, hydrocarbon derivatives (oil, gasoline, solvents, etc.), or other abrasive or corrosive substances, wash towels or feminine sanitary products, etc. in all pumping applications. The warranty set out in the paragraph above is in lieu of all other warranties expressed or implied; and we do not authorize any representative or other person to assume for us any other liability in connection with our products.

Contact Manufacturer at, 3649 Cane Run Road, Louisville, Kentucky 40211, Attention: Customer Service Department to obtain any needed repair or replacement of part(s) or additional information pertaining to our warranty.

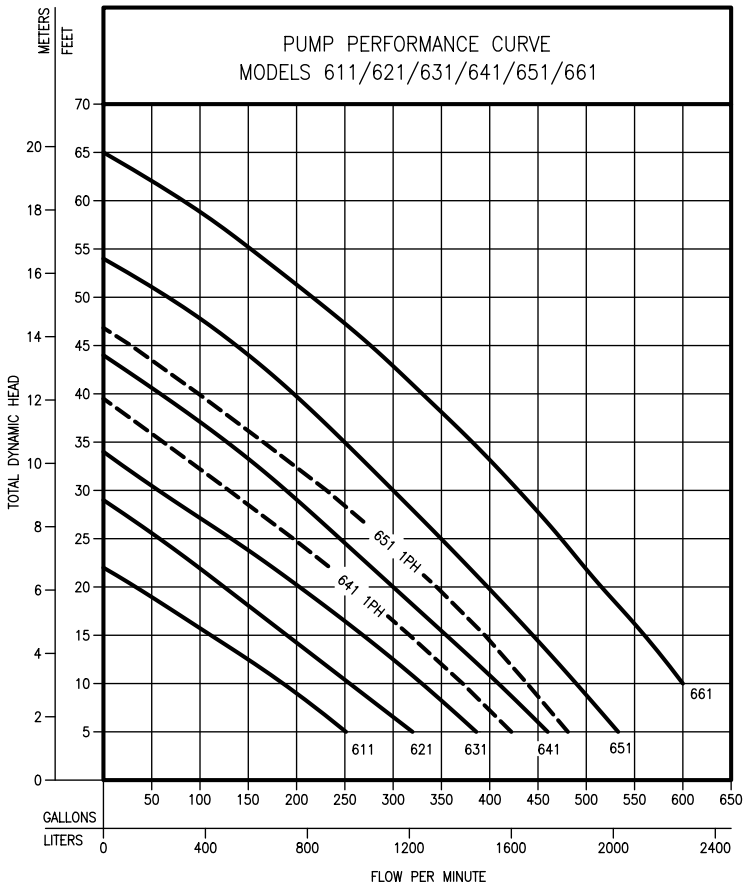
MANUFACTURER EXPRESSLY DISCLAIMS LIABILITY FOR SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES OR BREACH OF EXPRESSED OR IMPLIED WARRANTY; AND ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND OF MERCHANTABILITY SHALL BE LIMITED TO THE DURATION OF THE EXPRESSED WARRANTY.

Some states do not allow limitations on the duration of an implied warranty, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Each Zoeller Pump Company 600 Series Pump installation is required to have a completed Zoeller Pump Company Start-up Report (FM0990). The report is to be completed by an approved Start-up Technician in the presence of the installing contractor. A copy of this report will be on file at the Zoeller Pump Company offices in Louisville, KY. **Failure to comply with the requirement could void the warranty agreement.**

Performance Data



013859

TOTAL DYNAMIC HEAD/FLOW
PER MINUTE
SEWAGE AND WASTEWATER

MODEL		611		621		631		641 (1PH)	
Feet	Meters	Gal.	Liters	Gal.	Liters	Gal.	Liters	Gal.	Liters
5	1.5	250	946	320	1211	390	1476	420	1590
10	3.0	185	700	255	965	335	1268	370	1401
15	4.6	110	416	190	719	272	1030	319	1208
20	6.1	35	132	125	473	200	757	260	984
25	7.6	--	--	60	227	130	492	198	750
30	9.1	--	--	--	--	55	208	130	492
35	10.7	--	--	--	--	--	--	62	235
40	12.2	--	--	--	--	--	--	--	--
45	13.7	--	--	--	--	--	--	--	--
50	15.2	--	--	--	--	--	--	--	--
55	16.7	--	--	--	--	--	--	--	--
60	18.2	--	--	--	--	--	--	--	--
Shut-off head:		22 ft. (6.7 m)		29 ft. (8.8 m)		34 ft. (10.4 m)		39.5 ft. (12 m)	

MODEL		641		651 (1PH)		651		661	
Feet	Meters	Gal.	Liters	Gal.	Liters	Gal.	Liters	Gal.	Liters
5	1.5	460	1741	475	1798	533	2018	--	--
10	3.0	410	1552	440	1666	490	1855	600	2271
15	4.6	355	1344	395	1495	445	1685	560	2119
20	6.1	300	1136	345	1306	398	1507	515	1949
25	7.6	245	927	290	1098	350	1325	475	1798
30	9.1	190	719	232	878	300	1136	430	1627
35	10.7	130	492	165	625	250	946	380	1438
40	12.2	60	227	95	360	198	738	330	1249
45	13.7	--	--	25	95	140	530	275	1041
50	15.2	--	--	--	--	70	265	215	814
55	16.7	--	--	--	--	--	--	150	568
60	18.2	--	--	--	--	--	--	85	303
Shut-off head:		44 ft. (13.4 m)		46.5 ft. (14.2 m)		54 ft. (16.5 m)		65 ft. (19.8 m)	

Preinstallation Information

1. **Inspect your pump.** Occasionally, products are damaged during shipment. If the unit is damaged, contact your dealer before using. **DO NOT** remove the test plugs in the cover nor the motor housing.
2. **Carefully read the literature** provided to familiarize yourself with specific details regarding installation and use. These materials should be retained for future reference.

⚠ WARNING **SEE BELOW FOR LIST OF WARNINGS**

⚠ CAUTION **SEE BELOW FOR LIST OF CAUTIONS**

1. Do not lift, carry, or hang pump by the electrical cables. Damage to the electrical cables can cause shock, burns or death.

2. Make sure there is a properly grounded connection available. All pumps are furnished with provisions for proper grounding to help protect you against the possibility of electrical shock.

3. Make certain that the control box is within the reach of the pump's power supply cord. **DO NOT USE AN EXTENSION CORD.** Extension cords that are too long or too light do not deliver sufficient voltage to the pump motor. But, more importantly, they could present a safety hazard if the insulation were to become damaged or the connection end were to fall into the sump.

4. Make sure the pump electrical supply circuit is equipped with fuses and disconnect or circuit breakers of proper capacity. A separate branch circuit is recommended, sized according to the "National Electrical Code" for the current shown on the pump nameplate.

5. Care should be taken during the initial installation to be sure that adequate air supply is available whenever any person is in the basin. Always follow OSHA guidelines on confined space requirements.

6. Risk of electric shock - These pumps have not been investigated for use in swimming pool areas.

1. Check to be sure your power source is capable of handling the voltage requirements of the motor, as indicated on the pump nameplate.

2. The installation of pumps using auxiliary variable level float switches is the responsibility of the installing party and care should be taken that the tethered float switch will not hang up on the pump apparatus or pit peculiarities and is secured so that the pump will shut off. It is recommended that rigid piping and fittings be used and the pit be 36" (91.4 cm) or larger in diameter.

3. INFORMATION - VENT HOLE PURPOSE. It is necessary that all submersible pumps capable of handling various sizes of solid waste be of the bottom intake design to reduce clogging and seal failures. If a check valve is incorporated in the installation, a vent hole [approx. 3/16" (4 mm)] must be drilled in the discharge pipe below the check valve and pit cover to purge the unit of trapped air. Water stream will be visible from this hole during pump run periods. This vent hole should be checked periodically for clogging and cleaned as necessary. Trapped air is caused by agitation and/or a dry basin.

4. Water hammer creates momentary high pressure surges. These surges can cause severe damage to check valves and the piping system. Consideration for water hammer must be included in the piping system design. Reference ASPE Data Book, Chapter 2.33. Some systems may require external spring or lever weighted check valves or other engineered solutions.

5. Three phase pumps must be connected for proper rotation, which is counterclockwise looking into impeller inlet. See page 4 for instructions for checking 3 phase rotation.

NOTE: Pumps with the "UL" mark and pumps with the "US" mark are tested to UL Standard UL778. CSA Certified pumps are certified to CSA Standard C22.2 No. 108.

Electrical Data

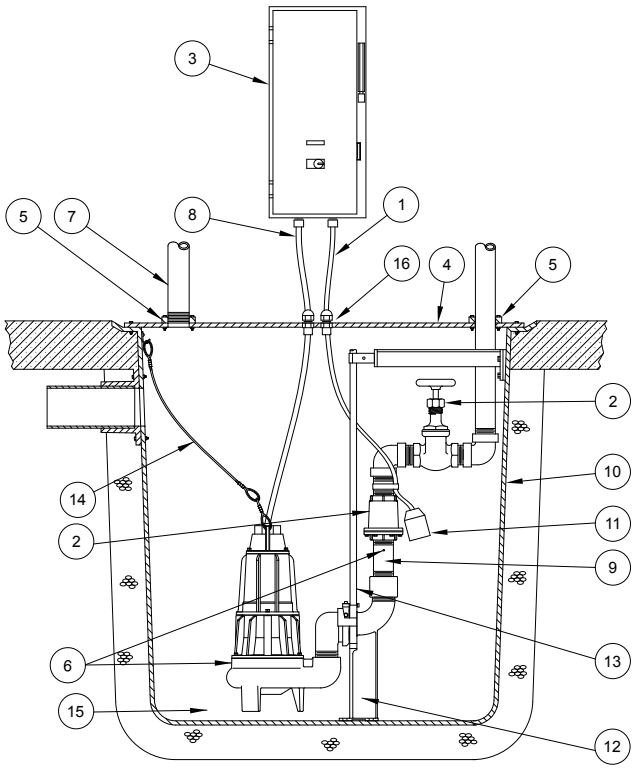
Model	HP	Service Factor	RPM	Voltage	Phase	Hertz	Amps				KVA Code	Winding Resistance Line-to-Line
							Full Load	In Air	Shut Off	Locked Rotor		
E611	1	1.2	1750	230	1	60	6.9	4.1	4.7	48.0	M	2.5 / 4.8
J611	1	1.2	1750	200	3	60	4.8	3.3	3.7	32.0	M	2.2
F611	1	1.2	1750	230	3	60	4.2	2.2	2.6	28.0	M	3
G611	1	1.2	1750	460	3	60	2.1	1.1	1.3	14.0	M	12
BA611	1	1.2	1750	575	3	60	1.7	1.0	1.1	11.5	M	18
E621	1-1/2	1.2	1750	230	1	60	8.9	4.3	5.3	48.0	J	2.5 / 4.8
J621	1-1/2	1.2	1750	200	3	60	5.9	3.3	3.7	32.0	J	2.2
F621	1-1/2	1.2	1750	230	3	60	5.1	2.3	2.9	28.0	J	3
G621	1-1/2	1.2	1750	460	3	60	2.6	1.2	1.5	14.0	J	12
BA621	1-1/2	1.2	1750	575	3	60	2.0	1.0	1.3	11.5	J	18
E631	2	1.2	1750	230	1	60	14.5	7.2	8.0	86.0	L	0.94 / 3.8
J631	2	1.2	1750	200	3	60	7.8	4.5	5.0	46.0	J	1.5
F631	2	1.2	1750	230	3	60	6.8	2.3	4.4	41.0	K	2
G631	2	1.2	1750	460	3	60	3.4	1.2	2.2	20.5	K	8
BA631	2	1.2	1750	575	3	60	2.7	1.4	1.8	16.2	K	12
E641	3	1.2	1750	230	1	60	17.0	7.2	8.9	86.0	H	0.94 / 3.8
J641	3	1.2	1750	200	3	60	11.0	4.5	5.6	46.0	F	1.5
F641	3	1.2	1750	230	3	60	9.6	2.3	4.7	41.0	F	2
G641	3	1.2	1750	460	3	60	4.8	1.7	2.4	20.5	F	8
BA641	3	1.2	1750	575	3	60	3.9	1.4	2.0	16.2	F	12
E651	5	1.2	1750	230	1	60	28.0	16.1	19.7	139.0	H	0.9 / 3.1
J651	5	1.2	1750	200	3	60	17.5	6.1	7.6	64.0	D	1
F651	5	1.2	1750	230	3	60	15.2	6.1	7.4	58.0	E	1.3
G651	5	1.2	1750	460	3	60	7.6	3.1	3.7	29.0	E	5.2
BA651	5	1.2	1750	575	3	60	6.1	1.5	3.4	23.0	E	8
J661	7-1/2	1.0	1750	200	3	60	25.3	17.9	18.3	83.0	C	0.5
F661	7-1/2	1.0	1750	230	3	60	22.0	15.0	15.7	72.0	C	0.7
G661	7-1/2	1.0	1750	460	3	60	11.0	7.5	7.9	36.0	C	2.8
BA661	7-1/2	1.0	1750	575	3	60	9.0	5.3	5.8	29.0	C	5.4

*Consult Factory.

Typical Sewage/Waste Pumping System Installation

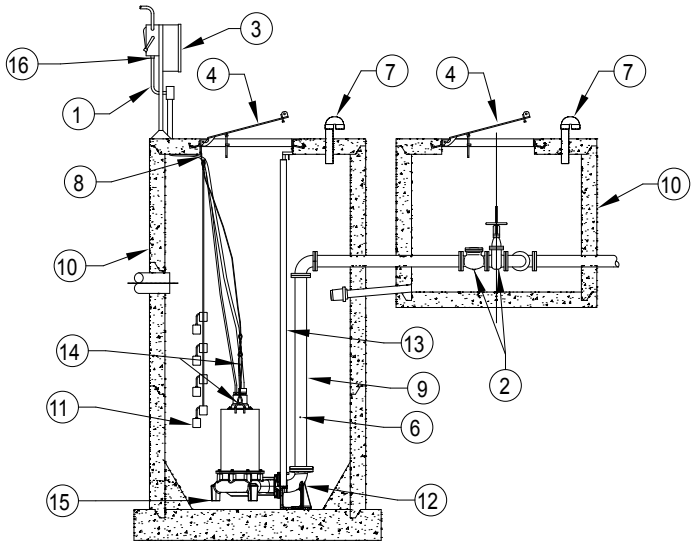
All installations must comply with all applicable electrical and plumbing codes, including, but not limited to, National Electrical Code, local, regional, and/or state plumbing codes, etc.

TYPICAL INDOOR FIBERGLASS BASIN



ZEPA0466

TYPICAL OUTDOOR CONCRETE BASIN WITH VALVE BOX AND HINGED ACCESS COVERS



ZEPA0071

(1) Electrical wiring and protection **must** be in accordance with the National Electrical Code, and any other applicable state and local electrical requirements.

(2) Install proper full flow check and shut-off valve.

(3) Install proper controls. (Outdoor panels **require** NEMA 3R or 4X enclosure)

(4) All installations **require** a basin cover to prevent debris from falling into the basin and to prevent accidental injury.

(5) Gas tight seals are **required in all indoor sewage installations** to contain gases and odors.

(6) **When check valve is installed**, drill a 3/16" (4 mm) diameter hole in the discharge pipe below the check valve even with the top of the pump. NOTE: The hole must be below the basin cover and cleaned periodically. Water stream will be visible from this hole during pump run periods. Also a vent hole is drilled in the pump housing. Be sure that this hole is cleared during any servicing.

(7) Vent gases and odors to the atmosphere through vent pipe per Local and State codes.

(8) Secure power cord to avoid entanglement with variable level float switch mechanism.

(9) **Do not** reduce pump discharge pipe below 3" (76 mm) IPS size.

(10) Basin **must** be in accordance with all applicable codes and specifications. Basin must be sized to allow a minimum 3 minute lapse time between starts.

(11) Pump must be level and the tethered variable level float switch must be free and not hang up on pump or pit peculiarities.

(12) **If** a rail system is used, discharge elbow **must** be firmly anchored to the bottom of basin. In fiberglass basin, the bottom will need to be reinforced if the discharge elbow is used.

(13) **If** a rail system is used, the guide rails are 3/4" schedule 40 pipe for threaded vertical discharge units and 2" schedule 40 pipe for flanged horizontal discharge units. Brass, stainless steel or galvanized steel is recommended.

(14) Install ring and cable for lifting pump from pit.

(15) Basin must be clean and free of debris after installation.

(16) Cords must be properly sealed to prevent moisture and gases from entering the control panel.

Pump Wiring Instructions

⚠ WARNING Installation and checking of electrical circuits and hardware should be performed by a qualified licensed electrician.

⚠ WARNING **"Risk of electrical shock"** Do not remove power supply cord and strain relief or connect conduit directly to the pump.

⚠ CAUTION Power cords, sensor cords, and float cords all must be sealed to prevent gases from the basin entering the control panel.

INSTRUCTIONS FOR CHECKING ROTATION OF THREE PHASE UNITS

It is very important that these units be connected for proper rotation. Since no rotating parts are visible without removing the pump from the pit, the rotation on 3 phase units should be checked before installation into the pit as follows:

After the proper electrical connections are made, momentarily energize the pump observing the direction of kick back due to starting torque. The rotation is correct if the kick back is in the opposite direction of the rotation arrow. If the rotation is not correct, disconnect power and switch any two power leads. Turn power back on and retest for proper rotation.

DOUBLE SEAL PUMPS

(1) Double seal pumps offer extra motion protection from damage caused by seal failure.

(2) Pumps should be serviced on a periodic preventative maintenance schedule.

(3) Oil in the motor housing and lower seal cavity must be checked when pump is serviced. If oil from the motor housing contains water or other contaminations, both seals should be replaced during maintenance. Always replace with new factory recommended oil and service parts. All warranty repairs must be made by Zoeller Authorized Service Stations.

CONTROL PANELS

These pumps are nonautomatic. They require a control panel. A motor starter circuit, control circuit, and alarm circuit within the panel are standard features. Outdoor enclosures and alternating relays are often required. Variable level float switches are the most common level sensing device. The following should be noted.

(1) Single phase units have externally mounted capacitors and starting relays. Your control panel should have provisions for mounting these starting components.

(2) All pumps require overload protection in panel. Use with approved motor control that matches motor input in full load amperes with overload element(s) selected or adjusted in accordance with control instructions.

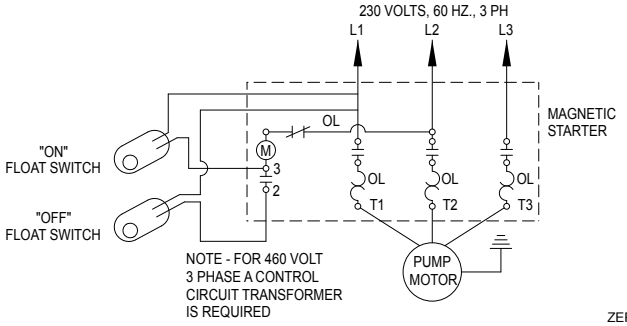
(3) Hazardous Location pumps require panels that offer intrinsically safe relays and all other NEC requirements must be followed (see Article 500, 501 & 502 plus any others that apply.)

Three Phase Installation

Three phase pumps are nonautomatic. To operate automatically, a control panel is required. Follow the instructions provided with the panel to wire the system.

Before installing a pump, check the pump rotation to insure that wiring has been connected properly to power source, and that the green lead of power cord (See wiring diagram), is connected to a valid ground, Momentarily energize the pump, observing the directions of kick back due to starting torque. Rotation is correct if kick back is in the opposite direction of rotation arrow on the pump casing. If rotation is not correct, switching of any two power leads other than ground, should provide the proper rotation.

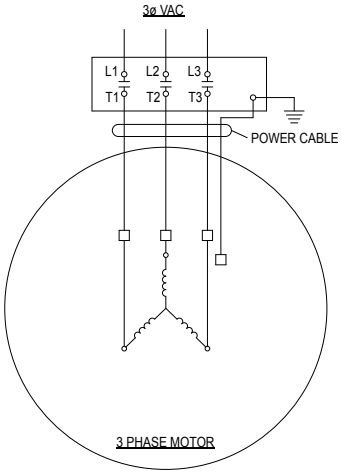
TYPICAL WIRING DIAGRAM



ZEPA0036

The above wiring diagram shows a typical hookup for a 230 volt, 3 phase pump, two variable level float switches, and a magnetic starter. It is not intended that this diagram cover all applications. See wiring diagram supplied with specific electrical controllers and panels.

TYPICAL 3-PHASE WIRING DIAGRAM



ZEPA0038F

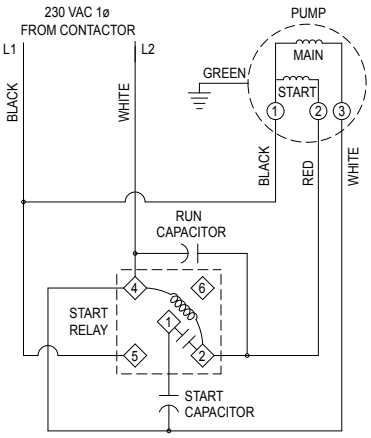
"600 SERIES" FOUR CONDUCTOR AWG. POWER CORD SIZE						
MODEL	**BHP**	**230 / 1 PH**	**200 / 3 PH**	**230 / 3 PH**	**460 / 3 PH**	**575 / 3 PH**
611	1	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
621	1.5	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
631	2	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
641	3	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
651	5	8 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
661	7.5	N/A	8 AWG.	8 AWG.	12 AWG.	12 AWG.
Approximate cord diameter per gauge						
12/4 AWG.	.64"					
8/4 AWG.	.93"					

Single Phase Installation

All single phase models require start capacitor, run capacitor and relay in the circuit to start and operate properly. These components can be purchased separately or prewired in Zoeller Pump Company control panel. For components purchased separately used the diagram for installation and hookup.
Single phase models are nonautomatic. To operate automatically a control panel must be added to the power circuit. Follow the instructions provided with the panel.

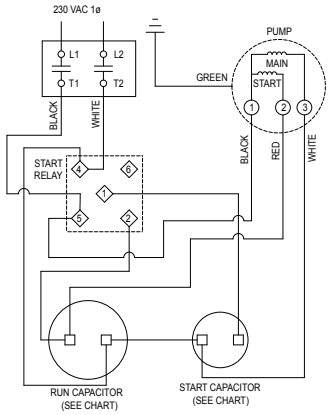
WIRING DIAGRAM

MODELS 611 / 621
USING SUPCO PR90
RELAY BEFORE 10/1/07



ZEPA0539

COMPONENT LAYOUT

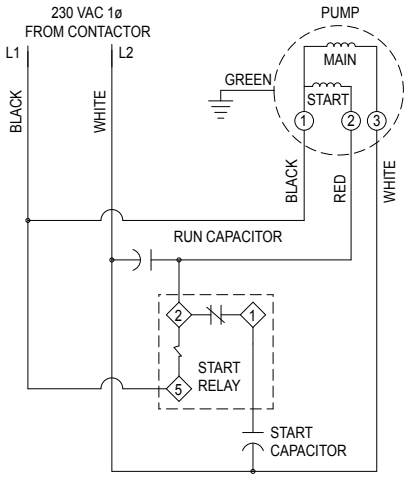


MODELS	START CAP.	RUN CAP.
611/621	324-389 UF 125 V	40 UF 370 V

ZEPA0477B

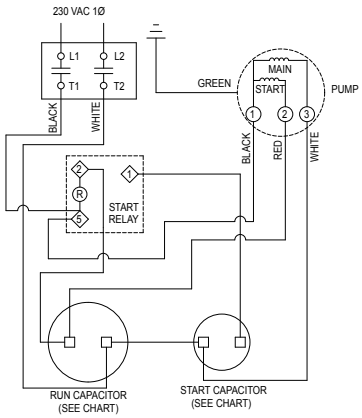
WIRING DIAGRAM

MODELS 631 / 641 / 651
AND 611 / 621 USING GE
RELAY AFTER 10/1/07



ZEPA0540

COMPONENT LAYOUT



MODELS	START CAP.	RUN CAP.
6120/6121	216-259UF 250V	40UF 370 V
6111/6122/6123/6124	270-324UF 250V	50UF 370 V

ZEPA0537B

Operation

GENERAL
Zoeller Pump Company pumps are lubricated and tested at the factory prior to shipment and require minimum pre-start-up maintenance.

Maximum continuous operating temperature of pump liquid for standard model pumps must not exceed 140 °F (40 °C). For longest service life all pumps should be totally submerged on long pumping cycles and a maximum of 1/2 hour run time per hour.

These units are not designed to handle liquids other than water or sewage. If pump is used in water contaminated with heavy, viscous, or abrasive materials, the warranty will be voided.

NAMEPLATE DATA
The nameplate, located on the top of pump, indicates specific information about the construction of the pump. The model number, date code, and serial number information should be recorded on the front page in the “Owner’s Information” section of this manual.

SHORT TERM STORAGE
If pump is to be stored, the following is advised:
- Store pump inside whenever possible or cover with some type of protective covering.
- Tape or seal in plastic bag the terminal ends of wire leads.
- Spray coat unpainted surfaces with rust inhibiting oil.
- The impeller should be rotated every six months in order to keep the seals lubricated and not develop a permanent set.

If panel is to be stored, the following is advised:

- Store the panel inside whenever possible and leave in the shipping box.
- All openings shall be sealed.
- Store in an upright position.
- Do not stack anything on top of panel.

START-UP PROCEDURE
Before placing the equipment into operation the following checked:

- Correct pump rotation (3 Phase units only).
- Clean pit.
- Panel dry and securely installed.
- Floats positioned properly.
- Discharge valves open.
- 3/16” (4 mm) vent hole drilled in pipe between check valve and pump.

(Continued on next page)

Operation *(continued)*

Once the above has been verified proceed with the following checks:

- Pump power cables properly connected to panel.
- Float cables properly connected to panel.
- Conduit connections to panel are properly sealed.
- Thermal overload adjustments made in the panel.
- After installing the pump into the containment area, with adequate submergence, open the discharge valve fully. Start the unit using manual controls. If flow is appreciably less than rated performance, pump may be air locked. To expel trapped air, jog the unit several times, using the manual controls.
- Have a qualified electrician take voltage and current measurements on the black wire of single phase or all three power wires of three phase with the pump running. Record these readings in the space provided in the **"Owner's Information"** section on page 1 of this manual for future reference.

After the preoperational functional test has been completed, system is ready for operation. Zoeller Pump Company requires completing a Start-up Report (ZM1074) whenever a system is started for the first time or after a system has had a significant change take place (i.e. pump replacement, overhaul, etc.). A copy of the Start-up Report should remain with the system for future reference.

ADJUSTMENT PROCEDURE

Pumps: No adjustments are required other than assuring correct rotation.

Panels: The thermal overloads in the panel must be set to the F.L.A. rating on the pump nameplate (or refer to pump data sheet).

Floats: Refer to the system drawing for desired location of each float function.

Valves: Discharge valves should be placed in the fully open position. Systems should not be operated for extended periods of time with the discharge valves partially closed due to damaging the valve.

SHUTDOWN PROCEDURES

If a system is shutdown for more than six months, the following is recommended:

Pumps: If pit is to remain dry, then the pump can remain in the pit. With the pump in the pit, it should be operated for five minutes once every three months. If the pit is to remain wet, the pump should be removed and stored as noted above.

Panels: The panel should have all openings sealed to prevent moisture and dust from entering the enclosure. Prior to restarting system, the panel should be inspected for presence of moisture and any loose connections.

Valves: Consult the valve/actuator supplier for information concerning these systems components.

Maintenance

⚠ NOTICE Repair and service should be performed by a Zoeller Authorized Service and Warranty Center only.

SAFETY PROCEDURES

⚠ WARNING For your protection, always disconnect pump and panel from its power source before handling.

⚠ WARNING Never enter the basin until it has been properly vented and tested. Any person entering a basin should be wearing a harness with safety rope extending to the surface so that they can be pulled out in case of asphyxiation. Sewage water gives off methane and hydrogen sulfide gases, both of which can be highly poisonous.

Installation and checking of electrical circuits and hardware should be performed by a qualified electrician.

Pump is never to be lifted by power cord.

⚠ WARNING Unit must be flushed and disinfected, inside and out, prior to servicing.

GENERAL SYSTEM INSPECTION

Before the system is placed into operation, a system Start-up Report should be conducted by a qualified technician.

⚠ WARNING Wiring and grounding must be in accordance with the national electrical code and all applicable local codes and ordinances.

LUBRICATION PROCEDURES

No lubrication is required.

If pumps are to be stored for more than six months, refer to short term storage procedure in the Operation section.

PREVENTIVE MAINTENANCE

Preventive maintenance is recommended to ensure a long service life from the product. Provided is a suggested maintenance schedule.

Every month:

- Check for proper and unobstructed float operation.
- Listen for proper check valve operation.
- Duplex Units - Check for even operating times. Uneven times indicate a defective unit, float switch or control.
- Inspect the panel for any presence of moisture in enclosure, loose connections, and general component condition. check out location and condition of float switches.

Every year:

- In addition to the monthly checks, the basin should be inspected and cleaned. Any defective components should be replaced. Inspect and remove any sand, debris, or mud present in the pump basin assembly.

Every two years:

- Check insulating oil in motor and seal chambers. Inspect oil for contaminations as follows:
- Clear oil, no burnt odor - Oil, motor and seals are in satisfactory condition.
- Dark oil, burnt odor - Pump motor has overheated. Check the motor winding resistance to ground. Ohm readings of 1 megohm or higher is required. If lower readings are present, return the unit to an Zoeller Authorized Service and Warranty Center for service.
- Milky, emulsified oil - Seals have failed. Unit must be returned to an authorized service facility for service.
- Dispose of the motor insulating oil properly if replacement is required.
- Inspect power cables for damage or wear. Replace immediately if damage or wear is detected.
- Inspect impeller for damage or wear. Replace as required by a Zoeller Authorized Service and Warranty Center.

DOUBLE SEAL PUMPS

- Double seal pumps offer extra protection from damage caused by seal failure.
- Oil in a motor housing and lower seal cavity must be checked when pump is serviced. If oil from the motor housing contains water or other contamination, both seals should be replaced during maintenance. Always replace with new factory recommended oil and service parts. All repairs must be made by Zoeller Authorized Service and Warranty Centers.

Service Checklist & Trouble Shooting

⚠ WARNING **ELECTRICAL PRECAUTIONS** Before servicing a pump, always shut off the main power breaker to the panel and then disconnect the pump - making sure you are wearing insulated protective sole shoes and are not standing in water. Under flooded conditions, contact your local electric company or a qualified licensed electrician for disconnecting electrical service prior to pump removal.

⚠ WARNING Submersible pumps contain oils which become pressurized and hot under operating conditions - **allow 2-1/2 hours after disconnecting before attempting service.**

CONDITION

A. Pump will not start or run.

Steps	Check Voltage At	If No Voltage	If Voltage
No. 1	Line terminals in pump's control panel L_1 - L_2 - L_3 (3 Phase)	Check Disconnect switch, line fuse, and/or circuit breakers in power supply circuit.	Proceed to No. 2
No. 2	Pump motor terminals in pump's control panel T_1 - T_2 - T_3	Check for control circuit voltage. Check out magnetic starter contacts, thermal overloads, and float switches	Check starting relay and capacitor (1 phase units). Check pump for ground, and binding impeller

COMMON CAUSES

B. Motor overheats and trips overload or blows fuse.

- Incorrect Voltage
- Unbalanced power source
- Incorrect motor rotation
- Negative or low head
- Excessive water temperature
- Impeller or seal mechanically bound
- Defective capacitor or relay
- Motor shorted
- Lost one line in a Three Phase unit

C. Pumps starts and stops too often.

- Check valve stuck open
- Level controls out of adjustment
- Thermal overload switch out of adjustment or defective
- Pit too small

D. Pump will not shut off.

- Debris under float switch
- Float travel obstructed
- Defective or damaged float switch
- Magnetic starter contacts shorted
- Air lock - check vent hole

E. Pump operates but delivers little or no water.

- Check for plugged Pump housing, discharge pipe or sticking check valve
- Vent hole clogged or not drilled
- Discharge head exceeds pumps capacity
- Low or incorrect voltage
- Incorrect motor rotation
- Defective capacitor

F. Drop in head and/or capacity after a period or use.

- Increase Pipe Friction
- Clogged line or check valve
- Abrasive material & chemical, deteriorated impeller and pump housing

If the above check list does not uncover the problem, consult the factory - Do not attempt to service or otherwise disassemble pump.

These are the original installation instructions.

Aviso al contratista instalador: Las instrucciones deberán permanecer con la instalación. FM1798S

Su tranquilidad es nuestra mayor prioridad™

La información presentada adentro refleja condiciones al tiempo de publicación. Consultar la fábrica sobre discrepancias o contradicciones.

Registre en línea su producto de Zoeller Pump Company: http://reg.zoellerpumps.com/

ZOELLER® PUMP COMPANY

DIRECCIÓN POSTAL: *P.O. BOX 16347 • Louisville, KY 40256-0347 EEUU*
DIRECCIÓN PARA ENVÍOS: *3649 Cane Run Road • Louisville, KY 40211-1961 EEUU*
TEL: *+1 (502) 778-2731 •* ***FAX:*** *+1 (502) 774-3624*

Visite a nuestro sitio web:
www.zoeller.com

DISEÑADO • MANUFACTURADO • MONTADO EN LOS EEUU

MANUAL DE PROPIETARIO

SERIE 600 UNIDADES SUMERGIBLES QUE NO SE OBSTRUYE

Enhorabuena por la compra de una bomba sumergible trituradora Zoeller Pump Company. Desde 1939, el nombre Zoeller ha representado el estándar para bombas sumergibles de achique y aguas negras. La misma mano de obra de alta calidad y diseño de fácil mantenimiento han sido incorporados en esta línea de bombas trituradoras sumergibles de alta resistencia. Esta bomba de Zoeller Pump Company le proporcionará años de servicio sin problemas cuando se instale de acuerdo con las recomendaciones del fabricante.

Este manual incluye instrucciones de instalación, operación, mantenimiento y servicio en un solo documento para servir de soporte al propietario de un producto sumergible de aguas residuales Zoeller Pump Company. Lea y revise este manual antes de instalar el producto. Siga los pasos de FM0990 para un arranque correcto. Muchos de los artículos contenidos en este manual, cuando se sigan correctamente, no solo garantizarán una vida útil larga y sin problemas de la bomba, sino que también ahorrarán tiempo y dinero durante la instalación. Consulte las piezas de repuesto en FM1799 para el serie 600. En caso de que necesite ayuda, comuníquese con nuestro departamento de servicio técnico al 1-800-928-PUMP (7867) o al +1-502-778-2731.

Índice

Información del propietario

Número de modelo: _____ **Código de fecha:** _____

Número de serie: Bomba 1 _____ **Bomba 2** _____

☐ **Simplex** ☐ **N/P de Panel** _____

☐ **Duplex** ☐ **N/P de Sistema de riel:** _____

Nombre del trabajo: _____

Distribuidor: _____

N° S/O Zoeller: _____

Contratista: _____

Fecha de instalación: _____

Lecturas del sistema al encender: Voltaje ____ **Amperaje** _____

Instrucciones de seguridad

PARA EVITAR LESIONES PERSONALES GRAVES O FATALES O DAÑOS IMPORTANTES A LA PROPIEDAD, LEA Y CUMPLA TODAS LAS INSTRUCCIONES DE SEGURIDAD DE ESTE MANUAL Y DE LA BOMBA.

ESTE MANUAL TIENE POR OBJETIVO AYUDAR EN LA INSTALACIÓN Y OPERACIÓN DE ESTA UNIDAD Y DEBE PERMANECER JUNTO A ELLA.

Este símbolo significa una **ALERTA DE SEGURIDAD**. Al ver este símbolo en la bomba o el manual, buscar una de las siguientes palabras de advertencia y ponerse sobre aviso de posibles lesiones personales o daños a la propiedad.

⚠ PELIGRO Advierte de peligros que **OCASIONARÍAN** graves lesiones personales, la muerte o daños importantes a la propiedad.

⚠ ADVERTENCIA Advierte de peligros que **PODRÍAN** ocasionar graves lesiones personales, la muerte o daños importantes a la propiedad.

⚠ PRECAUCIÓN Advierte de peligros que **PODRÍAN** ocasionar lesiones personales o daños a la propiedad.

⚠ AVISO INDICA QUE SE DEBEN SEGUIR INSTRUCCIONES ESPECIALES MUY IMPORTANTES.

REVISE A FONDO TODAS LAS INSTRUCCIONES Y ADVERTENCIAS ANTES DE LLEVAR A CABO NINGÚN TRABAJO CON ESTA BOMBA.

MANTENGA TODAS LAS CALCOMANÍAS DE SEGURIDAD.

REFIÉRASE A LA GARANTÍA EN LA PÁGINA 10.

GARANTÍA LIMITADA

El Fabricante garantiza, al comprador y el propietario subsiguiente durante el período de garantía, que cada producto nuevo está libre de defectos en materiales y mano de obra bajo condiciones de uso y servicio normales, cuando se usa y mantiene correctamente, durante un período de un año a partir de la fecha de compra por parte del usuario final, o por 18 meses de la fecha de fabricación original del producto, lo que ocurra primero. Las partes que fallen durante el período de garantía, un año a partir de la fecha de compra por parte del usuario final, o 18 meses de la fecha de fabricación original del producto, lo que ocurra primero, cuyas inspecciones determinen que presentan defectos en materiales o mano de obra, serán reparadas, reemplazadas o remanufacturadas a opción del Fabricante, con la condición sin embargo de que por hacerlo no estemos en la obligación de reemplazar un ensamblaje completo, el mecanismo entero o la unidad completa. No se dará concesión alguna por costos de envío, daños, mano de obra u otros cargos que pudieran surgir por falla, reparación o reemplazo del producto.

Esta garantía no aplica a y no se ofrecerá garantía alguna por ningún material o producto que haya sido desarmado sin aprobación previa del Fabricante, o que haya sido sometido a uso indebido, aplicación indebida, negligencia, alteración, accidente o acto de naturaleza; que no haya sido instalado, usado o mantenido según las instrucciones de instalación del Fabricante; que haya sido expuesto a sustancias foráneas que incluyen pero no se limitan a lo siguiente: arena, grava, cemento, lodo, alquitrán, hidrocarburos, derivados de hidrocarburos (aceite, gasolina, solventes, etc.), u otras sustancias abrasivas o corrosivas, toallas para lavar o productos sanitarios femeninos, etc. en todas las aplicaciones de bombeo. La garantía presentada en el párrafo anterior deja sin efecto cualquier otra garantía expresa o implícita; y no autorizamos a ningún representante u otra persona para que asuma por nosotros ninguna otra responsabilidad con respecto a nuestros productos.

Comuníquese con el Fabricante en 3649 Cane Run Road, Louisville, KY 40211 EE.UU., Attention: Customer Support Department, para obtener cualquier reparación necesaria o reemplazo de partes o información adicional sobre nuestra garantía.

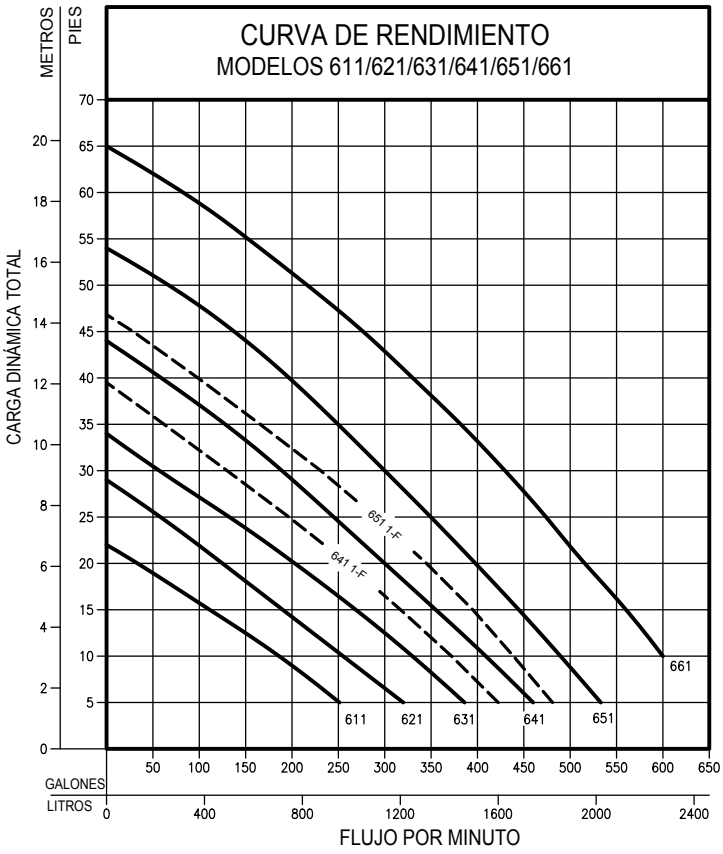
EL FABRICANTE EXPRESAMENTE RECHAZA RESPONSABILIDAD POR DAÑOS ESPECIALES, EMERGENTES O INCIDENTALES O POR INCUMPLIMIENTO DE LA GARANTÍA EXPRESA O IMPLÍCITA; Y CUALQUIER GARANTÍA IMPLÍCITA DE IDONEIDAD PARA UN FIN PARTICULAR Y DE COMERCIALIZACIÓN SE LIMITARÁ A LA DURACIÓN DE LA GARANTÍA EXPRESA.

Algunos estados no permiten limitaciones en la duración de una garantía implícita, de forma que la limitación anterior podría no aplicar a usted. Algunos estados no permiten la exclusión o limitación de daños incidentales o emergentes, de forma que la limitación o exclusión anterior podría no aplicar a usted.

Esta garantía le otorga a usted derechos legales específicos y podría tener otros derechos que varían de un estado a otro.

Cada instalación de bomba Zoeller Pump Company Serie 600 debe contar con un informe de puesta en marcha de Zoeller Pump Company (FM0990). El informe debe ser realizado por un técnico de puestas en marcha aprobado en presencia del contratista de instalación. En las oficinas de Zoeller Pump Company en Louisville, KY se guardará una copia de este informe. **La falta de cumplimiento de los requisitos puede anular el contrato de garantía.**

Datos de rendimiento



CARGA DINÁMICA TOTAL/
FLUJO POR MINUTO
AGUAS NEGRAS Y ACHIQUE

MODELO		611		621		631		641 (1-F)	
Pies	Metros	Galones	Litros	Galones	Litros	Galones	Litros	Galones	Litros
5	1.5	250	946	320	1211	390	1476	420	1590
10	3.0	185	700	255	965	335	1268	370	1401
15	4.6	110	416	190	719	272	1030	319	1208
20	6.1	35	132	125	473	200	757	260	984
25	7.6	––	––	60	227	130	492	198	750
30	9.1	––	––	––	––	55	208	130	492
35	10.7	––	––	––	––	––	––	62	235
40	12.2	––	––	––	––	––	––	––	––
45	13.7	––	––	––	––	––	––	––	––
50	15.2	––	––	––	––	––	––	––	––
55	16.7	––	––	––	––	––	––	––	––
60	18.2	––	––	––	––	––	––	––	––
Carga máxima:		6.7 m (22 pies)		8.8 m (29 pies)		10.4 m (34 pies)		12 m (39.5 pies)	

MODELO		641		651 (1-F)		651		661	
Pies	Metros	Galones	Litros	Galones	Litros	Galones	Litros	Galones	Litros
5	1.5	460	1741	475	1798	533	2018	––	––
10	3.0	410	1552	440	1666	490	1855	600	2271
15	4.6	355	1344	395	1495	445	1685	560	2119
20	6.1	300	1136	345	1306	398	1507	515	1949
25	7.6	245	927	290	1098	350	1325	475	1798
30	9.1	190	719	232	878	300	1136	430	1627
35	10.7	130	492	165	625	250	946	380	1438
40	12.2	60	227	95	360	198	738	330	1249
45	13.7	––	––	25	95	140	530	275	1041
50	15.2	––	––	––	––	70	265	215	814
55	16.7	––	––	––	––	––	––	150	568
60	18.2	––	––	––	––	––	––	85	303
Carga máxima:		13.4 m (44 pies)		14.2 m (46.5 pies)		16.5 m (54 pies)		19.8 m (65 pies)	

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Lista de verificación de pre-instalación

1. **Inspeccione todos materiales.** Ocasionalmente, los productos se dañan durante el envío. Si la unidad está dañada, comuníquese con su vendedor antes de usarla. **NO** quite los tapones de prueba de la bomba.
2. **Lea cuidadosamente toda la literatura** provista para familiarizarse con los detalles específicos relacionados con la instalación y uso. Estos materiales deberán guardarse para referencia futura.

⚠ ADVERTENCIA **VER ABAJO LA LISTA DE ADVERTENCIAS**

1. No levante, cargue ni cuelgue la bomba mediante los cables eléctricos. Los cables eléctricos dañados pueden ocasionar choques eléctricos, quemaduras o la muerte.
2. **Asegúrese de que esté disponible una conexión debidamente aterrizada.** Todas las bombas cuentan con dispositivos para su adecuado aterrizaje, a fin de ayudarle a protegerse contra la posibilidad de que ocurra un choque eléctrico.
3. Asegúrese de que la caja de controles esté dentro del rango de alcance del cable de alimentación de la bomba. **NO USE EXTENSIONES.** Las extensiones muy largas o muy ligeras no suministran suficiente voltaje al motor de la bomba. Pero sobre todo, podrían constituir un peligro a la seguridad si el aislamiento se dañara o si el extremo de la conexión cayera dentro del foso.
4. **Asegúrese de que el circuito de alimentación eléctrica de la bomba esté equipado con fusibles y desconexiones o disyuntores con capacidad adecuada.** Se recomienda un circuito derivado del tamaño que se indica en el Código Eléctrico Nacional para la corriente detallada en la placa de características de la bomba.
5. Durante la instalación inicial se debería prestar atención a asegurar que exista el debido suministro de aire siempre que una persona esté en el depósito. Cumpla siempre las directrices de OSHA en cuanto a los requisitos en espacios confinados.
6. Riesgo de choque eléctrico - No se ha estudiado el uso de estas bombas en albercas recreativas.

⚠ PRECAUCIÓN **VER ABAJO LA LISTA DE PRECAUCIONES**

1. Asegúrese de que la fuente de poder tenga capacidad para los requerimientos de voltaje del motor, según se indica en la placa de características de la bomba.
2. La instalación de bombas que usen interruptores de flotador de nivel variable es responsabilidad de la parte instaladora y se deberá tener cuidado de que el anclaje del flotador no cuelgue sobre los aparatos de la bomba ni las peculiaridades de la cavidad y esté bien sujeto de modo que la bomba pueda apagar. Se recomienda que se usen tuberías y conectores rígidos y que la cavidad sea de un diámetro de 91.4 cm (36 pulg.) o mayor.
3. **INFORMACIÓN - FINALIDAD DEL RESPIRADERO**. Es necesario que todas las bombas sumergibles con capacidad para manejar desechos sólidos de diferentes tamaños tengan un diseño para entrada en la parte inferior de modo que se reduzcan los atascos y las fallas del sello. Si se incorpora una válvula de retención en la instalación, deberá perforarse un respiradero (aprox. 3/16 pulg.) en el tubo de descarga por debajo de la válvula de retención y la cubierta del foso para purgar la unidad cuando haya aire atrapado. Durante los periodos de funcionamiento de la bomba se verá un chorro de agua que sale del respiradero. El respiradero deberá revisarse periódicamente para ver que no esté obstruido y limpiarlo si es necesario. El aire queda atrapado debido a la agitación y/o a que el depósito está vacío.
4. El golpe de ariete crea picos momentáneos de presión elevada. Estos picos pueden ocasionar daños severos a las válvulas de retención y el sistema de tuberías. El diseño del sistema de bombeo debe tomar en cuenta el golpe de ariete. Consulte el capítulo 2.33 del documento "ASPE Data Book" (Libro de datos de la Asociación Americana de Ingenieros de Instalaciones Sanitarias). Algunos sistemas podrían requerir resortes externos o válvulas de retención con palanca de contrapeso, o alguna otra solución de ingeniería.
5. Las bombas trifásicas deben conectarse para que la rotación sea adecuada, es decir, en sentido contrario a las manecillas del reloj viendo desde la entrada del impulsor. Consulte la página 12 para leer las instrucciones de revisión de la rotación trifásica.

NOTA: Probado al Estándar UL778 y certificado al Estándar CSA C22.2 No. 108

Datos eléctricos

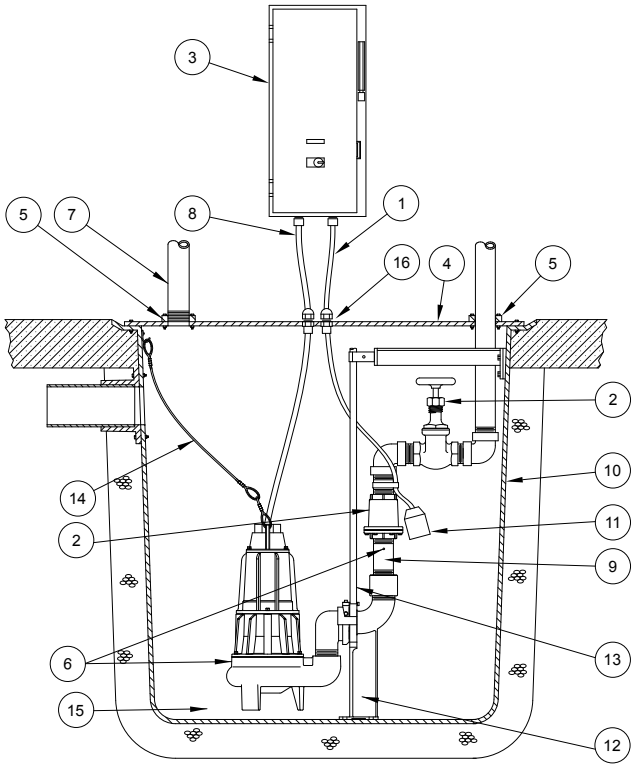
Modelo	HP	Service Factor	RPM	Voltaje	Fase	Hz	Amperios				Código KVA	Resistencia del devanado línea a línea
							Carga total	En aire	Máximo	Rotor cerrado		
E611	1	1.2	1750	230	1	60	6.9	4.1	4.7	48.0	M	2.5 / 4.8
J611	1	1.2	1750	200	3	60	4.8	3.3	3.7	32.0	M	2.2
F611	1	1.2	1750	230	3	60	4.2	2.2	2.6	28.0	M	3
G611	1	1.2	1750	460	3	60	2.1	1.1	1.3	14.0	M	12
BA611	1	1.2	1750	575	3	60	1.7	1.0	1.1	11.5	M	18
E621	1-1/2	1.2	1750	230	1	60	8.9	4.3	5.3	48.0	J	2.5 / 4.8
J621	1-1/2	1.2	1750	200	3	60	5.9	3.3	3.7	32.0	J	2.2
F621	1-1/2	1.2	1750	230	3	60	5.1	2.3	2.9	28.0	J	3
G621	1-1/2	1.2	1750	460	3	60	2.6	1.2	1.5	14.0	J	12
BA621	1-1/2	1.2	1750	575	3	60	2.0	1.0	1.3	11.5	J	18
E631	2	1.2	1750	230	1	60	14.5	7.2	8.0	86.0	L	0.94 / 3.8
J631	2	1.2	1750	200	3	60	7.8	4.5	5.0	46.0	J	1.5
F631	2	1.2	1750	230	3	60	6.8	2.3	4.4	41.0	K	2
G631	2	1.2	1750	460	3	60	3.4	1.2	2.2	20.5	K	8
BA631	2	1.2	1750	575	3	60	2.7	1.4	1.8	16.2	K	12
E641	3	1.2	1750	230	1	60	17.0	7.2	8.9	86.0	H	0.94 / 3.8
J641	3	1.2	1750	200	3	60	11.0	4.5	5.6	46.0	F	1.5
F641	3	1.2	1750	230	3	60	9.6	2.3	4.7	41.0	F	2
G641	3	1.2	1750	460	3	60	4.8	1.7	2.4	20.5	F	8
BA641	3	1.2	1750	575	3	60	3.9	1.4	2.0	16.2	F	12
E651	5	1.2	1750	230	1	60	28.0	16.1	19.7	139.0	H	0.9 / 3.1
J651	5	1.2	1750	200	3	60	17.5	6.1	7.6	64.0	D	1
F651	5	1.2	1750	230	3	60	15.2	6.1	7.4	58.0	E	1.3
G651	5	1.2	1750	460	3	60	7.6	3.1	3.7	29.0	E	5.2
BA651	5	1.2	1750	575	3	60	6.1	1.5	3.4	23.0	E	8
J661	7-1/2	1.0	1750	200	3	60	25.3	17.9	18.3	83.0	C	0.5
F661	7-1/2	1.0	1750	230	3	60	22.0	15.0	15.7	72.0	C	0.7
G661	7-1/2	1.0	1750	460	3	60	11.0	7.5	7.9	36.0	C	2.8
BA661	7-1/2	1.0	1750	575	3	60	9.0	5.3	5.8	29.0	C	5.4

* Consulte con la fábrica.

Instalación típica de un sistema de bombeo de aguas negras

Todas las instalaciones deben cumplir con todos los códigos eléctricos y de plomería aplicables, incluyendo de manera enunciativa pero no limitativa, el Código Eléctrico Nacional y los códigos para instalaciones sanitarias regionales y/o estatales, etc.

CONTENEDOR PARA AGUA DE FIBRA DE VIDRIO TÍPICO PARA INTERIORES



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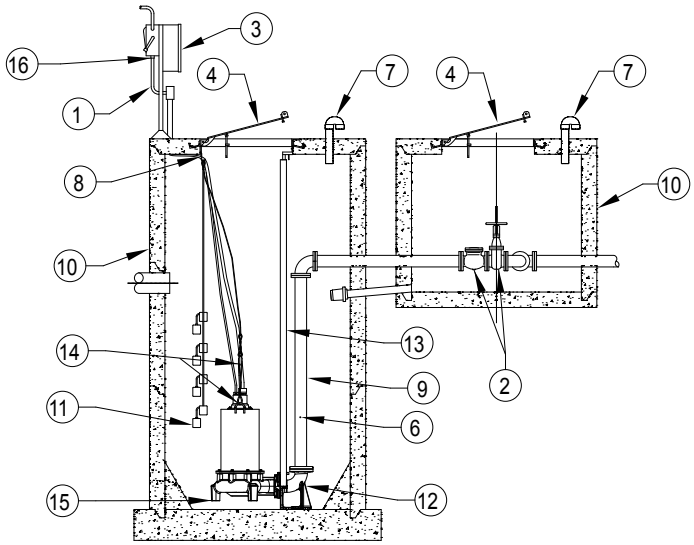
CONTENEDOR PARA AGUA DE CONCRETO TÍPICO PARA EXTERIORES CON CAJA DE VÁLVULA Y TAPA DE ACCESO CON BISAGRAS



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(1) Las conexiones de cables eléctricos y la protección **deben** cumplir lo establecido en el Código Eléctrico Nacional así como los demás requisitos eléctricos pertinentes locales y estatales

(2) Instale una válvula de retención de paso completo adecuada y una llave de paso adecuada

(3) Instale los controles adecuados. (Los paneles para exteriores **requieren** de un armazón NEMA 3R o 4X)

(4) Todas las instalaciones **requieren** de una cubierta para el contenedor a fin de evitar que los desechos caigan dentro del contenedor y para prevenir lesiones por accidentes.

(5) **Se requieren** sellos estancos al gas en todas las instalaciones de aguas negras en interiores que retengan los gases y olores

(6) **Cuando la válvula de retención esté instalada**, perfore un agujero de 4 mm (3/16 pulg.) en el tubo de descarga, debajo de la válvula de retención alineada con la parte superior de la bomba. NOTA: El agujero deberá estar debajo de la cubierta del contenedor y limpiarse periódicamente. Durante los periodos de funcionamiento de la bomba se verá un chorro de agua que sale del respiradero. Perfore también un respiradero en la caja de la bomba. Asegúrese de que el respiradero no esté bloqueado durante el mantenimiento.

(7) La ventilación de gases y olores que salgan por el tubo de ventilación y se liberen hacia la atmósfera deberá cumplir con los código locales y estatales.

(8) Asegure el cable de alimentación para evitar que se enrede con el mecanismo del interruptor de flotador de nivel variable.

(9) **No reduzca** el tubo de descarga de la bomba a una medida inferior a IPS de 76 mm (3 pulg.).

(10) El depósito **debe** cumplir con todos los códigos y especificaciones aplicables. El depósito debe tener una medida que permita un intervalo mínimo de 3 minutos entre arranques.

(11) La bomba debe estar nivelada y los interruptores de flotador de nivel variable anclados deben estar libres y no colgar sobre la bomba o el pozo.

12) **Si** se utiliza un sistema de rieles, el codo de descarga **debe** estar firmemente anclado a la parte inferior del depósito. En el caso de depósitos de fibra de vidrio, la parte inferior deberá reforzarse si emplea un codo de descarga.

(13) **Si** se utiliza un sistema de rieles, los rieles guía son cédula 40 de DN50 (2 pulg.) para unidades de descarga horizontal con brida. Se recomienda latón, acero inoxidable o acero galvanizado.

(14) Instale un anillo con cable para izar la bomba y sacarla del foso.

(15) El contenedor deberá estar limpio y libre de desechos después de la instalación

(16) Los cables deben estar sellados adecuadamente para evitar que la humedad y los gases entren en el panel de control.

Instrucciones de cableado

ADVERTENCIA La instalación y revisión de los circuitos eléctricos y el hardware deberá hacerla un electricista debidamente calificado y certificado

ADVERTENCIA **Riesgo de descarga eléctrica.** No quite el cable de alimentación eléctrica ni el dispositivo de alivio de tensión y no conecte un conductor directamente a la bomba.

PRECAUCIÓN Los cables de alimentación y del sensor, así como todos los cables del flotador deben estar sellados para evitar que los gases del depósito entren al panel de control.

INSTRUCCIONES PARA REVISAR LA ROTACIÓN DE LAS UNIDADES TRIFÁSICAS

Es muy importante que estas unidades estén conectadas de modo que la rotación sea la adecuada. Dado que no es posible ver las partes giratorias sin sacar la bomba del foso, deberá revisarse la rotación de las unidades trifásicas antes de instalar la bomba en el foso y de acuerdo con lo siguiente:

Después de que se hagan las conexiones eléctricas adecuadas, energice momentáneamente la bomba y observe la dirección del retroceso que se deriva del par de torsión. La rotación será la correcta si el retroceso va en sentido opuesto a la flecha de rotación. Si la rotación no es la correcta, desconecte la energía y cambie dos de los conectores de alimentación. Vuelva a encender la energía y haga nuevamente la prueba de rotación.

BOMBAS DE DOBLE SELLO

(1) Las bombas de doble sello ofrecen protección de movimiento adicional ante el daño causado por la falla de un sello.
(2) Las bombas deben ser inspeccionadas en un programa de mantenimiento preventivo periódico.
(3) Se debe comprobar el aceite en la carcasa del motor y en la cavidad sellada inferior cuando se repare la bomba. Si el aceite de la carcasa del motor contiene agua u otro contaminante, ambos sellos deben reemplazarse durante el mantenimiento. Siempre reemplace con nuevas piezas de servicio y aceite recomendados de fábrica. Todas las reparaciones en garantía deben ser realizadas por Centros de servicio autorizados Zoeller.

PANELES DE CONTROL

Estas bombas son no automáticas. Requieren un panel de control. Tanto el circuito de arranque del motor, como el circuito de control y el circuito de alarma dentro del panel son características estándar. Generalmente se requieren clasificaciones de cajas para exteriores y relés alternativos. Los interruptores de flotador de nivel variable son el dispositivo más común para medir niveles. Tome nota de lo siguiente:

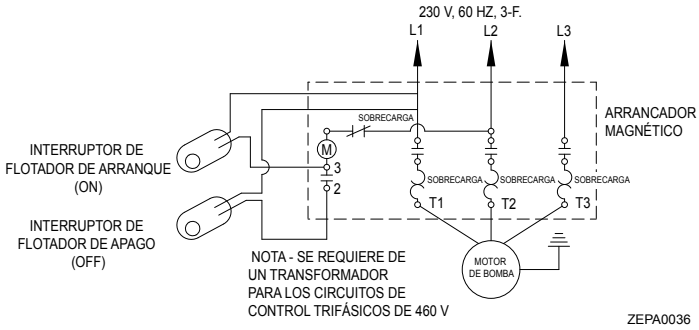
(1) Las unidades monofásicas tienen condensadores y reguladores de arranque montados en el exterior. El panel de control deberá permitir el montaje de estos componentes del arranque.
(2) Todas las bombas requieren de protección contra sobrecargas en el panel. Use un control para el motor aprobado que corresponda a la carga completa del amperaje de entrada del motor con el/los elemento(s) de sobrecarga seleccionado(s) según las instrucciones del control.
(3) Las bombas para ambientes peligrosas requieren paneles que ofrezcan reguladores de seguridad intrínseca y deberán cumplirse todos los demás requerimientos de la NEC (consulte los artículos 500, 501 y 502 y los demás que correspondan).

Instalación trifásica

Las bombas trifásicas no son automáticas. Para su operación automática se requiere de un panel de control. Siga las instrucciones del panel para cablear el sistema.

Antes de instalar una bomba, revise la rotación de la bomba para asegurarse de que el cableado se haya conectado adecuadamente a la fuente de poder y que el conector verde del cable de alimentación (consulte el diagrama de cableado) esté conectado a una tierra válida. Energice la bomba momentáneamente y observe la dirección del retroceso que se deriva del par de arranque. La rotación será la correcta si el retroceso va en sentido opuesto a la flecha de rotación de la carcasa de la bomba. Si la rotación no es la correcta, cambie dos de los conectores de alimentación (excepto la tierra). Esto debería corregir la rotación.

DIAGRAMA DE CABLEADO TÍPICO



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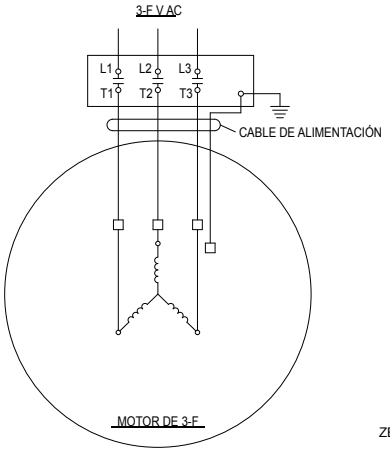
El diagrama de cableado de arriba muestra una conexión típica de una bomba trifásica de 230 V, dos interruptores de flotador de nivel variable y un arrancador magnético. No se pretende que este diagrama cubra todas las aplicaciones. Vea el diagrama de cableado suministrado con los controladores eléctricos y paneles específicos.

DIAGRAMA TÍPICO DE UN CABLEADO TRIFÁSICO



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TAMAÑO DEL CABLE DE ALIMENTACIÓN "SERIE 600" DE CUATRO CONDUCTORES AWG.

MODELO	BHP	230 / 1-F	200 / 3-F	230 / 3-F	460 / 3-F	575 / 3-F
611	1	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
621	1.5	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
631	2	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
641	3	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
651	5	8 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
661	7.5	N/A	8 AWG.	8 AWG.	12 AWG.	12 AWG.

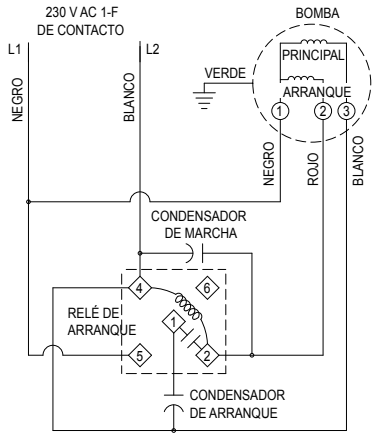
Diámetro aproximado del cable por calibre	
12/4 AWG.	.64 pulg.
8/4 AWG.	.93 pulg.

Instalación monofásica

Todos los modelos monofásicos requieren de un circuito con condensador de arranque, condensador de marcha y regulador para poder arrancar y funcionar debidamente. Estos componentes se pueden comprar por separado o precablearse en el panel de control de Zoeller Pump Company. Para componentes comprados por separado use el diagrama de instalación y conexión. Los modelos monofásicos no son automáticos. Para operar automáticamente, debe agregarse un panel de control al circuito de poder. Siga las instrucciones del panel.

DIAGRAMA DE CABLEADO

MODELOS 611 / 621 CON RELÉ SUPCO PR90 ANTES DEL 10/1/07



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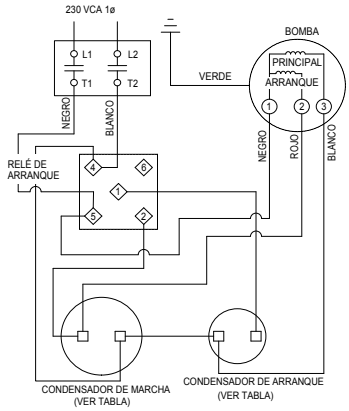
ESQUEMA DE COMPONENTES



MODELOS	CONDENSADOR DE ARRANQUE	CONDENSADOR DE MARCHA
6120/6121	324-389UF 125 V	40UF 370 V

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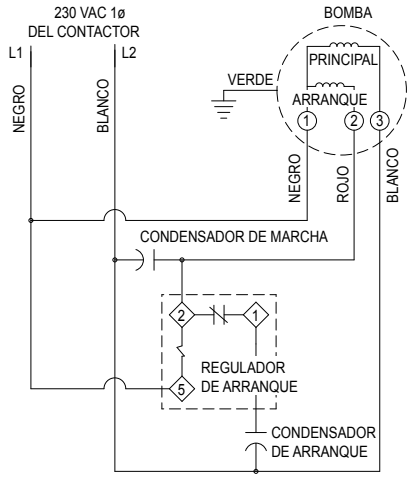
DIAGRAMA DE CABLEADO

MODELOS 631 / 641 / 651 Y 611 / 621 CON RELÉ GE DESPUÉS DEL 10/1/07



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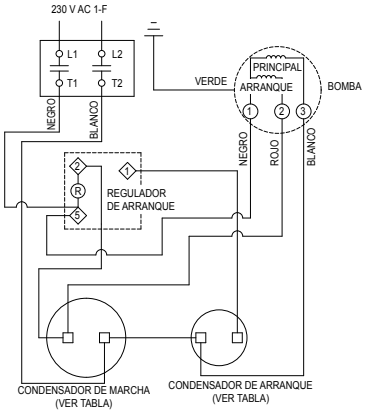
ESQUEMA DE COMPONENTES



MODELOS	CONDENSADOR DE ARRANQUE	CONDENSADOR DE MARCHA
6120/6121	216-259 UF 250 V	40 UF 370 V
6111/6122/6123/6124	270-324 UF 250 V	50 UF 370 V

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Funcionamiento

GENERAL

Las bombas de Zoeller Pump Company se lubrican y prueban en la fábrica antes de embarcarse y requieren de un mantenimiento mínimo antes de su arranque.

La temperatura continua máxima de operación del líquido bombeado de los modelos estándar de bomba no debe sobrepasar los 40 °C (140 °F). Para una duración más prolongada, todas las bombas deben estar completamente sumergidas en los ciclos de bombeo extensos y tener un tiempo de funcionamiento máximo de 1/2 hora por cada hora.

Estas unidades no están diseñadas para manejar líquidos que no sean agua o aguas negras. Si la bomba se usa para aguas contaminadas con materiales pesados, viscosos o abrasivos, la garantía quedará invalidada.

DATOS DE LA PLACA DE CARACTERÍSTICAS

La placa de características, ubicada en la parte superior de la bomba, proporciona información específica acerca de la construcción de la bomba. Deberán anotarse el número de modelo, el código de fecha y el número de serie en la carátula que está en la sección “Datos del propietario” de este manual.

ALMACENAMIENTO POR PERIODOS BREVES

Si es necesario almacenar la bomba, siga estas recomendaciones:

- Guarde la bomba bajo techo siempre que sea posible o colóquele algún tipo de cubierta protectora.
- Cubra con cinta o selle con una bolsa de plástico los extremos de las terminales de alambre
- Rocíe una capa de aceite anticorrosivo a las superficies que no estén pintadas
- El impulsor debe girarse cada seis meses para mantener los sellos lubricados y evitar que se queden pegados

Si se va a almacenar el panel, se recomienda lo siguiente:

- Guarde el panel bajo techo siempre que sea posible y colóquelo en su empaque original
- Selle todas las aberturas
- Colóquelo en posición vertical
- No coloque nada encima del panel

PROCEDIMIENTO DE ARRANQUE

Revise lo siguiente antes de poner a funcionar el equipo:

- Rotación correcta de la bomba (sólo unidades trifásicas.)
- Limpieza del foso
- Panel seco y debidamente instalado
- Flotadores colocados correctamente.
- Válvulas de descarga abiertas
- Respiradero de 4 mm (3/16 pulg.) perforado en el tubo entre la válvula de retención y la bomba

(Continuación en la próxima página)

Funcionamiento *(continuada)*

Una vez que todo lo anterior se haya verificado, revise lo siguiente:

- Cables de alimentación de la bomba debidamente conectados al panel
- Cables flotadores conectados adecuadamente al panel.
- Conexiones entre el conduit y el panel debidamente selladas
- Panel ajustado para la sobrecarga térmica
- Después de instalar la bomba en el área de contención y cuidando que la inmersión sea la adecuada, abra completamente la válvula de descarga. Encienda la unidad con los controles manuales. Si el flujo es notablemente inferior al rendimiento nominal, es posible que haya aire atrapado dentro de la bomba.
- Pídale a un electricista calificado que mida el voltaje y la corriente del cable negro del equipo monofásico o de los tres cables de corriente del equipo trifásico mientras la bomba esté en funcionamiento. Anote las lecturas en el espacio correspondiente en la sección "**Datos del propietario**" de la página 1 de este manual, para futuras referencias.

Una vez terminada la prueba preliminar, el sistema estará listo para ponerse en marcha. Zoeller Pump Company requiere que se llene un Reporte de arranque (ZM1074S) siempre que un sistema se ponga en funcionamiento por primera vez o después de que un sistema haya tenido un cambio importante (es decir, un reemplazo de la bomba, un reacondicionamiento, etc.). Es necesario conservar una copia del Reporte de arranque en el lugar donde esté instalado el equipo, para referencias futuras.

PROCEDIMIENTO DE AJUSTE

Bombas: Lo único que hace falta es verificar que la rotación esté correcta.

Paneles: La sobrecarga térmica del panel debe estar configurada según el amperaje a plena carga (FLA, por sus siglas en inglés) que se indica en la placa de características de la bomba (o consulte la ficha técnica de la bomba).

Flotadores: Consulte el diagrama del sistema para conocer la ubicación deseada de cada una de las funciones del flotador.

Válvulas: Las válvulas de descarga deberán colocarse en la posición totalmente abierta. Los sistemas no deberán operarse durante periodos de tiempo prolongados con las válvulas de descarga parcialmente cerradas debido a que esto podría dañarlas.

PROCEDIMIENTOS DE APAGADO

Si planea dejar apagado un sistema durante más de seis meses, siga estas recomendaciones:

Bombas: Si el pozo va a permanecer seco, la bomba se puede quedar en él. Si la bomba se queda en el pozo, habrá que ponerla a funcionar por cinco minutos una vez cada tres meses. Si el pozo va a permanecer húmedo, se debería quitar la bomba y guardarla como se indicó anteriormente.

Paneles: El panel debería tener todas las aberturas selladas para evitar la entrada de humedad y polvo a la caja. Para restablecer el sistema se debería inspeccionar primero la presencia de humedad en el panel y buscar conexiones sueltas.

Válvulas: Consulte con el suministrador de la válvula/accionador la información concerniente a estos componentes del sistema.

Mantenimiento

⚠ AVISO Las reparaciones y el mantenimiento deben ser realizados únicamente por un Centro de servicio autorizado de Zoeller Pump Company.

PROCEDIMIENTOS DE SEGURIDAD

⚠ ADVERTENCIA Por protección, siempre desconecte la bomba y el panel de la fuente de poder antes de manipular el equipo.

⚠ ADVERTENCIA Nunca entre en el depósito hasta que haya sido debidamente ventilado y probado. Todas las personas que entren en el depósito deberán llevar puesto un arnés con una cuerda de seguridad que llegue hasta la superficie para poder sacarlas en caso de asfixia. Las aguas negras despiden gas metano y sulfuro de hidrógeno que pueden ser altamente tóxicos.

La instalación y revisión de los circuitos eléctricos y el hardware deberá hacerla un electricista debidamente calificado.

Nunca levante la bomba jalándola del cable de alimentación.

⚠ ADVERTENCIA Antes de reparar, se deben vaciar y desinfectar el interior y el exterior de la unidad.

INSPECCIÓN GENERAL DEL SISTEMA

Antes de poner en marcha el sistema, un técnico calificado deberá hacer un Reporte de arranque.

⚠ ADVERTENCIA El cableado y la tierra deberán apegarse al código eléctrico nacional y a todos los códigos y reglamentos locales aplicables.

PROCEDIMIENTO DE LUBRICACIÓN

No es necesario lubricar el equipo.

Si la bomba se va a guardar durante más de seis meses, consulte el procedimiento de almacenamiento por periodos breves que se describe en la sección sobre el funcionamiento del equipo.

MANTENIMIENTO PREVENTIVO

Se recomienda hacer mantenimiento preventivo para prolongar la vida útil del equipo. A continuación se presenta un calendario de mantenimiento sugerido

Cada mes:

- Revise que los flotadores funcionen bien y que no tengan obstrucciones.
- Haga una prueba auditiva para verificar el funcionamiento de las válvulas de retención.
- Unidades dúplex - Revise que los tiempos de operación sean uniformes. Si son desiguales, es señal de una falla en la unidad, el interruptor de flotador o el control.
- Revise el panel para verificar que no haya humedad en la caja ni conexiones sueltas y para inspeccionar la condición general de los componentes. Revise la ubicación y el estado de los interruptores de flotador

Cada año:

- Además de hacer las revisiones mensuales, revise y limpie el depósito. Reemplace todos los componentes defectuosos. Retire la arena, los desechos o el lodo que encuentre en el depósito de la bomba.

Cada dos años:

- Revise el aceite aislante en las cámaras de motor y de sello. Inspeccione si el aceite contiene contaminantes de la siguiente manera:
- Aceite transparente, sin olor a quemado - el aceite, el motor y los sellos están en condiciones satisfactorias
- Aceite oscuro, olor a quemado - el motor de la bomba se ha sobrecalentado. Verifique la conexión de la resistencia del devanado del motor a tierra. Se requieren lecturas de 1 megaohmio o más. Si se presentan lecturas más bajas, lleve la unidad a un Centro de servicio autorizado Zoeller para su reparación.
- Aceite emulsionado y turbio - las juntas han fallado. La unidad debe ser llevada a un centro de servicio autorizado para su reparación.
- Deseche el aceite aislante del motor correctamente si es necesario cambiarlo.
- Inspeccione los cables de alimentación por si presentan daños o desgaste. Reemplace de inmediato si se detectan daños o desgaste.
- Revise el impulsor para verificar que no esté dañado ni desgastado. Cámbielo según se lo indique una estación de servicio autorizada por Zoeller.

BOMBAS DE DOBLE SELLO

- Las bombas de doble sello ofrecen protección adicional ante el daño causado por la falla de un sello.
- Se debe comprobar el aceite en la carcasa del motor y en la cavidad sellada inferior cuando se repare la bomba. Si el aceite de la carcasa del motor contiene agua u otro contaminante, ambos sellos deben reemplazarse durante el mantenimiento. Siempre reemplace con nuevas piezas de servicio y aceite recomendados de fábrica. Todas las reparaciones deben ser realizadas por Centros de servicio autorizados Zoeller.

Lista de control de servicio y solución de problemas

ADVERTENCIA **PRECAUCIONES ELÉCTRICAS** Antes de darle mantenimiento a la bomba, siempre apague el interruptor de energía principal del panel y luego deconecte la bomba. Usted calzado con suela protectora aislante y asegúrese de no estar pisando agua. En caso de inundación, comuníquese con la compañía eléctrica local o con un electricista debidamente calificado y autorizado para desconectar el suministro eléctrico antes de sacar la bomba.

ADVERTENCIA Las bombas sumergibles llevan aceite que se presuriza y se calienta en condiciones de operación. **Antes de proceder con el mantenimiento, permita que pasen 2-1/2 horas después de desconectar.**

PROBLEMA

A. La bomba no enciende o no funciona.

Pasos	Revise el voltaje de	Si no hay voltaje	Si hay voltaje
N° 1	Las terminales de línea del panel de control de la bomba L1 - L2 - L3 (trifásico)	Revise el imterruptor de la desconexión, el fusible de la línea y/o los disyuntores del circuito de suministro de poder.	Continúe con el paso 2
N° 2	Las terminales del motor de la bomba del panel de control de la bomba T1 - T2 - T3	Revise el voltaje del ciruito de control. Revise los contactos del arrancador magnético, la sobrecarga térmica y los interruptores de flotador.	Revise el regulador de arranque y el condensador (unidades monofásicas). Revise la tierra de la bomba y que el impulsor no esté pegado.

CAUSAS COMUNES

B. El motor se sobrecalienta y activa el control de sobrecarga o quema el fusible

- Voltaje incorecto
- Fuente de poder desbalanceada
- Rotación incorrecta del motor
- Carga baja o nagativa
- Temperatura del agua demasiado alta
- El impulsor o el sello están pegados mecánicamente
- Hay un defecto en el condensador o el regulador
- Hay un cortocircuito en el motor
- Se perdió una línea en la unidad trifásica

C. La bomba arranca y se detiene con demasiada frecuencia.

- La válvula de retención se quedó pegada en la posición abierta
- Los controles de nivel están desajustados
- Se activa el sensor de temperatura
- El interruptor de sobrecarga térmica está desajustado o defectuoso
- El foso es demasiado pequeño

D. La bomba no se apaga.

- Hay basura debajo del interruptor de flotador
- Hay una obstrucción en el desplazamiento del flotador
- El interruptor de flotador está dañado o defectuoso
- Los contactos del arrancador magnético hicieron corto
- Aire atrapado - revise el respiradero

E. La bomba funciona pero procesa muy poca agua o nada.

- Revise que no haya obstrucciones en la carcasa de la bomba ni en el tubo de descarga y que la válvula de retención no esté pegada
- El respiradero está tapado o no se ha perforado
- La descarga sobrepasa la capacidad de la bomba
- El voltaje es muy bajo o incorrecto
- Rotación incorrecta del motor
- El condensador está defectuoso

F. Después de un periodo de uso se reducen la carga y/o la capacidad.

- Hay un aumento en la fricción de la tubería
- Hay una obstrucción en la línea o la válvula de retención
- Los materiales abrasivos y químicos deterioraron el impulsor y la carcasa de la bomba

Si esta lista no le ayuda a identificar el problema, consulte al fabricante - No intente reparar ni desarmar la bomba.

Esta es una traducción de las instrucciones de instalación originales.

Avis à l'installateur - Les instructions doivent rester avec l'installation.
Votre tranquillité d'esprit est notre priorité absolue™

FM1798
0517
Remplace
Nouveau

Les renseignements présentés dans ce document représentent les conditions au moment de la publication. Consulter l'usine en cas de désaccord et de manque de cohérence.

Enregistrez votre produit Zoeller Pump Company en ligne: http://reg.zoellerpumps.com/

ADRESSE POSTALE : *P.O. BOX 16437 • Louisville, KY 40256-0347 USA*
ADRESSE PHYSIQUE : *3649 Cane Run Road • Louisville, KY 40211-1961 USA*
TÉL : *+1 (502) 778-2731 •* ***FAX :*** *+1 (502) 774-3624*

Visitez notre site internet : www.zoeller.com

MODE D'EMPLOI

UNITÉS SUBMERSIBLES ANTIBLOCAGE SÉRIE 600

Félicitations pour l'achat d'une pompe submersible Zoeller Pump Company de la série 600. Depuis plus de soixante-dix ans, la marque Zoeller représente la norme pour les pompes pour assèchement et eaux usées submersibles. Cette gamme de pompes submersibles robustes pour eaux usées et matières solides possède une finition de grande qualité et est facile à entretenir. La pompe Zoeller Pump Company va vous offrir des années de tranquillité si vous suivez les recommandations fournies par le fabricant pour l'installation.

Ce manuel est un document complet avec les instructions pour l'installation, le fonctionnement, la maintenance pour assister le propriétaire d'un produit d'eaux usées submersible et antiblocage Zoeller Pump Company. Veuillez lire ce manuel avant d'installer le produit. Suivez les étapes et les procédures indiquées dans FM0990_Fa pour un bon démarrage. De nombreux éléments ci-inclus, lorsqu'ils sont suivis correctement, ne vont pas seulement assurer une longue vie sans souci à la pompe mais aussi réaliser des économies de temps et d'argent au moment de l'installation. Consultez le FM1799 pour le manuel de réparation sur les pompes de la série 600. Si vous avez besoin d'assistance, veuillez appeler notre service technique au 1-800-928-PUMP (7867) ou au +1-502-778-2731.

Tables des matières

Renseignements concernant le propriétaire

Numéro de modèle : _____ **Code de date :** _____

Serial Number : Bomba 1_____ **Bomba 2**_____

☐ **Simplex** ☐ **N° de panneau** _____

☐ **Duplex** ☐ **N° du système de rail** _____

Nom du site : _____

Distributeur : _____

Numéro du bon de commande : _____

Installateur : _____

Date d'installation : _____

Données du système pendant le démarrage : **Voltage** _____ **Ampères** _____

Instructions de sécurité

POUR ÉVITER TOUTE BLESSURE SÉRIEUSE OU FATALE OU DOMMAGE MATÉRIEL IMPORTANT, VEUILLEZ LIRE ET RESPECTER TOUTES LES CONSIGNES DE SÉCURITÉ CONTENUES DANS CE MANUEL ET SUR LA POMPE.

CE MANUEL A ÉTÉ CONÇU POUR AIDER À L'INSTALLATION ET AU FONCTIONNEMENT DE CETTE UNITÉ ET DOIT ÊTRE CONSERVÉ AVEC LA POMPE.

Voici un **SYMBOLE D'AVERTISSEMENT**.
Lorsque vous voyez ce symbole sur la pompe ou dans le manuel, repérez les mots indiquant un danger et faites attention au risque de blessure corporelle ou de dommage matériel.

⚠ DANGER Ces mots avertissent des dangers qui **CAUSENT** des blessures corporelles graves, la mort ou des dommages matériels importants.

⚠ AVERTISSEMENT Il avertit des dangers qui **PEUVENT** causer des blessures corporelles graves, la mort ou des dommages matériels importants.

⚠ MISE EN GARDE Il avertit des dangers qui **PEUVENT** causer des blessures corporelles ou des dommages matériels.

⚠ AVIS IL AVERTIT DES CONSIGNES SPÉCIALES QUI SONT TRÈS IMPORTANTES ET QUI DOIVENT ÊTRE RESPECTÉES.

LIRE MINUTIEUSEMENT TOUS LES AVERTISSEMENTS ET CONSIGNES AVANT D'EFFECTUER DES TRAVAUX SUR CETTE POMPE.

CONSERVER TOUS LES AUTOCOLLANTS DE SÉCURITÉ.

SE RÉFÉRER À LA GARANTIE EN PAGE 18.

Garantie limitée

Le fabricant garantit à l'acheteur et au propriétaire ultérieur pendant la période de garantie, tout produit neuf contre tout vice de matériel et de main-d'œuvre, en utilisation normale et quand utilisé et entretenu correctement, pendant une période d'un an à compter de la date de l'achat par l'utilisateur final ou 18 mois à compter de la date de fabrication initiale, la première des deux périodes prévalant. Les pièces devenant défectueuses pendant la période de garantie, dans une période d'un an à compter de la date de l'achat par l'utilisateur final ou 18 mois à compter de la date de fabrication initiale du produit, la première des deux périodes prévalant, et que des inspections prouvent contenir des vices de fabrication ou de main-d'œuvre, seront réparées, remplacées ou rénovées au choix du Fabricant, à condition qu'en faisant cela nous ne soyons pas obligés de remplacer l'ensemble, le mécanisme complet ou l'appareil complet. Aucune provision n'est faite pour les frais d'expédition, les dégâts, la main-d'œuvre ni d'autres frais causés par la défaillance, la réparation ou le remplacement du produit.

Cette garantie ne s'applique pas et ne couvre aucun matériel ou produit qui a été démonté sans l'autorisation préalable du Fabricant, soumis à un usage abusif, des applications incorrectes, de la négligence, des modifications, des accidents ou un cas de force majeure ; qui n'a pas été installé, utilisé ou entretenu selon les instructions d'installation du Fabricant; qui a été exposé, y compris, mais non de façon limitative, à du sable, des gravillons, du ciment, de la boue, du goudron, des hydrocarbures ou des dérivés d'hydrocarbures (huile, essence, solvants, etc.) ou à d'autres produits abrasifs ou corrosifs, serviettes ou produits d'hygiène féminine etc., dans toutes les applications de pompage. La garantie mentionnée ci-dessus remplace toutes les autres garanties expresses ou implicites et nous n'autorisons aucun représentant ou autre personne à accepter la responsabilité en notre nom pour nos produits.

Prendre contact avec le Fabricant, 3649 Cane Run Road, Louisville, KY 40211, Attention: Customer Support, pour obtenir des réparations, des pièces de remplacement ou des renseignements supplémentaires concernant la garantie.

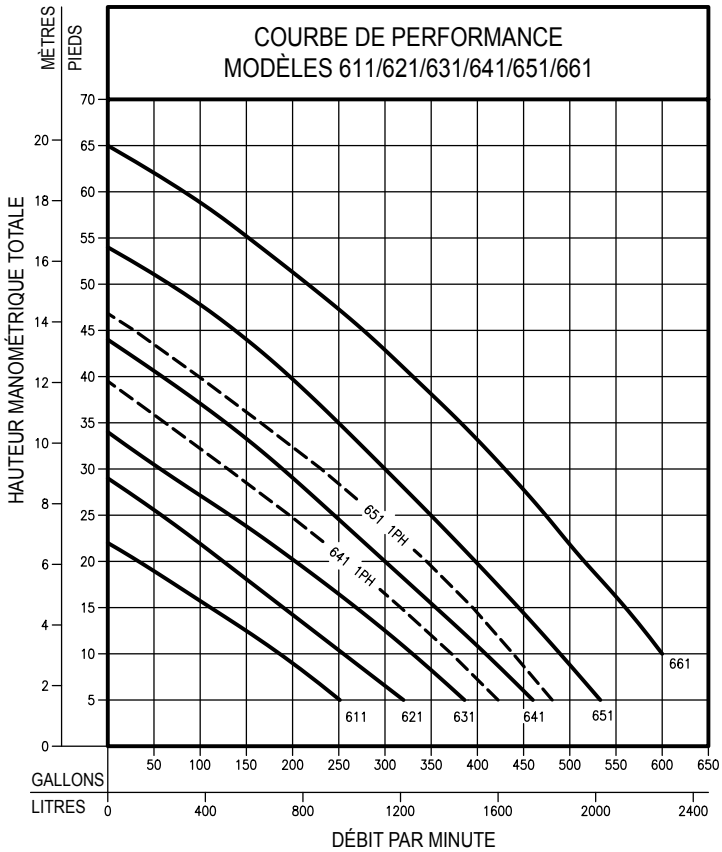
LE FABRICANT REFUSE EXPRESSÉMENT TOUTE RESPONSABILITÉ POUR LES DÉGÂTS SPÉCIAUX, INDIRECTS OU SECONDAIRES OU POUR LES RUPTURES DE GARANTIE EXPRESSES OU IMPLICITES; ET TOUTE GARANTIE IMPLICITE D'APPLICABILITÉ À UNE UTILISATION SPÉCIFIQUE OU DE COMMERCIALITÉ EST LIMITÉE À LA DURÉE DE LA GARANTIE EXPRESSE.

Certaines provinces ne permettent pas les limitations de la durée de la garantie implicite et il est possible que cette limitation ne s'applique pas. Certaines provinces ne permettent pas l'exclusion ou la limitation des dégâts secondaires ou indirects, et il est possible que cette limitation ou exclusion ne s'applique pas.

Cette garantie vous donne des droits spécifiques reconnus par la loi et vous pouvez également avoir d'autres droits qui varient d'une province à l'autre.

Toute installation d'une pompe de la série 600 de Zoeller doit être accompagnée d'un rapport de mise en marche Zoeller Pump Company (FM0990) complété. Ce rapport doit être rempli par un technicien de mise en marche autorisé en présence du contracteur d'installation. Une copie de ce rapport sera conservée aux bureaux de Zoeller Pump Company à Louisville, KY. **Le non-respect des conditions annulera l'accord de garantie.**

Données sur le rendement



HAUTEUR MANOMÉTRIQUE TOTALE
DÉBIT PAR MINUTE
EAUX USÉES ET ASSÈCHEMENT

MODÈLE		611		621		631		641 (1 PH)	
Pieds	Mètres	Gallons	Litres	Gallons	Litres	Gallons	Litres	Gallons	Litres
5	1,5	250	946	320	1 211	390	1 476	420	1 590
10	3,0	185	700	255	965	335	1 268	370	1 401
15	4,6	110	416	190	719	272	1 030	319	1 208
20	6,1	36	132	125	473	200	757	260	984
25	7,6	--	--	60	227	130	492	198	750
30	9,1	--	--	--	--	55	208	130	492
35	10,7	--	--	--	--	--	--	62	235
40	12,2	--	--	--	--	--	--	--	--
45	13,7	--	--	--	--	--	--	--	--
50	15,2	--	--	--	--	--	--	--	--
55	16,7	--	--	--	--	--	--	--	--
60	18,2	--	--	--	--	--	--	--	--
Robinet d'arrêt :		6,7 m (22 pieds)		8,8 m (29 pieds)		10,4 m (34 pieds)		12 m (39,5 pieds)	

MODÈLE		641		651 (1 PH)		651		661	
Pieds	Mètres	Gallons	Litres	Gallons	Litres	Gallons	Litres	Gallons	Litres
5	1,5	460	1 741	475	1 798	533	2 018	--	--
10	3,0	410	1 552	440	1 666	490	1 855	600	2 271
15	4,6	355	1 344	395	1 495	445	1 685	560	2 119
20	6,1	300	1 236	345	1 306	398	1 507	515	1 949
25	7,6	245	927	290	1 098	350	1 325	475	1 798
30	9,1	190	719	232	878	300	1 136	430	1 627
35	10,7	130	492	165	625	250	946	380	1 438
40	12,2	60	227	95	360	198	738	330	1 249
45	13,7	--	--	25	95	140	530	275	1 041
50	15,2	--	--	--	--	70	265	215	814
55	16,7	--	--	--	--	--	--	150	568
60	18,2	--	--	--	--	--	--	85	303
Robinet d'arrêt :		13,4 m (44 pieds)		14,2 m (46,5 pieds)		16,5 m (54 pieds)		19,8 m (65 pieds)	

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Information avant l'installation

1. **Inspecter la pompe.** De temps en temps, la pompe est endommagée en cours d'expédition. Si la pompe est endommagée, contacter le distributeur avant de l'utiliser. **NE PAS** enlever les bouchons test du la pompe.
2. **Il faut lire attentivement tous les documents** fournis pour se familiariser avec les détails spécifiques de l'installation et de l'utilisation. Il faut conserver ces documents pour pouvoir les consulter ultérieurement.

⚠ AVERTISSEMENT **VOIR PLUS BAS POUR LA LISTE DES AVERTISSEMENTS**

1. Ne pas soulever, ni porter, ni suspendre la pompe par les câbles électriques. Il existe un risque d'électrocution, de brûlure ou de mort si les câbles électriques sont endommagés.
2. **Assurez-vous de la présence d'une prise correctement mise à la terre.** Les pompes disposent d'une mise à la terre pour aider à protéger des risques de décharges électriques.
3. I faut vérifier que la prise est à portée du cordon d'alimentation de la pompe. **NE PAS UTILISER DE RALLONGE.** Les rallonges trop longues ou de trop faible capacité ne fournissent pas la tension nécessaire au moteur de la pompe, et elles peuvent être dangereuses si l'isolant est endommagé ou si l'extrémité avec le branchement tombe dans un endroit humide ou mouillé.
4. **Assurez-vous que le circuit d'alimentation électrique de la pompe est équipé de fusibles et de raccords ou de disjoncteurs de la bonne puissance.** Il est recommandé d'installer un circuit indépendant de capacité suffisante, conforme aux codes électriques nationaux pour la capacité indiquée sur la plaque d'identification de la pompe.
5. Lors de l'installation initiale, il est nécessaire de vérifier que l'approvisionnement en air adapté est disponible lorsqu'une personne se trouve dans la cuve. Toujours respecter les normes de l'OSHA concernant les exigences relatives aux espaces confinés.
6. Risque d'électrocution. L'usage de ce type de pompe dans une piscine de natation n'a pas été étudié.

⚠ MISE EN GARDE **VOIR PLUS BAS POUR LA LISTE DES MISES EN GARDE**

1. Vérifier que le circuit d'alimentation a une capacité suffisante pour alimenter le moteur, comme indiqué sur la pompe ou sur la plaque d'identification de l'appareil.
2. L'installation de pompes utilisant des interrupteurs auxiliaires à flotteur à niveau variable est de la responsabilité de l'installateur qui doit s'assurer que l'interrupteur à flotteur ancré ne s'accroche pas au dispositif de la pompe ni aux aspérités de la fosse et qu'il est sécurisé afin que la pompe puisse s'éteindre. Il est recommandé d'utiliser des tuyaux et des raccords rigides et que la fosse ait un diamètre de 46 cm (36 po) ou plus.
3. **Trou d'event.** Il est nécessaire que toutes les pompes submersibles capables de traiter les différentes tailles de solides possèdent une entrée inférieure pour réduire les obstructions et les défaillances de joint. Si l'installation comprend un clapet de sécurité, il faut percer un trou d'évent d'environ 5 mm (3/16 po) dans le tuyau de refoulement au-dessous du clapet de sécurité et le couvercle pour purger l'air de l'appareil. Un jet d'eau sera visible de cette orifice durant les périodes de fonctionnement de la pompe. Le trou doit aussi être au-dessous du couvercle du puits et il faut le nettoyer régulièrement. Les bulles d'air proviennent de l'agitation et/ou d'une cuve asséchée.
4. Les coups de bélier créent des surcharges momentanées de haute pression. Ces surcharges peuvent gravement endommager les clapets antiretour et le système de tuyauterie. Il faut prendre en compte les risques de coups de bélier lors de la conception du système de tuyauterie. Référence ASPE Data Book, chapitre 2.33. Certains systèmes peuvent nécessiter l'utilisation de clapets antiretour à ressort extérieur ou avec levier à contrepoids ou autres solutions techniques.
5. Les pompes triphasées doivent être branchées avec la rotation dans le bon sens, c'est-à-dire en tournant vers la gauche si on regarde par l'entrée de l'impulseur. Voir la page 5 pour les instructions concernant la vérification de la rotation triphasée.

REMARQUE - Les pompes avec annotations "UL" et "US" sont vérifiées d'après la norme UL778. Les pompes certifiées CSA sont vérifiées d'après la norme C22.2 no 108.

Données électriques

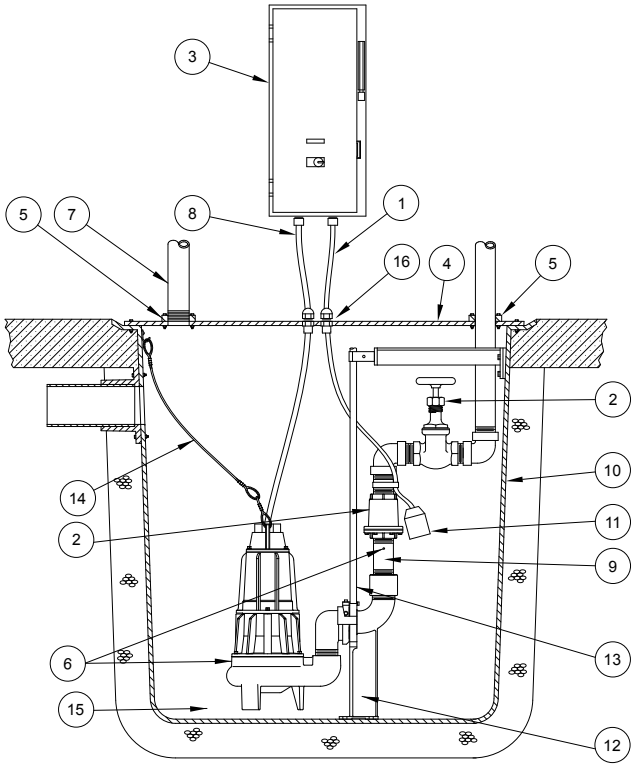
Modèle	Cheval-puissance	Facteur de surcharge	Tr/min	Voltage	Phase	Hz	Ampères				Code KVA	Résistance de bobinage tension composée
							Pleine charge	Entrée d'air	Arrêt	LRA		
E611	1	1,2	1 750	230	1	60	6,9	4,1	4,7	48,0	M	2,5 / 4,8
J611	1	1,2	1 750	200	3	60	4,8	3,3	3,7	32,0	M	2,2
F611	1	1,2	1 750	230	3	60	4,2	2,2	2,6	28,0	M	3
G611	1	1,2	1 750	460	3	60	2,1	1,1	1,3	14,0	M	12
BA611	1	1,2	1 750	575	3	60	1,7	1,0	1,1	11,5	M	18
E621	1-1/2	1,2	1 750	230	1	60	8,9	4,3	5,3	48,0	J	2,5 / 4,8
J621	1-1/2	1,2	1 750	200	3	60	5,9	3,3	3,7	32,0	J	2,2
F621	1-1/2	1,2	1 750	230	3	60	5,1	2,3	2,9	28,0	J	3
G621	1-1/2	1,2	1 750	460	3	60	2,6	1,2	1,5	14,0	J	12
BA621	1-1/2	1,2	1 750	575	3	60	2,0	1,0	1,3	11,5	J	18
E631	2	1,2	1 750	230	1	60	14,5	7,2	8,0	86,0	L	0,94 / 3,8
J631	2	1,2	1 750	200	3	60	7,8	4,5	5,0	46,0	J	1,5
F631	2	1,2	1 750	230	3	60	6,8	2,3	4,4	41,0	K	2
G631	2	1,2	1 750	460	3	60	3,4	1,2	2,2	20,5	K	8
BA631	2	1,2	1 750	575	3	60	2,7	1,4	1,8	16,2	K	12
E641	3	1,2	1 750	230	1	60	17,0	7,2	8,9	86,0	H	0,94 / 3,8
J641	3	1,2	1 750	200	3	60	11,0	4,5	5,6	46,0	F	1,5
F641	3	1,2	1 750	230	3	60	9,6	2,3	4,7	41,0	F	2
G641	3	1,2	1 750	460	3	60	4,8	1,7	2,4	20,5	F	8
BA641	3	1,2	1 750	575	3	60	3,9	1,4	2,0	16,2	F	12
E651	5	1,2	1 750	230	1	60	28,0	16,1	19,7	139,0	H	0,9 / 3,1
J651	5	1,2	1 750	200	3	60	17,5	6,1	7,6	64,0	D	1
F651	5	1,2	1 750	230	3	60	15,2	6,1	7,4	58,0	E	1,3
G651	5	1,2	1 750	460	3	60	7,6	3,1	3,7	29,0	E	5,2
BA651	5	1,2	1 750	575	3	60	6,1	1,5	3,4	23,0	E	8
J661	7-1/2	1,0	1 750	200	3	60	25,3	17,9	18,3	83,0	C	0,5
F661	7-1/2	1,0	1 750	230	3	60	22,0	15,0	15,7	72,0	C	0,7
G661	7-1/2	1,0	1 750	460	3	60	11,0	7,5	7,9	36,0	C	2,8
BA661	7-1/2	1,0	1 750	575	3	60	9,0	5,3	5,8	29,0	C	5,4

*Consulter l'usine

Installation typique d'un système de pompage des rejets et des eaux usées

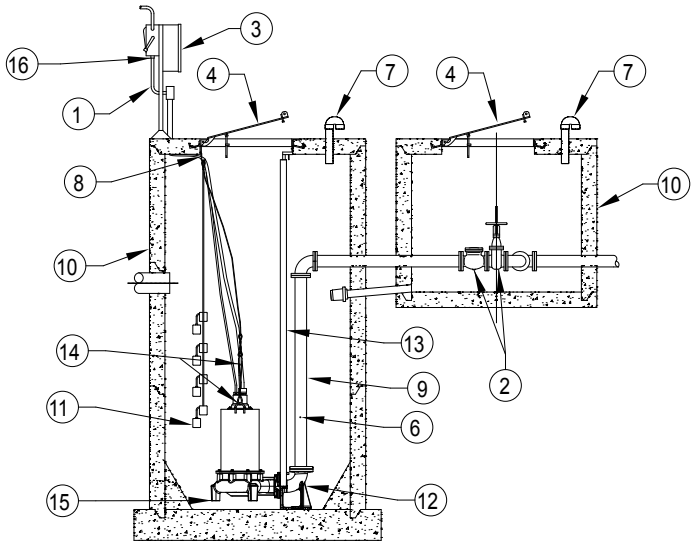
Toutes les installations doivent être conformes aux codes de la plomberie et de l'électricité y compris au code national d'électricité américain, aux codes de la plomberie locale, nationale ou de l'état, etc.

CUVE INTÉRIEURE TYPIQUE EN FIBRE DE VERRE



ZEPA0466

CUVE EXTÉRIEURE TYPIQUE EN BÉTON AVEC BOÎTE DE VANNES ET COUVERCLE À CHARNIÈRES



ZEPA0071

(1) Le câblage et la protection électrique **doivent** être conformes au code national d'électricité américain et à toutes les autres normes électriques nationales et locales.

(2) Installer un clapet antiretour plein débit et une vanne d'arrêt adéquats.

(3) Installer des commandes adéquates. (Les panneaux extérieurs **nécessitent** un boîtier NEMA 3R ou 4X).

(4) Toutes les installations exigent un couvercle de cuve pour empêcher les débris de tomber dans la cuve et pour éviter des blessures accidentelles.

(5) Des joints étanches aux gaz **sont nécessaires dans toutes les installations d'eaux usées intérieures** afin de contenir les gaz et les odeurs.

(6) **Quand un clapet antiretour est installé**, percer un trou de 5 mm (3/16 po) dans le tayau de refoulement, situé sous le clapet antiretour de nivau avec le dessus de la pompe.
REMARQUE : Le trou doit aussi être au-dessous du couvercle du puits et il faut le nettoyer régulièrement. Un flux d'eau sera visible dans ce trou lorsque la pompe fonctionnera. Le boitier de la pompe dispose d'un trou d'évent.

(7) Doit être nettoyé avant le etretien. Les gaz et les odeurs rejetés dans l'atmosphère par le tuyau d'évent d'après les codes locaux et nationaux.

(8) Sécuriser le cordon d'alimentation afin d'éviter son enchevêtrement avec le mécanisme de l'interrupteur à flotteur à niveau variable.

(9) **Ne pas** utiliser un tuyau d'évacuation de moins de 3 po IPS.

(10) La cuve **doit** être conforme aux codes et à la réglementation en vigueur. La cuve doit être dimensionnée de façon à disposer d'au moins 3 minutes entre les démarrages.

(11) La pompe doit être à niveau et l'interrupteur à flotteur à niveau variable attaché doit être libre et ne pas s'accrocher sur la pompe ou les irrégularités de la fosse.

(12) **En cas** d'utilisation de système sur rail, le coude d'évacuation **doit** être fixé au fond de la cuve. Dans une cuve en fibre de verre, il faut renforcer le fond si le coude d'évacuation est utilisé.

(13) **En cas** d'utilisation de système sur rail, les guides rails sont composés de tuyaux nomenclature 40 de DN20 (3/4 po) pour les unités d'évacuation verticales filetées et de tuyaux nomenclature 40 de DN50 (2 po) pour les unités d'évacuation horizontales à bride. Le laiton, l'acier inoxydable et l'acier galvanisé sont recommandés.

(14) Installer l'anneau et le câble pour hisser la pompe hors de la fosse.

(15) La cuve doit être propre et exempte de tout débris après l'installation.

(16) Les cordons doivent être scellés pour empêcher l'humidité et les gaz de pénétrer dans le panneau de commande.

Instructions de branchement

⚠ AVERTISSEMENT
⚠ AVERTISSEMENT
⚠ MISE EN GARDE

L'installation et la vérification des circuits et du matériel électriques doivent être effectuées par un électricien professionnel et qualifié. **Risque d'électrocution.** Il ne faut pas enlever le cordon d'alimentation et le serre-câble ni brancher directement la pompe. Les cordons d'alimentation, les cordons des capteurs et les cordons des flotteurs doivent tous être scellés afin de prévenir l'entrée des gaz de la cuve dans le panneau de commande.

INSTRUCTIONS DE VÉRIFICATION DE LA ROTATION DES UNITÉS TRIPHASÉES

Il est très important que ces unités soient correctement branchées pour une rotation adéquate. Puisqu'aucune pièce rotative n'est visible lorsque la pompe est dans la fosse, il est important de vérifier la rotation des unités triphasées avant leur installation selon les instructions ci-dessous : Lorsque les branchements électriques appropriés sont faits, mettre momentanément la pompe sous tension en observant bien le sens du contrecoup résultant du couple de démarrage. La rotation est bonne si le contrecoup est dans le sens opposé de la flèche indiquant le sens de rotation. Si la rotation est incorrecte, débrancher l'alimentation électrique et échanger deux des câbles d'alimentation. Rebrancher l'alimentation et revérifier le sens de la rotation.

POMPES À DEUX JOINTS

(1) Les pompes à deux joints offrent une protection accrue du mouvement contre les dommages causés par la défaillance d'un joint.
(2) Les pompes doivent être entretenues selon un calendrier d'entretien préventif périodique.
(3) L'huile du boîtier du moteur et la cavité inférieur du joint doivent être vérifiées lors de l'entretien de la pompe. Si l'huile du boîtier du moteur contient de l'eau ou d'autres contaminants, les deux joints doivent être remplacés lors de l'entretien. Toujours les remplacer avec l'huile et les pièces de rechange recommandés par l'usine. Toutes les réparations sous garantie doivent être effectuées par un centre d'entretien autorisé de Zoeller.

PANNEAUX DE COMMANDE

Ces pompes ne sont pas automatiques. Elles nécessitent un panneau de commande. Un panneau type comprend un circuit de démarrage du moteur, un circuit de commande et un circuit d'alarme. Des boîtiers pour l'extérieur et des relais alternatifs sont souvent requis. Les interrupteurs à flotteur à niveau variable sont les appareils de détection de niveau les plus courants. Les points suivants doivent être notés :

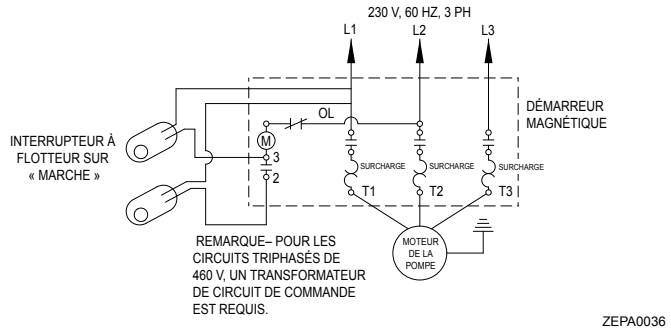
(1) Les unités monophasées ont des condensateurs et des relais de démarrage externes. Le panneau de commande doit avoir les ressources nécessaires à l'installation de ces composantes de démarrage.
(2) Toutes les pompes nécessitent une protection de surcharge dans le panneau. N'utiliser qu'avec une commande moteur équivalente à l'entrée du moteur en ampérage pleine charge incluant l'élément/les éléments de surcharge sélectionné(s) ou ajusté(s) selon les instruction de la commande.
(3) Les pompes pour emplacements dangereux nécessitent des panneaux offrant des relais à sécurité intrinsèque et toutes les autres exigences du code national d'électricité américain doivent être respectées (voir les articles 500, 501 et 502 et tout autre pouvant s'appliquer).

Installation triphasée

Les pompes triphasées ne sont pas automatiques. Un panneau de commande est requis pour permettre l'utilisation en mode automatique. Suivre les instructions fournies avec le panneau afin de câbler le système.

Avant d'installer la pompe, vérifier la rotation de la pompe pour s'assurer que tous les branchements ont été bien faits, s'assurer que le fil vert du cordon d'alimentation (voir le schéma de câblage) est bien connecté à une mise à la terre valide puis mettre momentanément la pompe sous tension en observant bien le sens du contrecoup résultant du couple de démarrage. La rotation est bonne si le contrecoup est dans le sens opposé de la flèche indiquant le sens de rotation sur le boîtier de la pompe. Si la rotation est incorrecte, l'échange de deux des câbles d'alimentation autres que la mise à la terre devrait rétablir le bon sens de rotation.

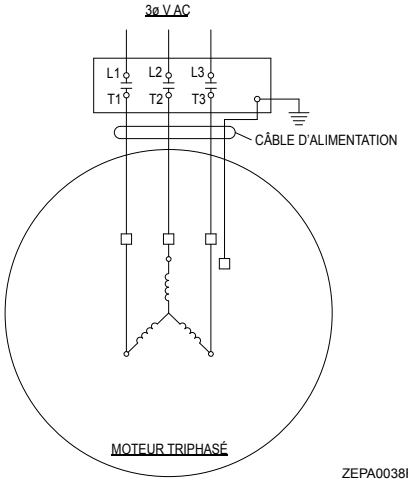
SCHÉMA DE CÂBLAGE TYPIQUE



ZEPA0036

Le schéma de câblage ci-dessus illustre un branchement courant pour une pompe triphasée de 230 V. deux interrupteurs à flotteur à niveau variable et un démarreur magnétique. Ce schéma ne concerne pas toutes les applications. Se référer au schéma de câblage fourni avec des panneaux de commande ou de contrôleurs particuliers.

SCHÉMA DE CÂBLAGE TYPIQUE D'UN SYSTÈME TRIPHASÉ



ZEPA0038F

SÉRIES 600 – QUATRE CONDUCTEURS AWG DIMENSION DU CORDON D'ALIMENTATION

MODÈLE	BHP	230 / 1 PH	200 / 3 PH	230 / 3 PH	460 / 3 PH	575 / 3 PH
611	1	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
621	1.5	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
631	2	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
641	3	12 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
651	5	8 AWG.	12 AWG.	12 AWG.	12 AWG.	12 AWG.
661	7.5	S.O.	8 AWG.	8 AWG.	12 AWG.	12 AWG.

Diamètre approximatif du cordon selon son calibre	
12/4 AWG.	0,64 po
8/4 AWG.	0,93 po

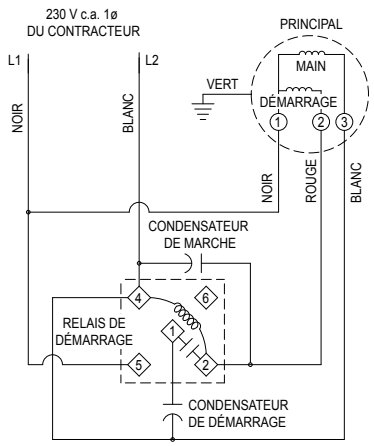
Installation monophasée

Tous les modèles monophasés nécessitent un condensateur de démarrage, un condensateur de fonctionnement et un relai dans le circuit afin de démarrer et de fonctionner correctement. Ces composantes peuvent être achetées séparément ou être incluses dans le panneau de commande Zoeller Pump Company. Suivre le schéma de câblage pour l'installation et le branchement des composantes achetées séparément. Les modèles monophasés ne sont pas automatiques. Un panneau de commande doit être ajouté au circuit d'alimentation afin de permettre l'utilisation en mode automatique. Suivre les instructions fournies avec le panneau.

SCHÉMA DE CÂBLAGE

MODÈLES 611 / 621 UTILISANT SUPCO PR90 RELAIS AVANT 01/10/2007

DISPOSITION DES ÉLÉMENTS



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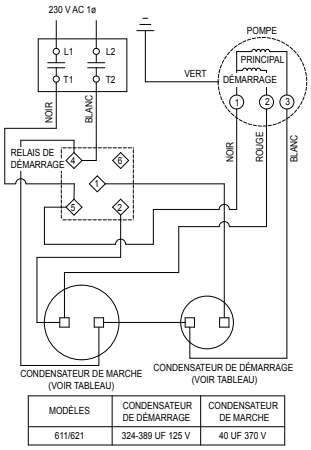


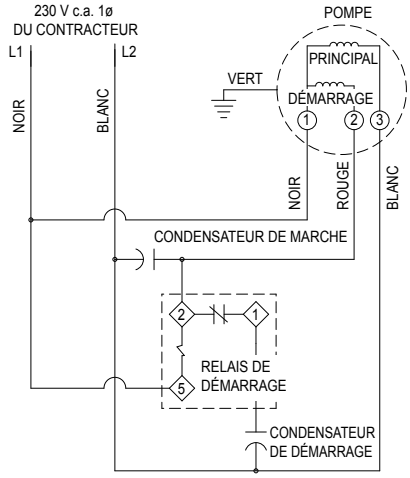
MODÈLES	CONDENSATEUR DE DÉMARRAGE	CONDENSATEUR DE MARCHE
611/621	324-389 UF 125 V	40 UF 370 V

ZEPA0477B

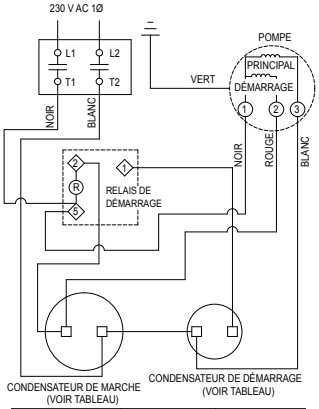
SCHÉMA DE CÂBLAGE

MODÈLES 631 / 641 / 651 ET 611 / 621 UTILISANT LE RELAI GE APRÈS LE 01/10/07

DISPOSITION DES ÉLÉMENTS



ZEPA0540



MODÈLES	CONDENSATEUR DE DÉMARRAGE	CONDENSATEUR DE MARCHE
6120/6121	216-259 UF 250 V	40 UF 370 V
6111/6122/6123/6124	270-324 UF 250 V	50 UF 370 V

ZEPA0537B

Fonctionnement

GÉNÉRALITÉS

Les pompes de Zoeller Pump Company sont graissées et testées à l'usine avant l'expédition et nécessitent peu d'entretien avant le démarrage.

La température maximale de fonctionnement continu des liquides pompés pour les modèles standard de pompes est de 40 °C (140 °F). Pour prolonger leur durée de vie, toutes les pompes devraient être complètement submergées lors de cycles prolongés et devraient fonctionner au maximum 30 minutes par heure.

Ces unités ne sont pas conçues pour prendre en charge des liquides autres que l'eau et les eaux usées. Si la pompe est utilisée avec une eau contaminée par des matériaux lourds, visqueux ou abrasifs, la garantie sera annulée.

DONNÉES DE LA PLAQUE SIGNALÉTIQUE

La plaque signalétique, située sur le dessus de la pompe, donne des renseignements précis concernant la fabrication de la pompe. Le numéro du modèle, le code de la date et le numéro de série doivent être reportés à la première page de la section « Renseignements concernant le propriétaire » de ce manuel.

STOCKAGE À COURT TERME

Si la pompe doit être rangée, suivre les consignes suivantes :

- Stocker la pompe à l'intérieur si possible, sinon la recouvrir d'un matériau protecteur.
- Protéger à l'aide d'un sachet plastique scellé les éléments de raccordement des câbles.
- Pulvériser une couche d'huile antirouille sur les surfaces non peintes.
- L'impulseur doit être tourné tous les six mois afin de lubrifier les joints et éviter une déformation permanente.

Si le panneau doit être stocké, suivre les consignes suivantes :

- Stocker le panneau à l'intérieur si possible et le laisser dans la boîte de transport.
- Toutes les ouvertures doivent être scellées.
- Stocker le panneau à la verticale.
- Ne rien poser sur le panneau.

PROCÉDURES DE DÉMARRAGE

Avant de démarrer, les points suivants doivent être vérifiés :

- Bonne rotation de la pompe (unités triphasées uniquement).
- La fosse est propre.
- Le panneau doit être sec et correctement attaché.
- Les flotteurs doivent être correctement positionnés.
- Les vannes d'évacuation sont ouvertes.
- Trou d'évent de 4 mm (3/16 po) percé entre le clapet antiretour et la pompe.

Une fois que les points suivants ont été vérifiés, passer aux vérifications suivantes :

- Les câbles d'alimentation de la pompe sont branchés correctement au panneau.
- Les câbles de flotteur sont branchés correctement au panneau.
- Les raccords du conduit au panneau sont bien scellés.
- Les ajustements de surchauffe ont été réglés dans le panneau.

(suite à la page suivante)

Fonctionnement *(suite)*

- Une fois la pompe installée dans la zone de confinement, avec l'immersion appropriée, ouvrir entièrement la vanne d'évacuation. Démarrer l'unité à l'aide des commandes manuelles. Si le débit est nettement inférieur au rendement prévu, la pompe peut avoir une poche d'air. Pour expulser l'air emprisonné, actionner l'unité plusieurs fois à l'aide des commandes manuelles.
- Demander à un électricien qualifié de mesurer la tension et le courant avec la pompe en fonctionnement, sur le fil noir pour les unités monophasées et sur les trois fils d'alimentation pour les unités triphasées. Noter les données dans la partie réservée à cet effet dans la section des « **Renseignements concernant le propriétaire** » à la page 1 de ce manuel pour consultation ultérieure.

Lorsque le test fonctionnel pré-fonctionnement est complété, le système est prêt à être utilisé. Zoeller demande un Rapport de mise en route (ZM1074_Fa) complet lorsque le système est démarré pour la première fois et à chaque fois que le système subit un changement important (remplacement de la pompe, réorganisation, etc.). Une copie du Rapport de mise en route doit être conservée avec le système pour consultation ultérieure.

PROCÉDURES DE RÉGLAGE

Pompes : Aucun réglage n'est requis autre que de s'assurer de la bonne rotation.

Panneaux : Les surcharges thermiques du panneau doivent être réglées selon le classement F.L.A. (intensité maximale) de la plaque signalétique sur la pompe (ou selon la fiche technique de la pompe).

Flotteurs : Consulter le schéma du système pour trouver la position souhaitée de chaque flotteur selon sa fonction.

Vannes : Les vannes d'évacuation doivent être entièrement ouvertes. Les systèmes ne doivent pas fonctionner pendant de longues périodes de temps avec les vannes d'évacuation partiellement fermées car cela risque d'endommager les vannes.

PROCÉDURES D'ARRÊT

Si un système est arrêté pendant plus de six mois, il est conseillé de suivre les consignes suivantes :

Pompes : Si la fosse reste sèche, alors la pompe peut rester dans la fosse. Lorsque la pompe est dans la fosse, il est nécessaire de la faire fonctionner cinq minutes une fois tous les trois mois. Si la fosse reste humide, la pompe doit être retirée et stockée comme indiqué ci-dessus.

Panneaux : Toutes les ouvertures du panneau doivent être scellées pour éviter la pénétration d'humidité et de poussière dans le boîtier. Avant de redémarrer le système, vérifier la présence d'humidité dans le panneau et si tous les branchements sont bien en place.

Vannes : Consulter le fournisseur des vannes/servomoteurs pour obtenir les renseignements nécessaires pour ces éléments du système.

Entretien

⚠ AVIS La réparation et l'entretien doivent être effectués uniquement par un centre d'entretien autorisé de Zoeller Pump Company ou un Centre de garantie.

INSTRUCTIONS DE SÉCURITÉ

⚠ AVERTISSEMENT Pour des raisons de sécurité, il faut toujours débrancher l'alimentation électrique de la pompe avant l'intervention.

⚠ AVERTISSEMENT Ne jamais pénétrer dans la cuve si elle n'a pas été aérée et testée correctement. Toute personne pénétrant dans la cuve doit porter un harnais avec une corde de sécurité reliée à la surface afin de pouvoir remonter la personne en cas d'asphyxie. Les eaux usées émettent du méthane et du sulfure d'hydrogène, qui peuvent tous les deux être fortement toxiques.

L'installation et la vérification de l'équipement électrique doivent être faites par un électricien qualifié.

Il ne faut jamais soulever la pompe par le cordon d'alimentation.

⚠ AVERTISSEMENT Avant l'entretien, il faut nettoyer et désinfecter l'unité, à l'intérieur comme à l'extérieur.

INSPECTION GÉNÉRALE DU SYSTÈME

Avant de mettre le système en marche, un Rapport de mise en route doit être complété par un technicien qualifié.

⚠ AVERTISSEMENT Le câblage et la mise à la terre doivent être réalisés conformément au code national de l'électricité ainsi qu'à tous les codes et règlements locaux applicables.

PROCÉDURES DE LUBRIFICATION

Aucune lubrification n'est nécessaire.

Si les pompes doivent être stockées pendant plus de six mois, consulter les procédures de stockage à court terme dans la section sur le fonctionnement.

ENTRETIEN PRÉVENTIF

L'entretien préventif du produit est recommandé pour lui assurer une longue durée de vie. Voici une suggestion de programme d'entretien.

Tous les mois :

- Vérifier le bon fonctionnement, sans obstruction, des flotteurs.
- Écouter pour vérifier le bon fonctionnement des clapets antiretour.
- Unités duplex : Vérifier l'uniformité des temps de fonctionnement. Si les temps de fonctionnement ne sont pas uniformisés, cela signifie que l'unité, l'Interrupteur à flotteur ou la commande sont défectueux.
- Inspecter le panneau pour détecter toute présence d'humidité dans le boîtier, de branchements desserrés et l'état général du composant. Vérifier l'emplacement et les dispositions des interrupteurs à flotteur.

Tous les ans :

- En plus des vérifications normales, la cuve doit être inspectée et nettoyée. Remplacer tout composant défectueux. Inspecter et éliminer tout sable, débris ou boue présents dans la cuve de la pompe.

Tous les deux ans :

- Vérifier l'huile isolante dans le moteur et les joints des chambres. Inspecter l'huile à la recherche de contaminants en suivant la procédure suivante :
- Huile transparente, pas d'odeur de brûlé – L'huile, le moteur et les joints sont en bon état.
- Huile sombre, odeur de brûlé – Le moteur de la pompe a surchauffé. Vérifier que la résistance de bobinage du moteur est mise à la terre. Il est nécessaire que les lectures soient de 1 mégohm ou plus. En cas de lectures plus basses, renvoyer l'unité à un Centre d'entretien autorisé Zoeller pour un entretien.
- Huile laiteuse, émulsifiée – Les joints sont défaillants. L'unité doit être renvoyée à une usine d'entretien autorisée pour l'entretien.
- Jeter l'huile isolante du moteur correctement si un remplacement est nécessaire.
- Examiner les câbles d'alimentation à la recherche de signes d'usure ou de dommage. Si un élément est endommagé ou usé, le remplacer immédiatement.
- Examiner l'impulseur à la recherche de signes d'usure ou de dommage. Si requis, faire remplacer par un Centre d'entretien autorisé Zoeller.

POMPES À DEUX JOINTS

- Les pompes à deux joints offrent une protection accrue contre les dommages causés par la défaillance d'un joint.
- L'huile du boîtier du moteur et la cavité inférieure du joint doivent être vérifiées lors de l'entretien de la pompe. Si l'huile du boîtier du moteur contient de l'eau ou d'autres contaminants, les deux joints doivent être remplacés lors de l'entretien. Toujours les remplacer avec l'huile et les pièces de rechange recommandés par l'usine. Toutes les réparations doivent être effectuées par un centre d'entretien autorisé de Zoeller.

Aide-mémoire d'entretien et résolution de problèmes

⚠ AVERTISSEMENT **PRÉCAUTIONS ÉLECTRIQUES** Avant d'effectuer l'entretien d'une pompe, toujours couper l'alimentation principale puis débrancher la pompe et s'assurer de porter des chaussures de protection à semelles isolantes et de ne pas avoir les pieds dans l'eau. En cas d'inondation, veuillez contacter votre entreprise locale d'électricité ou un électricien qualifié et agréé pour déconnecter le service électrique avant de retirer une pompe.

⚠ AVERTISSEMENT Les pompes submersibles contiennent des huiles qui sont pressurisées et chaudes en cas de fonctionnement. **Attendre 2 heures et demie après le débranchement avant d'effectuer l'entretien.**

CONDITION

A. La pompe ne démarre pas ou ne fonctionne pas.

Étapes	Vérifier la tension au niveau de	S'il n'y a pas de tension	S'il y a de la tension
No. 1	Des bornes de lignes L1 - L2 - L3 (triphasé) dans le panneau de commande de la pompe.	Vérifier l'interrupteur de déconnexion, le fusible de ligne et/ou les disjoncteurs du circuit d'alimentation.	Passer à l'étape 2.
No. 2	Des bornes du moteur de la pompe T1 - T2 - T3 dans le panneau de commande de la pompe.	Vérifier la tension du circuit de commande. Vérifier les contacts du démarreur magnétique, des surcharges thermiques et de l'interrupteur à flotteur.	Vérifier le relai de démarrage et le condensateur (unités monophasées). S'assurer de la présence d'une mise à la terre sur la pompe et de l'absence de blocage de l'impulseur.

CAUSES FRÉQUENTES

B. Le moteur surchauffe et déclenche la surcharge ou grille un fusible.
- Mauvaise tension
- Source d'alimentation déséquilibrée
- Mauvaise rotation du moteur
- Pression faible ou négative
- Température de l'eau excessive
- Blocage mécanique de l'impulseur ou du joint
- Condensateur ou relais défectueux
- Court-circuit du moteur
- Perte d'une ligne dans une unité triphasée

C. La pompe se met en marche et s'arrête trop fréquemment.
- Clapet antiretour bloqué en position ouverte
- Contrôles de niveau mal réglés
- Déclenchement du capteur de protection thermique
- La surcharge thermique se désajuste ou est défectueuse
- Fosse trop petite

D. La pompe ne s'arrête pas.
- Débris sous l'interrupteur à flotteur
- Déplacement du flotteur entravé
- Interrupteur à flotteur défectueux ou endommagé
- Court-circuit des contacts du démarreur magnétique
- Accumulation d'air - vérifier les trous d'aération

E. La pompe fonctionne mais son débit est faible ou non existant.
- Vérifier l'encrassement du boîtier de la pompe, du tuyau d'évacuation ou si le clapet antiretour colle
- Trou d'évent bouché ou absent
- La pression d'évacuation dépasse la capacité de la pompe
- Tension faible ou incorrecte
- Mauvaise rotation du moteur
- Condensateur défectueux

F. Perte de pression et/ou réduction de la capacité après une période d'utilisation.
- Friction des tuyaux augmentée
- Une ligne ou un clapet antiretour obstrués
- Des matériaux abrasifs et des produits chimiques ont endommagé l'impulseur et le boîtier de la pompe

Si les vérifications ci-dessus ne résolvent le problème, consulter l'usine. Ne pas essayer de réparer ou de démonter la pompe.

Il s'agit ici d'une traduction des instructions d'origine.

Operation & Maintenance

Maintenance Logs and Inspection Records

Inspection Checklist Log

Date(s) of Inspection (MM/DD/YYYY)	BMP Identifier	Inspections Performed and Recommendations

Preventative Maintenance Log

Date(s) of Inspection (MM/DD/YYYY)	BMP Identifier	Maintenance Performed and Recommendations

Corrective Maintenance Log

Date(s) of Inspection (MM/DD/YYYY)	BMP Identifier	Maintenance Performed and Recommendations

Bio Clean

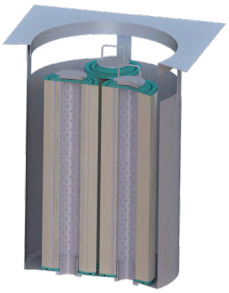
A Forterra Company

Catch Basin Inlet Filters

A Stormwater Trash Capture Solution

OVERVIEW

The Bio Clean Catch Basin Inlet Filters are insertable systems designed to capture fine to coarse sediments, floatable trash, debris, total suspended solids (TSS), nutrients, metals, and hydrocarbons conveyed in stormwater runoff. The filter system is available in four different model types:

Full Capture Type	Multi-Level Screen Type	Kraken Filter Type	Media Filter Type
			
California Water Board Certified	**Verified by the New Jersey Corporation for Advanced Technology**	**Advanced Pollutant Removal**	**Design for Industrial Applications**
TESTING HIGHLIGHT: **California Water Board** **100% of Trash**	**TESTING HIGHLIGHT:** **NJDEP Testing Protocol** **86.6% of TSS** **(Down to 100 Micron)**	**TESTING HIGHLIGHT:** **Third Party Testing** **85% of TSS & 72% of TP**	**TESTING HIGHLIGHT:** **Port of San Diego Field Testing** **82% of TSS**

The Catch Basin Inlet Filters are an effective and economical solution to help property owners, developers, and municipalities meet local, state, and federal water quality requirements and regulations, as each filter can be custom built to meet specific project needs, and screen size and media type can be modified to remove specific pollutants.

Constructed of 100% high-grade stainless steel, it is built to last longer than any other filter brand, and the non-clogging screens provide higher levels of filtration and water flow. The filter is equipped with unimpeded high flow bypass to prevent backflow during the largest storm events.

ADVANTAGES

- 1-YEAR WARRANTY
- WORKS IN ANY SIZE CATCH BASIN
  *SOME DEPTH RESTRICTIONS MAY APPLY.
- NO NETS OR GEOFABRICS
- 15+ YEARS USER LIFE
- EASIEST TO MAINTAIN TROUGH SYSTEM ALLOWS FOR 15-MINUTE OR LESS SERVICE TIME
- MEETS LEED REQUIREMENTS
- STAINLESS STEEL AND FIBERGLASS CONSTRUCTION

APPLICATIONS

The Catch Basin Inlet Filters have been successfully used on numerous new construction and retrofit projects. The system's superior durability and customization make it ideal for a wide range of stormwater applications. Each filter fits within a shallow catch basin, giving them the ability to integrate with versatile curb inlet trough systems.

- Parking Lot Curb Inlets
- Parking Lot Grate Inlets
- Roadway Curb Inlets
- Roadway Grate Inlets
- Bioswale Bypass Structures
- Stormwater Pretreatment

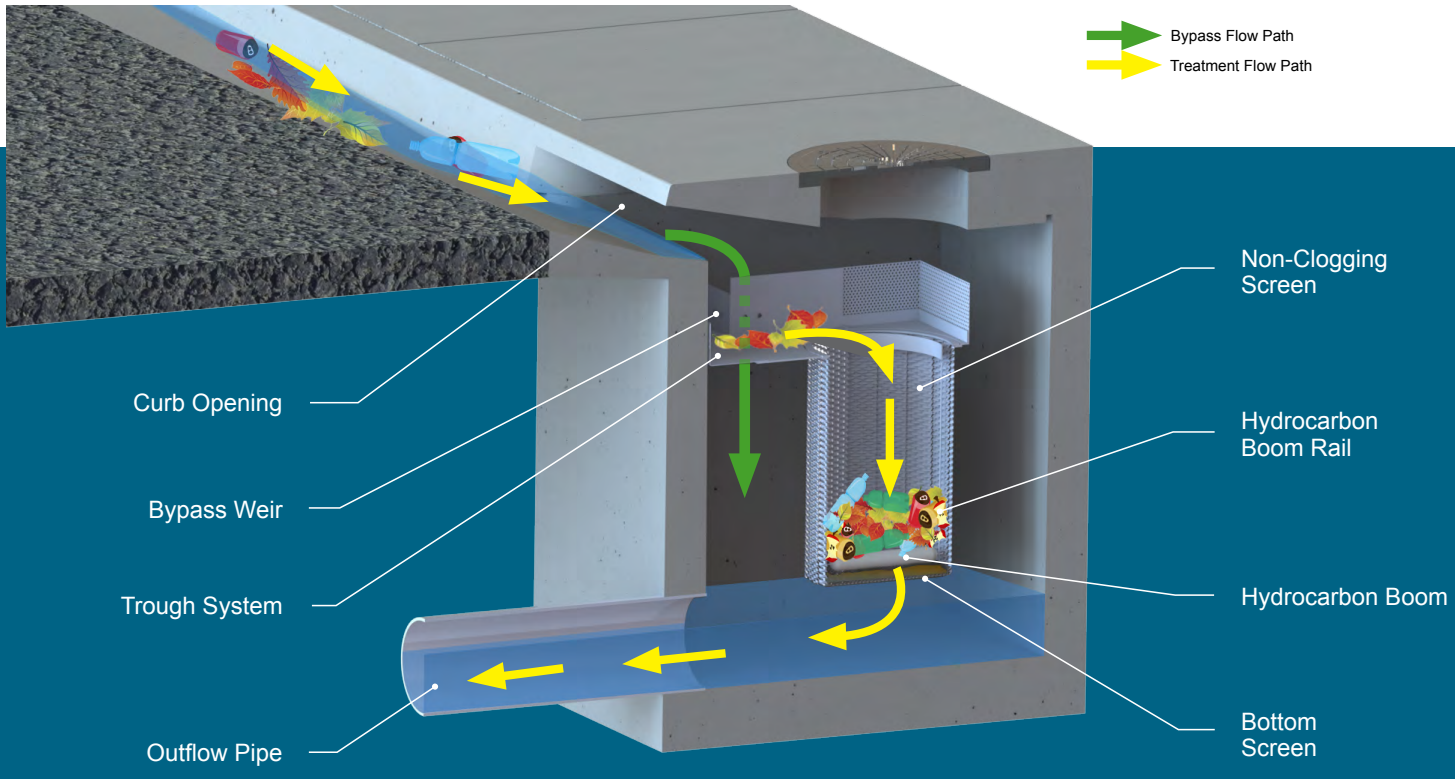
CURB INLET APPLICATION

The curb inlet application or shelf system, provides easy access for maintenance from the surface without having to enter the catch basin. Maintenance service takes about 15 minutes and requires no confined space entry.

Each Catch Basin Inlet Filter is designed to be insertable and the expandable trough system is designed to convey water quality design flows through the filter basket while allowing peak flows to bypass over the trough without resuspending captured pollutants. The modular design of the trough system makes it adaptable to any size* or type of curb inlet catch basin.

*SOME DEPTH RESTRICTIONS MAY APPLY.

OPERATION



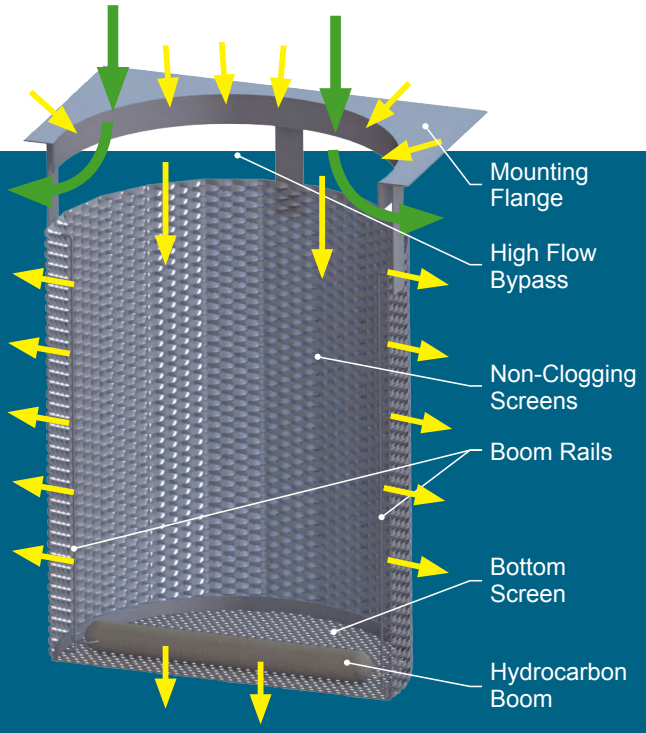
FULL CAPTURE TYPE

The Full Capture type inlet filter is California Full Capture approved and allows for a higher flow of water, making it more applicable for demanding applications. The screen has a specialized design that efficiently caputres all trash, but also makes cleaning more efficient while maintaining its ability to meet demanding flow requirements.

PERFORMANCE

100% REMOVAL OF TRASH

OPERATION



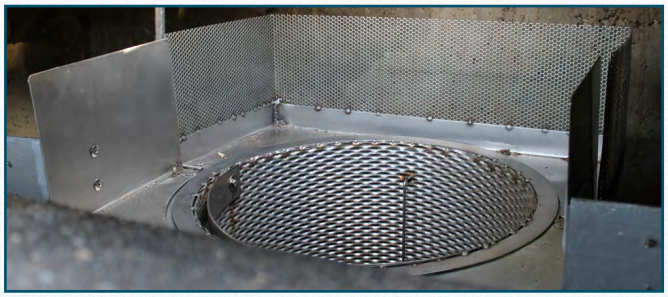
SPECIFICATIONS

MODEL #	TREATMENT FLOW (cfs)	BYPASS FLOW (cfs)
BIO-CURB-FULL	2.85	UNLIMITED
BIO-GRATE-FULL-12-12-12	1.55	1.55
BIO-GRATE-FULL-18-18-18	4.32	3.68
BIO-GRATE-FULL-24-24-24	7.67	4.83
BIO-GRATE-FULL-30-30-24	12.97	6.21
BIO-GRATE-FULL-25-38-24	13.53	6.59
BIO-GRATE-FULL-36-36-24	19.64	7.60
BIO-GRATE-FULL-48-48-18	25.59	10.13

Note: Curb inlet application teatment flow rate limited to the weir capacity - actual flow rates of the filter basket is greater than 2.85 cfs.
Various depth filter baskets available. Treatment and bypass flow rates include a safety factor of 2.

INSTALLATION

CURB INLET FILTER



Bio Clean's Curb Inlet Filters are easily installed under catch basin access for ease of maintenance.

GRATE INLET FILTER

Grate Inlet Filters can be quickly installed directly under grated inlets with no special equipment.

MAINTENANCE

CURB INLET FILTER

Filters can be lifted out by hand for routine maintenance and inspections.

GRATE INLET FILTER

Bio Clean
A Forterra Company

5796 Armada Drive Suite 250
Carlsbad, CA 92008
855.566.3938
stormwater@forterrabp.com
biocleanenvironmental.com

Grate Inlet Filter

Bio Clean
A Forterra Company

INSTALLATION MANUAL

Bio Clean Environmental Services, Inc.
398 Via El Centro
Oceanside, CA 92058

www.BioCleanEnvironmental.com
p: 760.433.7640
f: 760.433.3176

INSTALLATION PROCEDURES

The Bio Clean Grate Filter is a stormwater catch basin filter designed to remove high levels of trash, debris, sediments and hydrocarbons. The filter is available in several configurations including trash full capture, multi-level screening, Kraken membrane filter and media filter variations. This manual covers installation procedures of all configurations. This filter is made of 100% stainless steel and is available and various sizes and depths allowing it to fit in any grated catch basin inlet. The filter is generally mounted under the grate flange but can also be mounted below the grate to the wall of the basin. This configuration is recommended in areas with "direct traffic" ratings such as roads with higher speed traffic. The flange is cut to size allowing for quick and simple installation.

Delivery

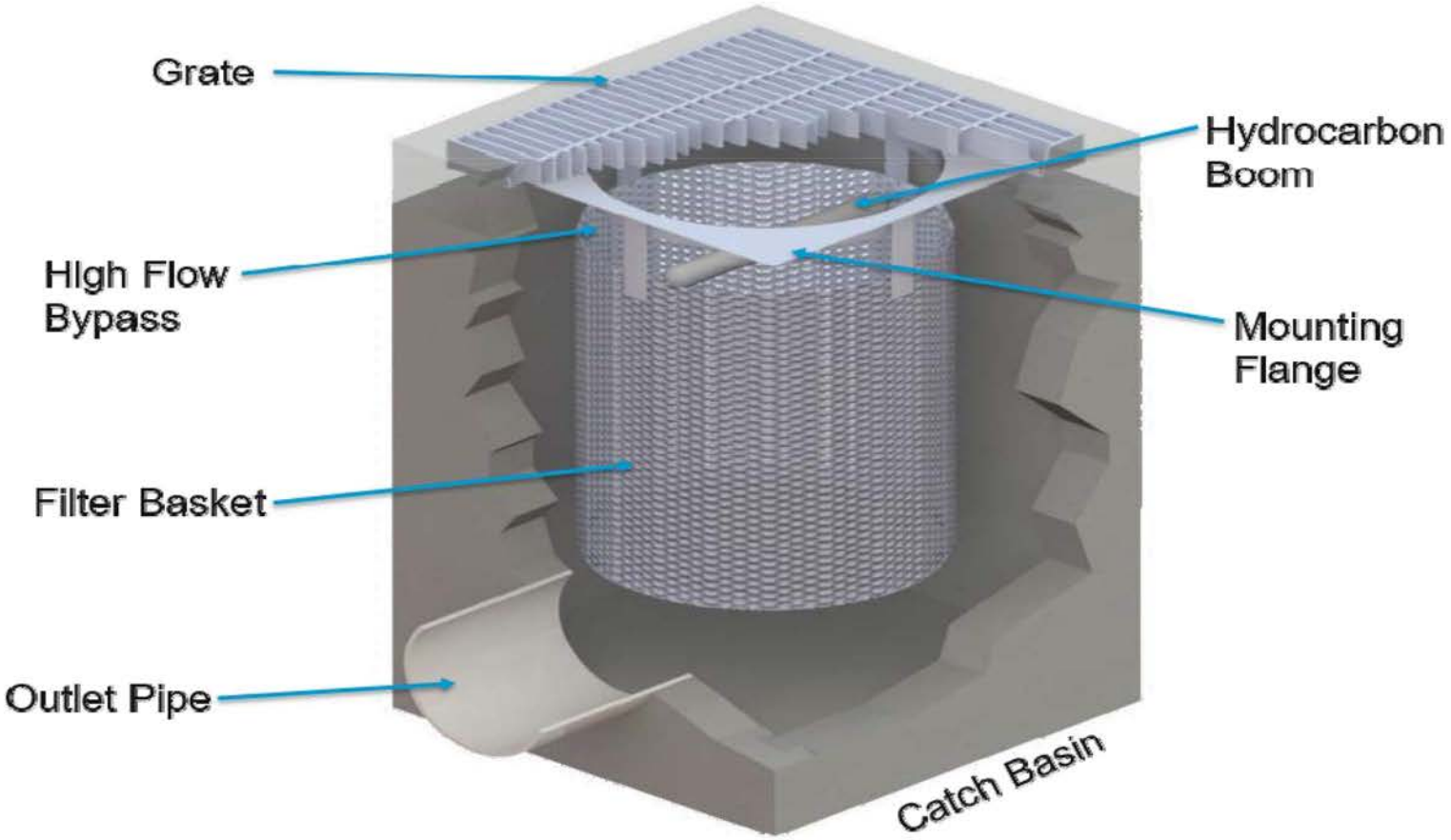
- Bio Clean Environmental Services, Inc. shall deliver the filter(s) to the site in coordination with the Contractor.

Inspection

- Inspection of the Grate Inlet Filter and all parts contained in or shipped shall be inspected at time of delivery by the site Engineer/Inspector and the Contractor. Any non-conformance to approved drawings or damage to any part of the system shall be documented on the Bio Clean shipping ticket.

Catch Basin Preparation

- The Contractor is responsible for providing adequate and complete catch basin and fall protection including gas metering and other safety equipment when installing the Grate Inlet Filter.
- The Contractor shall adhere to all jurisdictional and/or OSHA safety rules during installation of the filter.
- The Contractor or Owner is responsible for appropriately barricading the catch basin from traffic (in accordance with local codes).



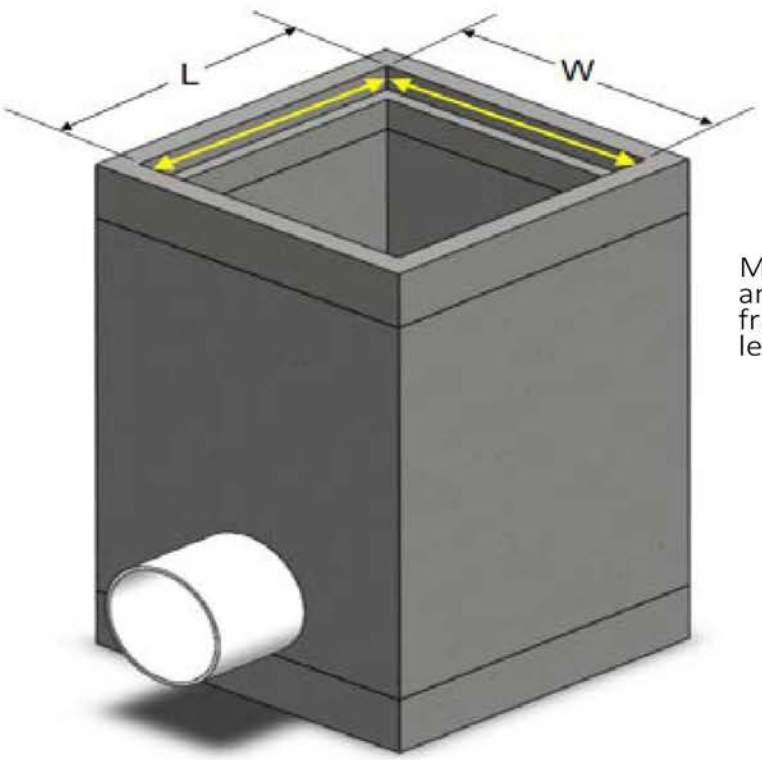
Filter Diagram:

Installation (non-under mount configuration)

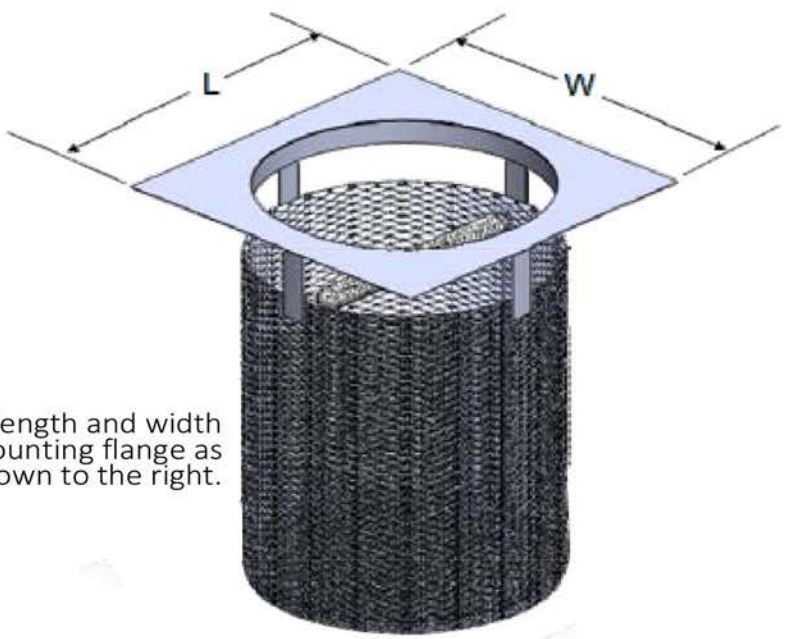
- Each Grate Inlet Filter shall be installed based on the locations and elevations according to the sizes shown on the approved drawings. Any modifications to the elevation or location shall be at the direction of and approved by the Engineer.
- It is recommended that the catch basin is properly cleaned and inspected for any damage prior to installing the Grate Inlet Filter. If under mounts are being used for "direct traffic" installations, the under mounts connect directly to the walls of the catch basin using concrete wedge and/or drive anchors/pins.
- Step one (non-under mount configuration) involves double checking measurements to ensure the filter will properly and fully fit the catch basin opening. Once the grate is removed use a tape measure to pull the dimensions (length and width) of the grate frame lip. Next check the dimensions (length and width) on the mounting flange. The mounting flange should be approximately ¼" to ½" shorter than the grate frame flange. If the mounting flange is larger

than the grate frame dimensions trimming of the flange will be required. Various tools and methods can be used to cut the flange such as a circular saw, cut-off-saw, plasma cutter or grinder. After cutting off the flange ensure that any sharp or protruding edges are removed with a grinder. Sharp edges could cause injury. Once cut, verify again that dimensions are accurate and the filter will properly fit. If a filter is delivered with a flange smaller than grate frame, meaning that the edge of the flange is too short to rest on the grate frame lip please call the manufacturer for guidance. Either a new filter can be sent out, a replacement flange piece or the filter under mounted.

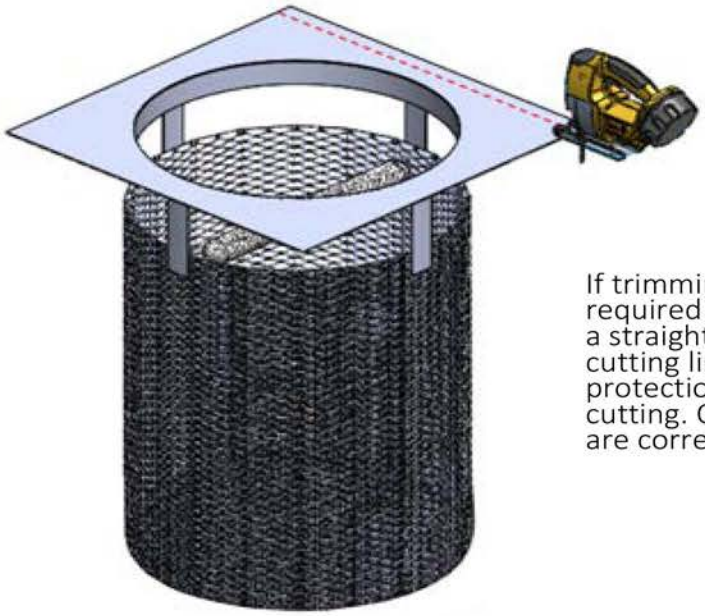
STEP 1



Measure the length and width of the grate frame as shown to the left.

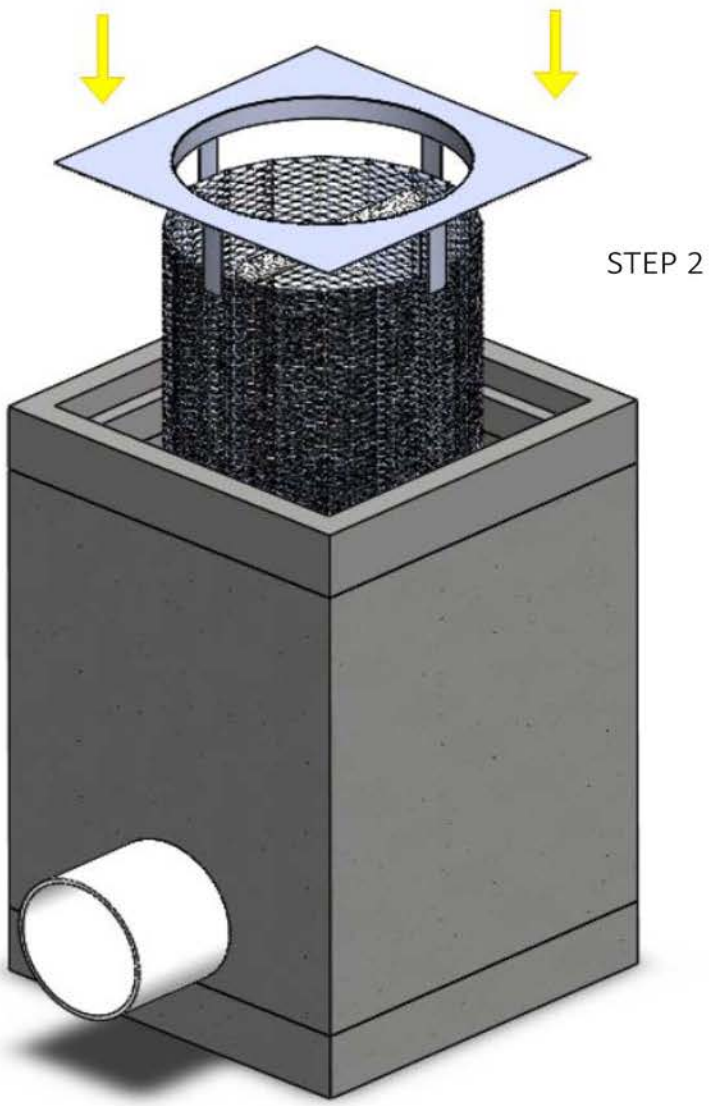


Measure the length and width of the mounting flange as shown to the right.



If trimming of the mounting flange is required use a tape measure along with a straightedge and market to draw a cutting line. Use proper tools and safety protection such as eyewear before cutting. Once cut verify measurements are correct.

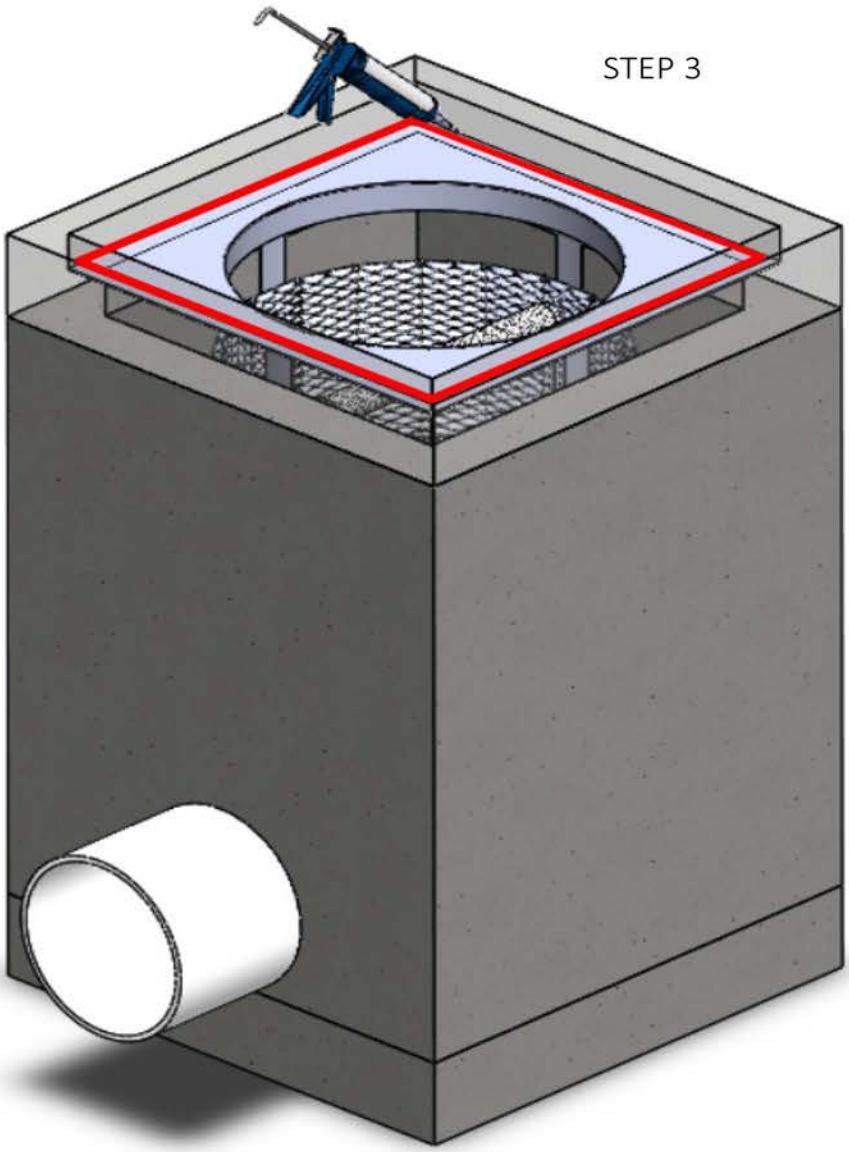
- Step 2 now that the filter is ready for installation, simply set the filter into place resting the mounting flange on the grate frame lip. Before setting, clean the grate frame lip of any debris. It is recommended the gloves are worn and proper lifting techniques are used. Larger filter may require two people to set in place. Do not drop the filter in place. Ensure that the filter is in proper position. Center the filter in the grate frame so any gaps are even on all four sides.



STEP 2

Installation of the filter is simple and fast. Set the filter in place on the grate frame lip and center.

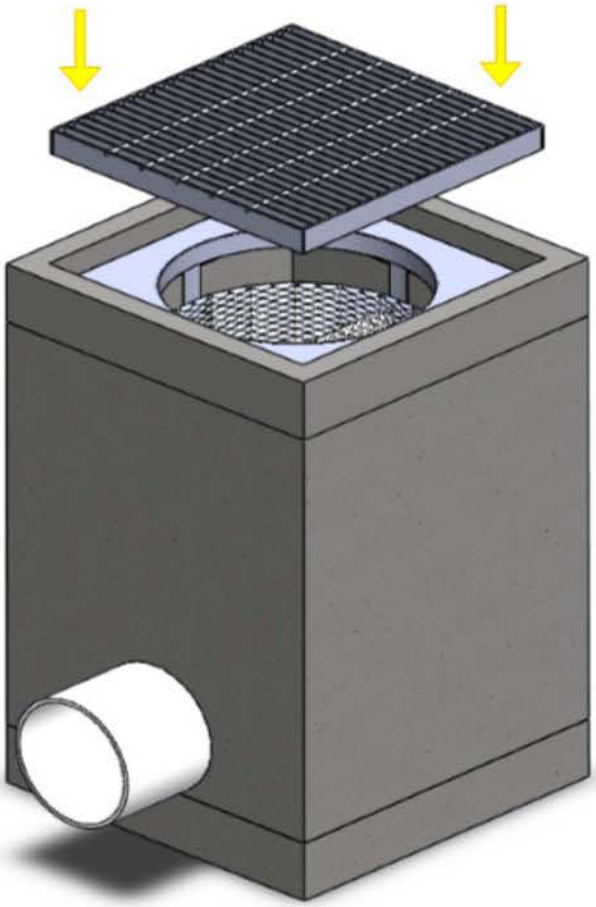
- Step 3 requires using sealant to seal all seams, gaps and joints to ensure no leakage. All surfaces in which the stainless steel flange make contact with a concrete surface must be fully filled with sealant and made completely watertight. Sealant must be Sil-Flx (RTV 7500). See below for diagram highlighting all areas where sealant is required:



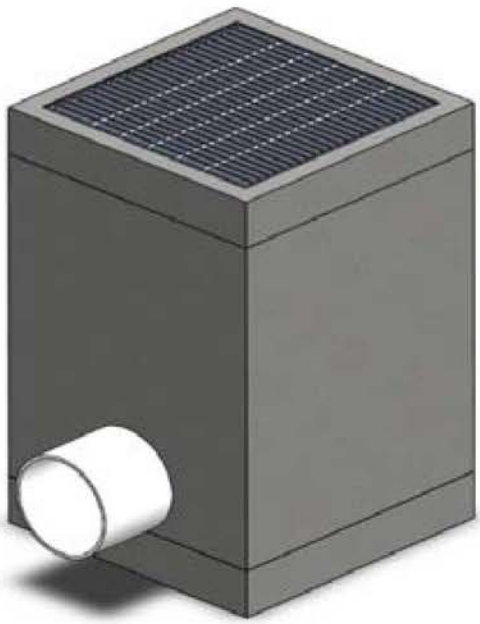
Making sure the seams of the flange are watertight is important to ensure 100% of stormwater entering the catch basin is directed through the filter, especially smaller dry weather flows.

- Step 4 installation is now complete. Be sure to remove all tools and seal up the catch basin by replacing the grate and take down any traffic control.

STEP 4



Not that installation of the filter is complete ensure that the grate is replaced and the install site is returned to its original condition.



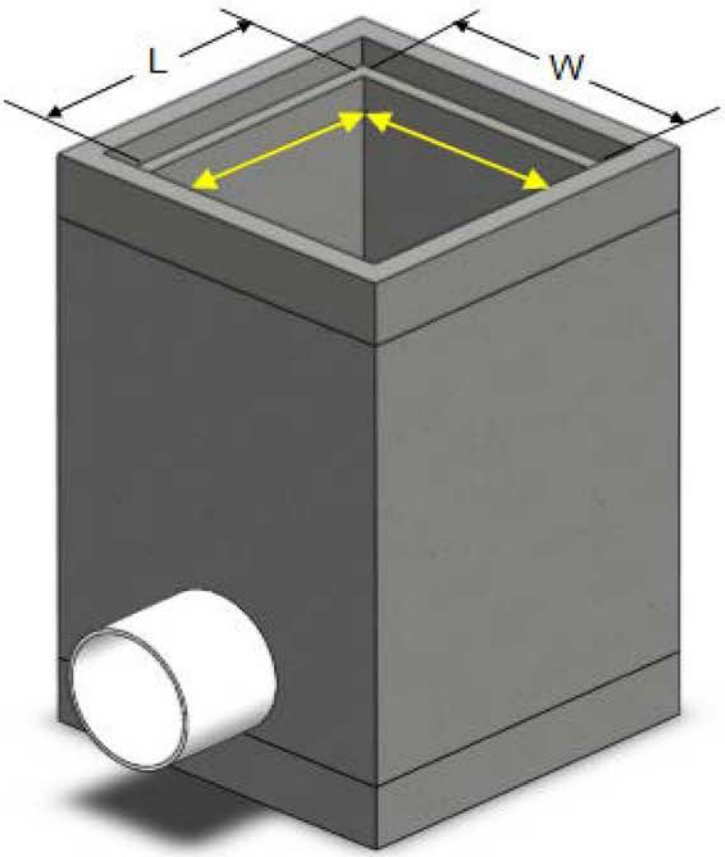
Installation (under mount configuration)

- Each Grate Inlet Filter shall be installed based on the locations and elevations according to the sizes shown on the approved drawings. Any modifications to the elevation or location shall be at the direction of and approved by the Engineer.
- It is recommended that the catch basin is properly cleaned and inspected for any damage prior to installing the Grate Inlet Filter. If under mounts are being used for "direct traffic" installations the under mounts connect directly to the walls of the catch basin using concrete wedge and/or drive anchors/pins.

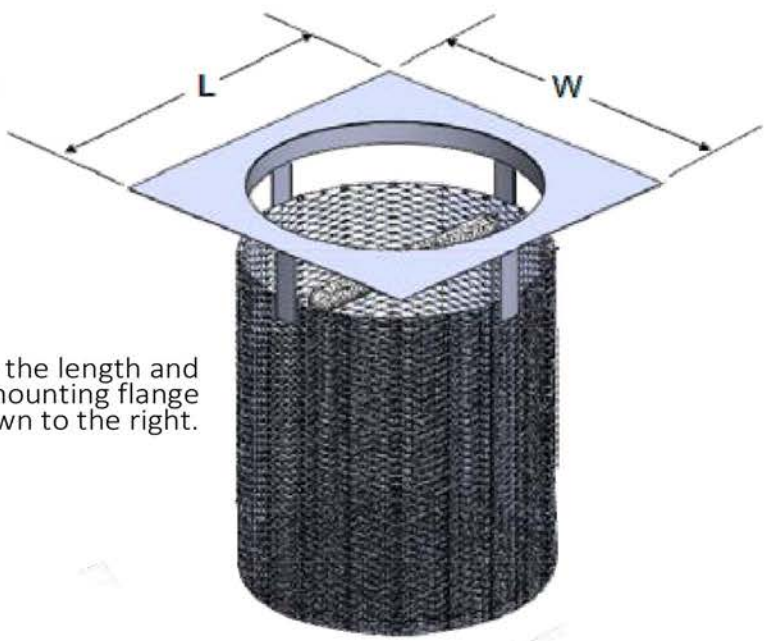
- Step one (under mount configuration) involves double checking measurements to ensure the filter will properly and fully fit the catch basin opening. Once the grate is removed use a tape measure to pull the dimensions (length and width) of catch basin walls below the grate frame

lip. Next check the dimensions (length and width) on the mounting flange. The mounting flange should be approximately ¼" to ½" shorter than the catch basin ID. If the mounting flange is larger than the catch basin ID trimming of the flange will be required. Various tools and methods can be used to cut the flange such as a circular saw, cut of saw, plasma cutter or grinder. After cutting of the flange ensure that any sharp or protruding edges are removed with a grinder. Sharp edges could cause injury. Once cut verify again that dimensions are accurate and the filter will properly fit.

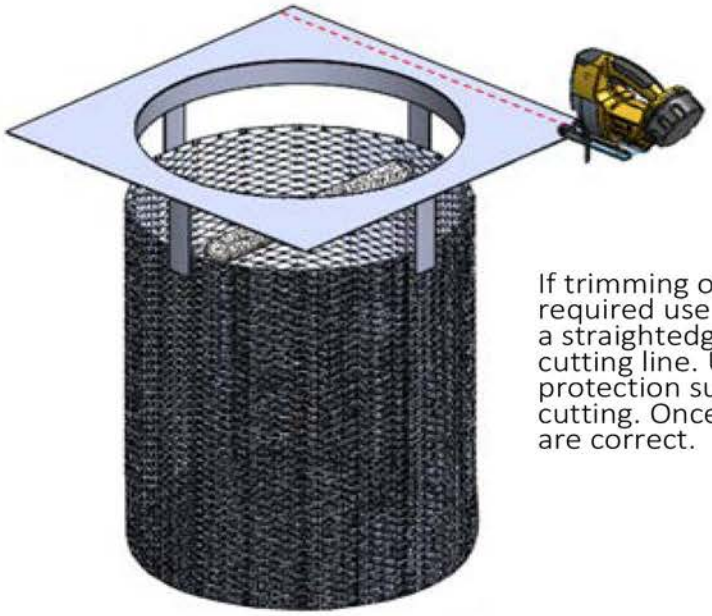
STEP 1



Measure the length and width of the catch basin ID as shown to the left.



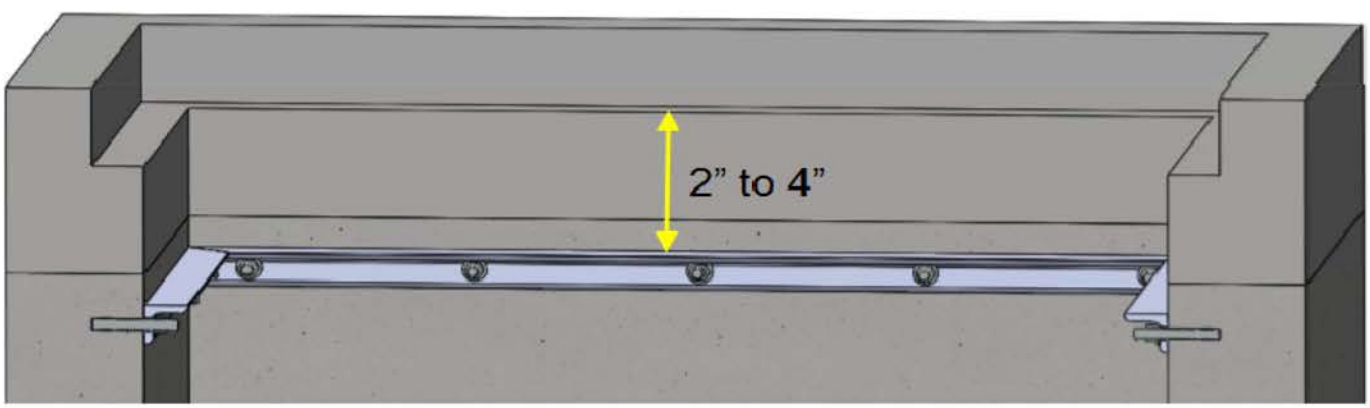
Measure the length and width of the mounting flange as shown to the right.

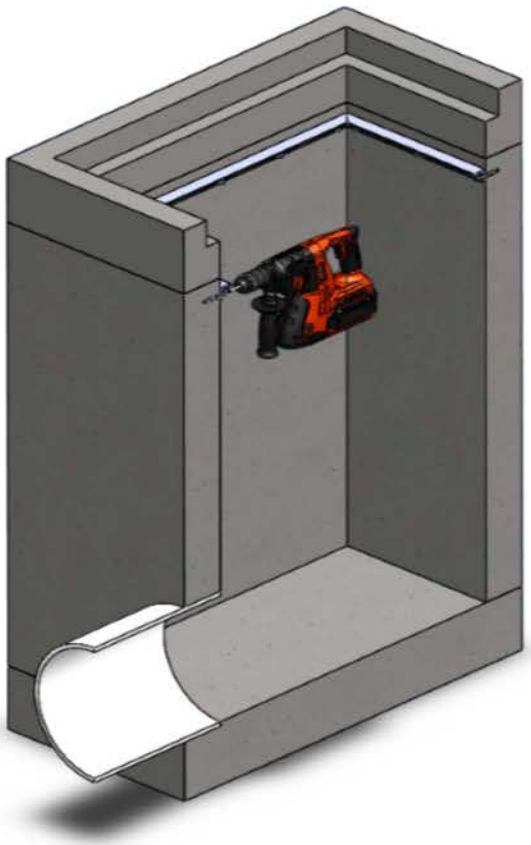


If trimming of the mounting flange is required use a tape measure along with a straightedge and market to draw a cutting line. Use proper tools and safety protection such as eyewear before cutting. Once cut verify measurements are correct.

- Step 2 involves mounting the under mounts which are supplied with the filter. Under mounts will be either aluminum or stainless steel L metal with holes pre-drilled for mounting. Using a tape measure along chalk or a large marker to draw a guideline 1 to 2" below the edge of the grate flange on all four sides of the basin walls. Ensure that the lines are level. This guideline shows where the top edge of the L metal under mounts will be positioned. Next check the length of each under mount. There should be two longer pieces and two shorter pieces. Double check their length and trim down if necessary to properly fit inside the basin. Next, while holding the first under mount in place use a rotary hammer with a 1/4" diameter concrete drill bit to drill holes 2 ¾" deep (minimum) at each location along the under mount that there is a pre-drilled hole. Once all holes are drilled, insert a ¼" diameter by 2 ¾" long stainless steel drive pins into each hole. This will temporarily support the weight of the under mount. Next drive the wedge anchors or drive pin tight using the hammer. Repeat the process on the other 3 under mounts.

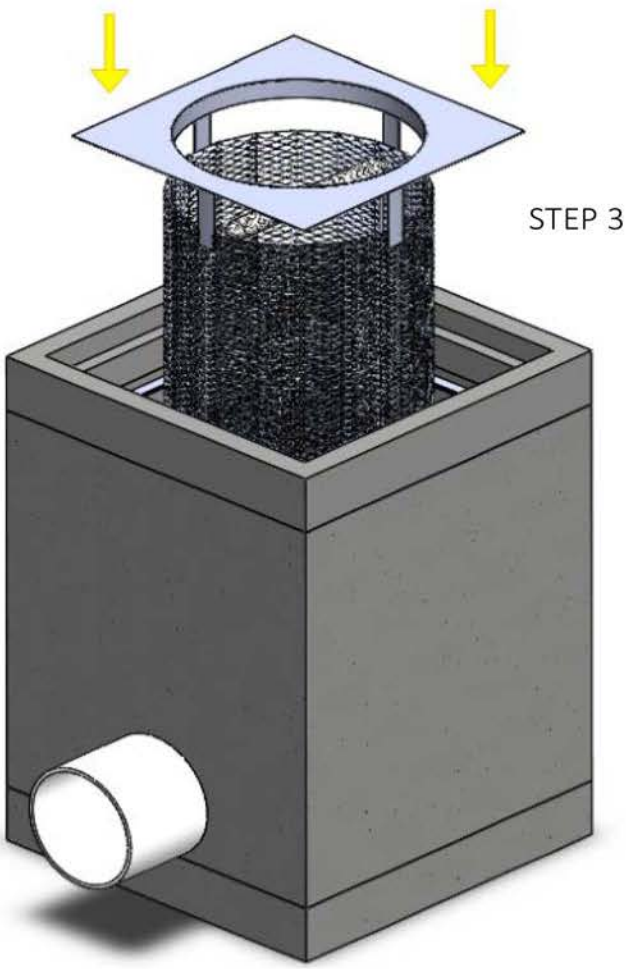
STEP 2





Under mounts should be installed with their top flange 2 to 4" below the grate flange to allow for proper clearance. Ensure the under mounts are level.

- Step 3 now that the filter is ready for installation and the under mount installed simply set the filter into place resting the mounting flange on the under mounts. Before setting clean the under mounts of any debris. It is recommended the gloves are worn and proper lifting techniques are use. Larger filter may require two people to set in place. Do not drop the filter in place. Ensure that the filter is in proper position. Center the filter in the grate frame so any gaps are even on all four sides.

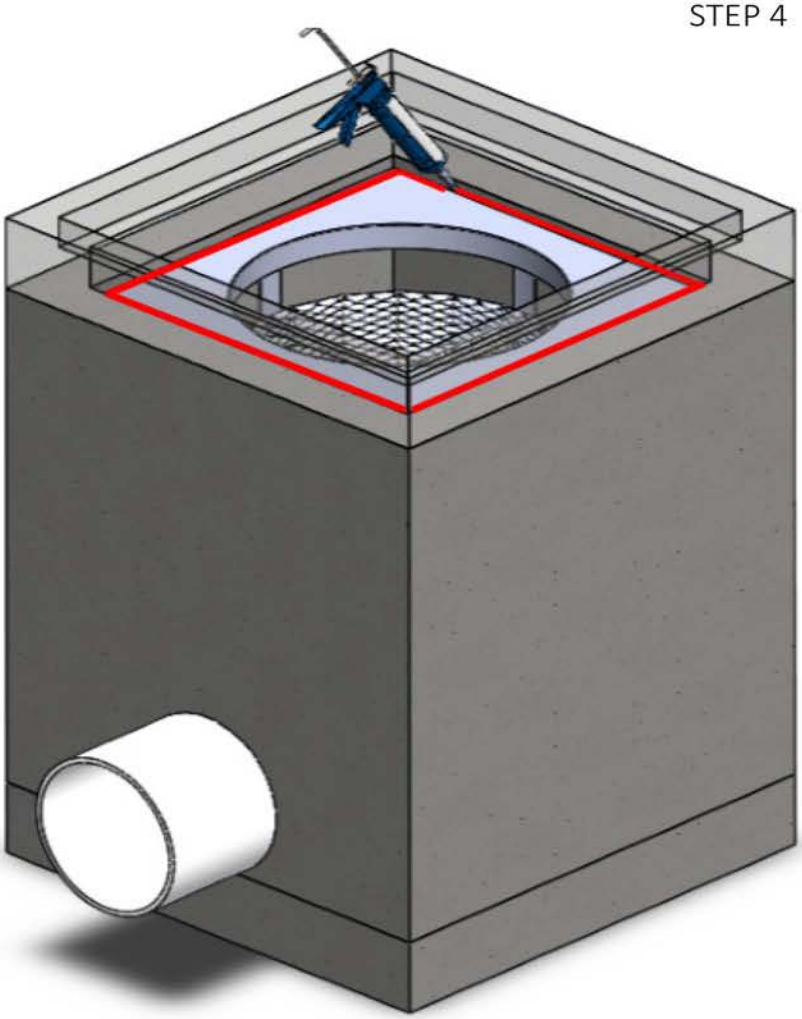


STEP 3

Installation of the filter is simple and fast. Set the filter in place on the grate frame lip and center.

- Step 4 requires using sealant to seal all seams, gaps and joints to ensure no leakage. All surfaces in which the stainless steel flange make contact with a concrete surface must be fully filled with sealant and made completely watertight. Sealant must be Sil-Flx (RTV 7500). See below for diagram highlighting all areas where sealant is required:

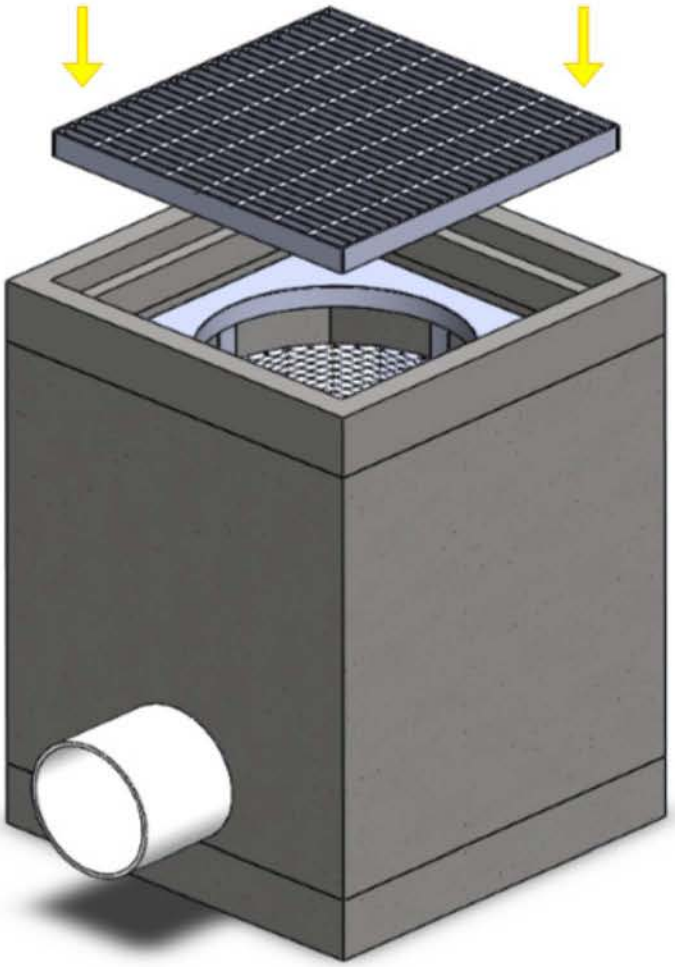
STEP 4



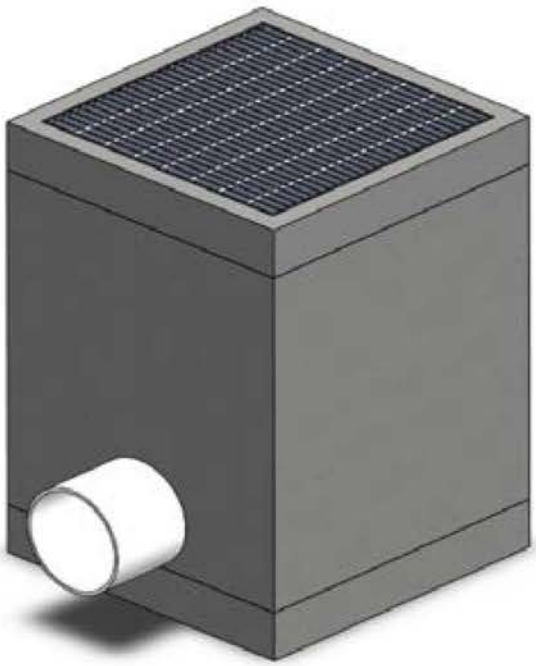
Making sure the seams of the flange are watertight is important to ensure 100% of stormwater entering the catch basin is directed through the filter, especially smaller dry weather flows.

- Step 5 installation is now complete. Be sure to remove all tools and seal up the catch basin by replacing the grate and take down any traffic control.

STEP 5



Not that installation of the filter is complete ensure that the grate is replaced and the install site is returned to its original condition.

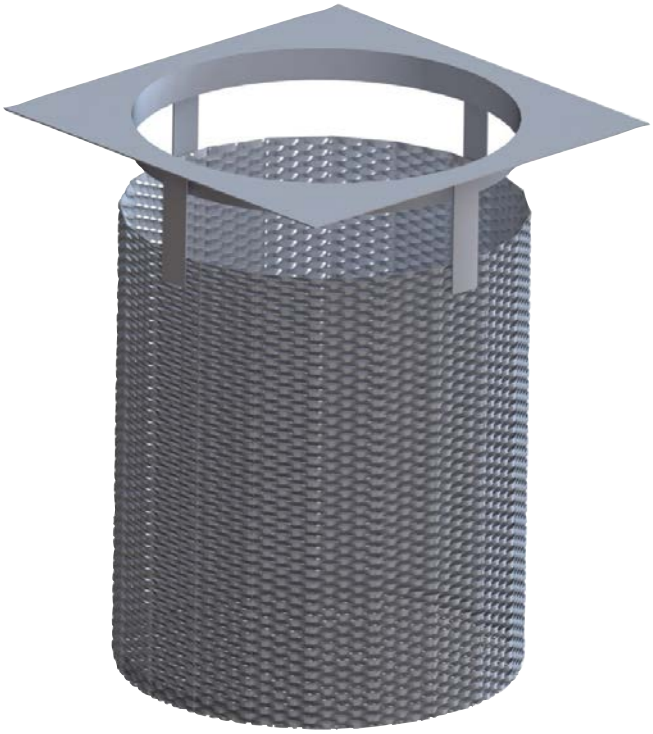


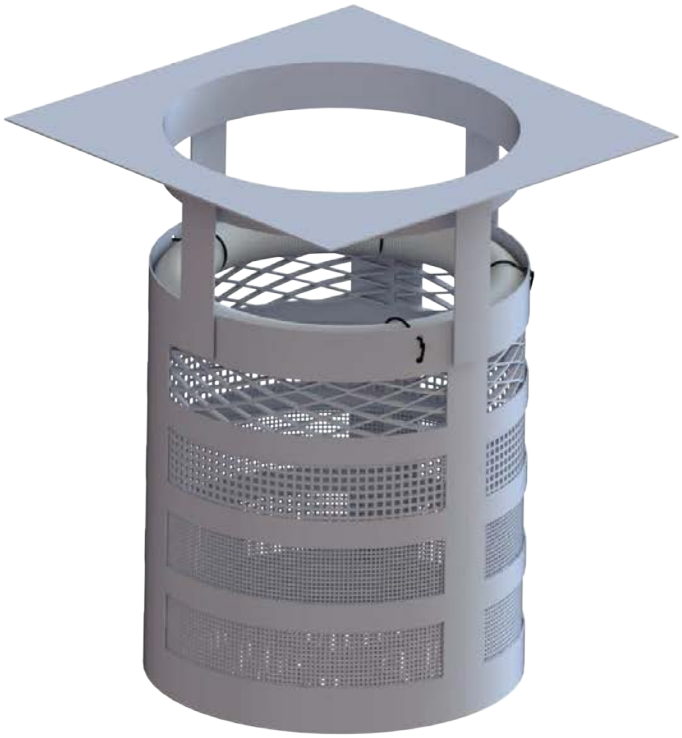
For Installation Support or Information Please Contact Us At:
760-433-7640
Or Email: info@biocleanenvironmental.com

Grate Inlet Filter

Bio Clean
A Forterra Company

OPERATION & MAINTENANCE





Bio Clean Environmental Services, Inc.
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Oceanside, CA 92058

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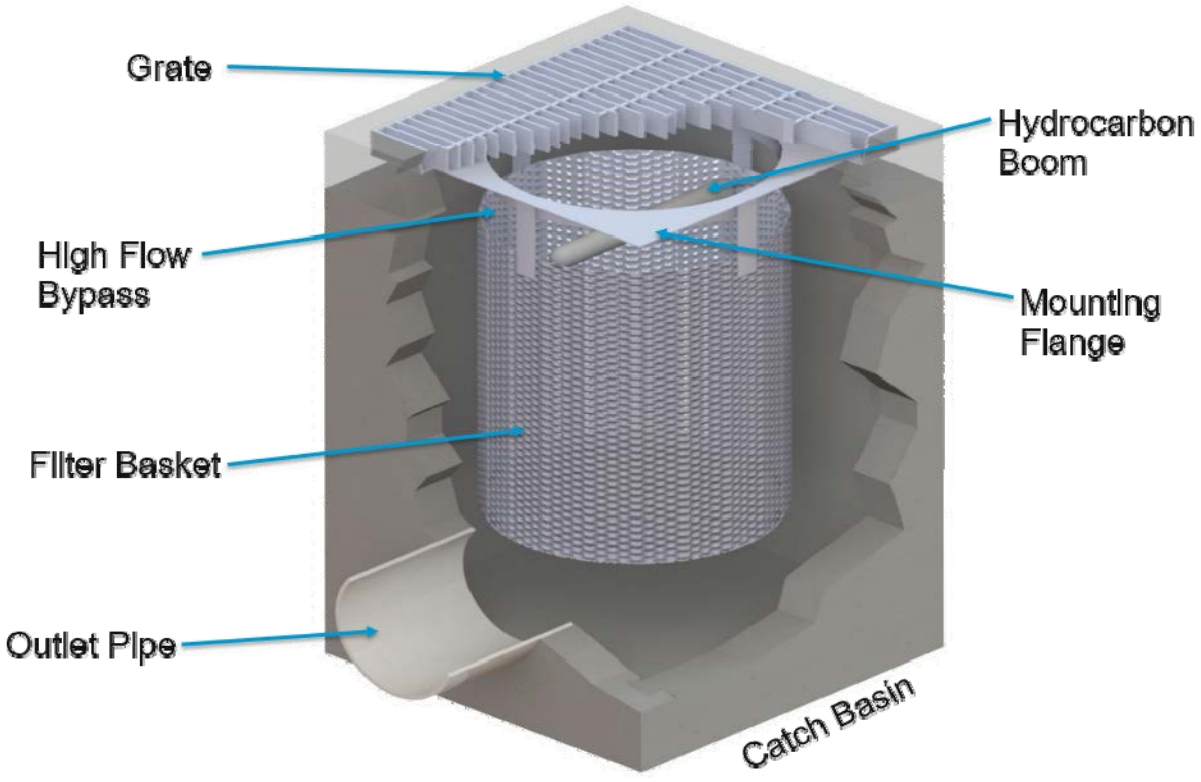
p: 760.433.7640
f: 760.433.3176

OPERATION & MAINTENANCE

The Bio Clean Grate Inlet Filter is a stormwater device designed to remove high levels of trash, debris, sediments and hydrocarbons. The filter is available in several configurations including trash full capture, multi-level screening, Kraken membrane filter and media filter variations. This manual covers maintenance procedures of the trash full capture and multi-level screening configurations. A supplemental manual is available for the Kraken and media filter variations. This filter is made of 100% stainless steel and is available and various sizes and depths allowing it to fit in any grated catch basin inlet. The filters heavy duty construction allows for cleaning with any vacuum truck. The filet can also easily be cleaned by hand.

As with all stormwater BMPs, inspection and maintenance on the Grate Inlet Filter is necessary. Stormwater regulations require BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess site-specific loading conditions. This is recommended because pollutant loading can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding of roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years. Without appropriate maintenance a BMP can exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.



System Diagram:

Inspection Equipment

Following is a list of equipment to allow for simple and effective inspection of the Grate Inlet Filter:

- Bio Clean Environmental Inspection Form (contained within this manual).
- Manhole hook or appropriate tools to remove access hatches and covers.
- Appropriate traffic control signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections or maintenance of the system.

Inspection Steps

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the Grate Inlet Filter are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long-term inspection and maintenance interval requirements.

The Grate Inlet Filter can be inspected though visual observation. All necessary pre-inspection steps must be carried out before inspection occurs, such as safety measures to protect the inspector and nearby pedestrians from any dangers associated with an open grated inlet. Once the grate has been safely removed the inspection process can proceed:

- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other info (see inspection form).
- Observe the filter with the grate removed.
- Look for any out of the ordinary obstructions on the grate or in the filter and its bypass. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, foliage and sediment accumulated inside the filter basket. Record this information on the inspection form.
- Observe the condition and color of the hydrocarbon boom. Record this information on the inspection form.
- Finalize inspection report for analysis by the maintenance manager to determine if maintenance is required.

Maintenance Indicators

Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components.
- Obstructions in the filter basket and its bypass.
- Excessive accumulation of trash, foliage and sediment in the filter basket. Maintenance is required when the basket is greater than half-full.
- The following chart shows the 50% and 100% storage capacity of each filter height:

Model	Filter Basket Diameter (in)	Filter Basket Height (in)	50% Storage Capacity (cu ft)	100% Storage Capacity (cu ft)
BC-GRATE-12-12-12	10.00	12.00	0.27	0.55
BC-GRATE-18-18-18	16.00	18.00	1.05	2.09
BC-GRATE-24-24-24	21.00	24.00	2.41	4.81
BC-GRATE-30-30-24	27.00	24.00	3.98	7.95
BC-GRATE-36-36-24	33.00	24.00	5.94	11.88
BC-GRATE-48-48-18	44.00	18.00	7.92	15.84

Maintenance Equipment

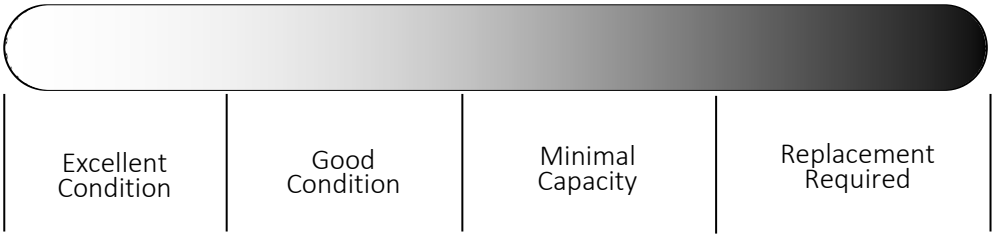
It is recommended that a vacuum truck be utilized to minimize the time required to maintain the Curb Inlet Filter, though it can easily cleaned by hand:

- Bio Clean Environmental Maintenance Form (contained in O&M Manual).
- Manhole hook or appropriate tools to remove the grate.
- Appropriate safety signage and procedures.
- Protective clothing and eye protection.
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine maintenance of the system. Small or large vacuum truck (with pressure washer attachment preferred).

Maintenance Procedures

It is recommended that maintenance occurs at least two days after the most recent rain event to allow debris and sediments to dry out. Maintaining the system while flows are still entering it will increase the time and complexity required for maintenance. Cleaning of the Grate Inlet Filter can be performed utilizing a vacuum truck. Once all safety measures have been set up cleaning of the Grate Inlet Filter can proceed as followed:

- Remove grate (traffic control and safety measures to be completed prior).
- Using an extension on a vacuum truck position the hose over the opened catch basin. Insert the vacuum hose down into the filter basket and suck out trash, foliage and sediment. A pressure wash is recommended and will assist in spraying of any debris stuck on the side or bottom of the filter basket. Power wash off the filter basket sides and bottom.
- Next remove the hydrocarbon boom that is attached to the inside of the filter basket. The hydrocarbon boom is fastened to rails on two opposite sides of the basket (vertical rails). Assess the color and condition of the boom using the following information in the next bullet point. If replacement is required install and fasten on a new hydrocarbon boom. Booms can be ordered directly from the manufacturer.
- Follow is a replacement indication color chart for the hydrocarbon booms:



- The last step is to replace the grate and remove all traffic control.
- All removed debris and pollutants shall be disposed of following local and state requirements.
- Disposal requirements for recovered pollutants may vary depending on local guidelines. In most areas the sediment, once dewatered, can be disposed of in a sanitary landfill. It is not anticipated that the sediment would be classified as hazardous waste.
- In the case of damaged components, replacement parts can be ordered from the manufacturer. Hydrocarbon booms can also be ordered directly from the manufacturer as previously noted.

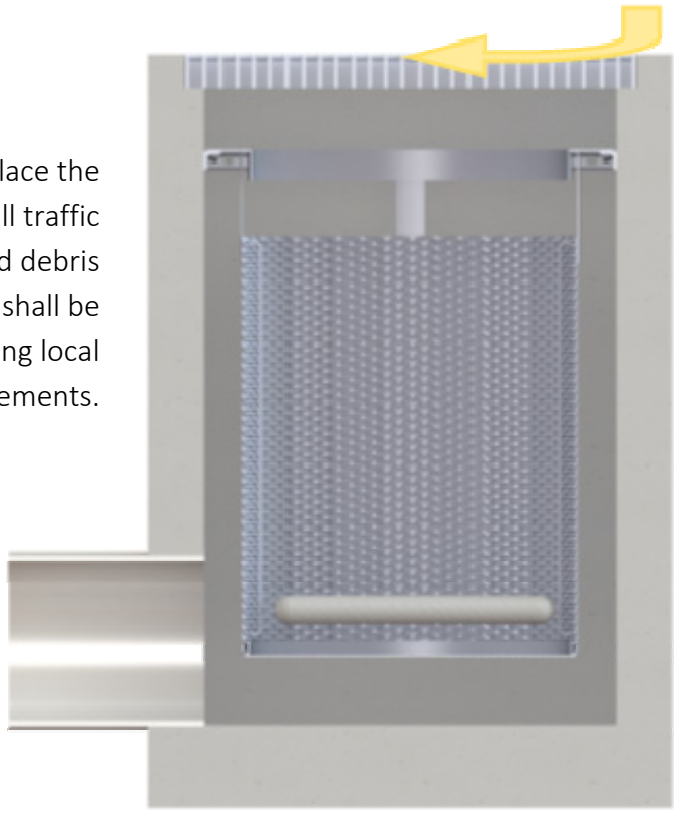
Maintenance Sequence

Remove grate and set up vacuum truck to clean the filter basket.

Insert the vacuum hose down into the filter basket and suck out debris. Use a pressure washer to assist in vacuum removal. Pressure wash off screens.

Remove the hydrocarbon boom that is attached to the inside of the filter basket. The hydrocarbon boom is fastened to rails on two opposite sides of the basket (vertical rails). Assess the color and condition of the boom using the following information in the next bullet point. If replacement is required install and fasten on a new hydrocarbon boom.

Close up and replace the grate and remove all traffic control. All removed debris and pollutants shall be disposed of following local and state requirements.



For Maintenance Services or Information Please Contact Us At:
760-433-7640
Or Email:
info@biocleanenvironmental.com

Bio Clean
A Forterra Company

Inspection and Maintenance Report
Catch Basin Only

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ___/___/___ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ollow Up ☐omplaint ☐torm Storm Event in Last 72-hours? ☐ ☐s

Weather Condition _____ Additional Notes _____

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Catch Basin Size	Evidence of Illicit Discharge?	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Signs of Structural Damage?	Functioning Properly or Maintenance Needed?
1	Lat: Long:							
2	Lat: Long:							
3	Lat: Long:							
4	Lat: Long:							
5	Lat: Long:							
6	Lat: Long:							
7	Lat: Long:							
8	Lat: Long:							
10	Lat: Long:							
11	Lat: Long:							
12	Lat: Long:							

Comments:

398 Via El Centro, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

Bio Clean
A Forterra Company

Inspection and Maintenance Report
Catch Basin Only

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ ☐

Weather Condition _____ Additional Notes _____

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Catch Basin Size	Evidence of Illicit Discharge?	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Signs of Structural Damage?	Functioning Properly or Maintenance Needed?
1	Lat: Long:							
2	Lat: Long:							
3	Lat: Long:							
4	Lat: Long:							
5	Lat: Long:							
6	Lat: Long:							
7	Lat: Long:							
8	Lat: Long:							
10	Lat: Long:							
11	Lat: Long:							
12	Lat: Long:							

Comments:

398 Via El Centro, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

Appendix 10: Educational Materials

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

For the Final WQMP, examples of material to provide in Appendix 10 may include but are not limited to the following:

- BMP Fact Sheets for proposed BMPs form Exhibit C: LID BMP Design Handbook of the SMR WQMP,
- Source control information and training material for site owners and operators,
- O&M training material,
- Other educational/training material related to site drainage and BMPs.

Sample Employee Training Sign-in

EMPLOYEE NAME	DATE COMPLETED	TRAINING PERFORMED	SUPERVISOR INITIALS

Stormwater Pollution

What you should know for...

Industrial & Commercial Facilities

Riverside County Stormwater Program Members

City of Banning
(951) 922-3105

City of Beaumont
(951) 769-8520

City of Calimesa
(909) 795-9801

City of Canyon Lake
(951) 244-2955

City of Cathedral City
(760) 770-0340

City of Coachella
(760) 398-3502

City of Corona
(951) 736-2447

City of Desert Hot Springs
(760) 329-6411

City of Eastvale
(951) 361-0900

City of Hemet
(951) 765-2300

City of Indian Wells
(760) 346-2489

City of Indio
(760) 391-4000

City of Jurupa Valley
(951) 332-6464

City of Lake Elsinore
(951) 674-3124

City of La Quinta
(760) 777-7000

City of Menifee
(951) 672-6777

City of Moreno Valley
(951) 413-3000

City of Murrieta
(951) 304-2489

City of Norco
(951) 270-5607

City of Palm Desert
(760) 346-0611

City of Palm Springs
(760) 323-8299

City of Perris
(951) 943-6100

City of Rancho Mirage
(760) 324-4511

City of Riverside
(951) 826-5311

City of San Jacinto
(951) 487-7330

City of Temecula
(951) 694-6444

City of Wildomar
(951) 677-7751

Coachella Valley Water District
(760) 398-2651

County of Riverside
(951) 955-1000

Riverside County Flood Control District
(951) 955-1200

Best Management Practices (BMPS) for:

- Industrial Facilities
- Commercial Facilities

YOU can prevent Stormwater Pollution following these practices...

Industrial and Commercial Facilities

The Riverside County Stormwater Program has identified a number of Best Management Practices (BMPs) for Industrial and Commercial Facilities. These BMPs control and reduce stormwater pollutants from reaching our storm drain system and ultimately our local water bodies. City and County ordinances require businesses to use these BMPs to protect our water quality. Local cities and the County are required to verify implementation of these BMPs by performing regular facility inspections.

Prohibited Discharges

Discontinue all non-stormwater discharges to the storm drain system. It is *prohibited* to discharge any chemicals, paints, debris, wastes or wastewater into the gutter, street or storm drain.

Outdoor Storage BMPs

- Install covers and secondary containment areas for all hazardous materials and wastes stored outdoors in accordance with County and/or City standards.
- Keep all temporary waste containers covered, at all times when not in use.
- Sweep outdoor areas instead of using a hose or pressure washer.
- Move all process operations including vehicle/equipment maintenance inside of the building or under a covered and contained area.
- Wash equipment and vehicles in a contained and covered wash bay which is closed-loop or connected to a clarifier sized to local standards and discharged to a sanitary sewer or take them to a commercial car wash.

Spills and Clean Up BMPs

- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep up the area.
- Clean up spills immediately when they occur, using dry clean up methods such as absorbent materials or sweep followed by proper disposal of materials.
- Always have a spill kit available near chemical loading dock doors and vehicle maintenance and fueling areas.
- Follow your Business Emergency Plan, as filed with the local Fire Department.
- Report all prohibited discharges and non-implementation of BMPs to your local Stormwater Coordinator as listed on the back of this pamphlet.
- Report hazardous materials spills to 951-358-5055 or call after hours to 951-782-2973 or, if an emergency, call the Fire Department's Haz Mat Team at 911.

Plastic Manufacturing Facilities BMPs

AB 258 requires plastic product manufacturers to use BMPs, such as safe storage and clean-up procedures to prevent plastic pellets (nurdles) from entering the waterway. The plastic pellets are released into the environment during transporting, packaging and processing and migrate to waterways through the storm drain system. AB 258 will help protect fish and wildlife from the hazards of plastic pollution.

Training BMPs

As prescribed by your City and County Stormwater Ordinance(s), train employees in spill procedures and prohibit non-stormwater discharges to the storm drain system. Applicable BMP examples can be found at www.cabmphandbooks.com.

Permitting

Stormwater discharges associated with specific categories for industrial facilities are regulated by the State Water Resources Control Board through an Industrial Stormwater General Permit. A copy of this General Permit and application forms are available at: www.waterboards.ca.gov, select stormwater then the industrial quick link.

To report illegal dumping or for more information on stormwater pollution prevention call: 1-800-506-2555 or e-mail us at: fcnpdes@rcflood.org.

Stormwater Pollution . . . What You Should Know

Riverside County has two drainage systems - sewers and storm drains. The storm drain system was designed to reduce flooding by carrying excess rainwater away from streets and developed areas. The storm drain system does not provide water treatment. It is connected directly to our local waterways.

Unlike sanitary sewers, storm drains are not connected to a wastewater treatment plant – they flow directly to our local streams, rivers and lakes.

Stormwater runoff is a part of the natural hydrologic process. However, land development and construction activities can affect the natural drainage processes and introduce pollutants into stormwater runoff. Polluted stormwater runoff from construction sites has been identified as a major source of water pollution in California. It jeopardizes the quality of our local waterways and can pose a serious threat to the health of our aquatic ecosystems.

The Cities and County of Riverside Water Pollution Prevention Program

Because preventing pollution is much easier and less costly than cleaning up "after the fact," Cities and County of Riverside's "Only Rain Down the Storm Drain" Water Pollution Prevention Program informs residents and businesses on pollution prevention activities. This pamphlet describes various Best Management Practices (BMPs) that construction site operators can use to prevent stormwater pollution.

In accordance with applicable federal and state law, the Cities and County of Riverside have adopted ordinances for stormwater management that prohibit the discharge of pollutants into the storm drain system or local surface water. This includes discharges from construction sites containing sediment, concrete, mortar, paint, solvents, lubricants, vehicle fluids, fuel, pesticides, and construction debris.

PLEASE NOTE: The Federal, State and local regulations strictly prohibit the discharge of sediment and pollutants into the streets, the storm drain system or waterways. As an owner, operator or supervisor of a construction site, you may be held financially responsible for any environmental damage caused by your subcontractors or employees.

WATER POLLUTION PREVENTION FOR CONSTRUCTION ACTIVITIES

The two most common sources of stormwater pollution problems associated with construction activities are ***erosion*** and ***sedimentation***. Failure to maintain adequate erosion and sediment controls at construction sites often results in sediment discharges into the storm drain system, creating multiple problems once it enters local waterways.

Construction vehicles and heavy equipment can also track significant amounts of mud and sediment onto adjacent streets. Additionally, wind may transport construction materials and wastes into streets storm drains, or directly into our local waterways.

Resources

State Water Resources Control Board
Division of Water Quality
1001 I Street
Sacramento CA 95814
(916) 341-5455
www.swrcb.ca.gov/water_issues/programs/stormwater

Colorado River Basin Regional Water Quality Control Board - Region 7
73-720 Fred Waring Drive, Suite 100
Palm Desert, CA 92260
(760) 346-7491
www.waterboards.ca.gov/coloradoriver

Santa Ana Regional Water Quality Control Board - Region 8
3737 Main Street, Suite 500
Riverside, CA 92501-3348
(951) 782-4130
www.waterboards.ca.gov/santaana

San Diego Regional Water Quality Control Board - Region 9
2375 Northside Drive Suite 100
San Diego, CA 92108
(619) 516-1990
www.waterboards.ca.gov/sandiego

To report a hazardous materials spill, call:

During normal business hours
(7:00 a.m. to 5:30 p.m.)
Riverside County Department of Environmental Health
(951)-358-5172 or **1-888-722-4234**
www.rivcoeh.org.

After business hours, on weekends or holidays, call **(951)-782-2968**

In an emergency, dial **911**

For hazardous waste disposal information call:

(951) 358-5055

To report an illegal discharge or a clogged storm drain, call:

1-800-506-2555

For more information, please call the Riverside County's "Only Rain Down the Storm Drain" Water Pollution Prevention Program at 1-800-506-2555 or www.rcflood.org

The "Only Rain Down the Storm Drain" Pollution Prevention Program acknowledges The City of Coronado for the information provided in brochure.

Water Pollution Prevention

What you should know for...

GENERAL CONSTRUCTION & SITE SUPERVISION

Best Management Practices (BMPs) for:

- Developers
- General Contractors
- Home Builders
- Construction Inspectors
- Anyone in the construction business

What Should You Do?
Advance Planning to Prevent Pollution

- ❑ Remove existing vegetation only as needed.
- ❑ Schedule excavation, grading, and paving operations for dry weather periods, if possible.
- ❑ Designate a specific area of the construction site, well away from storm drain inlets or watercourses, for material storage and equipment maintenance.
- ❑ Develop and implement an effective combination of erosion and sediment controls for the construction site.
- ❑ Practice source reduction by ordering only the amount of materials that are needed to finish the project.
- ❑ Educate your employees and subcontractors about stormwater management requirements and their pollution prevention responsibilities.
- ❑ Control the amount of surface runoff at the construction site by impeding internally generated flows and using berms or drainage ditches to direct incoming offsite flows to go around the site. ***Note:*** *Consult local drainage policies for more information.*

Best Management Practices

The following Best Management Practices (BMPs) can significantly reduce pollutant discharges from your construction site. Compliance with stormwater regulations can be as simple as minimizing stormwater contact with potential pollutants by providing covers and secondary containment for construction materials, designating areas away from storm drain systems for storing equipment and materials and implementing good housekeeping practices at the construction site.

- ❑ Protect all storm drain inlets and streams located near the construction site to prevent sediment-laden water from entering the storm drain system.
- ❑ Limit access to and from the site. Stabilize construction entrances/exits to minimize the track out of dirt and mud onto adjacent streets. Conduct frequent street sweeping.
- ❑ Protect stockpiles and construction materials from winds and rain by storing them under a roof, secured impermeable tarp or plastic sheeting.
- ❑ Avoid storing or stockpiling materials near storm drain inlets, gullies or streams.
- ❑ Phase grading operations to limit disturbed areas and duration of exposure.
- ❑ Perform major maintenance and repairs of vehicles and equipment offsite.
- ❑ Wash out concrete mixers only in designated washout areas at the construction site.
- ❑ Set-up and operate small concrete mixers on tarps or heavy plastic drop cloths.
- ❑ Keep construction sites clean by removing trash, debris, wastes, etc. on a regular basis.
- ❑ Clean-up spills immediately using dry clean-up methods (e.g., absorbent materials such as cat litter, sand or rags for liquid spills; sweeping for dry spills such as cement, mortar or fertilizer) and by removing the contaminated soil from spills on dirt areas. .
- ❑ Prevent erosion by implementing any or a combination of soil stabilization practices such as mulching, surface roughening, permanent or temporary seeding.
- ❑ Maintain all vehicles and equipment in good working condition. Inspect frequently for leaks, and repair promptly.
- ❑ Practice proper waste disposal. Many construction materials and wastes, including solvents, water-based paint, vehicle fluids, broken asphalt and concrete, wood, and cleared vegetation can be recycled. Materials that cannot be recycled must be taken to an appropriate landfill or disposed of as hazardous waste.
- ❑ Cover open dumpsters with secured tarps or plastic sheeting. Never clean out a dumpster by washing it down on the construction site.
- ❑ Arrange for an adequate debris disposal schedule to insure that dumpsters do not overflow.

General Construction Activities Stormwater Permit

(Construction Activities General Permit)

The State Water Resources Control Board (SWRCB) adopted a new Construction Activities General Permit (Order No. 2010-0014-DWQ) on September 2, 2009, This permit is administered and enforced by the SWRCB and the local Regional Water Quality Control Boards (RWQCB). The updated Construction Activities General Permit establishes a number of new stormwater management requirements for construction site operator.

NOTE: *Some construction activies stormwater permits are issued on a regional basis. Consult your local RWQCB to find out if your project requires coverage under any of these permits.*

Frequently Asked Questions:

How do I know if I need a Construction Activities General Permit?

If your construction project requires a land disturbance of one acre or more, or less than one acre but part of a larger common plan of development or sale.

How do I obtain coverage under the Construction Activities General Permit?

The Legally Responsible Person (LRP) must electronically submit Permit Registration Documents (PRDs) prior to commencement of construction activities in the Storm Water Multi-Application Report Tracking System (SMARTS).

PRDs consist of the Notice of Intent, Risk Assessment, Post-Construction Calculations, a Site Map, the SWPPP, a signed certification statement by the LRP, and the first annual fee. Once these components have been submitted and are deemed complete by the SMARTS system, a WDID number will automatically be emailed to the LRP.

What must I do to comply with the requirements of the Construction Activities General Permit?

- ● Have a qualified SWPPP Developer (QSD) prepare a Stormwater Pollution Prevention Plan (SWPPP) prior to commencing construction activities.
- ● Have a qualified SWPPP Practitioner (QSP) implement the SWPPP.
- ● Keep a copy of the SWPPP at the construction site for the entire duration of the project.
- ● Implement an effective combination of erosion and sediment control on all soil disturbed areas.
- ● Conduct site inspections prior to anticipated storm events, every 24-hours during extended storm events, and after an actual storm event.
- ● Implement BMPs for non-stormwater discharges year-round.
- ● Perform repair and maintenance of BMPs as soon as possible after storm events depending upon worker safety.
- ● Update the SWPPP as needed, to manage pollutants or reflect changes in site conditions.
- ● Include description of post construction BMPs at the construction site, including parties responsible for long-term maintenance.

NOTE: *Please refer to the Construction Activities General Permit for detailed information. You may contact the SWRCB, your local RWQCB, or visit the SWRCB website at www.swrcb.ca.gov/water_issues/programs/stormwater/ for more information.*

Revised July 2014

After the Storm

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

A Citizen's Guide to Understanding Stormwater

EPA 833-B-03-002

January 2003

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

Stormwater Pollution Solutions

Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential

Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Auto care

Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

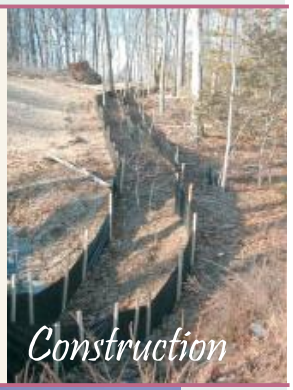
Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

Commercial

Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Construction



Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

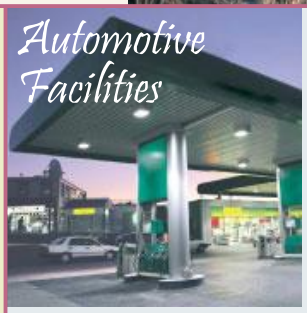
- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.

Agriculture

Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

Automotive Facilities



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- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
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Forestry

Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
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- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
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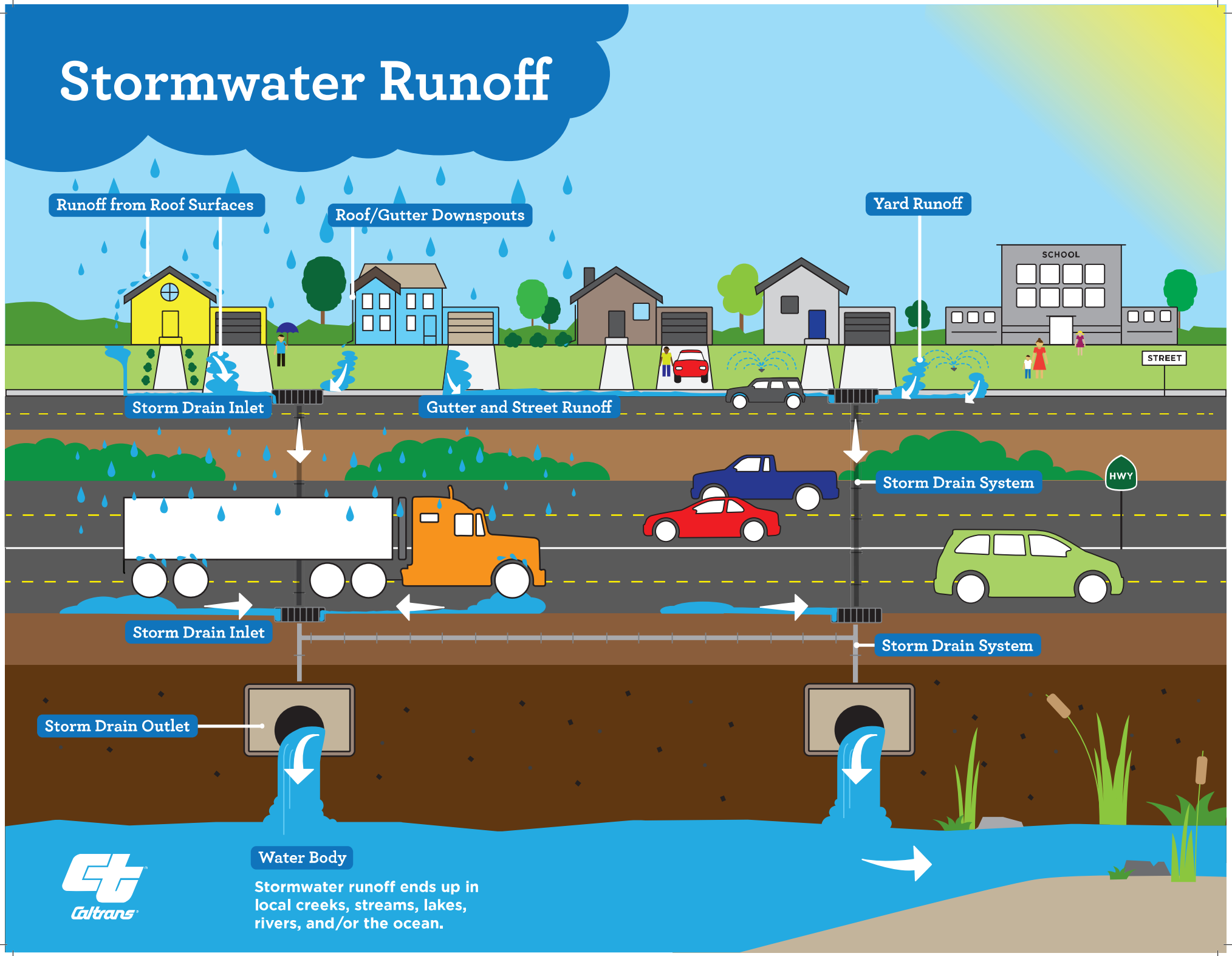
Stormwater Runoff



Caltrans

Caltrans

I Pledge to Protect Every Drop

ILLEGAL DUMPING IS RUBBISH

Properly dump your garbage to reduce California's stormwater pollution! Five easy tips to reduce pollutants:

APPLIANCES

When illegally dumped, appliances can release toxins that get washed away with rain and end up in our water bodies, polluting our water.

TIP 1: Donate or recycle appliances.
TIP 2: Properly dispose at your local dump.

FURNITURE

When dumped on the side of the roadway all furniture not only causes a safety hazard, but can also breakdown and get into local water bodies, causing pollution.

TIP 3: Contact local waste management for bulky pick-up or locate a dump for drop-off.

VEGETATION

Improperly dumped vegetation can flow to waterways, creating an imbalance of nitrates in water and thus harm aquatic life.

TIP 4: Tarp loads to reduce biodegradable waste on highways.
TIP 5: Use a green waste bin or consider composting biodegradable waste.

Don't risk a $10k fine & up to 6 months in jail

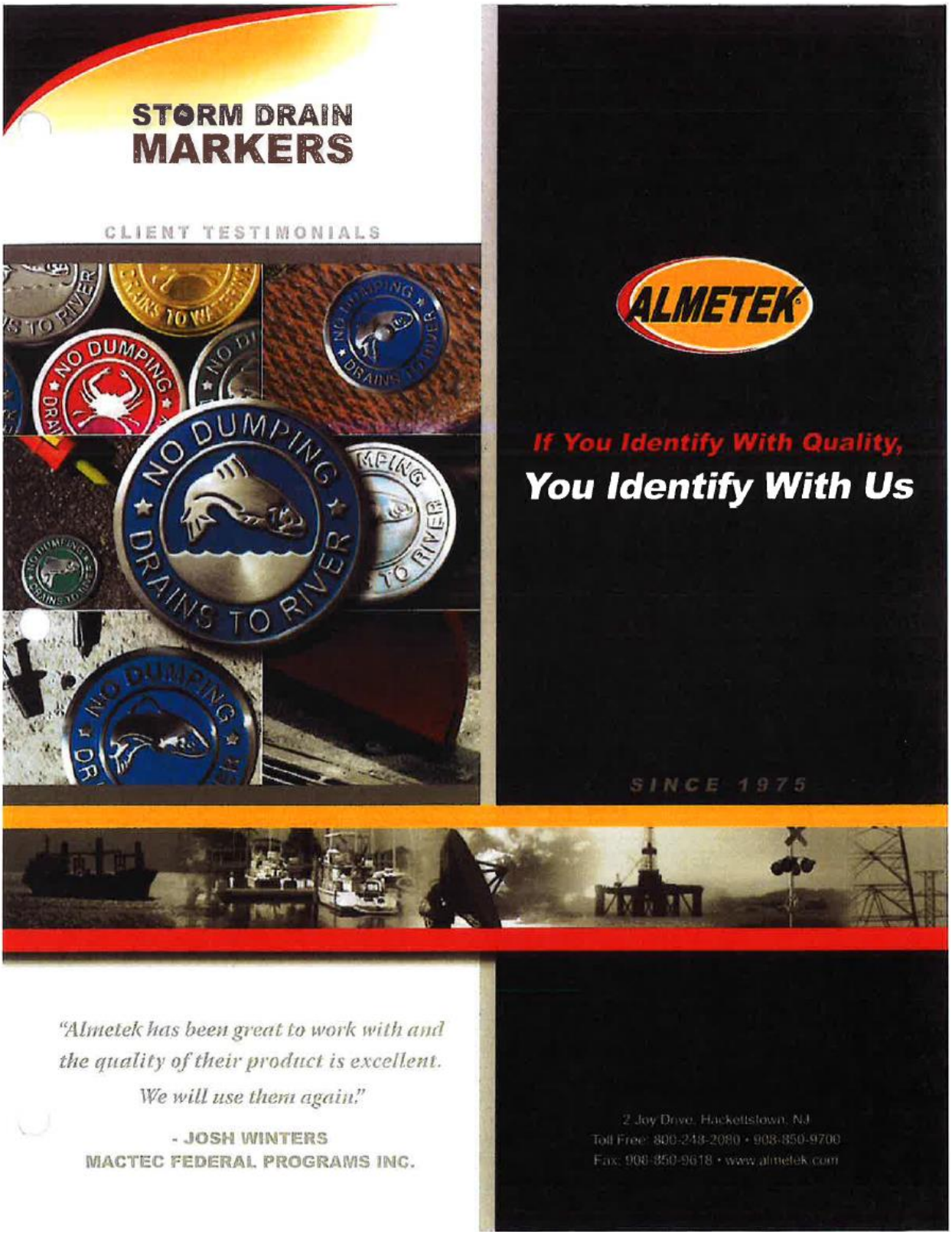
Simple changes in disposal of rubbish can help keep California's highways, waterways and bodies of water clean!

FOLLOW US ON SOCIAL MEDIA

#ProtectEveryDrop

FIND US ONLINE

www.protecteverydrop.com


STORM DRAIN
MARKERS
CLIENT TESTIMONIALS
NO DUMPING
DRAINS TO RIVER
ALMETEK
If You Identify With Quality,
You Identify With Us
SINCE 1975
"Almetek has been great to work with and the quality of their product is excellent. We will use them again."
- JOSH WINTERS
MACTEC FEDERAL PROGRAMS INC.
2 Joy Drive, Hackettstown, NJ
Toll Free: 800-248-2080 • 908-850-9700
Fax: 908-850-9618 • www.almetek.com

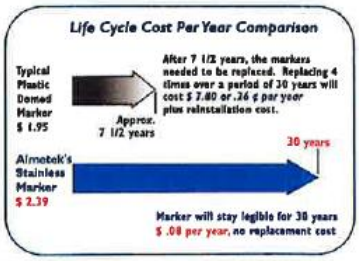
Almetek's Markers last a lifetime and are cost effective

Our attractive 4" Disc, 3-D embossed, metal, Storm Drain Markers will last for decades. They may even last a lifetime. These markers are so strong that they are virtually indestructible.

The Perfect Marker!
Almetek's metal markers have been engineered to perfection. They install easily, quickly and will remain permanently in place. Our patent pending sub-surface mounting installation with the turned down edges will ensure against theft and snow plow displacement. Our markers can be installed on the roadway, curb, storm drain grate or head. We are so sure of this product and its installation process that we will replace any missing marker with a brand new one, totally **FREE OF CHARGE.***

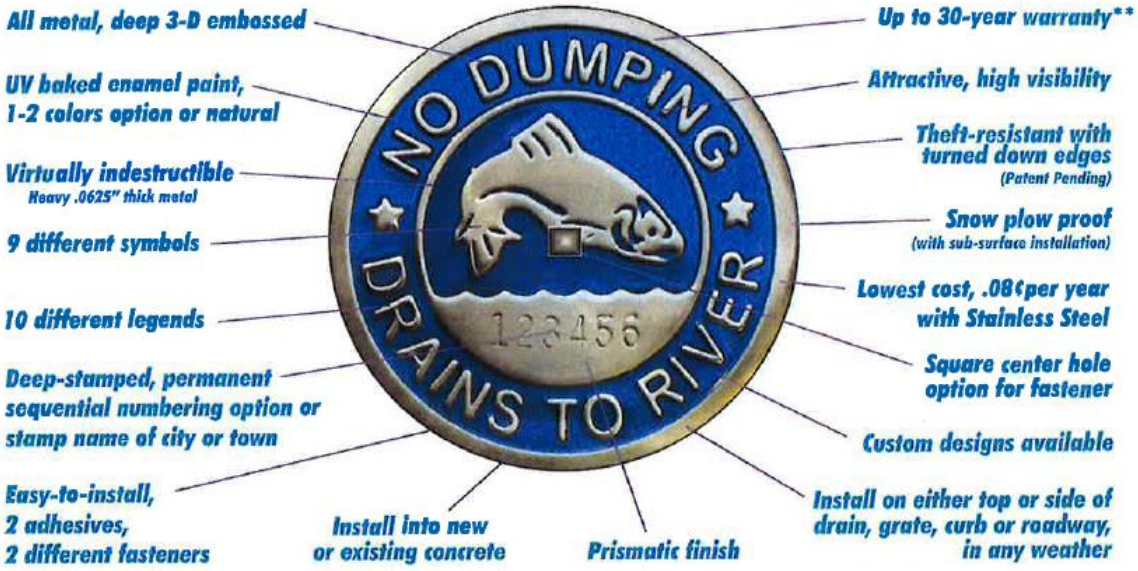
The Price is Right!
The price for stainless is less expensive than you think. A plastic marker may be pennies less initially, but in the long term, it will be more than three times expensive. Look at the facts.

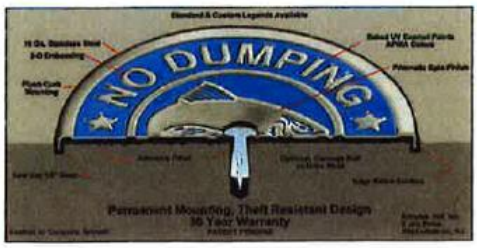
Plastic isn't as durable as stainless steel. The estimated life of a domed marker is approximately 7 1/2 years and some customers are telling us that the plastic markers are failing after two years. During the span of 30 years, with a domed marker, you may need to replace it, at least, 4 times. The typical cost of a domed marker of $1.95 and replacing 4 times, will cost you, without inflation and re-installation cost, $7.80. Our stainless steel marker will only cost $2.39 (500 order) and no replacement cost for 30-years. *The final fact:* you will save at least $5.40 per marker with Almetek's Stainless Steel Marker.



Now you know the facts.
Go ahead and compare our Storm Drain Marker's advantages.

Our Storm Drain Marker's Advantages



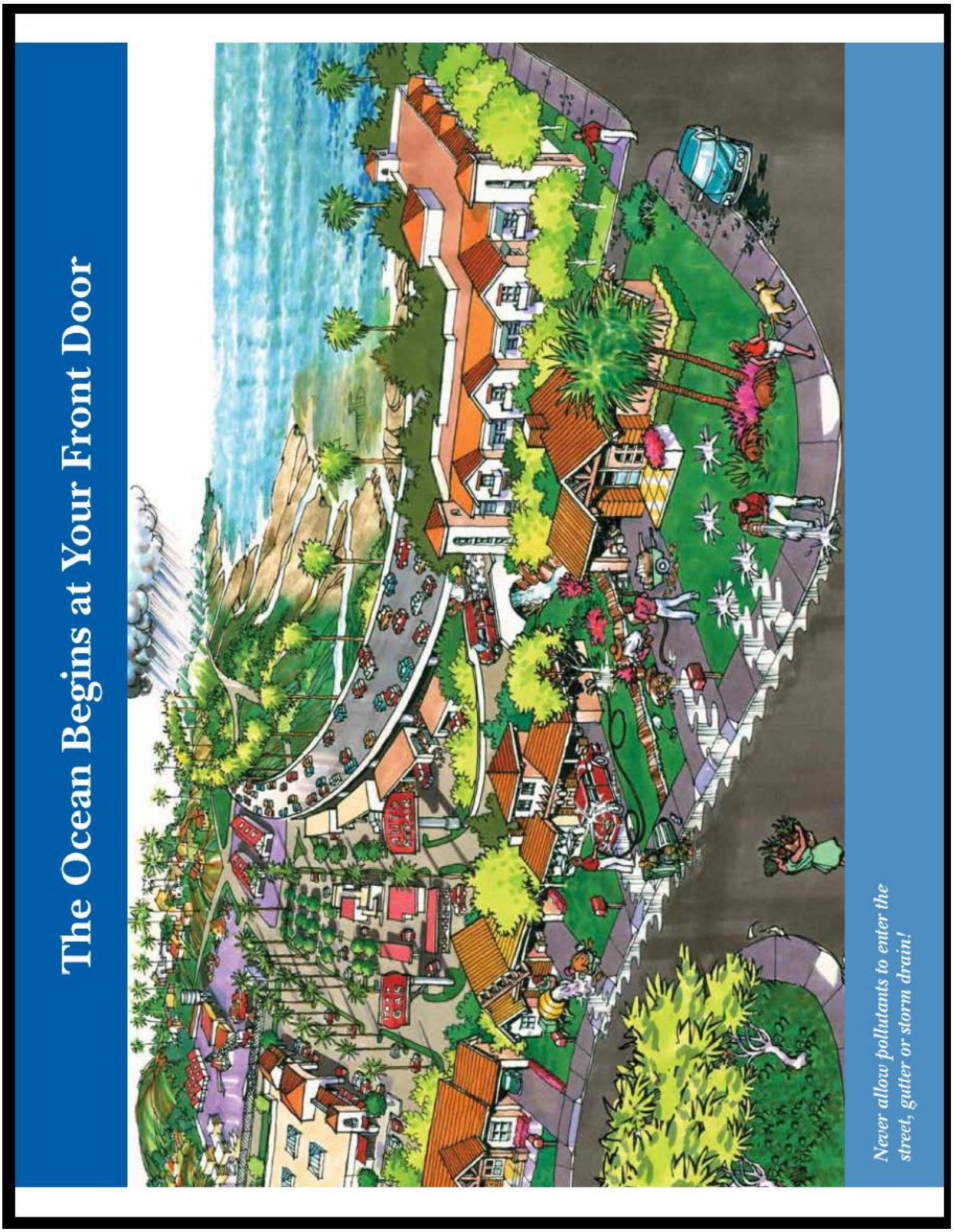


Patent pending sub-surface mounting.
See back page for all installation options.

BACK VIEW
Back has cavities for better adhesion.

CUSTOM IMPRINT
Optional: Engrave your City or Town or GPS location

* Provided that you have purchased our fastener, adhesive & sub-surface installation tool and followed all installation instructions.
** Stainless & Brass- 30-years, Aluminum and Anodized Aluminum, 15-years. Call for Almetek's Metal Storm Drain Warranty Certificate.


The Ocean Begins at Your Front Door
Never allow pollutants to enter the street, gutter or storm drain!

Follow these simple steps to help reduce water pollution:

Household Activities

- Do not rinse spills with water. Use dry cleanup methods such as applying cat litter or another absorbent material, sweep and dispose of in the trash. Take items such as used or excess batteries, oven cleaners, automotive fluids, painting products and cathode ray tubes, like TVs and computer monitors, to a Household Hazardous Waste Collection Center (HHWCC).
- For a HHWCC near you call (714) 834-6752 or visit www.oclandfills.com.
- Do not hose down your driveway, sidewalk or patio to the street, gutter or storm drain. Sweep up debris and dispose of it in the trash.

Automotive

- Take your vehicle to a commercial car wash whenever possible. If you wash your vehicle at home, choose soaps, cleaners, or detergents labeled non-toxic, phosphate-free or biodegradable. Vegetable and citrus-based products are typically safest for the environment.
- Do not allow washwater from vehicle washing to drain into the street, gutter or storm drain. Excess washwater should be disposed of in the sanitary sewer (through a sink or toilet) or onto an absorbent surface like your lawn.
- Monitor your vehicles for leaks and place a pan under leaks. Keep your vehicles well maintained to stop and prevent leaks.
- Never pour oil or antifreeze in the street, gutter or storm drain. Recycle these substances at a service station, a waste oil collection center or used oil recycling center. For the nearest Used Oil Collection Center call 1-800-CLEANUP or visit www.1800cleanup.org.

Pool Maintenance

- Pool and spa water must be dechlorinated and free of excess acid, alkali or color to be allowed in the street, gutter or storm drain.
- When it is not raining, drain dechlorinated pool and spa water directly into the sanitary sewer.
- Some cities may have ordinances that do not allow pool water to be disposed of in the storm drain. Check with your city.

Landscape and Gardening

- Do not over-water. Water your lawn and garden by hand to control the amount of water you use or set irrigation systems to reflect seasonal water needs. If water flows off your yard onto your driveway or sidewalk, your system is over-watering. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of waste by composting, hauling it to a permitted landfill, or as green waste through your city's recycling program.
- Follow directions on pesticides and fertilizer, (measure, do not estimate amounts) and do not use if rain is predicted within 48 hours.
- Take unwanted pesticides to a HHWCC to be recycled. For locations and hours of HHWCC, call (714) 834-6752 or visit www.oclandfills.com.

Trash

- Place trash and litter that cannot be recycled in securely covered trash cans.
- Whenever possible, buy recycled products.
- Remember: Reduce, Reuse, Recycle.

Pet Care

- Always pick up after your pet. Flush waste down the toilet or dispose of it in the trash. Pet waste, if left outdoors, can wash into the street, gutter or storm drain.
- If possible, bathe your pets indoors. If you must bathe your pet outside, wash it on your lawn or another absorbent/permeable surface to keep the washwater from entering the street, gutter or storm drain.
- Follow directions for use of pet care products and dispose of any unused products at a HHWCC.

Common Pollutants

Home Maintenance

- Detergents, cleaners and solvents
- Oil and latex paint
- Swimming pool chemicals
- Outdoor trash and litter

Lawn and Garden

- Pet and animal waste
- Pesticides
- Clippings, leaves and soil
- Fertilizer

Automobile

- Oil and grease
- Radiator fluids and antifreeze
- Cleaning chemicals
- Brake pad dust

Did You Know?

- Most people believe that the largest source of water pollution in urban areas comes from specific sources such as factories and sewage treatment plants. In fact, the largest source of water pollution comes from city streets, neighborhoods, construction sites and parking lots. This type of pollution is sometimes called "non-point source" pollution.
- There are two types of non-point source pollution: stormwater and urban runoff pollution.
- Stormwater runoff results from rainfall. When rainstorms cause large volumes of water to rinse the urban landscape, picking up pollutants along the way.
- Urban runoff can happen any time of the year when excessive water use from irrigation, vehicle washing and other sources carries trash, lawn clippings and other urban pollutants into storm drains.

Where Does It Go?

- Anything we use outside homes, vehicles and businesses – like motor oil, paint, pesticides, fertilizers and cleaners – can be blown or washed into storm drains.
- A little water from a garden hose or rain can also send materials into storm drains.
- Storm drains are separate from our sanitary sewer systems; unlike water in sanitary sewers (from sinks or toilets), water in storm drains is not treated before entering our waterways.

Sources of Non-Point Source Pollution

- Automotive leaks and spills.
- Improper disposal of used oil and other engine fluids.
- Metals found in vehicle exhaust, weathered paint, rust, metal plating and tires.
- Pesticides and fertilizers from lawns, gardens and farms.
- Improper disposal of cleaners, paint and paint removers.
- Soil erosion and dust debris from landscape and construction activities.
- Litter, lawn clippings, animal waste, and other organic matter.
- Oil stains on parking lots and paved surfaces.

The Effect on the Ocean

Non-point source pollution can have a serious impact on water quality in Orange County. Pollutants from the storm drain system can harm marine life as well as coastal and wetland habitats. They can also degrade recreation areas such as beaches, harbors and bays.

Stormwater quality management programs have been developed throughout Orange County to educate and encourage the public to protect water quality, monitor runoff in the storm drain system, investigate illegal dumping and maintain storm drains.

Support from Orange County residents and businesses is needed to improve water quality and reduce urban runoff pollution. Proper use and disposal of materials will help stop pollution before it reaches the storm drain and the ocean.

Stormwater and the Construction Industry

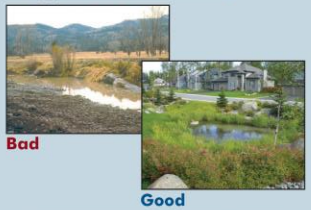
Protect Natural Features

- Minimize clearing.
- Minimize the amount of exposed soil.
- Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity.
- Protect streams, stream buffers, wild woodlands, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas.

Construction Phasing

- Sequence construction activities so that the soil is not exposed for long periods of time.
- Schedule or limit grading to small areas.
- Install key sediment control practices before site grading begins.
- Schedule site stabilization activities, such as landscaping, to be completed immediately after the land has been graded to its final contour.

Vegetative Buffers



- Protect and install vegetative buffers along waterbodies to slow and filter stormwater runoff.
- Maintain buffers by mowing or replanting periodically to ensure their effectiveness.

Silt Fencing

- Inspect and maintain silt fences after each rainstorm.
- Make sure the bottom of the silt fence is buried in the ground.
- Securely attach the material to the stakes.
- Don't place silt fences in the middle of a waterway or use them as a check dam.
- Make sure stormwater is not flowing around the silt fence.

Maintain your BMPs!

IN RIVERSIDE COUNTY....Call 1-800-506-2555
TO REPORT ILLEGAL STORMDRAIN DISPOSAL

E-mail: Flood.fcnpdes@co.riverside.ca.us
Visit our website: www.floodcontrol.co.riverside.ca.us

Brought to you by the Storm Water/Clean Water Pollution Protection Program.....
REMEMBER, ONLY RAIN IN THE STORMDRAIN!

Site Stabilization

- Vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed.

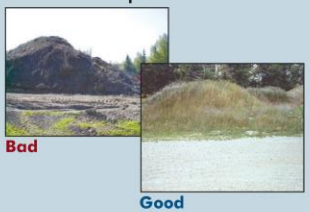
Construction Entrances

- Remove mud and dirt from the tires of construction vehicles before they enter a paved roadway.
- Properly size entrance BMPs for all anticipated vehicles.
- Make sure that the construction entrance does not become buried in soil.

Slopes

- Rough grade or terrace slopes.
- Break up long slopes with sediment barriers, or under drain, or divert stormwater away from slopes.

Dirt Stockpiles



- Cover or seed all dirt stockpiles.

Storm Drain Inlet Protection

- Use rock or other appropriate material to cover the storm drain inlet to filter out trash and debris.
- Make sure the rock size is appropriate (usually 1 to 2 inches in diameter).
- If you use inlet filters, maintain them regularly.

www.epa.gov/npdes/menuofbmps

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

After the Storm

For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

EPA 833-B-03-002

January 2003

Internet Address (URL) • HTTP://www.epa.gov
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A Citizen's Guide to Understanding Stormwater

Stormwater Pollution Solutions

Residential

Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

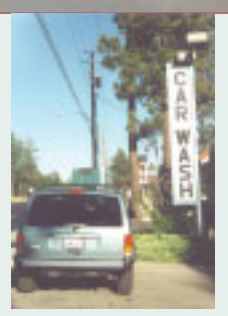
- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Auto care



Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

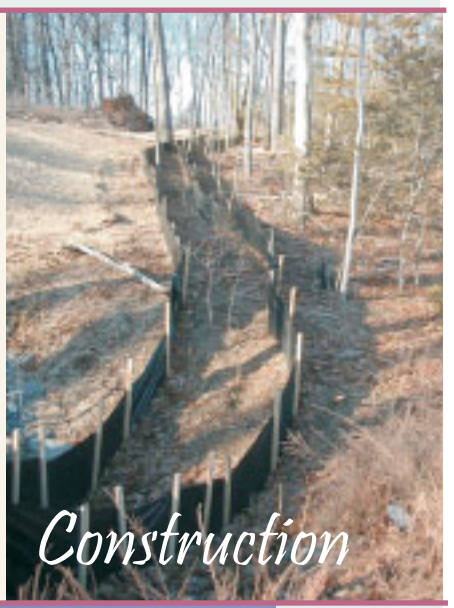
Commercial

Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



Construction

Agriculture

Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

Forestry

Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
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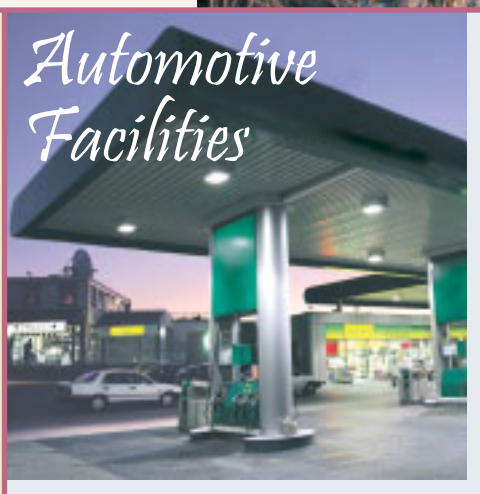


Automotive Facilities

Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

RIVERSIDE COUNTY
ANIMAL SERVICES LOCATIONS:

www.rcdas.org

BLYTHE
16450 West Hobson Way
Blythe, CA 92225
760-921-7857

COACHELLA VALLEY ANIMAL CAMPUS
72-050 Petland Place
Thousand Palms, CA 92276
760-343-3644

RIVERSIDE COUNTY ANIMAL SERVICES
6851 Van Buren Blvd.
Riverside, CA 92509
951-688-4340

OTHER ANIMAL SHELTERS:

ANIMAL CARE CENTER OF INDIO
45-355 Van Buren
Indio, CA 92201
760-391-4138

ANIMAL FRIENDS OF THE VALLEYS
29001 Bastron Avenue
Lake Elsinore, CA 92530
951-674-0618
(Serving incorporated Temecula, Wildomar, Lake Elsinore, Murrieta and Canyon Lake)

MARY S. ROBERTS PET ADOPTION CENTER
6185 Industrial Avenue
Riverside, CA 92504
951-688-4340

RAMONA HUMANE SOCIETY
690 Humane Way
San Jacinto 92586
951-654-8002
(Serving Sun City, Menifee, Romoland and Homeland)

Looking to adopt a pet?
This website is linked to many animal shelters.
www.petfinder.com

To report illegal storm drain disposal, call
1-800-506-2555

Or visit our website at www.rcflood.org

E-mail fcnpdes@rcflood.org

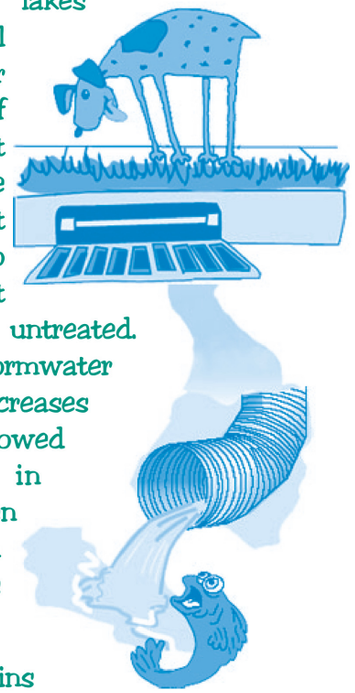
What's the Scoop?

Tips for a Healthy Pet and a Healthier Environment

CREATE A HEALTHY ENVIRONMENT in and around your home by following these simple pet practices. Your pet, family and neighbors will appreciate their clean comfortable surroundings.

HOUSEHOLD PETS

We all love our pets, but pet waste is a subject everyone likes to avoid. Pet waste left on trails, sidewalks, streets and grassy areas can be washed into the nearest waterway when it rains. Even if you can't see streams or lakes near you, rainfall (stormwater) or sprinkler runoff can wash pet waste into the storm drains that carry runoff to the nearest streams or lakes untreated. The risk of stormwater contamination increases if pet waste is allowed to accumulate in outdoor animal pen areas or left on sidewalks, streets or driveways.



Pet waste contains nutrients and bacteria. Nutrients can promote the growth of algae in streams and lakes. Algae can cause fish kills and other environmental damage if it is fed too many nutrients. Pet Waste also contains e. Coli and fecal bacteria, which can cause disease in other animals and humans that come in contact with it when swimming or splashing in streams and lakes. Dogs also carry salmonella and giardia, which can make people sick.

Pet waste that is not picked up and properly disposed can also increase vector problems. Flies and other insects are not only attracted to and feed on pet waste, but can also be infected with diseases and spread those diseases to humans and other animals.

WHAT CAN YOU DO?

- SCOOP up pet waste and flush it down the toilet or place in trash can.
- NEVER DUMP pet waste into a storm drain or catch basin.
- USE the complimentary bags or mutt mitts offered in dispensers at local parks.
- CARRY EXTRA BAGS when walking your dog and make them available to other pet owners who are without.
- TEACH CHILDREN how to properly clean up after a pet.
- TELL FRIENDS AND NEIGHBORS about the ill effects of animal waste on the environment. Encourage them to clean up after pets.

Call 1-800-506-2555 TOLL FREE to report illegal dumping to the storm drain, find the dates and times of local Household Hazardous Waste Collection Events, obtain additional information on stormwater problems and solutions, request presentations about stormwater pollution in your child's classroom, or learn about free grasscycling and composting workshops.

SCOOP THE POOP

Many communities have "Scoop the Poop" laws that govern pet waste cleanup. Some of these laws specifically require anyone who walks an animal off their property to carry a bag, shovel, or scooper. Any waste left by the animal must be cleaned up immediately. CALL YOUR LOCAL CODE ENFORCEMENT OFFICE to find out more about pet waste regulations.

OTHER WAYS TO PROTECT YOUR PETS AND THE ENVIRONMENT

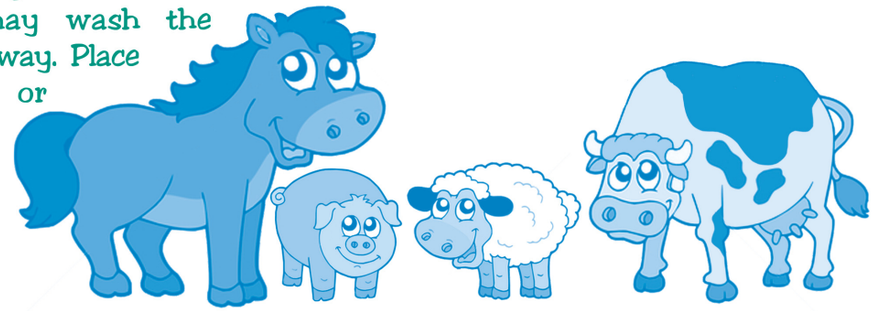
Pets are only one of many sources that contribute to water pollution. However, these other sources of water pollution cannot only harm the environment but also harm your pet. Improperly used or stored lawn fertilizers, pesticides, soaps, grease and vehicle fluids cannot only be washed into local streams and lakes, these chemicals can also harm your pet if they ingest or touch these chemicals. Call 1-800-506-2555 for information regarding how to properly dispose of household hazardous wastes such as these. You can also keep your pets and our environment healthy by properly maintaining your vehicles, and limiting use of pesticides and fertilizers to only the amount that is absolutely needed.

Make sure to not only protect your pets, but to also protect your neighbors pets. NEVER HOSE VEHICLE FLUIDS into the street or gutter. USE ABSORBENT MATERIALS such as cat litter to clean-up spills. SWEEP UP used absorbent materials and place it in the trash.

HORSES AND LIVESTOCK

Fortunate enough to own a horse or livestock? You, too, can play a part in protecting and cleaning up our water resources. The following are a few simple Best Management Practices (BMPs) specifically designed for horses and livestock.

- STORE your manure properly. Do not store unprotected piles of manure in places where stormwater runoff may wash the manure away. Place a cover or tarp over the pile to keep rainwater out.



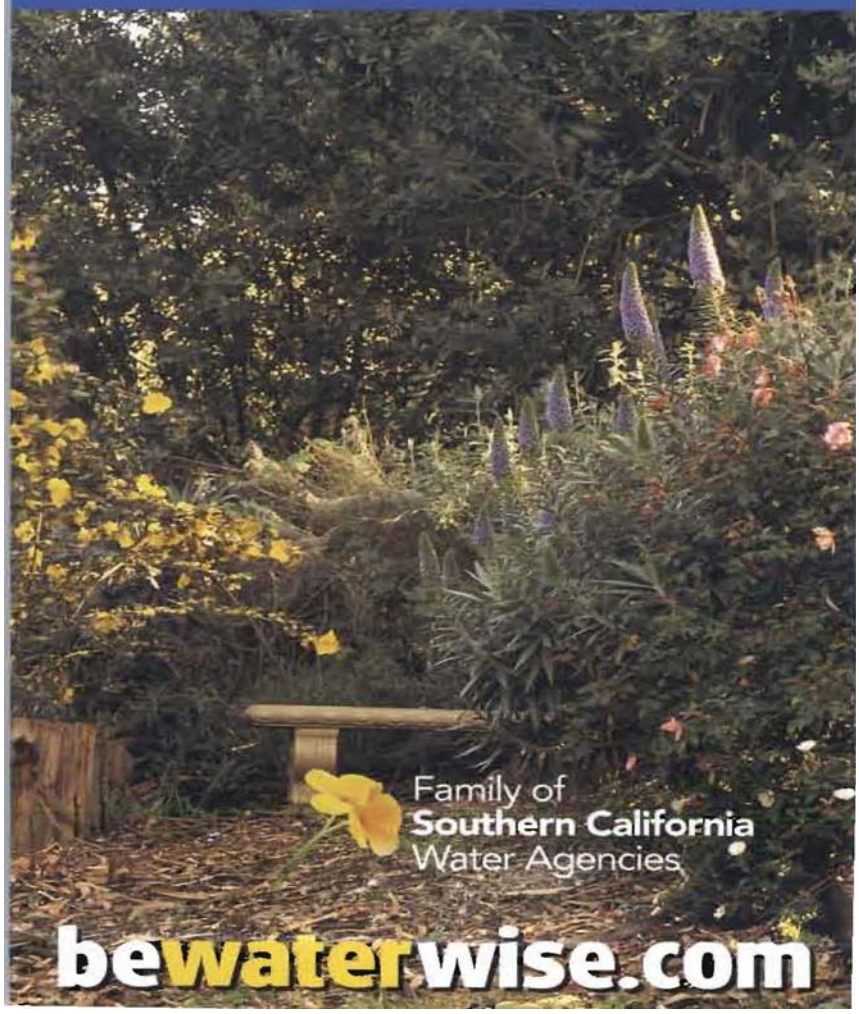
- BUILD a manure storage facility to protect your pets, property and the environment. These structures usually consist of a concrete pad to protect groundwater and a short wall on one or two sides to make manure handling easier.
- READ the Only Rain Down the Storm Drain brochure titled "Tips for Horse Care" for additional guidance and recommendations. This brochure should be available from your local city office or for download at www.rcflood.org/stormwater.
- KEEP animals out of streams - Horses and livestock can deficate in streams causing stormwater pollution. Livestock and horses in streams can also disturb sensitive habitat and vegetation, causing additional environmental damage. Keep livestock and horses away from streams and use designated stream crossings whenever possible.
- MATERIAL STORAGE SAFETY TIPS Many of the chemicals found in barns require careful handling and proper disposal. When using these chemicals, be certain to follow these common sense guidelines:
  - Buy only what you need.
  - Treat spills of hoof oils like a fuel spill. Use kitty litter to soak up the oil and dispose of it in a tightly sealed plastic bag.
  - Store pesticides in a locked, dry, well-ventilated area.
  - Protect stored fertilizer and pesticides from rain and surface water.

RESOURCE CONSERVATION DISTRICTS CAN HELP

Call 1-800-506-2555 for assistance with locating a local conservation district that can help you properly manage your manure, re-establish healthy pastures, control weeds, or identify appropriate grasses for your soils.

Thank you for doing your part to protect your watershed, the environment, your pets and your community!

10 Ways to Save Water Outdoors



TIP #1 The average homeowner uses twice the amount of water needed to keep plants healthy. Use the watering calculator and index at **bewaterwise.com** to know exactly how much water your plants need.

TIP #2 Check your sprinkler system for leaks, overspray and broken sprinkler heads. Update with drip or other more water-efficient sprinklers where appropriate.

TIP #3 This fall, plant a portion of your garden with beautiful native and California Friendly plants. Browse the plant database at **bewaterwise.com** to find just the right look for your outdoor spaces.

TIP #4 Reduce the amount of water-thirsty grass. Keep only what you need and replace the rest with less-thirsty plants or permeable paving.

TIP #5 For the grass you keep, set your lawnmower blade higher.

TIP #6 Adjust your sprinkler timer downward in September. Plants need less water when days are shorter.

TIP #7 Use a broom instead of the hose for cleaning sidewalks and patios.

TIP #8 Mulch! A layer of bark, gravel, compost, sawdust or low-growing groundcover evens out soil temperature and allows better water retention.

TIP #9 Check the list of invasive plants that hurt our environment at **caleppc.org** and remove any from your garden.

TIP #10 Share these tips with your gardener, neighbors and friends. Water conservation should be a part of every Southern Californian's lifestyle, but that doesn't mean we can't have lush and beautiful outdoor spaces.

bewaterwise.com

Site Design & Landscape Planning SD-10

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- ☑ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.

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Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.
- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.
- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.
- Promote natural vegetation by using parking lot islands and other landscaped areas.
- Preserve riparian areas and wetlands.

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.
- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and

regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of “ redevelopment” must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under “designing new installations” above should be followed.

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

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

Roof Runoff Controls SD-11

Rain Garden

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

One method of addressing roof runoff is to direct roof downspouts to cisterns or rain barrels. A cistern is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain

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barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say ¼ to ½ inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. These are described under Treatment Controls.

Pop-up Drainage Emitter

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a pop-up irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

Foundation Planting

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Supplemental Information

Examples

- City of Ottawa's Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

Other Resources

Hager, Marty Catherine, Stormwater, "Low-Impact Development", January/February 2003. www.stormh2o.com

Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD. www.lid-stormwater.net

Start at the Source, Bay Area Stormwater Management Agencies Association, 1999 Edition

Efficient Irrigation SD-12

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

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- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

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

Storm Drain Signage SD-13

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include “NO DUMPING

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– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

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

Trash Storage Areas SD-32

Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

Designing New Installations

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

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- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Maintenance Considerations

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

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

Drain Inserts MP-52

Description

Drain inserts are manufactured filters or fabric placed in a drop inlet to remove sediment and debris. There are a multitude of inserts of various shapes and configurations, typically falling into one of three different groups: socks, boxes, and trays. The sock consists of a fabric, usually constructed of polypropylene. The fabric may be attached to a frame or the grate of the inlet holds the sock. Socks are meant for vertical (drop) inlets. Boxes are constructed of plastic or wire mesh. Typically a polypropylene "bag" is placed in the wire mesh box. The bag takes the form of the box. Most box products are one box; that is, the setting area and filtration through media occur in the same box. Some products consist of one or more trays or mesh grates. The trays may hold different types of media. Filtration media vary by manufacturer. Types include polypropylene, porous polymer, treated cellulose, and activated carbon.

California Experience

The number of installations is unknown but likely exceeds a thousand. Some users have reported that these systems require considerable maintenance to prevent plugging and bypass.

Advantages

- Does not require additional space as inserts as the drain inlets are already a component of the standard drainage systems.
- Easy access for inspection and maintenance.
- As there is no standing water, there is little concern for mosquito breeding.
- A relatively inexpensive retrofit option.

Limitations

Performance is likely significantly less than treatment systems that are located at the end of the drainage system such as ponds and vaults. Usually not suitable for large areas or areas with trash or leaves than can plug the insert.

Design and Sizing Guidelines

Refer to manufacturer's guidelines. Drain inserts come any many configurations but can be placed into three general groups: socks, boxes, and trays. The sock consists of a fabric, usually constructed of polypropylene. The fabric may be attached to a frame or the grate of the inlet holds the sock. Socks are meant for vertical (drop) inlets. Boxes are constructed of plastic or wire mesh. Typically a polypropylene "bag" is placed in the wire mesh box. The bag takes the form of the box. Most box products are

Design Considerations

- Use with other BMPs
- Fit and Seal Capacity within Inlet

Targeted Constituents

- ☑ Sediment
- ☑ Nutrients
- ☑ Trash
- ☑ Metals
- Bacteria
- ☑ Oil and Grease
- ☑ Organics

Removal Effectiveness

See New Development and Redevelopment Handbook-Section 5.

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one box; that is, the setting area and filtration through media occurs in the same box. One manufacturer has a double-box. Stormwater enters the first box where setting occurs. The stormwater flows into the second box where the filter media is located. Some products consist of one or more trays or mesh grates. The trays can hold different types of media. Filtration media vary with the manufacturer: types include polypropylene, porous polymer, treated cellulose, and activated carbon.

Construction/Inspection Considerations

Be certain that installation is done in a manner that makes certain that the stormwater enters the unit and does not leak around the perimeter. Leakage between the frame of the insert and the frame of the drain inlet can easily occur with vertical (drop) inlets.

Performance

Few products have performance data collected under field conditions.

Siting Criteria

It is recommended that inserts be used only for retrofit situations or as pretreatment where other treatment BMPs presented in this section area used.

Additional Design Guidelines

Follow guidelines provided by individual manufacturers.

Maintenance

Likely require frequent maintenance, on the order of several times per year.

Cost

- The initial cost of individual inserts ranges from less than $100 to about $2,000. The cost of using multiple units in curb inlet drains varies with the size of the inlet.
- The low cost of inserts may tend to favor the use of these systems over other, more effective treatment BMPs. However, the low cost of each unit may be offset by the number of units that are required, more frequent maintenance, and the shorter structural life (and therefore replacement).

References and Sources of Additional Information

Hrachovec, R., and G. Minton, 2001, Field testing of a sock-type catch basin insert, Planet CPR, Seattle, Washington

Interagency Catch Basin Insert Committee, Evaluation of Commercially-Available Catch Basin Inserts for the Treatment of Stormwater Runoff from Developed Sites, 1995

Larry Walker Associates, June 1998, NDMP Inlet/In-Line Control Measure Study Report

Manufacturers literature

Santa Monica (City), Santa Monica Bay Municipal Stormwater/Urban Runoff Project - Evaluation of Potential Catch basin Retrofits, Woodward Clyde, September 24, 1998

Parking Area Maintenance SC-43

Description

Parking lots can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants from parking areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

BMPs for other outdoor areas on site (loading/unloading, material storage, and equipment operations) are described in SC-30 through SC-33.

Approach

The goal of this program is to ensure stormwater pollution prevention practices are considered when conducting activities on or around parking areas to reduce potential for pollutant discharge to receiving waters. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- Encourage advanced designs and maintenance strategies for impervious parking lots. Refer to the treatment control BMP fact sheets in this manual for additional information.
- Keep accurate maintenance logs to evaluate BMP implementation.

Good Housekeeping

- Keep all parking areas clean and orderly. Remove debris, litter, and sediments in a timely fashion.
- Post "No Littering" signs and enforce anti-litter laws.

Objectives
■ *Cover*
■ *Contain*
■ *Educate*
■ *Reduce/Minimize*
■ *Product Substitution*

Targeted Constituents	
Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	✓
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

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- ☐ Provide an adequate number of litter receptacles.
- ☐ Clean out and cover litter receptacles frequently to prevent spillage.

Preventative Maintenance

Inspection

Have designated personnel conduct inspections of parking facilities and stormwater conveyance systems associated with parking facilities on a regular basis.

- ☐ Inspect cleaning equipment/sweepers for leaks on a regular basis.

Surface Cleaning

- ☐ Use dry cleaning methods (e.g., sweeping, vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system if possible.
- ☐ Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- ☐ Sweep all parking lots at least once before the onset of the wet season.
- ☐ Dispose of parking lot sweeping debris and dirt at a landfill.
- ☐ Follow the procedures below if water is used to clean surfaces:
  - ✓ Block the storm drain or contain runoff.
  - ✓ Collect and pump wash water to the sanitary sewer or discharge to a pervious surface. Do not allow wash water to enter storm drains.
- ☐ Follow the procedures below when cleaning heavy oily deposits:
  - ✓ Clean oily spots with absorbent materials.
  - ✓ Use a screen or filter fabric over inlet, then wash surfaces.
  - ✓ Do not allow discharges to the storm drain.
  - ✓ Vacuum/pump discharges to a tank or discharge to sanitary sewer.
  - ✓ Dispose of spilled materials and absorbents appropriately.

Surface Repair

- ☐ Check local ordinance for SUSMP/LID ordinance.
- ☐ Preheat, transfer or load hot bituminous material away from storm drain inlets.
- ☐ Apply concrete, asphalt, and seal coat during dry weather to prevent contamination from contacting stormwater runoff.
- ☐ Cover and seal nearby storm drain inlets where applicable (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in

place until job is complete and all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.

- Use only as much water as necessary for dust control during sweeping to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Spill Response and Prevention Procedures

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible or at a central location.
- Clean up fluid spills immediately with absorbent rags or material.
- Dispose of spilled material and absorbents properly.

Employee Training Program

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Use a training log or similar method to document training.

Quality Assurance and Record Keeping

- Keep accurate maintenance logs that document minimum BMP activities performed for parking area maintenance, types and quantities of waste disposed of, and any improvement actions.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Capital investments may be required at some sites to purchase sweeping equipment, train sweeper operators, install oil/water/sand separators, or implement advanced BMPs. These costs can vary significantly depending upon site conditions and the amount of BMPs required.

Maintenance

- Sweep and clean parking lots regularly to minimize pollutant transport into storm drains from stormwater runoff.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Maintain advanced BMPs such as vegetated swales, infiltration trenches, or detention basins as appropriate. Refer to the treatment control fact sheets for more information.

Supplemental Information

Advanced BMPs

Some parking areas may require advanced BMPs to further reduce pollutants in stormwater runoff, and a few examples are listed below. Refer to the Treatment Control Fact Sheets and the New Development and Redevelopment Manual for more information.

- When possible, direct sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low quantities.
- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.

References and Resources

City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual.*

California Stormwater Quality Association, 2003. *New Development and Redevelopment Stormwater Best Management Practice Handbook.* Available online at: https://www.casqa.org/resources/bmp-handbooks/new-development-redevelopment-bmp-handbook.

Kennedy/Jenks Consultants, 2007. *The Truckee Meadows Industrial and Commercial Storm Water Best Management Practices Handbook.* Available online at: http://www.cityofsparks.us/sites/default/files/assets/documents/env-control/construction/TM-I-C_BMP_Handbook_2-07-final.pdf.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Pollution from Surface Cleaning Folder, 1996, 2003. Bay Area Stormwater Management Agencies Association. Available online at: http://basmaa.org/Portals/0/documents/pdf/Pollution%20from%20Surface%20Cleaning.pdf.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at: http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

The Storm Water Managers Resource Center, http://www.stormwatercenter.net.

US EPA. *Post-Construction Stormwater Management in New Development and Redevelopment*. BMP Fact Sheets. Available online at: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=5.

Retention/Irrigation TC-12

General Description

Retention/irrigation refers to the capture of stormwater runoff in a holding pond and subsequent use of the captured volume for irrigation of landscape or natural pervious areas. This technology is very effective as a stormwater quality practice in that, for the captured water quality volume, it provides virtually no discharge to receiving waters and high stormwater constituent removal efficiencies. This technology mimics natural undeveloped watershed conditions wherein the vast majority of the rainfall volume during smaller rainfall events is infiltrated through the soil profile. Their main advantage over other infiltration technologies is the use of an irrigation system to spread the runoff over a larger area for infiltration. This allows them to be used in areas with low permeability soils.

Capture of stormwater can be accomplished in almost any kind of runoff storage facility, ranging from dry, concrete-lined ponds to those with vegetated basins and permanent pools. The pump and wet well should be automated with a rainfall sensor to provide irrigation only during periods when required infiltration rates can be realized. Generally, a spray irrigation system is required to provide an adequate flow rate for distributing the water quality volume (LCRA, 1998). Collection of roof runoff for subsequent use (rainwater harvesting) also qualifies as a retention/irrigation practice.

Inspection/Maintenance Considerations

Pollutant removal rates are estimated to be nearly 100% for all pollutants in the captured and irrigated stormwater volume. However, relatively frequent inspection and maintenance is necessary to verify proper operation of these facilities.

Maintenance Concerns, Objectives, and Goals

- Sediment Accumulation
- Mechanical malfunction
- Vector Control

Targeted Constituents

☑	Sediment	■
☑	Nutrients	■
☑	Trash	■
☑	Metals	■
☑	Bacteria	■
☑	Oil and Grease	■
☑	Organics	■
☑	Oxygen Demanding	■

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

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Inspection Activities	Suggested Frequency
■ The irrigation system should be inspected and tested (or observed while in operation) to verify proper operation multiple times annually. Two of these inspections should occur during or immediately following wet weather. Any leaks, broken spray heads, or other malfunctions with the irrigation system should be repaired immediately.	Frequently (3-6 times per year)
Maintenance Activities	**Suggested Frequency**
■ The upper stage, side slopes, and embankment of a retention basin must be mowed regularly to discourage woody growth and control weeds.	Frequently
■ Remove sediment from inlet structure/sediment forebay, and from around the sump area at least 2 times annually or when depth reaches 3 inches. When sediment in other areas of the basin fills the volume allocated for sediment accumulation, all sediment should be removed and disposed of properly. ■ Grass areas in and around basins must be mowed at least twice annually to limit vegetation height to 18 inches. More frequent mowing to maintain aesthetic appeal may be necessary in landscaped areas. When mowing is performed, a mulching mower should be used, or grass clippings should be caught and removed. ■ Debris and litter will accumulate near the basin pump and should be removed during regular mowing operations and inspections. Particular attention should be paid to floating debris that can eventually clog the irrigation system.	Semi-annual
■ The pond side slopes and embankment may periodically suffer from slumping and erosion, although this should not occur often if the soils are properly compacted during construction. Regrading and revegetation may be required to correct the problems.	Infrequently

3.12 Harvest and Use BMPs

Type of BMP	Site Design – Harvest and Use
Treatment Mechanisms	Volume Reduction
Infiltration Rate Range	Any infiltration rate, when applicable and feasible
Maximum Drainage Area	This BMP is generally limited by the cistern / detention storage volume

Description

Harvest and use BMPs include both above-ground and underground cisterns / vaults. Such BMPs collect and temporarily store runoff for later non-potable uses including the following:

- Irrigation
- Toilet flushing
- Other non-potable uses, such as industrial processes

Above-ground cisterns collect and temporarily store runoff from rooftops or other above-ground impervious surfaces. Underground cisterns include subsurface tanks, vaults and oversized pipes that temporarily store runoff for later use. These systems can include pipes that divert runoff to the cistern, an overflow system for when the cistern is full, a pump, and a distribution system to supply the intended uses.

Siting Considerations

- The primary feasibility consideration for harvest and use BMPs is the presence of a consistent and reliable demand that is sufficient to drain the BMPs between storms. When designing harvest and use systems for stormwater management, a reliable method of quickly regenerating storage capacity (through the use of the captured stormwater) must exist to ensure that there will be adequate storage capacity for subsequent storms in the wet season.
- Other feasibility considerations include potential conflicts with health and plumbing codes. Applicable health codes focus mainly on the potential impacts of long-term standing water in the BMP facility.
- For above-ground cisterns, the facilities should be installed on a level surface, either on consolidated and stable native soil, or on a concrete pad. A geotechnical analysis is required to ensure stability.
- For underground detention facilities, **pretreatment** must be provided where necessary or as directed by the Engineering Authority, to prevent accumulation of sediments within the BMP. These facilities should be installed on consolidated and stable native soil. A geotechnical analysis is required to ensure stability.

Key Design Elements

- All cisterns must:
  - Have provisions for mosquito prevention and abatement.
  - Have mechanisms to keep debris and animals from entering the cistern, and have a mechanism to easily clean any/all screens.
  - Have provisions for safe overflow of runoff when the cistern is full. Overflow shall be directed to an appropriate area as approved by the Engineering Authority. Dispersion within vegetated areas is preferred.
  - Have adequate access to maintain and/or replace the cistern and all associated equipment such as pumps. For underground cisterns / vaults, this includes access adequate to remove any/all accumulated sediment.
  - Be designed in a manner that allows for supplemental potable water to be used when there is insufficient harvested water to fully meet required demands.
  - Include measures acceptable to the local water supplier to prevent harvested storm water from being introduced into the potable water supply.

See the following figures for *examples* of common elements of above-ground and underground cisterns. The proposed design elements and configurations must be approved by the Engineering Authority.

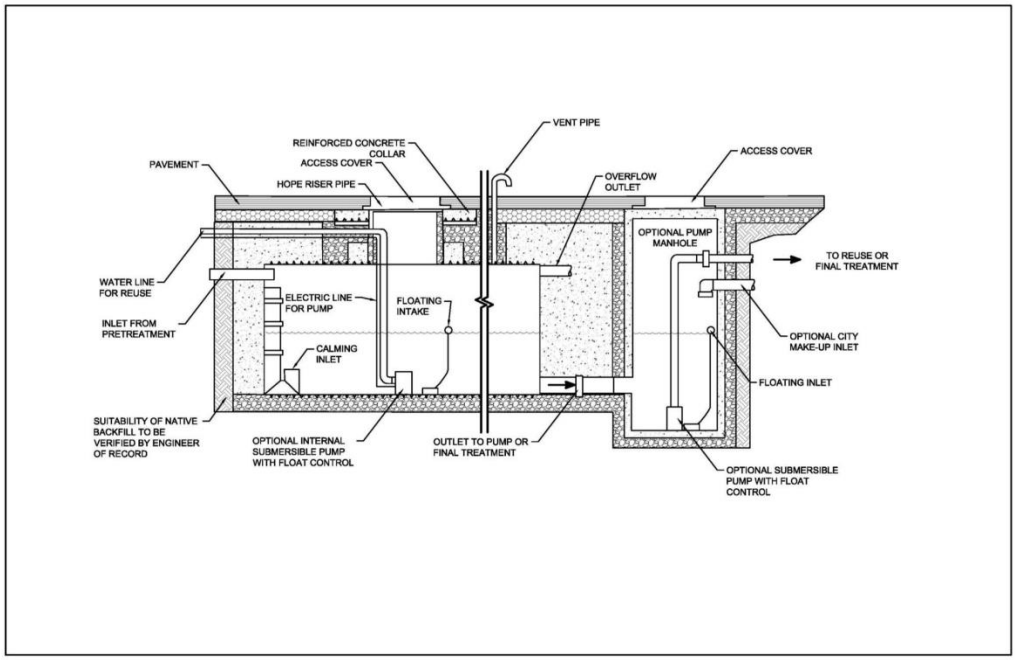

Figure 1 – Common Design Elements of Underground Cistern

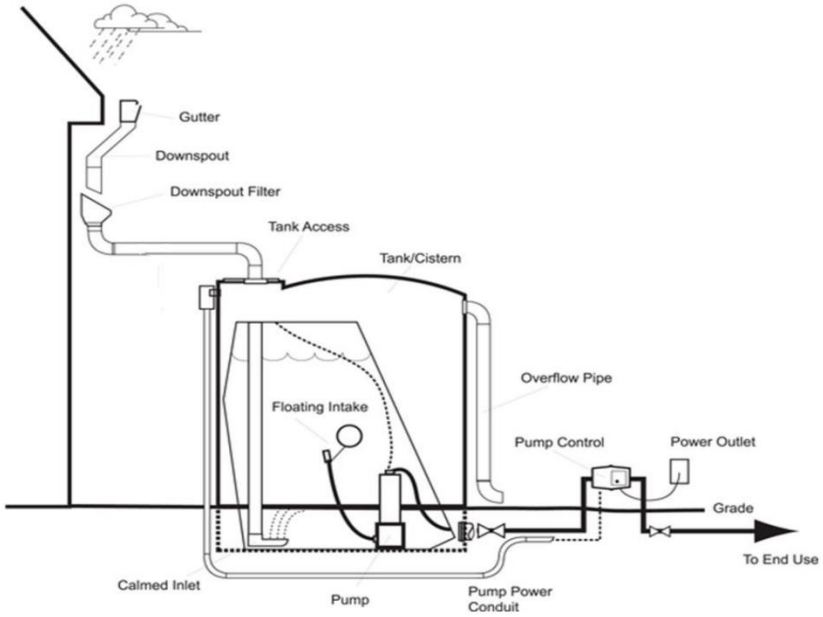

Figure 2 – Common Design Elements of Above-ground Cistern
Graphic courtesy of BRAE

Design and Sizing Criteria

1. Assess whether there is sufficient and reliable (year-round) demand for non-potable use of the runoff from the area tributary to the BMP. Consider seasonal variations in demand for harvested water, such as irrigation needs during the wet season, periodic facility closures (such as for schools), etc. Verify with the Engineering Authority (EA) and the Santa Margarita Region (SMR) Water Quality Management Plan (WQMP) for applicability requirements / restrictions for this BMP. The following potential on-site uses for harvested rainwater are typically assessed:

    a. Irrigation use
    b. Toilet use
    c. Other non-potable uses (i.e. industrial use)

2. If there is a sufficient on-site demand for harvested rainwater acceptable to the Engineering Authority, determine the Design Capture Volume, V_{BMP}, determined from Section 2.1 of this Handbook.

3. Size the cistern to hold and allow for the use of the Design Capture Volume, in accordance with any manufacturer specifications.

Inspection and Maintenance Schedule

Schedule	Activity
Annually before the wet season	• Check for debris and sediment on screens and overflow facilities and remove where observed. • Verify proper operation of all pumps. • Check integrity of downspout connections to harvest and use BMPs • Check locking mechanisms on facility entry covers • Check integrity of mosquito screens
After storm events	• Check for long-term standing water in the facility. If standing water is observed more than 72 hours after the last storm event, monitor water levels, and verify that the water is being drawn down through the intended use of the water. If water is not properly being drawn down ensure that all pumps distribution systems are functioning correctly. Under no circumstances shall water retained within a cistern be pumped or otherwise drained in a manner that could allow a discharge to a street or storm drain. • Remove debris and sediment from screens and overflow facilities