City of Escalon
2060 McHenry Ave., Escalon CA 95320
Tel 209-691-7450
http://cityofescalon.org/departments/public-works/stormwater/

POST-CONSTRUCTION STANDARDS PLAN

A GUIDANCE DOCUMENT ON STORM WATER POST-CONSTRUCTION DESIGN MEASURES FOR DEVELOPERS AND PLAN CHECKERS

TABLE OF CONTENTS

Contents

1 Introduction and Regulatory Requirements 1

1.1 Purpose of the Plan 1

1.2 Federal and State Regulatory Requirements 2

1.3 Regional Approach and Municipal Collaboration 3

1.4 Overview of the Post-Construction Requirements 3

1.5 Role of the Municipal Plan Checker 4

1.6 Role of the Project Proponent 5

2 Applicability 6

2.1 Small Projects 2,500 to 5,000 ft² 6

2.2 Regulated Projects >5,000 FT² 6

2.2.1 The 50% Rule 7

2.2.2 Effective Date of Applicability 8

3 The Submittal and Review Process 9

3.1 Ministerial (Non-Discretionary Building Permit) Projects 9

3.2 Discretionary (Plan Check) Projects 9

3.3 Capital Improvement / Municipal-Owned Projects 10

4 Requirements for Small Projects (2,500 to 5,000 ft²) 11

4.1 Select Site Design Measures 11

4.2 Quantify the Runoff Reduction 14

4.3 Prepare the Submittal 15

5 Requirements for Regulated Projects 16

5.1 Specify Drainage Management Areas 16

5.2 Identify Applicable Source Controls 16

5.3 Incorporate Low Impact Development Design Standards 18

5.4 Select and Size Site Design and Treatment Control Measures 18

5.4.1 List of Site Design Measures and Associated Sizing Criteria 18

5.4.2 Volumetric Criteria 20

TABLE OF CONTENTS

5.4.3 Flow-Based Criteria 21

5.4.4 Allowed Variations and Exceptions 21

5.5 Incorporate Hydromodification Management Measures 23

5.6 Prepare the Submittal 24

6 Operation and Maintenance of Post-Construction Measures 27

6.1 Long Term Plan for Conducting Regular Maintenance of Control Measures 27

6.2 Statement of Responsibility 28

6.3 Self-Certification Annual Reports 28

7 Municipal-Specific Information 29

7.1 Contact Information 29

TABLE OF CONTENTS

APPENDICES:

Appendix 1 - Glossary

Appendix 2 - Acronyms

Appendix 3 – Section E.12 of the Phase II MS4 Permit

Appendix 4 – Post-Construction Management Flow Chart

Appendix 5 – State of California Post-Construction Calculator

Appendix 6 – Volumetric Sizing Tool for Treatment Controls

Appendix 7 – Design Standard References

Appendix 8 – Post-Construction Project Worksheet

Appendix 9 – O&M Plan and Certificate of Responsibility Form

Appendix 10 – List of Collaborating Municipalities

LIST OF TABLES:

Table 1 – List of Source Controls ____ *17*

Table 2 – LID Standards ____ *18*

Table 3 – Site Design and Treatment Control Measures ____ *19*

Table 4 - Rainfall Intensities and Flow-based Design Values ____ *21*

Table 5 – Allowed Design Variations ____ *21*

Table 6 – 2-Year, 24-Hour Storm Totals for Selected Locations ____ *24*

Table 7 – Hydrologic Soil Groups ____ *25*

© Copyright by WGR Southwest, Inc., 2014. This document and its attachments may only be used by permission. Permission is granted by WGR Southwest, Inc. to the collaborating municipalities listed in Appendix 10 of this document. This document and its attachments may be used by project proponents submitting post-construction plans to any of the municipalities listed in Appendix 10.

INTRODUCTION AND REGULATORY REQUIREMENTS

1 Introduction and Regulatory Requirements

This Post-Construction Standards Plan was prepared for the City of Escalon to guide project proponents and municipal plan checkers through the various site design requirements of the Phase II Municipal Separate Storm Water Sewer System (MS4) Permit. This opening section describes the purpose of the plan; a background summary of the Federal and State regulations; the regional collaborative approach taken by many Central Valley municipalities; an overview of the post-construction site design requirements; and, finally, the roles and responsibilities of the plan checker and project proponent.

1.1 PURPOSE OF THE PLAN

According to the California State Water Resource Control Board (Water Board), urban storm water runoff is listed as the primary source of impairment for ten percent of all rivers, lakes and reservoirs, and seventeen percent of all estuaries in California.[1] While these numbers may not seem significantly large, considering that urban areas cover only six percent of the land mass of California[2], the impact that runoff from urban areas have on California's surface waters is disproportionally large. When the Water Board uses the term "urbanization", it is referring to the development of land through which the imperviousness percentage increases; meaning that buildings and hardscapes prevent water from infiltrating into the ground, thereby, causing it to flow off of the property. Increased urbanization through new development and redevelopment has been shown to cause more frequent storm water discharge events, higher peak flow velocities, and larger volumes of storm water runoff. These conditions, if not properly managed, can affect water quality by mobilizing greater and more frequent loads of pollutants such as sediment, organic material, trash, nutrients, pathogens, heavy metals, and other toxic substances. These conditions also over tax existing natural and man-made drainage systems, causing accelerated erosion of channels and deposition of sediment and pollutants in estuaries, deltas, and basins. Conditions such as these could cause flooding and deterioration of waterways that, at one time, may have been adequate to handle expected runoff. This has a direct impact on municipalities by causing them to perform more maintenance on existing systems and to develop new drainage systems with higher capacities. Urbanization and the resulting runoff can also impact

Figure 1 - Channels, streams, and drainage ways are over taxed by increases in runoff caused by increased development and impervious surfaces.

[1] Fact Sheet of the Phase II MS4 Permit, Order No. 2013-0001-DWQ, p. 33 - 34

[2] U.S. Department of Agriculture, 2009

the State's ability to realize the full potential of the beneficial uses of its surface waters.

Low Impact Development – A sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional storm water management, which collects and conveys storm water runoff through storm drains, pipes, or other conveyances to a centralized storm water facility, Low Impact Development (LID) takes a different approach by using site design and storm water management to maintain the site's pre-development runoff rates and volumes. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall. LID has been a proven approach in other parts of the country and is seen in California as an alternative to conventional storm water management.
Source: Phase II MS4 Permit Glossary

The purpose of this document is to provide developers and municipal plan checkers with information on how to meet the State Water Board's requirements for mitigating the negative impact of increases in storm water runoff caused by new development and redevelopment. This document accomplishes this goal through the incorporation of Low Impact Development standards and hydromodification management techniques. Low Impact Development (LID) mitigates excessive runoff by the use of control measures that utilize evapo-transpiration, infiltration, capture / reuse, and biotreatment to mimic the runoff of a natural environment. Hydromodification techniques are used to design development sites so that post-construction runoff flow rates do not exceed those of the pre-construction conditions.

Using this document, developers will be equipped to provide a submittal package to the municipality as a part of its permitting or plan check process to adequately demonstrate how the project will meet the LID and hydromodification requirements.

Plan checkers will be able to use this document to objectively and sufficiently condition discretionary projects with the required post-construction storm water design requirements.

1.2 FEDERAL AND STATE REGULATORY REQUIREMENTS

The Federal Clean Water Act is the impetus behind all of these regulations to manage storm water discharges from new development and redevelopment projects. The Clean Water Act delegates authority to the States to issue National Pollutant Discharge Elimination System (NPDES) permits for discharges of storm water from construction, industrial, and municipal entities to Waters of the United States. Large and medium size municipalities were issued individual municipal NPDES permits in the first phase (Phase I) of the process. Subsequently, small municipalities identified by the State of California were required to obtain permit coverage under the Phase II General NPDES Permit for Municipal Separate Storm Water Sewer Systems (MS4). These Phase II MS4s (municipalities) are required to implement various storm water management programs, one of which is to require certain new development and applicable redevelopment projects to incorporate post-construction storm water control measures into their design that include LID and hydromodification techniques. The City of Escalon is one of the municipalities specified in the current Phase II MS4 Permit that must comply with these post-construction requirements, which are contained in Section E. 12 of Order No. 2013-0001-DWQ. (Refer to Appendix 3 for copy of Section E.12 of the Phase II MS4 Permit.)

INTRODUCTION AND REGULATORY REQUIREMENTS

1.3 REGIONAL APPROACH AND MUNICIPAL COLLABORATION

The post-construction requirements are not new with this version of the Phase II MS4 Permit. The previous version of the permit also contained LID and post-construction requirements. For many years now, Phase I MS4s have been requiring development and redevelopment projects to include post-construction design measures into site designs. Even projects outside of an MS4 now have to incorporate post-construction and LID measures into their designs as required by the State's Construction General Permit. However, as this area of storm water management has grown to maturity, post-construction requirements and programs have changed significantly over the years to where there can be dramatic differences between the control measures required in two neighboring municipalities. This, obviously, can cause confusion for developers. With the roll out of the current Phase II MS4 Permit and the requirement for municipalities to, for the most part, completely overhaul their post-construction requirements to meet the Section E.12 requirements, an opportunity arose for many Phase II MS4s to work together and develop a consistent Post-Construction Storm Water Standards Plan. Collaboration on this task not only shares the cost of development with other MS4s, but also provides a standardized plan that developers will encounter in 17 different Central Valley municipalities. Another benefit is that it allows for regional training of plan checkers on this common plan, saving more cost and time for each municipality. Refer to Appendix 10 for a list of the collaborating Central Valley municipalities.

1.4 OVERVIEW OF THE POST-CONSTRUCTION REQUIREMENTS

The Phase II MS4 Permit requires the City of Escalon to condition certain small projects with implementing one or more **Site Design Measures** that "treat" storm water runoff using methods to evapo-transpire, infiltrate, harvest and reuse, or biotreat. After proponents of small projects select the Site Design Measure(s), they are required to quantify the runoff reduction achieved through the implementation of those measures. This is done using the State Water Board's Post-Construction Calculator (which can be downloaded following the information provided in Appendix 5).

Proponents of larger projects are required to implement into their design and on-going activities specific **Source Control Measures** to minimize the impact of pollutant-generating activities. For example, if the project includes a permanent trash enclosure in its design, it will be required to be designed following the California Storm Water Quality Association's (CASQA) design standard SD-32; meaning, that among other requirements, the trash enclosure will need to have a wall or screen around it and a rain proof covering or container lids. This larger project will also need to incorporate into its design specific **Low Impact Development (LID) Standards** such as

Hydromodification - Modification of hydrologic pathways (precipitation, surface runoff, infiltration, groundwater flow, return flow, surface-water storage, groundwater storage, evaporation and transpiration) that results in negative impacts to watershed health and functions.

Source Control - Land use or site planning practices, or structural or nonstructural measures, that aim to prevent runoff pollution by reducing the potential for contact with rainfall runoff at the source of pollution. Source control BMPs minimize the contact between pollutants and urban runoff.

Source: Phase II MS4 Permit Glossary

concentrating development on portions of the site with less permeable soils and preserving areas that can promote infiltration. As with the smaller project, the larger project will need to implement one or more **Site Design Measures** to "treat" storm water, such as with permeable pavement or a green roof. But in the case of a larger project, the Site Design Measure(s) will have to be sized following one of two specified hydraulic sizing criteria. In addition, the project will be required to be designed to incorporate into it **Hydromodification Management Measures** that slow and minimize the amount of runoff so that, ideally, and where possible, there is no net-increase of the post-construction runoff flow rate compared to the pre-construction value for a 2-year, 24-hour storm event. The project proponent or subsequent property owner is required to maintain these storm water control measures in an effective condition for perpetuity.

1.5 ROLE OF THE MUNICIPAL PLAN CHECKER

The Phase II MS4 Permit states that the municipality "shall require these post-construction standards to be applied on applicable new and redevelopment regulated projects, both private development requiring municipal permits and public projects, to the extent allowable by applicable law." Therefore, the role of the municipal plan checker is to verify that applicable projects have been properly conditioned with the post-construction standards. The plan checker will be responsible for performing the following tasks:

- Since LID is integral with the design, communication of post-construction submittal requirements shall be included in land use permits or conditions of approval. A copy of the plan will be available by July 1, 2015.
- Perform an initial review of the submitted post-construction package including the completed Post-Construction Project Worksheet (included in Appendix 8) and the Operation and Maintenance Plan and Certificate of Responsibility (Appendix 9).
- Transmit the package to the municipality's in-house or contracted engineering staff for review of design and calculations.
- Communicate to the project proponent any required changes or modifications and request a re-submittal of information.
- Review the adequacy of the submitted Operation and Maintenance Plan for the proposed post-construction design measures and make sure that the signed Certificate of Responsibility has been received.
- Condition the project with the proposed and approved post-construction design measures.
- Maintain records of all submitted post-construction design information and plans for a minimum of 5 years.
- Entered into a database or spreadsheet information about Regulated Projects so that they can be tracked by the municipality for annual verification that the storm water treatment measures and hydromodification measures are being maintained in an effective condition.

1.6 ROLE OF THE PROJECT PROPONENT

The Phase II MS4 Permit and the City of Escalon require project proponents to incorporate into its design and completed development post-construction measures that reduce the volume of runoff and mitigate pollutants in runoff. The role of the project proponent is to select design measures that are appropriate for the project and will adequately meet the goals of this Post-Construction Standards Plan. The project proponent will be responsible for performing the following tasks:

- Selecting, sizing, and engineering site design measures, source control measures, and hydromodification management techniques that are adequate in meeting the requirements of this plan.
- Providing to the municipal plan checker the required submittal package, supporting information, maps, drawings, and calculations; including plans and calculations that have been stamped by a certified and / or licensed professional.
- Providing an Operation and Maintenance Plan and a signed Certificate of Responsibility to the plan checker for the on-going maintenance of the constructed post-construction design measures.
- Providing any additional requested information to the plan checker.
- Verifying that approved site design measures and source control measures are constructed as specified on the approved plans.

2 Applicability

In regards to the Post-Construction Standards Plan, all projects fall into one of three possible categories: small, regulated, or not applicable. If a project does not qualify under either of the two following sections, the Post Construction Standards Plan does not apply to it.

2.1 SMALL PROJECTS 2,500 TO 5,000 FT^2

Small projects are defined as those that create and/or replace between 2,500 ft^2 and 5,000 ft^2 of impervious surface. This includes projects that have no net increase in the impervious footprint. Single family homes that create and / or replace 2,500 ft^2 or more of impervious surface and are not part of a larger plan of development are considered to be applicable small projects. Small projects would include, but not limited to, the following:

Figure 2 - A single family home that creates and / or replaces 2,500 ft^2 or more is a small project.

- New construction that creates between 2,500 ft^2 and 5,000 ft^2 of impervious surface;
- A demolition of a small project site and the redevelopment of that site if more than 2,500 ft^2 of impervious surface is replaced or created;
- The replacement of 2,500 ft^2 or more of a parking lot;
- The construction of a new parking lot that is less than 5,000 ft^2; and
- A roadway or sidewalk project that is creating or replacing between 2,500 ft^2 and 5,000 ft^2 of impervious surface.

Linear utility projects (LUPs) are not subject to the small project Site Design Measure requirements.

2.2 REGULATED PROJECTS >5,000 FT^2

For the purposes of this Post-Construction Standards Plan, a "Regulated Project" is one that will create and / or replace 5,000 ft^2 or more of impervious surface. Regulated Projects include new and redevelopment projects on public or private land that fall under the planning and permitting authority of the municipality. Redevelopment is defined as any land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface areas on a site on which some past development has occurred. Redevelopment

Impervious Surface - A surface covering or pavement of a developed parcel of land that prevents the land's natural ability to absorb and infiltrate rainfall/storm water. Impervious surfaces include, but are not limited to; roof tops, walkways, patios, driveways, parking lots, storage areas, impervious concrete and asphalt, and any other continuous watertight pavement or covering. Landscaped soil and pervious pavement, including pavers with pervious openings and seams, underlain with pervious soil or pervious storage material, such as a gravel layer sufficient to hold the specified volume of rainfall runoff are not impervious surfaces.

Source: Phase II MS4 Permit Glossary

projects do not include pavement grinding and resurfacing of existing roadways; construction of new sidewalks, pedestrian ramps, or bike lanes on existing roadways; or routine replacement of damaged pavement for short, non-contiguous sections of roadway.

Regulated Projects do not include the following:

- Detached single family homes that are not a part of a larger plan of development (they are considered to be a "small project" even if they exceed 5,000 ft^2 of impervious surface);
- Projects that are exclusively interior remodels;
- Routine maintenance or repair such as exterior wall surface replacement, pavement grinding and resurfacing within the existing footprint, and roofing replacement or repair;
- Projects consisting solely of sidewalks or bicycle lanes built as part of new streets or roads and built to direct storm water runoff to adjacent vegetated areas;
- Projects consisting solely of impervious trails built to direct storm water to adjacent non-erodible permeable areas;
- Projects consisting solely of sidewalks, bicycle lanes, or trails constructed with permeable surfaces;
- Replacement of damaged pavement or the replacement of short, non-contiguous sections of roadways; and
- Trenching, excavation, and resurfacing associated with Linear Utility Projects (LUPs) unless it has a discrete location that has 5,000 ft^2 or more of newly constructed contiguous impervious surface such as a pump station or maintenance facility. In such cases, only the discrete location is subject to this Post-Construction Standards Plan.

Please note that some of the above-listed projects may still be considered "small projects" even if they are exempted from being a Regulated Project.

2.2.1 The 50% Rule

If a redevelopment project results in an increase of ***more than*** 50 percent of the impervious surface of a previously existing development, runoff from the entire project, consisting of all existing, new, and / or replaced impervious surfaces, must be included in the selection and sizing of site design measures, LID design standards, and hydromodification management measures to the extent feasible. However, if the redevelopment project results in an increase of ***less than*** 50 percent of the impervious surface, only runoff from the new and /or replaced impervious surface must be included in the selection and sizing of site design measures, LID design standards, and hydromodification management measures.

For street and road widening projects that include additional traffic lanes, where the addition of traffic lanes results in an alteration of ***more than*** 50 percent of the impervious surface,

roadways must include post-construction design measures and be appropriately sized.

runoff from the entire project must be included in the selection and sizing of site design measures, LID design standards, and hydromodification management measures. However, if the addition of traffic lanes results in an alteration of ***less than*** 50 percent of the impervious surface, only the runoff from the new and / or replaced impervious surface is required to be included in the selection and sizing of site design measures, LID design standards, and hydromodification management measures.

2.2.2 Effective Date of Applicability

This Post-Construction Standards Plan becomes effective on July 1, 2015 (or the date that this plan is adopted by the municipality, whichever is sooner). Until that date, there are no post-construction storm water design requirements because the City of Escalon was not required by the previous permit to implement such standards. After July 1, 2015 (or the date that this plan is adopted by the municipality, whichever is sooner), this Post-Construction Standards Plan will apply to all applicable public and private new and redevelopment "Small" and "Regulated Projects". Any discretionary projects that have been deemed complete prior to July 1, 2015 (or the date that this plan is adopted by the municipality, whichever is sooner) and have unexpired vesting tentative maps will only need to comply with the municipality's post-construction requirements that were in effect at the time of the map approval. Capital improvement projects or municipal-owned projects, for which their governing body or designee approved the initiation of the project design prior to July 1, 2015 (or the date that this plan is adopted by the municipality, whichever is sooner), will need only to comply with the post-construction requirements that were in place at that time.

Approved Tentative Maps and Signed Improvement Plans are completed once a discretionary project has a tentative map application that is deemed complete by the City of Escalon. Approval of development applications is a discretionary action taken by the City of Escalon once a discretionary project has a development application deemed complete. If the discretionary project has a tentative map application or development application that was deemed complete prior to the second year of the effective date of the Small MS4 Permit (i.e. prior to 1 July 2015), it is not subject to the Post Construction Standards of the Small MS4 Permit.

3 The Submittal and Review Process

Projects applicable to this Post-Construction Standards Plan may originate from different sources. They may be private non-discretionary or discretionary projects, or they may be municipal-owned projects. The following sections describe how applicable projects are detected by the municipality and appropriately conditioned with post-construction design requirements. This section also summarizes the submittal requirements for each type of project.

3.1 MINISTERIAL (NON-DISCRETIONARY BUILDING PERMIT) PROJECTS

Projects that are ministerial or non-discretionary projects are those that are not required to pass through the plan check process and can be issued a building permit over the counter. Typically, these projects will either not be applicable to this Post-Construction Standards Plan or be considered "small" projects as defined in Section 2.1. Specific submittal requirements for small projects are identified in Section 4 of this plan. In general, proponents of non-discretionary small projects, will need to submit, at the permit counter, information about the project, the selected design measures, and a printout copy of the State Water Board's Post-Construction Calculator.

If a ministerial project is found to be a "Regulated Project" as defined in Section 2.2, the requirement for the project to include site design measures, source control measures, LID design standards, and hydromodification management techniques will necessitate that it pass through the plan check process and, thus, will make it become a discretionary project, with respect to this Post-Construction Standards Plan.

3.2 DISCRETIONARY (PLAN CHECK) PROJECTS

Discretionary projects are those that are required to pass through the plan check process and be conditioned with site-specific requirements. Discretionary projects have the potential to be classified as "small", "regulated", or not applicable to this Post-Construction Standards Plan. In general, proponents of discretionary projects must submit to the plan checker information about the project, which may include: the project's applicability status to the Post-Construction Standards Plan, site design plans and specifications, a completed Post-Construction Project Worksheet form, and an O&M Plan and signed Certificate of Responsibility. The plan checker will review the post-construction submittal package for completeness and will direct it to the engineering reviewers. Once comments are received from the engineering reviewers, the project proponent will be notified by the plan checker of any required modifications or of the approval of the proposed post-construction design measures. Regulated Projects will be entered into a database or spreadsheet to be tracked by the municipality for annual verification that the storm water treatment measures and hydromodification measures are being maintained in an effective condition.

3.3 CAPITAL IMPROVEMENT / MUNICIPAL-OWNED PROJECTS

Public projects, capital improvement projects (CIPs), or other municipal-owned projects typically do not pass through the plan check process, but must also be reviewed for applicability of the post-construction requirements. The following process will be implemented by the City of Escalon in conditioning and reviewing projects for the post-construction requirements of the municipality's Phase II MS4 Permit.

1. The municipal department sponsoring the project will review and evaluate the project's applicability to the post-construction requirements and make a determination as to whether the proposed project is a "small" project as defined in Section 2.1, a "regulated" project as defined in Section 2.2, or is exempt from the post-construction requirements.
2. The sponsoring department will submit to the Engineering Department a partially completed Post-Construction Project Worksheet (included in Appendix 8) which will identify information about the project and the selection of the required post-construction design measures. The Engineering Department, or an engineering contractor, will provide the sizing and design criteria for the selected site design measures, source control measures, LID design standards, and hydromodification management techniques.
3. The Engineering Department will develop an operation and maintenance plan for the post-construction treatment and hydromodification measures.
4. The municipality will maintain records of all project-related post-construction design information and plans for a minimum of 5 years.
5. Regulated Projects will be entered into a database or spreadsheet to be tracked by the municipality for annual verification that the storm water treatment measures and hydromodification measures are being maintained in an effective condition.

4 Requirements for Small Projects (2,500 to 5,000 ft^2)

The following is a 3-step process required by the City of Escalon for small projects as defined in Section 2.1.

4.1 SELECT SITE DESIGN MEASURES

The first step is for the project proponent to select and implement into the project's design one or more of the following **Site Design Measures**:

Stream Setbacks and Buffers – are vegetated areas (including trees, shrubs, riparian habitat, or herbaceous vegetation) that exist or are established to protect a stream system, lake, reservoir, or estuary. These areas provide a buffer between the development and the water body to filter out pollutants carried by storm water, provide stabilization of erodible banks and opportunities to infiltrate water prior to discharging, and help slow peak flows. The C*alifornia Storm Water Quality Association's (CASQA) Best Management Handbook (BMP) for New Development and Redevelopment* has a specification sheet (TC-31) for Vegetated Buffer Strips that contains useful information applicable to stream setbacks and buffers. It can be downloaded at:

www.casqa.org/sites/default/files/BMPHandbooks/tc-31_from_newdevelopmentredevelopment_handbook.pdf

Contra Costa County has a compiled a list of Northern California and other U.S. counties who have stream buffer requirements. This list can be accessed at the following website and utilized as guidance for sizing buffer widths:

www.acgov.org/pwa/documents/Contra%20Costa%20County%20HCP%20Table%206-4%20Setbacks.pdf

Soil Quality Improvement and Maintenance – is accomplished through the addition of soil amendments and the creation of a healthy microbial community. Soils with higher organic content are less likely to erode and also provide nutrients needed to maintain healthy plants. This, in turn, means that landscaping will require less fertilizers and pesticides. Soils with more organic content or covered with a compost layer will retain moister, requiring them to be irrigated less often. Engineered soils allow water to infiltrate and be stored below grade providing LID and hydromodification benefits. The United States Department of

REQUIREMENTS FOR SMALL PROJECTS (2,500 TO 5,000 FT2)

Agriculture's Natural Resources Conservation Service (NRCS) has a publication called the *Urban Soil Primer* which is an excellent resource in helping developers understand how healthy soils improve water quality. This resource can be downloaded at:

www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052835.pdf

Tree Planting and Preservation – includes the preservation of existing trees and the establishment of new ones. Both evergreens and deciduous trees can be utilized. Trees are beneficial to water quality in that they help stabilize erodible soil, dissipate energy of falling rain, and help slow peak flow rates.

Rooftop and Impervious Area Disconnection – is where roof drains and hardscapes do not discharge directly to a storm drain inlet but are directed to permeable areas or rain water collection and harvesting mechanisms. Water, in excess of the permeable area's infiltration capacity or the capacity of the collection / harvesting system, can be directed to a drainage system. CASQA has a BMP specification sheet (SD-11) that provides information about designing roof runoff controls. It can be downloaded at:

www.casqa.org/sites/default/files/BMPHandbooks/sd-11.pdf

Porous Pavement – is pavement that allows runoff to pass through it and infiltrate into the underlying soils. Porous pavement systems are typically designed with a subsurface drainage and storage system that consists of a bed of rock and piped collection system below the porous pavement. Where soils have high infiltration rates, water is allowed to dissipate directly into the soil. Where infiltration rates are less than desirable, a sub-grade gravity collection system conveys excess water to a storm water outfall or storm water sewer system. Porous pavement includes porous asphalt and concrete, porous pavers and bricks, cobbles, reinforced grass pavement, and gravel covered surfaces.

REQUIREMENTS FOR SMALL PROJECTS (2,500 TO 5,000 FT2)

Green Roofs – is an engineered vegetative layer grown on a roof that allows a certain amount of runoff reduction by infiltration, storage, and evapo-transpiration. In 2010, the United States Environmental Protection Agency (USEPA) published a document titled: *Design Guidelines and Maintenance Manual for Green Roofs in the Semi-Arid and Arid West.* This guidance document can be downloaded at:

http://www2.epa.gov/sites/production/files/documents/GreenRoofsSemiAridAridWest.pdf

Vegetated Swales – are a vegetated, open-channel management practice designed specifically to treat and attenuate storm water runoff through infiltration, biotreatment, and evapo-transpiration. If they are designed with engineered soils, storage and greater infiltration can be achieved. CASQA has a BMP specification sheet (TC-30) that provides information about designing vegetated swales. It can be downloaded at:

www.casqa.org/sites/default/files/BMPHandbooks/TC-30.pdf

Rain Barrels and Cisterns – is a system that collects and stores storm water runoff from a roof or other impervious surfaces. Collected water is saved and reused for irrigation or other purposes. In 2008, the USEPA published a document titled: *Managing Wet Weather with Green Infrastructure Municipal Handbook: Rainwater Harvesting Policies*. This guidance document can be downloaded at:

http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_harvesting.pdf

The City of San Diego published a Rain Water Harvesting Guide, which can be downloaded at:

http://www.sandiego.gov/water/pdf/conservation/rainwaterguide.pdf

REQUIREMENTS FOR SMALL PROJECTS (2,500 TO 5,000 FT2)

4.2 QUANTIFY THE RUNOFF REDUCTION

The second step for small projects is for the project proponent to quantify the runoff reduction resulting from the implementation of the selected Site Design Measure(s). The Phase II MS4 Permit does not set any goals or minimum amounts of runoff reduction. Therefore, this step is only informational. To accomplish this quantification of runoff reduction, the project proponent is required to utilize the State Water Board's Post-Construction Calculator which is available on the Water Board's SMARTS website or can be accomplished through the State's Microsoft Excel™ version of the calculator. The Water Board has created an instructional video on how to populate and use the Post-Construction Calculator. Information about how to access the calculator is included in Appendix 5 of this document.

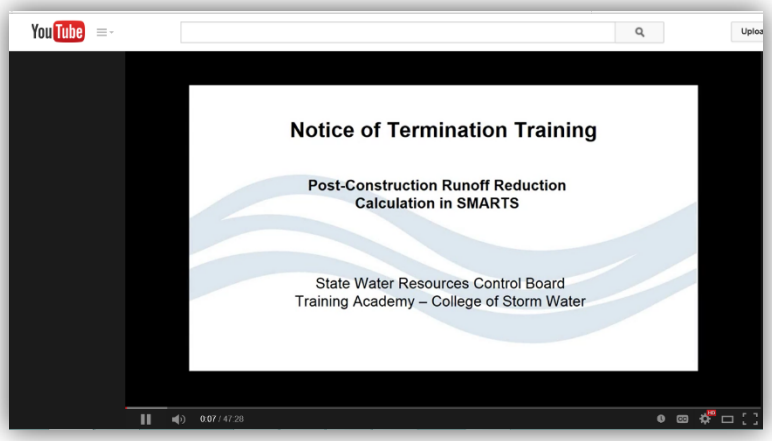
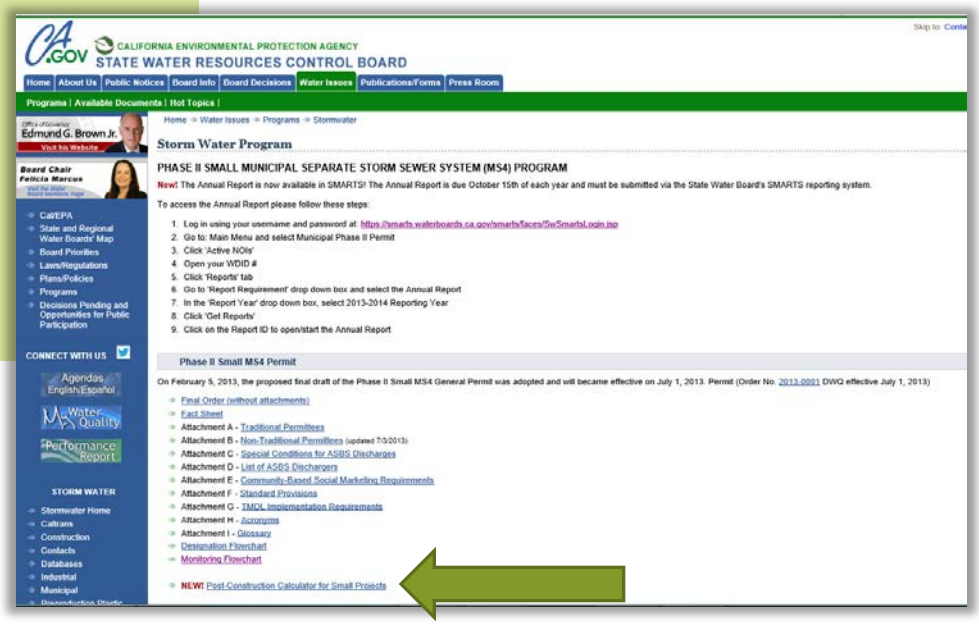


Figure 4 - The Water Board created this 47-minute video that describes how to use the Post-Construction Calculator on SMARTS. It will also help with the Excel version. Although the video was created for the Construction General Permit, it also applies to the Post-Construction Standards Plan. It can be accessed at:

https://www.youtube.com/watch?v=W3nj4pj8WHY&feature=youtu.be

Post-Construction Calculator for Small Projects

The Water Board has created a Microsoft Excel version of the calculator that can now be downloaded from the State Water Board's website at the following link: http://www.swrcb.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml



REQUIREMENTS FOR SMALL PROJECTS (2,500 TO 5,000 FT2)

4.3 PREPARE THE SUBMITTAL

The third and final step for the "small" project proponent is to compile the information required to be submitted to the plan checker. This includes the following items:

- A completed Post-Construction Worksheet (obtained from Appendix 8).
- Site plans showing the selected Site Design Measure(s) (identified in Section 4.1). The plans must be stamped by a California Civil Professional Engineer if any of the following Site Design Measures were selected: rooftop and impervious area disconnection, porous pavement, or rain cisterns. The plans must be stamped by a California Structural Professional Engineer if a green roof was selected or if there is a significant structural aspect to the rain cisterns and collection system. The plans must be stamped by a California Licensed Landscape Architect if any of the following Site Design Measures were selected: stream setbacks and buffers, soil quality improvement, or vegetated swales. The Site Design Measure(s) must be clearly called out on the submitted plans.
- A printout of the results page from the Water Board's SMARTS or Microsoft Excel™ Post-Construction Calculator.

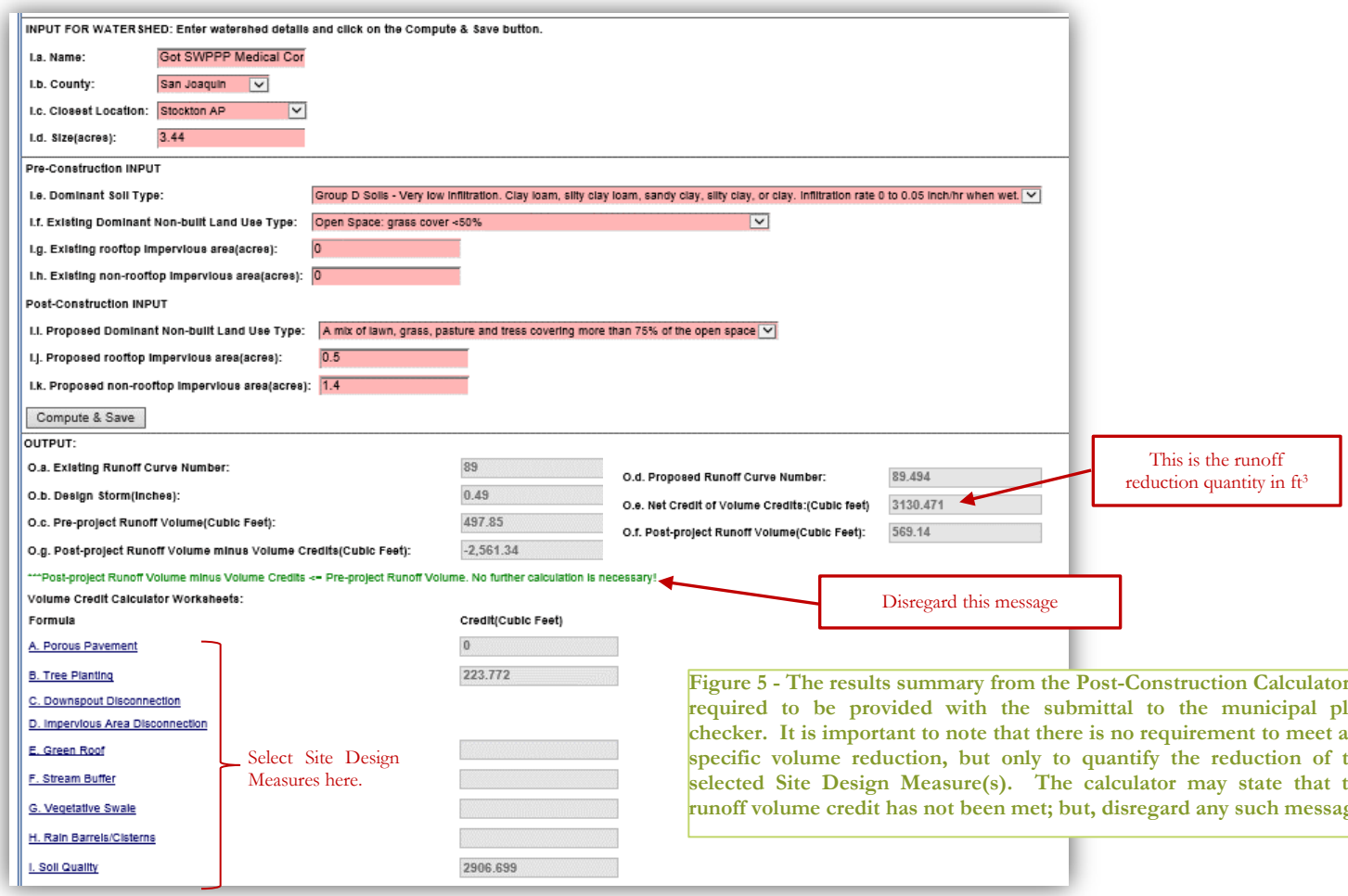


Figure 5 - The results summary from the Post-Construction Calculator is required to be provided with the submittal to the municipal plan checker. It is important to note that there is no requirement to meet any specific volume reduction, but only to quantify the reduction of the selected Site Design Measure(s). The calculator may state that the runoff volume credit has not been met; but, disregard any such message.

5 Requirements for Regulated Projects

The following is a 6-step process required by the City of Escalon for Regulated Projects as defined in Section 2.2.

5.1 SPECIFY DRAINAGE MANAGEMENT AREAS

Regulated Projects are required to provide a map or diagram that divides the development into discrete Drainage Management Areas (DMAs). These are areas of the project where the nature of the development is distinct from the other portions of the development and, therefore, require a unique approach to mitigating storm water runoff. A separate DMA would also be necessary for portions of the project where post-construction design measures are dedicated to that portion and operate independently from the other DMAs. Some projects will have multiple DMAs while other projects may have only one single DMA.

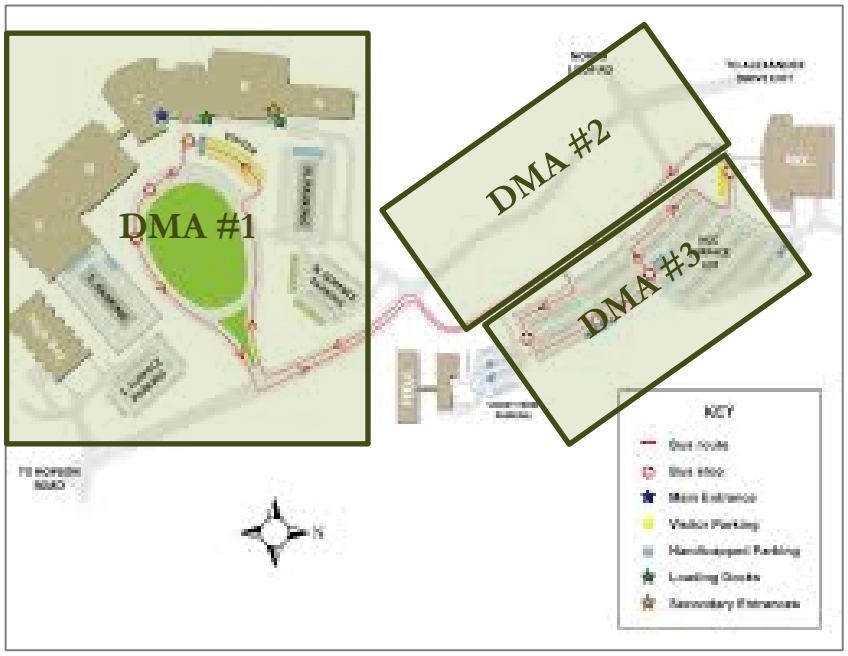


Figure 6 - Regulated Projects must submit a map with the boundaries of the various DMAs depicted.

5.2 IDENTIFY APPLICABLE SOURCE CONTROLS

The project proponent is required to identify potential sources of pollutants and to include into the design appropriate Best Management Practices / Source Controls. If a proposed Regulated Project has any of the potential pollutant-generating activities or sources identified in Table 1, it must be designed and operated consistent with the recommendations provided in the CASQA Storm Water BMP Handbooks. A link is provided in Table 1 to each BMP specification. The CASQA Handbooks can be accessed in their entirety at www.CASQA.org . There is an annual subscription to access the Commercial / Industrial Handbook and the Construction Handbook. At the date of this edition of the Post-Construction Standards Plan, CASQA was still offering free access to their BMP Handbooks for Municipal Operations and New Development and Redevelopment.

REQUIREMENTS FOR REGULATED PROJECTS

TABLE 1 – LIST OF SOURCE CONTROLS

Activity / Pollutant Source	CASQA BMP Handbook Link	Activity or Design-based Control Measure
Accidental spills or leaks	SC-11	Activity
Interior floor drains	SC-10	Activity and Design (connection of interior floor drains to the storm drainage system is prohibited)
Parking / storage areas and maintenance	SC-43	Activity
Indoor and structural pest control	SC-35	Activity
Landscape / outdoor pesticide use	SD-10 BG-40	Activity
Pools, spas, ponds, decorative fountains, and other water features	BG-63 SC-72	Activity and Design
Restaurants, grocery stores, and other food service operations	BG-30	Activity
Refuse areas	SC-34 SD-32	Activity and Design
Industrial processes	SD-35 SD-36	Design
Outdoor storage of equipment or materials	SC-32 SD-34	Activity and Design
Vehicle and equipment cleaning	SC-21 SD-33 BG-65	Activity and Design
Vehicle and equipment repair and maintenance	SC-22 BG-21	Activity
Fuel dispensing areas	SC-20 SD-30 BG-22	Activity and Design
Loading docks	SC-30 SD-31	Activity and Design
Fire sprinkler test water	SC-41	Activity
Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources	SC-10 SC-41	Activity
Unauthorized non-storm water discharges	SC-10	Activity
Building and grounds maintenance	SC-41	Activity

REQUIREMENTS FOR REGULATED PROJECTS

5.3 INCORPORATE LOW IMPACT DEVELOPMENT DESIGN STANDARDS

The project proponent must demonstrate how each DMA has been designed to accomplish the LID Standards listed in Table 2.

TABLE 2 – LID STANDARDS
1. Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed.
2. Concentrate development on portions of the site with less permeable soils and preserve areas that can promote infiltration.
3. Limit overall impervious coverage of the site with paving and roofs.
4. Set back development from creeks, wetlands, and riparian habitats.
5. Preserve significant trees.
6. Conform the site layout along natural landforms.
7. Avoid excessive grading and disturbance of vegetation and soils.
8. Replicate the site's natural drainage patterns.
9. Detain and retain runoff throughout the site.

In completing Post-Construction Project Worksheet (included in Appendix 8), the project proponent will be required to demonstrate for each DMA how it is accomplishing the nine LID Standards listed in Table 2. This demonstration can be done through narrative description, calculations, supporting information, and / or site plans and diagrams. The municipal plan checker will review the project proponent's response to each of the nine LID Standards and may challenge unsubstantiated statements, request additional information, or request that more be done to meet the objective of one or more of these LID Standards.

5.4 SELECT AND SIZE SITE DESIGN AND TREATMENT CONTROL MEASURES

As with small projects, Regulated Projects must also select one or more Site Design Measures (also called "facilities" in the Phase II MS4 Permit) that infiltrate, evapo-transpire, harvest and reuse, or biotreat storm water runoff. Regulated Projects are required to reduce the amount of runoff by sizing each "facility" (Site Design or Treatment Control Measure) to one of two hydraulic design criteria specified in the Phase II MS4 Permit. This section of the plan discusses how project proponents select, size, and configure Site Design and Treatment Control Measures.

5.4.1 List of Site Design Measures and Associated Sizing Criteria

Many of the Site Design Measures are described in Section 4.1 of this Post-Construction Standards Plan. Table 3 lists these Site Design Measures along with other possible Treatment Control Measures that infiltrate, evapo-transpire, harvest and reuse, or biotreat storm water runoff. The project proponent will need to select one or more of these control measures for each DMA. For each measure listed in Table 3, the appropriate hydraulic sizing criteria and specification reference is also provided.

REQUIREMENTS FOR REGULATED PROJECTS

TABLE 3 – SITE DESIGN AND TREATMENT CONTROL MEASURES

Site Design or Treatment Control Measure	Description	CASQA Specification	Sizing Criteria
Stream setbacks and vegetated buffers *(Site Design Measure)*	*Preservation of a green strip or vegetated buffer between the development and the discharge point through which storm water runoff passes.*	TC-10	Flow
Soil quality improvement *(Site Design Measure)*	*Commonly used in conjunction with landscaping, bioretention, or storm water gardens. Also known as "engineered soils", through which storm water can infiltrate. This provides additional on-site storage and reduces peak flow rates.*	TC-40	Volume
Tree planting and preservation *(Site Design Measure)*	*Incorporated into the site's landscaping. Trees reduce the energy of falling rain and help to reduce peak flow rates.*	SD-10	SMARTS Calculator
Porous pavement *(Site Design Measure)*	*Porous asphalt, concrete, or pavers; cobbles or rock covered surfaces; typically with at least 18" of drainage rock below the porous surface covering to store and infiltrate storm water.*	SD-20	Volume
Green roofs *(Site Design Measure)*	*Plants and growing media permanently installed on a rooftop to allow a certain amount of storm water infiltration and storage.*	TC-40	Volume
Vegetated swales *(Site Design Measure)*	*Storm water conveyance swales that are vegetated to stabilize the swale and prevent erosion. Vegetated swales improve water quality by providing filtration and bio-uptake of pollutants and by promoting sedimentation of suspended particles. Often, vegetative swales are used in conjunction with "soil quality improvement" to provide greater infiltration and / or with retention or detention basins.*	TC-30	Flow
Rain harvesting and reuse *(Site Design Measure)*	*Large scale or small scale capture, collection and re-use of storm water runoff. Includes rain barrels used at downspouts and large cisterns and collection systems.*	TC-12	Volume
Bioretention and rain gardens *(Treatment Control Measure)*	*Depressed landscaped areas to which storm water runoff flows. These rain gardens are designed with engineered soils so that they facilitate infiltration and storage of storm water.*	TC-32	Volume
Infiltration trench, Flow-through Planter, or Tree Wells *(Treatment Control Measure)*	*Similar in concept to a French drain or a leach field, in which storm water runoff is able to drain to a trench or pit that has been filled with rock. It provides underground storage of the water until it can infiltrate into the soils.*	TC-10	Volume and Flow
Retention and detention basins *(Treatment Control Measure)*	*Aboveground storage of storm water runoff in a basin that allows it to infiltrate into soils and / or be stored and released at a slower flow rate. Impounded water must be infiltrated or discharged within 72 hours to avoid vector breeding problems.*	TC-11 TC-12 TC-22 TC-40	Volume

A single control measure or a combination of two or more of the control measures specified in Table 3 can be used to meet the hydraulic sizing criteria for each DMA. An example of a control measure combination would be a site using engineered soils below a vegetated swale and using a rain harvesting /

collection system for roof drains that are in the same DMA. Information for on-line publicly available design references and guidance to many of the above-listed control measures are provided in Appendix 7.

5.4.2 Volumetric Criteria

The Phase II MS4 Permit requires the municipality to condition applicable new development and redevelopment projects to require "facilities" designed to evapo-transpire, infiltrate, harvest/use, and biotreat storm water ***and that are designated on Table 3 as a volume-based control measure*** to meet at least one of the following volumetric hydraulic sizing design criteria:

- The maximized capture storm water volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in the *Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (1998)* pages 175-178 (that is, approximately the 85th percentile 24-hour storm runoff event); ***or***
- The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of *CASQA's Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003)*, using local rainfall data.

As a part of this Post-Construction Standards Plan, the City of Escalon is providing the project proponent with a Microsoft Excel™ worksheet that calculates the volumetric criteria. (Refer to Appendix 6 for information on how to download and use the worksheet). In this worksheet, capture volumes can be calculated using both of the above-referenced volumetric criteria methods. Both methods are described in Section 5 of the *2003 Edition of the CASQA Stormwater Best Management Practice Handbook for New Development and Redevelopment*. Section 5 of the handbook can be accessed and downloaded at the following web link:

www.casqa.org/sites/default/files/BMPHandbooks/BMP_NewDevRedev_Section_5.pdf

The project proponent can select either method to size the Site Design and Treatment Control Measures that require volumetric sizing as specified in Table 3. ***To satisfy the plan check requirements one or more of these control measures must be used for each DMA and sized for the total runoff area of the DMA.***

The State Water Board's Post-Construction Calculator (refer to Appendix 5) provides a discharge credit for trees by allowing an area of 218 ft^2 for each evergreen tree and 109 ft^2 for each deciduous tree. If trees are included within the DMA boundary, the project proponent may take the total area within the DMA (number of trees multiplied by the allowed area credit) multiplied by the "P" value (converted from inches to feet) as shown on Volumetric Sizing Tool in Appendix 6. This will provide a volume reduction in cubit feet which may be used in meeting the overall volumetric criteria for the DMA and has been built into the Volumetric Sizing Tool.

5.4.3 Flow-Based Criteria

The Phase II MS4 Permit requires the municipality to condition applicable new development and redevelopment projects to require "facilities" designed to evapo-transpire, infiltrate, harvest/use, and biotreat storm water ***and that are designated on Table 3 as a flow-based control measure*** to meet at least one of the following flow-based hydraulic sizing design criteria:

- The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; ***or***
- The flow of runoff produced from a rain event equal to at least 2 times the 85th percentile hourly rainfall intensity as determined from local rainfall records. Local rainfall records are provided in Appendix D of the *CASQA Stormwater Best Management Practice Handbook for New Development and Redevelopment* for Fresno, Sacramento, and Redding, California.[3] Table 4 below provides the 85th percentile hourly rainfall intensities for these Central Valley locations as reported in the CASAQ BMP Handbook.

TABLE 4 - RAINFALL INTENSITIES AND FLOW-BASED DESIGN VALUES

Central Valley Weather Station	85th Percentile Rainfall Intensity (inches/hour)	Flow-Based Design Value (2 x 85th Percentile Intensity in inches/hour)
Fresno – Yosemite International Airport (3257)	0.090	0.180
Sacramento – 5 ESE (7633)	0.093	0.186
Redding – Municipal Airport (7304)	0.130	0.260

The project proponent can select either method to size the Site Design and Treatment Control Measures that require flow-based sizing as specified in Table 3. ***To satisfy the plan check requirements one or more of these control measures must be used for each DMA and sized for the total runoff area of the DMA.***

5.4.4 Allowed Variations and Exceptions

Site Design and Treatment Control Measures that infiltrate or bioretain storm water into the subsurface may be altered in their design as specified on Table 5.

TABLE 5 – ALLOWED DESIGN VARIATIONS

Condition	Allowed Variation
Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project	May incorporate an impervious cutoff wall between the bioretention / infiltration facility and the structure or other geotechnical hazard

[3] www.casqa.org/sites/default/files/BMPHandbooks/BMP_NewDevRedev_Appendix_D.pdf

Facilities with documented high concentrations of pollutants in underlying soil or groundwater; facilities located where infiltration could contribute to a geotechnical hazard; and facilities located on elevated plazas or other structures	May incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a "flow-through planter")
Facilities located in areas of high groundwater, highly infiltrative soils or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible	May omit the underdrain
Facilities serving high-risk areas such as fueling stations, truck stops, auto repairs, and heavy industrial sites	Are required to provide additional treatment to address pollutants of concern prior to the flow reaching the infiltration facility

If the project proponent demonstrates that the use of bioretention or infiltration control measures are infeasible at the site, other types of treatment such as tree-box biofilters, compost filters, or in-vault media filters may be utilized for the following types of projects:

1. Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;
2. Facilities receiving runoff solely from existing (pre-project) impervious areas; and
3. Historic sites, structures or landscapes that cannot alter their original configuration in order to maintain their historic integrity.

If any of these alternate non-infiltrating treatment control measures are utilized, they must meet the following performance criteria:

- Sized to treat the volumetric criteria specified in Section 5.4.2 or the flow-based criteria in Section 5.4.3 as appropriate to the type of treatment control measure selected.
- Selected to effectively remove pollutants of concern associated with the new development.

The project proponent is required to support the demonstration of infeasibility of using bioretention or infiltration control measures at the project site and the selection of the alternate non-infiltration treatment control measure(s) through the opinion of a qualified expert such as a California licensed Professional Civil Engineer, a California licensed Professional Geologist, a California licensed Geotechnical Engineer, and/or an EnviroCert International, Inc. Certified Professional in Storm Water Quality (CPSWQ). If an alternate non-infiltrating treatment control measure(s) is proposed by the project proponent, a technical report, stamped and signed by any of the above-referenced experts, demonstrating infeasibility of bioretention or infiltration and the selection and sizing of the alternate treatment control measure must be submitted with the Post-Construction Project Worksheet (Appendix 8).

5.5 INCORPORATE HYDROMODIFICATION MANAGEMENT MEASURES

Storm water runoff that is not addressed with Site Design Measures must be treated with Treatment Control Measures (both of which are identified on Table 3) designed to infiltrate, evapo-transpire, and/or bioretain runoff. In other words, if the DMA is utilizing trees and a storm water capture, collection, and reuse system, **only the net runoff**, after factoring in the credit for the trees and for the amount captured / recycled, is subject to being included in the treatment control requirements. Treatment "facilities" must comply with the following design parameters:

1. Sized to treat the volumetric criteria specified in Section 5.4.2 or the flow-based criteria in Section 5.4.3 as appropriate to the type of treatment control measure selected;
2. Maximum surface loading rate of the infiltration facility of 5 inches per hour, based on the runoff rates calculated for the DMA;
3. Minimum surface reservoir volume equal to surface area of the infiltration facility times a depth of 6 inches;
4. Minimum planting medium depth of 18 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used.
5. Subsurface drainage/storage layer (typically gravel) with an area equal to the surface area and having a minimum depth of 12 inches;
6. Underdrain with discharge elevation at top of the gravel layer;
7. No compaction of soils beneath the treatment control "facility"; or if the soils had previously been compacted, they must be ripped and loosened;
8. No liners or other barriers interfering with infiltration; and
9. Appropriate plant palette for the specified soil mix and maximum available water use.

Alternatives to the above-listed nine design parameters for treatment "facilities" is allowed if **all** of the following equivalent effectiveness features are demonstrated:

- Equal or greater amount of runoff infiltrated or evapo-transpired;
- Equal or lower pollutant concentrations in runoff that is discharged after biotreatment / infiltration;
- Equal or greater protection against shock loadings and spills; and
- Equal or greater accessibility and ease of inspection and maintenance.

Regulated projects that create and / or replace one acre or more of impervious surface must have incorporated Site Design and Treatment Control Measures (from Table 3) that prevent the post-project runoff from exceeding the pre-project flow rate for a 2-year, 24-hour storm event. This does not include

projects that do not increase impervious surface area over the pre-project conditions. The 2-year, 24-hour values for a few selected Central Valley locations are shown in Table 6. The 2-year, 24-hour storm event volumes for all of Northern California are included on an isopluvial map included on the last tab of the Volumetric Post-Construction BMP Sizing Tool (which can be downloaded following the instructions in Appendix 6).

TABLE 6 – 2-YEAR, 24-HOUR STORM TOTALS FOR SELECTED LOCATIONS

Location	2-Year 24-Hour Design Value
City of Redding	4.0 inches
Yuba City	2.25 inches
City of West Sacramento	2.25 inches
City of Lodi	1.8 inches
City of Modesto	1.4 inches
City of Oakdale	1.55 inches
City of Merced	1.55 inches

5.6 PREPARE THE SUBMITTAL

The sixth and final step for Regulated Projects is to compile the information required to be submitted to the plan checker. This includes the following items:

- A completed Post-Construction Worksheet is required (obtained from Appendix 8).
- A separate site plan for each DMA must be submitted. If there are multiple DMAs, a key map showing the location of the DMAs in relationship to one another and the entire site is required to be submitted. Each DMA site plan is required to show the following information:
  - ✓ DMA name and boundary;
  - ✓ The selected Site Design and Treatment Control Measures (identified in Table 3);
  - ✓ The total drainage area in square feet of the DMA;
  - ✓ The pre-development peak flow rate at the point(s) of discharge;
  - ✓ The predicted post-development peak flow rate at the point(s) of discharge;
  - ✓ Areas of existing impervious surfaces (pre-development);
  - ✓ Proposed areas of impervious surfaces (post-development);
  - ✓ Setbacks from creeks, wetlands, and riparian habitats;
  - ✓ Existing topography and drainage patterns (pre-development);
  - ✓ Proposed topography and drainage patterns (post-development);

- ✓ Soil types, soil type boundaries within the DMA, and their Hydrologic Soil Group Classification rating (A, B, C, or D); and
- ✓ Trees, vegetation, and sensitive environmental areas to be protected and preserved.

Each plan must be stamped by a qualified licensed professional. The plans must be stamped by a California Civil Professional Engineer if any of the following control measures were selected: rooftop and impervious area disconnection, porous pavement, rain cisterns, bioretention or rain gardens, infiltration trench, or retention or detention basins. The plans must be stamped by a California Structural Professional Engineer if a green roof was selected or if there is a significant structural aspect to the rain cisterns and collection system. The plans must be stamped by a California licensed Landscape Architect if any of the following Site Design Measures were selected: stream setbacks and buffers, soil quality improvement, vegetated swales, bioretention and rain gardens. The selected Site Design and Treatment Control Measure(s) must be clearly called out on the submitted plans.

Soil types and Hydrologic Soil Groups (HSGs) can be identified using the USDA's online Web Soil Survey. The online tool uses aerial maps to select the area of interest. To access this online reference, go to:

http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

TABLE 7 – HYDROLOGIC SOIL GROUPS

Group A	Low runoff potential, high infiltration rates
Group B	Moderately low runoff potential, good infiltration rates
Group C	Moderately high runoff potential, low infiltration rates
Group D	High runoff potential, poor infiltration

For more information on the HSG classifications, go to:
http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba

- Design drawings for the proposed Treatment Control Measures showing a plan view, elevation view, and subsurface cross-sections must be submitted. Sufficient detail and specifications should be included in these drawings to provide for adequate plan check review and for the construction of the treatment "facility". Each design drawing must be stamped by a qualified licensed professional. The drawings must be stamped by a California Civil Professional Engineer if any of the following control measures were selected: rooftop and impervious area disconnection, porous pavement, rain cisterns, bioretention or rain gardens, infiltration trench, or retention or detention basins. The drawings must be stamped by a California Structural Professional Engineer if a green roof was selected or if there is a significant structural aspect to the rain cisterns and collection system. The drawings must be stamped by a California licensed Landscape Architect if any of the following Site Design Measures were selected: stream setbacks and buffers, soil quality improvement, vegetated swales, bioretention and rain gardens.
- A print out of the results page from the MS Excel™ Volumetric BMP Sizing Tool for each DMA and control measure that requires the volumetric sizing criteria is required to be submitted. (Refer to Appendix 6 for information on how to download the tool.)
- Calculations stamped by the appropriate licensed individual (as described above) for each DMA and control measure that requires flow-based sizing criteria must be included with the submittal.

- An Operation and Maintenance Plan and signed Statement of Responsibility for the proposed treatment control measures must accompany the submittal (refer to Section 6).

OPERATION AND MAINTENANCE OF POST-CONSTRUCTION MEASURES

6 Operation and Maintenance of Post-Construction Measures

Owners of the projects where post-construction treatment control measures (as identified on Table 3) were installed are required to maintain the control measures so that they operate effectively and as designed. To that effect, the project proponent during the plan check process must submit an Operation & Maintenance (O&M) Plan and a Statement of Responsibility.

6.1 LONG TERM PLAN FOR CONDUCTING REGULAR MAINTENANCE OF CONTROL MEASURES

The owner of the project where any post-construction treatment control measures were installed is required to prepare a written plan for conducting regular inspections and maintenance of the installed treatment facilities. The proposed O&M activities should be commensurate with the maintenance measures identified in the CASQA BMP specifications. (Refer to the hyperlinked references in Table 3.) The O&M Plan is required to identify the following information:

- Property name and address;
- Name of the DMA(s) and Treatment Control Measure(s);
- Property owner's contact information including name, mailing address, telephone number, and email address;
- Contact information for any contracted or delegated inspectors and maintenance personnel;
- Minimum inspection frequency by the property owner or their designee;
- Conditions that require maintenance or repair of the Treatment Control Measure; and
- Preventative maintenance tasks, their frequency, and who will perform them.

The project proponent is required to use the form provided in Appendix 9 for the O&M Plan submittal.

OPERATION AND MAINTENANCE OF POST-CONSTRUCTION MEASURES

6.2 STATEMENT OF RESPONSIBILITY

On the O&M Plan form (included in Appendix 9) is a Statement of Responsibility that must be accepted and signed by the property owner or the owner's duly authorized representative. The completed and signed form must be submitted during the plan check process. The statement indicates the current property owner's acceptance of responsibility for the on-going operation, inspection, and maintenance of the treatment control measures until the property and / or responsibility is legally transferred to another entity (such as the new property owner or a maintenance district). It is the responsibility of the current owner to notify the new owner or responsible party of their on-going O&M obligations. The storm water municipal code for the City of Escalon provides the municipality with the legal authority to require any property owner to properly maintain installed storm water treatment control measures.

6.3 SELF-CERTIFICATION ANNUAL REPORTS

Each year, the City of Escalon will mail to owners of installed Treatment Control Measures an O&M self-certification form. This form is required by the municipal code to be completed annually by the owner of the property to certify that the O&M program (described in Section 6.1) is being implemented and that the Treatment Control Measure(s) is in an effective operational condition. The property owner will have up to 60 days to complete and return the annual O&M self-certification form. If reports are not received within the 60-day period, the City of Escalon will perform the inspection and assessment; and the property owner will be billed for it as described in the municipal code Section 13.15.

7 Municipal-Specific Information

7.1 CONTACT INFORMATION

The City of Escalon is subject to the State Water Board's Phase II MS4 Permit and is required to condition applicable new development and redevelopment projects with the requirements contained in this Post-Construction Standards Plan. This plan was prepared as a part of a collaborative effort with other California Central Valley municipalities which are listed in Appendix 10. Although the plan is similar in content with these collaborating municipalities, it has been customized by the City of Escalon to meet hydrologic, topographic, and geophysical conditions; local zoning and building standards; and organizational requirements specific to this municipality.

For more information on the requirements of this plan or to obtain additional guidance on how to meet the conditions of this plan, please contact:

Bill Carlson
City of Escalon
2060 McHenry Ave., Escalon CA 95320
209-691-7450

For more information about the City of Escalon's storm water program or to download a copy of this Post-Construction Standards Plan or related-forms and tools, go to:

http://cityofescalon.org/departments/public-works/stormwater/

APPENDIX 1 - GLOSSARY

Glossary for the Post-Construction Standards Plan[4]

Capital Improvement Project (CIP) – A public project that is owned by the municipality. It is not subject to the plan check process but is subject to the Post-Construction Standards Plan and Section E.12 of the Phase II MS4 Permit. (Definition provided by the document publisher.)

Detached Single-family Home Project - The building of one single new house or the addition and/or replacement of impervious surface associated with one single existing house, which is not part of a larger plan of development.

Discretionary Project – A project that is subject to the municipal plan check process and discretionary review and conditioning.

Facility – For the purpose of this Post-Construction Development Standards Plan, facility refers to a Site Design Control or Treatment Control Measure and does not refer to a property, parcel, industrial plant, or place of business. (Definition provided by the document publisher.)

Hydromodification - Modification of hydrologic pathways (precipitation, surface runoff, infiltration, groundwater flow, return flow, surface-water storage, groundwater storage, evaporation and transpiration) that results in negative impacts to watershed health and functions.

Impervious Surface - A surface covering or pavement of a developed parcel of land that prevents the land's natural ability to absorb and infiltrate rainfall/storm water. Impervious surfaces include, but are not limited to; roof tops, walkways, patios, driveways, parking lots, storage areas, impervious concrete and asphalt, and any other continuous watertight pavement or covering. Landscaped soil and pervious pavement, including pavers with pervious openings and seams, underlain with pervious soil or pervious storage material, such as a gravel layer sufficient to hold the specified volume of rainfall runoff are not impervious surfaces.

Industrial Development - Development or redevelopment of property to be used for industrial purposes, such as factories, manufacturing buildings, and research and development parks.

Linear Underground/Overhead Projects (LUPs) - Include, but are not limited to, any conveyance, pipe, or pipeline for the transportation of any gaseous, liquid (including water and wastewater for domestic municipal services), liquescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g., telephone, telegraph, radio, or television messages); and associated ancillary facilities. Construction activities associated with LUPs include, but are not limited to, (a) those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment, and associated ancillary facilities); and include, but are not limited to, (b) underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling,

[4] Definitions (unless otherwise specified) are from the Phase II MS4 NPDES General Permit, Order No. 2013-0001-DWQ, Attachment I; www.swrcb.ca.gov/water_issues/programs/stormwater/docs/phsii2012_5th/att_i_glossary_final.pdf

access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/ or pavement repair or replacement, and stockpile/borrow locations.

Low Impact Development – A sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional storm water management, which collects and conveys storm water runoff through storm drains, pipes, or other conveyances to a centralized storm water facility, Low Impact Development (LID) takes a different approach by using site design and storm water management to maintain the site's pre-development runoff rates and volumes. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall. LID has been a proven approach in other parts of the country and is seen in California as an alternative to conventional storm water management.

Ministerial Project – A project that is non-discretionary and consists of a grading or building permit that is pulled "over-the-counter" without a plan check review process. (Definition provided by the document publisher.)

Municipal Separate Storm Sewer System (MS4) - The regulatory definition of an MS4 (40 CFR 122.26(b)(8)) 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 to or pursuant to state law) 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 a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States. (ii) Designed or used for collecting or conveying storm water; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2." In practical terms, operators of MS4s can include municipalities and local sewer districts, state and federal departments of transportation, public universities, public hospitals, military bases, and correctional facilities. The Storm water Phase II Rule added federal systems, such as military bases and correctional facilities by including them in the definition of small MS4s.

National Pollutant Discharge Elimination System (NPDES) - A national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the CWA.

New Development - New Development means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision on an area that has not been previously developed.

Non-Discretionary Project – A project that is not subject to the municipal plan check process; also known as a ministerial project. (Definition provided by the document publisher.)

Pervious Pavement - Pavement that stores and infiltrates rainfall at a rate that exceeds conventional pavement.

Pollutants of Concern - Pollutants of concern found in urban runoff include sediments, non-sediment solids, nutrients, pathogens, oxygen-demanding substances, petroleum hydrocarbons, heavy metals, floatables, polycyclic aromatic hydrocarbons (PAHs), trash, and pesticides and herbicides.

Redevelopment - Land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface area on a site on which some past development has occurred. Redevelopment does not include trenching, excavation and resurfacing associated with LUPs; pavement grinding and resurfacing of existing roadways; construction of new sidewalks, pedestrian ramps, or bike lanes on existing roadways; or routine replacement of damaged pavement such as pothole repair or replacement of short, non-contiguous sections of roadway.

Regulated Project – Refers to projects subject to the new and redevelopment standards in Section E.12c. of the Phase II MS4 Permit and includes projects that create and / or replace 5,000 ft^2 or more of impervious surface.

Residential Housing Subdivision - Any property development of multiple single-family homes or of dwelling units intended for multiple families/households (e.g., apartments, condominiums, and town homes).

Riparian Areas – Plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent water bodies. Riparian areas have one or both of the following characteristics: 1) distinctively different vegetative species than adjacent areas, and 2) species similar to adjacent areas but exhibiting more vigorous or robust growth forms. Riparian areas are usually transitional between wetland and upland.

Small Project – Projects that create and / or replace between 2,500 and 5,000 ft^2 of impervious surface and detached single family home projects that create and / or replace more than 2,500 ft^2 and that are not part of a larger common plan. (Definition provided by the document publisher.)

Smart Growth Projects – Projects that produce multiple-benefits such as economic, social and environmental benefits. Smart growth projects commonly include high density development projects that result in a reduction of runoff volume per capita as a result of reduced impervious surface.

Source Control - Land use or site planning practices, or structural or nonstructural measures, that aim to prevent runoff pollution by reducing the potential for contact with rainfall runoff at the source of pollution. Source control BMPs minimize the contact between pollutants and urban runoff.

Surface Drainage - Any above-ground runoff (sheet, shallow concentrated, and open channel) that flows into the storm drain system.

Storm Drain System - The basic infrastructure in a municipal separate storm sewer system that collects and conveys storm water runoff to a treatment facility or receiving water body.

Storm Water – Storm water is generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As storm water flows over the land or impervious surfaces, it accumulates debris, chemicals, sediment or other pollutants that could adversely affect water quality if the storm water is discharged untreated.

Storm Water Treatment System - Any engineered system designed to remove pollutants from storm water runoff by settling, filtration, biological degradation, plant uptake, media absorption/adsorption or other physical, biological, or chemical process. This includes landscape-based systems such as grassy swales and bioretention units as well as proprietary systems.

Structural Controls - Any structural facility designed and constructed to mitigate the adverse impacts of storm water and urban runoff pollution.

Treatment - Any method, technique, or process designed to remove pollutants and/or solids from polluted storm water runoff, wastewater, or effluent.

APPENDIX 2 - ACRONYMS

Acronyms of the Post-Construction Standards Plan

ASTM	American Society for Testing and Materials
BMP	Best Management Practice
CASQA	California Storm Water Quality Association (www.CASQA.org)
CPSWQ	Certified Professional in Storm Water Quality
CIP	Capital Improvement Project
CWA	Clean Water Act
DMA	Drainage Management Area
HSG	Hydrologic Soil Group
LID	Low Impact Development
LUPs	Linear Utility Projects
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
O&M	Operation and Maintenance
PE	Professional Engineer
SMARTS	Storm Water Multi-Application, Reporting, and Tracking System (https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp)
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency

APPENDIX 3 – SECTION E.12 OF THE PHASE II MS4 PERMIT

E.12 POST CONSTRUCTION STORM WATER MANAGEMENT PROGRAM

E.12.a. Post-Construction Measures

Permittees shall regulate development to comply with the following Sections:

- E.12.b Site Design Measures
- E.12.c. Regulated Projects
- E.12.d. Source Control Measures
- E.12.e. Low Impact Development (LID) Design Standards
- E.12.f. Hydromodification Measures
- E.12.g. Enforceable Mechanisms
- E.12.h. Operation and Maintenance of Storm Water Control Measures
- E.12.i. Post-Construction Best Management Practice Condition Assessment
- E.12.j. Planning and Development Review Process
- E.12.k. Post-Construction Storm Water Management Requirements Based on Assessment and Maintenance of Watershed Processes
- E.12.l. Alternative Post-Construction Storm Water Management Program

E.12.b. Site Design Measures

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall require implementation of site design measures for all projects that create and/or replace (including projects with no net increase in impervious footprint) between 2,500 square feet and 5,000 square feet of impervious surface, including detached single family homes that create and/or replace 2,500 square feet or more of impervious surface and are not part of a larger plan of development. Site design measures as specified in this section are not applicable to linear underground/overhead projects (LUPs).

(ii) **Implementation Level** - Projects shall implement one or more of the following **site design measures** to reduce project site runoff:

(a) **Stream Setbacks and Buffers** - a vegetated area including trees, shrubs, and herbaceous vegetation, that exists or is established to protect a stream system, lake reservoir, or coastal estuarine area;
(b) **Soil Quality Improvement and Maintenance** - improvement and maintenance soil through soil amendments and creation of microbial community;
(c) **Tree Planting and Preservation** - planting and preservation of healthy, established trees that include both evergreens and deciduous, as applicable;
(d) **Rooftop and Impervious Area Disconnection** - rerouting of rooftop drainage pipes to drain rainwater to rain barrels, cisterns, or permeable areas instead of the storm sewer;
(e) **Porous Pavement** - pavement that allows runoff to pass through it, thereby reducing the runoff from a site and surrounding areas and filtering pollutants;
(f) **Green Roofs** - a vegetative layer grown on a roof (rooftop garden);
(g) **Vegetated Swales** - a vegetated, open-channel management practice designed specifically to treat and attenuate storm water runoff;
(h) **Rain Barrels and Cisterns** - system that collects and stores storm water runoff from a roof or other impervious surface.

Project proponents shall use the State Water Board SMARTS Post-Construction Calculator[21], or equivalent to quantify the runoff reduction resulting from implementation of site design measures.

(iii) **Reporting** - The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.12.c. Regulated Projects

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall implement standards to effectively reduce runoff and pollutants associated with runoff from Regulated Projects as defined below.

(ii) **Implementation Level** - The Permittee shall regulate all projects that create and/or replace 5,000 square feet or more of impervious surface (Regulated Projects). The Permittee shall require these Regulated Projects to implement measures for site design, source control, runoff reduction, storm water treatment and baseline hydromodification management as defined in this Order.

Regulated Projects do not include:

- Detached single family home projects that are not part of a larger plan of development;
- Interior remodels;

[21] The State Water Board SMARTS Post-Construction Calculator can be found at: https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp

- Routine maintenance or repair such as: exterior wall surface replacement, pavement resurfacing within the existing footprint.
- LUPs - Unless the LUP has a discrete location that has 5,000 square feet or more of newly constructed contiguous impervious surface. When the LUP has a discrete location that has 5,000 sq-ft or more of new contiguous impervious surface, only that specific discrete location is subject to Section E.12.c.

Regulated Projects include development projects. Development includes new and redevelopment projects on public or private land that fall under the planning and permitting authority of a Permittee. Redevelopment is any land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface area on a site on which some past development has occurred. Redevelopment does not include trenching, excavation and resurfacing associated with LUPs; pavement grinding and resurfacing of existing roadways; construction of new sidewalks, pedestrian ramps, or bike lanes on existing roadways; or routine replacement of damaged pavement such as pothole repair or replacement of short, non-contiguous sections of roadway. The following (a-c) describe specific Regulated Project requirements for redevelopment, road projects and LUPs:

(a) Where a redevelopment project results in an increase of more than 50 percent of the impervious surface of a previously existing development, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included to the extent feasible.

(b) Where a redevelopment project results in an increase of less than 50 percent of the impervious surface of a previously existing development, only runoff from the new and/or replaced impervious surface of the project must be included.

(c) Road Projects and LUPs - Any of the following types of road projects and LUPs that create 5,000 square feet or more of newly constructed contiguous impervious surface and that are public road projects and/or fall under the building and planning authority of a Permittee shall comply with Section E.12.e. Low Impact Development Standards except that treatment of runoff of the 85th percentile that cannot be infiltrated onsite shall follow U.S. EPA guidance regarding green infrastructure to the extent feasible. Types of projects include:

1) Construction of new streets or roads, including sidewalks and bicycle lanes built as part of the new streets or roads.
2) Widening of existing streets or roads with additional traffic lanes.
   a) Where the addition of traffic lanes results in an alteration of more than 50 percent of the impervious surface of an existing street or road, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included in the treatment system design.
   b) Where the addition of traffic lanes results in an alteration of less than 50 percent (but 5,000 square feet or more) of the impervious surface

of an existing street or road, only the runoff from new and/or replaced impervious surface of the project must be included in the treatment system design.

3) Construction of linear underground/overhead projects (LUPs)
4) Specific exclusions are:
   a) Sidewalks built as part of new streets or roads and built to direct storm water runoff to adjacent vegetated areas.
   b) Bicycle lanes that are built as part of new streets or roads that direct storm water runoff to adjacent vegetated areas.
   c) Impervious trails built to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas, preferably away from creeks or towards the outboard side of levees.
   d) Sidewalks, bicycle lanes, or trails constructed with permeable surfaces.
   e) Trenching, excavation and resurfacing associated with LUPs; pavement grinding and resurfacing of existing roadways and parking lots; construction of new sidewalks, pedestrian ramps, or bike lanes on existing roadways; or routine replacement of damaged pavement such as pothole repair or replacement of short, non-contiguous sections of roadway.

Effective Date for Applicability of Low Impact Development Runoff Standards to Regulated Projects: By the second year of the effective date of the permit, the Permittee shall require these Post-Construction Standards be applied on applicable new and redevelopment Regulated Projects, both private development requiring municipal permits and public projects, to the extent allowable by applicable law. These include discretionary permit projects that have not been deemed complete for processing and discretionary permit projects without vesting tentative maps that have not requested and received an extension of previously granted approvals. Discretionary projects that have been deemed complete prior to the second year of the effective date of this Order are not subject to the Post-Construction Standards herein. For the Permittee's Regulated Projects, the effective date shall be the date their governing body or designee approves initiation of the project design.

Permittee's Development Projects - The Permittee shall develop and implement an equivalent approach, to the approach used for private development projects, to apply the most current version of the low impact development runoff standards to applicable public development projects, to the extent allowable by applicable law.

E.12.d. Source Control Measures

(i) **Task Description** – Regulated Projects with pollutant-generating activities and sources shall be required to implement standard permanent and/or operation source control measures as applicable.

(ii) **Implementation Level** - Measures for the following pollutant generating activities and sources shall be designed consistent with recommendations from the CASQA

Stormwater BMP Handbook for New Development and Redevelopment or equivalent manual, and include:

(a) Accidental spills or leaks
(b) Interior floor drains
(c) Parking/storage areas and maintenance
(d) Indoor and structural pest control
(e) Landscape/outdoor pesticide use
(f) Pools, spas, ponds, decorative fountains, and other water features
(g) Restaurants, grocery stores, and other food service operations
(h) Refuse areas
(i) Industrial processes
(j) Outdoor storage of equipment or materials
(k) Vehicle and equipment cleaning
(l) Vehicle and equipment repair and maintenance
(m) Fuel dispensing areas
(n) Loading docks
(o) Fire sprinkler test water
(p) Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources
(q) Unauthorized non-storm water discharges
(r) Building and grounds maintenance

E.12.e. Low Impact Development (LID) Design Standards

(i) **Task Description –** The Permittee shall require all Regulated Projects to implement low impact development (LID) standards designed to reduce runoff, treat storm water, and provide baseline hydromodification management to the extent feasible, to meet the Numeric Sizing Criteria for Storm Water Retention and Treatment under Section E.12.e(ii)(c).

(ii) **Implementation Level –** The Permittee **shall adopt and implement** requirements and standards to ensure design and construction of development projects achieve *the following LID Design Standards*.

(a) **Site Assessment**

At the earliest planning stages, the Permittee shall require Regulated Projects to assess and evaluate how site conditions, such as soils, vegetation, and flow paths, will influence the placement of buildings and paved surfaces. The evaluation will be used to meet the goals of capturing and treating runoff and assuring these goals are incorporated into the project design. The Permittee *may adopt* or reference an existing LID site assessment methodology[22]Permittees shall require Regulated Projects to consider optimizing the site layout through the following methods:

1) Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed.

[22] Low Impact Development Manual for Southern California (Low Impact Development Center – See CASQA's LID website at: http://www.casqa.org/LID/tabid/240/Default.aspx.

2) Concentrate development on portions of the site with less permeable soils and preserve areas that can promote infiltration.
3) Limit overall impervious coverage of the site with paving and roofs.
4) Set back development from creeks, wetlands, and riparian habitats.
5) Preserve significant trees.
6) Conform the site layout along natural landforms.
7) Avoid excessive grading and disturbance of vegetation and soils.
8) Replicate the site's natural drainage patterns.
9) Detain and retain runoff throughout the site.

(b) **Drainage Management Areas**

The Permittee shall require each Regulated Project to provide a map or diagram dividing the developed portions of the project site into discrete Drainage Management Areas (DMAs), and to manage runoff from each DMA using Site Design Measures, Source Controls and/or Storm Water Treatment and Baseline Hydromodification Measures.

(c) **Numeric Sizing Criteria for Storm Water Retention and Treatment**

The Permittees shall require facilities designed to *evapotranspire, infiltrate, harvest/use, and biotreat* storm water to meet at least one of the following hydraulic sizing design criteria:

1) Volumetric Criteria:

a) The maximized capture storm water volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (1998) pages 175-178 (that is, approximately the 85th percentile 24-hour storm runoff event); or

b) The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of the CASQA's Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.

2) Flow-based Criteria:

a) The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or

b) The flow of runoff produced from a rain event equal to at least 2 times the 85th percentile hourly rainfall intensity as determined from local rainfall records.

(d) **Site Design Measures**

The Permittee shall implement **Site Design Measures** (as defined in Section E.12.b. Site Design Measures and Section E.12.e(ii)(a) Site Assessment), site layout and design measures, based on the objective of achieving infiltration, evapotranspiration and/or harvesting/reuse of the 85th percentile 24-hour storm runoff event. Site design measures shall be used to reduce the amount of runoff, to the extent technically feasible, for which retention and runoff is required . *Any remaining runoff from impervious DMAs may then be directed to one or more bioretention facilities as specified in Section E.12.e.(ii)(f), below.*

(e) **Source Controls**

The Permittee shall implement Source Controls as defined in Section E.12.d. Source Control Measures.

(f) **Storm Water Treatment Measures and Baseline Hydromodification Management Measures**

After implementation of **Site Design Measures**, remaining runoff from impervious DMAs *must be directed* to one or more facilities designed to infiltrate, evapotranspire, and/or bioretain the amount of runoff specified in Section E.12.e(ii)(c) Numeric Sizing Criteria for Storm Water Retention and Treatment. *The facilities must be demonstrated to be at least as effective as a bioretention system with the following design parameters:*

1) Maximum surface loading rate of 5 inches per hour, based on the flow rates calculated. A sizing factor of 4% of tributary impervious area may be used.
2) Minimum surface reservoir volume equal to surface area times a depth of 6 inches.
3) Minimum planting medium depth of 18 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used.
4) Subsurface drainage/storage (gravel) layer with an area equal to the surface area and having a minimum depth of 12 inches.
5) Underdrain with discharge elevation at top of gravel layer.
6) No compaction of soils beneath the facility, or ripping/loosening of soils if compacted.
7) No liners or other barriers interfering with infiltration.
8) Appropriate plant palette for the specified soil mix and maximum available water use.

(g) **Alternative Designs —** Facilities, or a combination of facilities, of a different design than in Section E.12.e.(ii)(f) may be permitted if all of the following

measures of equivalent effectiveness are demonstrated:

1) Equal or greater amount of runoff infiltrated or evapotranspired;
2) Equal or lower pollutant concentrations in runoff that is discharged after biotreatment;
3) Equal or greater protection against shock loadings and spills;
4) Equal or greater accessibility and ease of inspection and maintenance.

(h) **Allowed Variations for Special Site Conditions** - The bioretention system design parameters in Section E.12.e.(ii)(f) may be adjusted for the following special site conditions:

1) Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project *may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.*
2) Facilities with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures *may incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer* (this configuration is commonly known as a "flow-through planter").
3) Facilities located in areas of high groundwater, highly infiltrative soils or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, *may omit the underdrain*.
4) Facilities serving high-risk areas such as fueling stations, truck stops, auto repairs, and heavy industrial sites *may be required to provide additional treatment to address pollutants of concern unless these high-risk areas are isolated from storm water runoff or bioretention areas with little chance of spill migration*.

(i) **Exceptions to Requirements for Bioretention Facilities** - Contingent on a demonstration that use of bioretention or a facility of equivalent effectiveness is infeasible, *other types of biotreatment or media filters (such as tree-box-type biofilters or in-vault media filters)* may be used for the following categories of Regulated Projects:

1) Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;
2) Facilities receiving runoff solely from existing (pre-project) impervious areas; and
3) Historic sites, structures or landscapes that cannot alter their original configuration in order to maintain their historic integrity.

By the second year of the effective date of the permit, each Permittee shall *adopt or reference appropriate performance criteria* for such biotreatment and media filters.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.12.f. Hydromodification Management

(i) **Task Description** – Within the third year of the effective date of the permit, the Permittee shall develop and implement Hydromodification Management procedures. Hydromodification management projects are Regulated Projects that create and/or replace one acre or more of impervious surface. A project that does not increase impervious surface area over the pre-project condition is not a hydromodification management project.

(ii) **Implementation Level** - The Permittee shall implement the following Hydromodification Standard:

(a) Post-project runoff shall not exceed estimated pre-project flow rate for the 2-year, 24-hour storm in the following geomorphic provinces (Figure 1):

- Coast Ranges
- Klamath Mountains
- Cascade Range
- Modoc Plateau
- Basin and Range
- Sierra Nevada
- Great Valley

(b) Post-project runoff shall not exceed estimated pre-project flow rate for the 10-year, 24-hour storm in the following geomorphic provinces (Figure 1):

- Transverse Ranges
- Peninsular Ranges
- Mojave Desert
- Colorado Desert

Figure 1. California Geomorphic Provinces

Alternatively, the Permittee may use a geomorphically based hydromodification standard or set of standards and analysis procedures designed to ensure that Regulated Projects do not cause a decrease in lateral (bank) and vertical (channel bed) stability in receiving stream channels. The alternative hydromodification standard or set of standards and analysis procedures must be reviewed and approved by the Regional Board Executive Officer.

(iii) **Reporting** –The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.12.g. Enforceable Mechanisms

(i) **Task Description** - Within the third year of the effective date of the permit, the Permittee shall develop and/or modify enforceable mechanisms that will effectively implement the requirements in Section E.12.b through f (if necessary).

(ii) **Implementation Level** - The Permittee shall develop and/or modify enforceable mechanisms that will effectively implement the requirements in Section E.12.b through E.12.f and may include municipal codes, regulations, standards, and specifications. The Permittee shall:

(a) *Conduct an analysis* of all applicable codes, regulations, standards, and/or specifications *to identify modifications and/or additions necessary to fill gaps and remove impediments to effective implementation of project-scale development requirements.*

(b) *Approve new and/or modified enforceable mechanisms that effectively resolve regulatory conflicts and implement the requirements* in Sections E.12.b through E.12.f (if necessary)

(c) *Apply new and/or modified enforceable mechanisms to all applicable new and redevelopment projects.* ***Develop and make available specific guidance for LID BMP design***

(d) Complete a Tracking Report indicating the Permittee's accomplishments in education and outreach supporting implementation of LID requirements for new and redevelopment projects.

E.12.h. Operation and Maintenance of Post-Construction Storm Water Management Measures

(i) **Task Description** –Within the second year of the effective date of the permit, the Permittee shall implement an O&M Verification Program for storm water treatment and baseline hydromodification management structural control measures defined in Section E.12.e(ii)(f). Storm Water Treatment Measures and Baseline Hydromodification Management Measures on all Regulated Projects.

(ii) **Implementation Level** – At a minimum, the O&M Verification Program shall include the following elements:

(a) All Regulated Projects shall at a minimum, require *at least one of the following* from all project proponents and their successors in control of the Project or successors in fee title:

1) The project proponent's signed statement accepting responsibility for the O&M of structural control measure(s) until such responsibility is legally transferred to another entity;
2) Written conditions in the sales or lease agreements or deed for the project that requires the buyer or lessee to assume responsibility for the O&M of the installed treatment system(s) and hydromodification control(s) (if any) until such responsibility is legally transferred to another entity;

3) Written text in project deeds, or conditions, covenants and restrictions for multi-unit residential projects that require the homeowners association or, if there is no association, each individual owner to assume responsibility for the O&M of the installed treatment system(s) and hydromodification control(s) (if any) until such responsibility is legally transferred to another entity; or

4) Any other legally enforceable agreement or mechanism, such as recordation in the property deed, that assigns the O&M responsibility for the installed treatment system(s) and hydromodification control(s) (if any) to the project owner(s) or the Permittee.

(b) Coordination with the appropriate mosquito[23] and vector control agency with jurisdiction to establish a protocol for notification of installed treatment systems and hydromodification management controls. *On an annual basis, before the wet season, prepare a list of newly installed (installed within the reporting period) storm water treatment systems and hydromodification management controls to the local mosquito and vector control agency and the appropriate Regional Water Board.* The Permittee may submit the list of Regulated Projects as described in Section E.12.h.(ii)(e). This list shall include the facility locations and a description of the storm water treatment measures and hydromodification management controls installed.

(c) Conditions of approval or other legally enforceable agreements or mechanisms for all Regulated Projects that require the granting of site access to all representatives of the Permittee for the sole purpose of performing O&M inspections of the installed treatment system(s) and hydromodification control(s) (if any).

(d) A ***written*** implementation plan that describes O&M (including inspection) of all Regional Projects and regional controls that are Permittee-owned and/or operated.

(e) ***A database or equivalent tabular format of all Regulated Projects*** (public and private) that have installed treatment systems. This database or equivalent tabular format shall include the following information for each Regulated Project:

1) Name and address of the Regulated Project;
2) Specific description of the location (or a map showing the location) of the installed treatment system(s) and hydromodification control(s) (if any);
3) Date(s) that the treatment system(s) and hydromodification controls (if any) is/are installed;
4) Description of the type and size of the treatment system(s) and hydromodification control(s) (if any) installed;
5) Responsible operator(s) of each treatment system and hydromodification control (if any);
6) Dates and findings of inspections (routine and follow-up) of the treatment system(s) and hydromodification control(s) (if any) by the Permittee; and
7) Any problems and corrective or enforcement actions taken.

[23] California Department of Public Health. (2012). Best Management Practices for Mosquito Control in California. Retrieved on July 20, 2012 from http://www.westnile.ca.gov/resources.php

8) Maintenance Approvals: The Permittee shall ensure that systems and hydromodification controls installed at Regulated Projects are properly operated and maintained for the life of the projects. In cases where the responsible party for a treatment system or hydromodification control has worked diligently and in good faith with the appropriate state and federal agencies and the Permittee to obtain approvals necessary to complete maintenance activities for the treatment system or hydromodification management control, but these approvals are not granted, the Permittee shall be deemed to be in compliance with this Provision.

(iii) **Reporting –** The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.12.i. Post-Construction Best Management Practice Condition Assessment

(i) **Task Description** – Within the third year of the effective date of the permit, the Permittee shall inventory and assess the maintenance condition of structural post-construction BMPs (including BMPs used for flood control) within the Permittee's jurisdiction.

(ii) **Implementation Level** – *The Permittee shall develop and implement a plan to inventory, map, and determine the relative maintenance condition of structural post-construction BMPs. Maintenance condition shall be determined through a self-certification program where Permittees require annual reports from authorized parties demonstrating proper maintenance and operations.* The plan shall include:

(a) An inventory and map of existing structural post-construction BMPs, in GIS if available.
(b) Assessments of the self-certification program annual reports. Assessment shall include a ranking of structural BMPs and verification that BMPs are operating to remove pollutants as designed. Regional BMPs should receive higher priority than lot-scale BMPs, and BMPs designed to remove pollutants for which receiving water is impaired should receive priority attention over other BMPs.
(c) Appropriate escalating enforcement based on the Permittee Enforcement Response Plan to ensure proper maintenance of BMPs and submittal of self-certification annual reports.
(d) Self-Certification Annual Reports. At a minimum, the self-certification annual reports shall include:

1) Field observations to determine the effectiveness of the structural post construction BMPs in removing pollutants of concern from storm water runoff and/or reducing hydromodification impacts as designed.

2) Long-term plan for conducting regular maintenance of BMPs, including the frequency of such maintenance.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.12.j. Planning and Development Review Process

(i) **Task Description** – The Permittee shall review their planning and permitting process to assess any gaps or impediments impacting effective implementation of these post-construction requirements specified in Section E.12, and where these are found to exist, seek solutions to promote implementation of these requirements within the context of public safety and community goals for land use. The Permittee shall prioritize review of the landscape code (code detailing landscaping requirements and considerations which should be implemented to protect environmental quality) to correct gaps and impediments impacting effective implementation of post-construction requirements.

(ii) **Implementation Level** – During years 1 – 3, the Permittee shall conduct the review using an existing guide or template already developed for MS4s (such as the Municipal Regulatory Update Assistance Program (MRUAP)[24] conducted by AHBL, Inc. for the Low Impact Development Initiative (LIDI) on the Central Coast). By the fourth year of the effective date of the permit, any changes to the planning and permitting process will be completed to effectively administer these provisions. Priority shall be placed on review of the landscape code, with the following implementation level.

(a) Within the first year of the effective date of this permit, the Permittee shall conduct an analysis of the landscape code to correct gaps and impediments impacting effective implementation of post-construction requirements.

(b) Within the second year of the effective date of the permit, the Permittee shall complete any changes to the landscape code to effectively administer post-construction requirements.

(iii) **Reporting** – By the second year Annual Report and annually thereafter, complete and have available a summary of the review process, and any proposed or completed changes to the Permittee's program.

[24] http://www.casqa.org/LIDDemo/LIDTraining/tabid/246/Default.aspx

E.12.k. Post-Construction Storm Water Management Requirements Based on Assessment and Maintenance of Watershed Processes

Small MS4s subject to Section E of this Order, *in place of complying with the requirements set forth in Section E.12*, except for Sections E.12.j. Planning and Development Review Process and E.12.e(ii)(e) Source Control Requirements, *shall comply* with post-construction storm water management requirements based on a watershed-process approach developed by Regional Water Board that include the following:

- Completion of a comprehensive assessment of dominant watershed processes affected by urban storm water
- LID site design and runoff reduction measures, numeric runoff treatment and retention controls, and hydromodification controls that will maintain watershed processes and protect water quality and beneficial uses.
- A process by which Regional Board staff will actively engage Permittees to adaptively manage requirements as determined by the assessment of watershed processes.
- An annual reporting program that involves Regional Board staff and State Board staff to inform statewide watershed process based criteria.

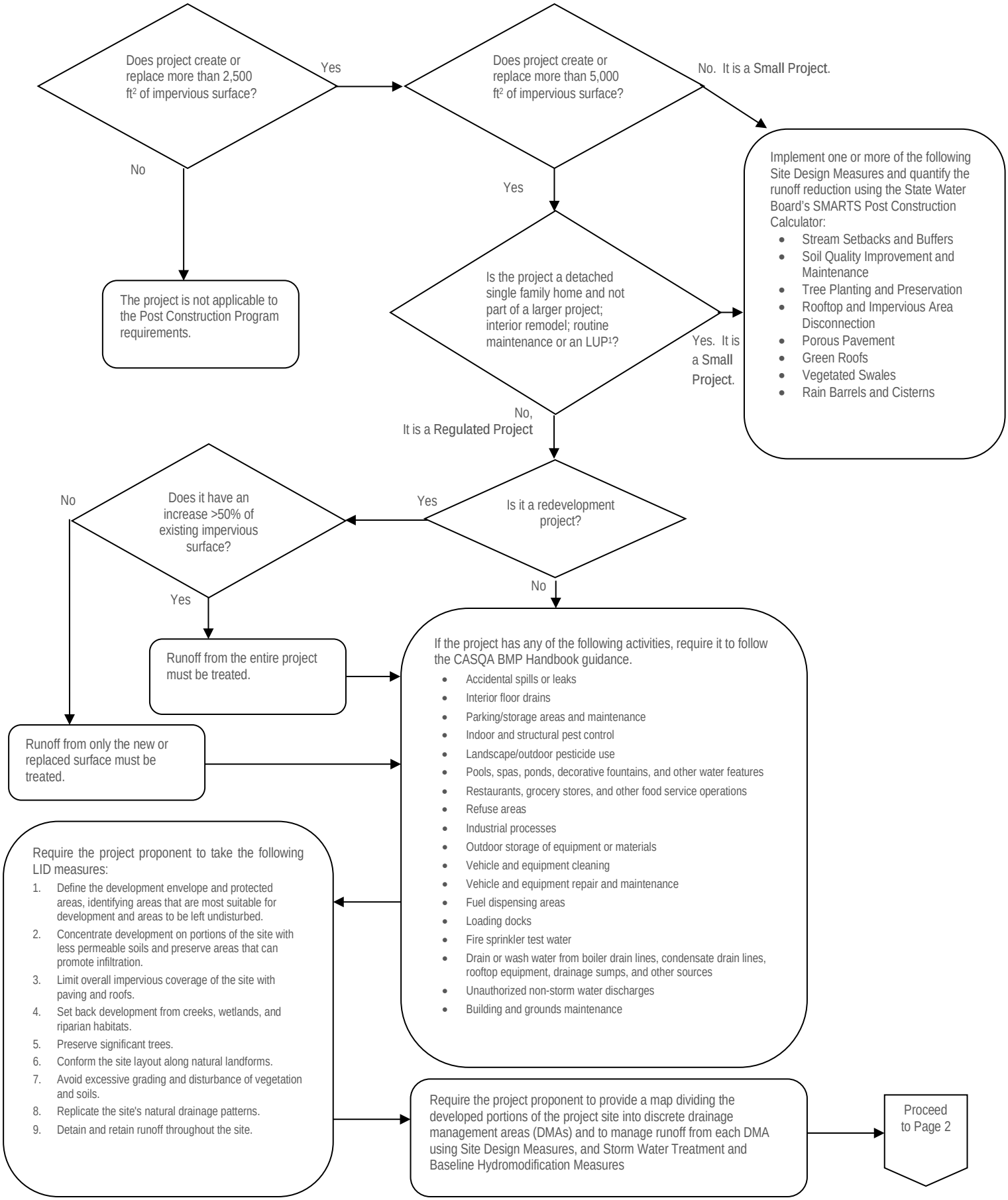
The regional watershed-process based approach must be approved by the Regional Water Board following a public process.

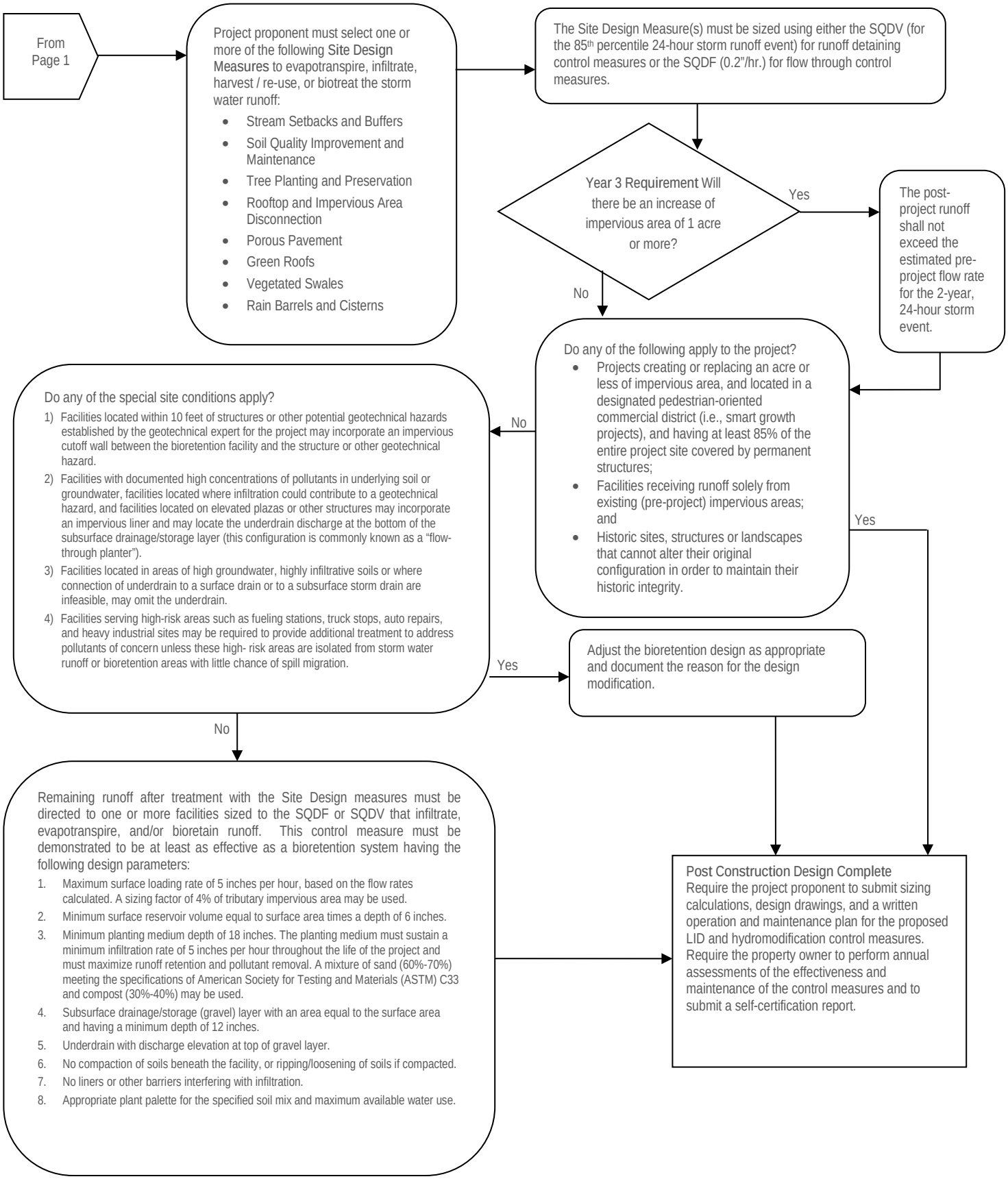
E.12.l. Alternative Post-Construction Storm Water Management Program

A Permittee may propose alternative post-construction measures *in lieu of some or all of Section E.12. requirements* for multiple benefit projects. Multiple-benefit projects include projects that may address any of the following, in addition to water quality: water supply, flood control, habitat enhancement, open space preservation, recreation, climate change. Multiple-benefit projects may be applied at various scales including project site, municipal or sub-watershed level. Multiple-benefit projects may include, but are not limited to, projects developed under Watershed Improvement Plans (Water Code §16100 et seq.), IRWMP implementation and green infrastructure projects. Multiple benefit projects must be equally or more protective of water quality than Section E.12. requirements.

The Regional Water Board or the Executive Officer, may approve alternative post-construction measures for multiple-benefit projects, as described above, after an opportunity for public comment, if the Regional Water Board or Executive Officer finds that the alternative measures are consistent with the MEP standard.

APPENDIX 4 – POST-CONSTRUCTION MANAGEMENT FLOW CHART

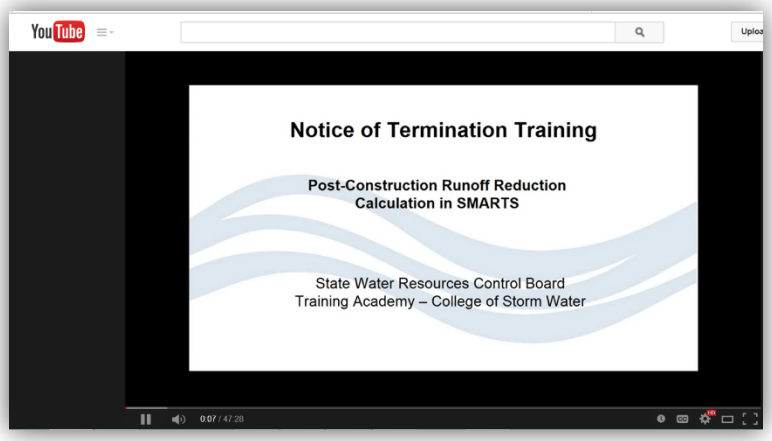

Does project create or replace more than 2,500 ft² of impervious surface?
Yes
No
The project is not applicable to the Post Construction Program requirements.
Does project create or replace more than 5,000 ft² of impervious surface?
No. It is a Small Project.
Yes
Is the project a detached single family home and not part of a larger project; interior remodel; routine maintenance or an LUP[1]?
Yes. It is a Small Project.
Implement one or more of the following Site Design Measures and quantify the runoff reduction using the State Water Board's SMARTS Post Construction Calculator:
• Stream Setbacks and Buffers
• Soil Quality Improvement and Maintenance
• Tree Planting and Preservation
• Rooftop and Impervious Area Disconnection
• Porous Pavement
• Green Roofs
• Vegetated Swales
• Rain Barrels and Cisterns
No, It is a Regulated Project
Is it a redevelopment project?
Yes
No
Does it have an increase >50% of existing impervious surface?
No
Yes
Runoff from the entire project must be treated.
Runoff from only the new or replaced surface must be treated.
If the project has any of the following activities, require it to follow the CASQA BMP Handbook guidance.
• Accidental spills or leaks
• Interior floor drains
• Parking/storage areas and maintenance
• Indoor and structural pest control
• Landscape/outdoor pesticide use
• Pools, spas, ponds, decorative fountains, and other water features
• Restaurants, grocery stores, and other food service operations
• Refuse areas
• Industrial processes
• Outdoor storage of equipment or materials
• Vehicle and equipment cleaning
• Vehicle and equipment repair and maintenance
• Fuel dispensing areas
• Loading docks
• Fire sprinkler test water
• Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources
• Unauthorized non-storm water discharges
• Building and grounds maintenance
Require the project proponent to take the following LID measures:
1. Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed.
2. Concentrate development on portions of the site with less permeable soils and preserve areas that can promote infiltration.
3. Limit overall impervious coverage of the site with paving and roofs.
4. Set back development from creeks, wetlands, and riparian habitats.
5. Preserve significant trees.
6. Conform the site layout along natural landforms.
7. Avoid excessive grading and disturbance of vegetation and soils.
8. Replicate the site's natural drainage patterns.
9. Detain and retain runoff throughout the site.
Require the project proponent to provide a map dividing the developed portions of the project site into discrete drainage management areas (DMAs) and to manage runoff from each DMA using Site Design Measures, and Storm Water Treatment and Baseline Hydromodification Measures
Proceed to Page 2


From Page 1
Project proponent must select one or more of the following Site Design Measures to evapotranspire, infiltrate, harvest / re-use, or biotreat the storm water runoff:
• Stream Setbacks and Buffers
• Soil Quality Improvement and Maintenance
• Tree Planting and Preservation
• Rooftop and Impervious Area Disconnection
• Porous Pavement
• Green Roofs
• Vegetated Swales
• Rain Barrels and Cisterns
The Site Design Measure(s) must be sized using either the SQDV (for the 85th percentile 24-hour storm runoff event) for runoff detaining control measures or the SQDF (0.2"/hr.) for flow through control measures.
Year 3 Requirement Will there be an increase of impervious area of 1 acre or more?
Yes
The post-project runoff shall not exceed the estimated pre-project flow rate for the 2-year, 24-hour storm event.
No
Do any of the following apply to the project?
• Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;
• Facilities receiving runoff solely from existing (pre-project) impervious areas; and
• Historic sites, structures or landscapes that cannot alter their original configuration in order to maintain their historic integrity.
No
Yes
Do any of the special site conditions apply?
1) Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.
2) Facilities with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a "flow-through planter").
3) Facilities located in areas of high groundwater, highly infiltrative soils or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.
4) Facilities serving high-risk areas such as fueling stations, truck stops, auto repairs, and heavy industrial sites may be required to provide additional treatment to address pollutants of concern unless these high- risk areas are isolated from storm water runoff or bioretention areas with little chance of spill migration.
Yes
Adjust the bioretention design as appropriate and document the reason for the design modification.
No
Remaining runoff after treatment with the Site Design measures must be directed to one or more facilities sized to the SQDF or SQDV that infiltrate, evapotranspire, and/or bioretain runoff. This control measure must be demonstrated to be at least as effective as a bioretention system having the following design parameters:
1. Maximum surface loading rate of 5 inches per hour, based on the flow rates calculated. A sizing factor of 4% of tributary impervious area may be used.
2. Minimum surface reservoir volume equal to surface area times a depth of 6 inches.
3. Minimum planting medium depth of 18 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used.
4. Subsurface drainage/storage (gravel) layer with an area equal to the surface area and having a minimum depth of 12 inches.
5. Underdrain with discharge elevation at top of gravel layer.
6. No compaction of soils beneath the facility, or ripping/loosening of soils if compacted.
7. No liners or other barriers interfering with infiltration.
8. Appropriate plant palette for the specified soil mix and maximum available water use.
Post Construction Design Complete
Require the project proponent to submit sizing calculations, design drawings, and a written operation and maintenance plan for the proposed LID and hydromodification control measures. Require the property owner to perform annual assessments of the effectiveness and maintenance of the control measures and to submit a self-certification report.

APPENDIX 5 – STATE OF CALIFORNIA POST-CONSTRUCTION CALCULATOR

Instructions on the Download and Use of the State of California's Post-Construction Calculator

Post-Construction Calculator which is available on the Water Board's SMARTS website or can be accomplished through the State's Microsoft Excel™ version of the calculator. The Water Board has created an instructional video on how to populate and use the Post-Construction Calculator.

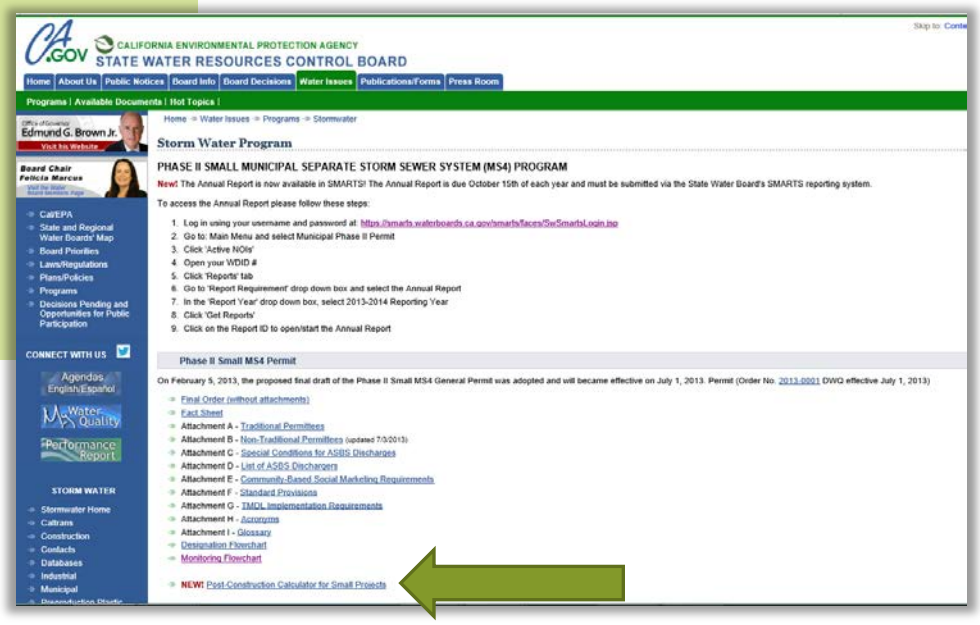


The Water Board created this 47-minute video that describes how to use the Post-Construction Calculator on SMARTS. It will also help with the Excel version. Although the video was created for the Construction General Permit, it also applies to the Post-Construction Standards Plan. It can be accessed at:

https://www.youtube.com/watch?v=W3nj4pj8WHY&feature=youtu.be

Post-Construction Calculator for Small Projects

The Water Board has created a Microsoft Excel version of the calculator that can now be downloaded from the State Water Board's website at the following link: http://www.swrcb.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml



APPENDIX 6 – VOLUMETRIC SIZING TOOL FOR TREATMENT CONTROLS

Instructions on the Download and Use of the Volumetric Sizing Tool for Treatment Control Measures

The Phase II MS4 Permit requires the municipality to condition applicable new development and redevelopment projects to require facilities designed to *evapo-transpire, infiltrate, harvest/use, and biotreat* storm water to meet at least one of the following hydraulic sizing design criteria:

Volumetric Criteria:

- The maximized capture storm water volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (1998) pages 175-178 (that is, approximately the 85th percentile 24-hour storm runoff event); or
- The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of the CASQA's Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.

A Microsoft Excel™ worksheet has been created to assist the project proponent to calculate the capture volumes using both of these volumetric criteria methods. Both methods are described in Section 5 of the 2003 edition of the *CASQA Stormwater Best Management Practice Handbook for New Development and Redevelopment*. Section 5 of the handbook can be accessed and downloaded for free at the following web link:

www.casqa.org/sites/default/files/BMPHandbooks/BMP_NewDevRedev_Section_5.pdf

The Volumetric Sizing Tool Worksheet can be downloaded from:

www.cityofescalon.org/stormwater

Instructions:

1. Start by entering the data on the "Volume Calculation" tab in the white boxes. It may be necessary to split up the project site into discrete drainage management areas (DMAs) where different "treatment" methods will be used. An example of this would be for a medical complex development where runoff from the parking lot is infiltrated through porous pavement and bioswales; runoff from the building roofs are infiltrated into rain gardens built into the landscaping; and a large undeveloped vegetated area has been graded to act as a retention area. In this case, it would be appropriate to have at least three different DMAs. Provide a name for each DMA and, in Step 1, enter the total area (in square feet) for the DMA.
2. Calculate the percentage of the DMA for completed project that will be impervious to storm water (i.e. hardscape such as building, asphalt, concrete, etc.) and enter it into the white box in Step 2. Also enter the number of existing and planned trees in the DMA, distinguishing between the number of evergreen and the number of deciduous varieties.
3. In Step 3, using Google Earth and the map on the worksheet's "State Map" tab, determine the distance along the blue line from the Sacramento weather station. Indicate if the project is relatively north or south of Sacramento. If the project is due east or west of the blue line, measure the distance from the perpendicular intercept of the blue line and the Sacramento

weather station. If the project is immediately east or west of the Sacramento weather station, the distance would be zero. This does not have to be exact and is a rough determination of the position of the project relative to the latitude of the Sacramento weather station and the other available weather stations. Rain amounts are relatively higher north of Sacramento and relatively lower south of Sacramento. The CASQA volumetric determination method (referenced above) only includes three relevant weather stations in the Central Valley, which are Redding, Sacramento, and Fresno.

4. Using the information presented under the "Runoff Coefficients" worksheet tab, determine the average runoff coefficient for the DMA and enter it into the white box in Step 4. Document how the average coefficient was determined.

5. In Step 5, the capture volumes using both methods allowed by the Phase II MS4 Permit are presented. The project proponent has the option of using either one. Select the one that will be used.

6. Please note that this sizing tool is only valid for projects located within the California Central Valley from Shasta County in the north to Fresno County in the south. Projects located in the Sierras, Bay Area, coastal mountains, or along the coast cannot use this tool. Projects south of Fresno County cannot use this tool without it being altered.

7. For assistance with this tool, contact John Teravskis of WGR Southwest, Inc. at jteravskis@wgr-sw.com or at (209) 334-5363 x.110.

APPENDIX 7 – DESIGN STANDARD REFERENCES

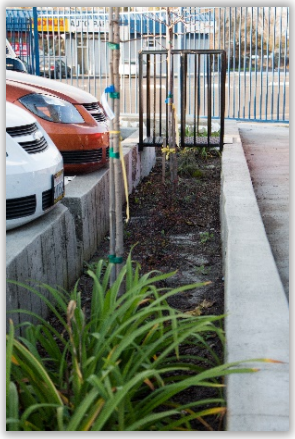
The following are some online design references for Design Standards and Treatment Controls:

Porous Pavement:

- Caltrans Pervious Pavement Design Guidance, August 2014 www.dot.ca.gov/hq/oppd/stormwtr/bmp/DG-Pervious-Pvm_082114.pdf
- Caltrans Pervious Pavement Specifications and Design Tool: www.dot.ca.gov/hq/oppd/stormwtr/pervious.htm
- USEPA Guidance Website on Porous Asphalt Pavement: http://water.epa.gov/polwaste/npdes/swbmp/Porous-Asphalt-Pavement.cfm
- Pennsylvania Storm Water Best Management Practices Manual on Pervious Pavement: www.stormwaterpa.org/assets/media/BMP_manual/chapter_6/Chapter_6-4-1.pdf
- University of New Hampshire Stormwater Center: Design Specifications for Porous Asphalt Pavement and Infiltration Beds: www.unh.edu/unhsc/sites/unh.edu.unhsc/files/pubs_specs_info/unhsc_pa_spec_10_09.pdf
- National Asphalt Pavement Association's Porous Asphalt Pavements for Storm Water Management Guide Book (Downloadable – cost $30) http://store.asphaltpavement.org/index.php?productID=759
- Bay Area Stormwater Management Agencies Association and City of Berkeley: Pervious Pavement - Storm Water Control for Small Projects www.ci.berkeley.ca.us/uploadedFiles/Online_Service_Center/Planning/Stormwater%20Fact%20Sheet_BASMAA_Pervious_Paving.pdf
- Santa Clara Valley Urban Runoff Pollution Prevention Program: Chapter 6 Technical Guidance for Stormwater Treatment and Site Design Measures www.scvurppp-w2k.com/permit_c3_docs/c3_handbook_2012/Chapter_6-Tech_Guidance_Stormwater_Treatment_Site_Design_Measures_2012.pdf

Rain Gardens:

- Bay Area Stormwater Management Agencies Association and Alameda County: Rain Gardens - Storm Water Control for Small Projects http://alamedaca.gov/sites/default/files/department-files/2013-04-29/11_-_rain_garden_fact_sheet.pdf
- Low Impact Development Center (www.lowimpactdevelopment.org/)
  Links for Guidance on the Design and Construction of a Rain Garden:
  www.lowimpactdevelopment.org/raingarden_design/links.htm#top
  Reference and Guidance Downloads:
  www.lowimpactdevelopment.org/raingarden_design/download.htm



Flow-through Planters:

- San Mateo Countywide Water Pollution Prevention Program: C.3 Technical Guidance, 6.2 Flow-Through Planter www.flowstobay.org/files/newdevelopment/C3techguide/12sec6.2Flowthru.pdf
- Stormwater Planters (draft version), Derek C. Godwin, Marissa Sowles, and Desiree Tullos, Oregon Sea Grant Extension; Maria Cahill, Green Girl Land Development Solutions. http://extension.oregonstate.edu/watershed/sites/default/files/stormwater_planters.pdf
  Santa Clara Valley Urban Runoff Pollution Prevention Program: Chapter 6 Technical Guidance for Stormwater Treatment and Site Design Measures www.scvurppp-w2k.com/permit_c3_docs/c3_handbook_2012/Chapter_6-Tech_Guidance_Stormwater_Treatment_Site_Design_Measures_2012.pdf

Infiltration Trenches and Tree Wells:

- USEPA Storm Water Technology Fact Sheet: Infiltration Trench (EPA 832-F-99-019, September 1999) http://water.epa.gov/scitech/wastetech/upload/2002_06_28_mtb_infltrenc.pdf
- Santa Clara Valley Urban Runoff Pollution Prevention Program: Chapter 6 Technical Guidance for Stormwater Treatment and Site Design Measures www.scvurppp-w2k.com/permit_c3_docs/c3_handbook_2012/Chapter_6-Tech_Guidance_Stormwater_Treatment_Site_Design_Measures_2012.pdf
- Minnesota Urban Small Sites BMP Manual: Infiltration Trenches http://www.sccd.org/Infiltration%20Trenches.pdf
- USEPA Stormwater to Street Trees: Engineering Urban Forests for Stormwater Management; (EPA 841-B-13-001, September 2013) http://water.epa.gov/polwaste/green/upload/stormwater2streettrees.pdf

Bioswales, Vegetated Buffers & Swales:

- Caltrans Biofiltration Swale Design Guidance; California Department of Transportation; CTSW-TM-07-172-05, January 2009 www.dot.ca.gov/hq/LandArch/ec/stormwater/guidance/DG-BioSwale-Final02-011309.pdf & www.dot.ca.gov/hq/LandArch/ec/stormwater/biofiltration_swales.htm
- Biofilters (Bioswales, Vegetative Buffers, & Constructed Wetlands) for Storm Water Discharge Pollution Removal; State of Oregon, Department of Environmental Quality, Dennis Jurries, PE; January 2003

www.deq.state.or.us/wq/stormwater/docs/nwr/biofilters.pdf

- Design Manual: Biological Filtration Canal (Bioswale); Dayna Yocum, Bren School of Environmental Science and Management, University of California, Santa Barbara http://fiesta.bren.ucsb.edu/~chiapas2/Water%20Management_files/Bioswales-1.pdf
- Santa Clara Valley Urban Runoff Pollution Prevention Program: Chapter 6 Technical Guidance for Stormwater Treatment and Site Design Measures www.scvurppp-w2k.com/permit_c3_docs/c3_handbook_2012/Chapter_6-Tech_Guidance_Stormwater_Treatment_Site_Design_Measures_2012.pdf
- USEPA Storm Water Technology Fact Sheet: Vegetated Swales (EPA 832-F-99-006, September 1999) http://water.epa.gov/scitech/wastetech/upload/2002_06_28_mtb_vegswale.pdf

Rain Water Harvesting and Reuse:

- USEPA Managing Wet Weather with Green Infrastructure Municipal Handbook: Rainwater Harvesting Policies; Christopher Kloss, Low Impact Development Center, December 2008 (EPA-833-F-08-010) http://water.epa.gov/infrastructure/greeninfrastructure/upload/gi_munichandbook_harvesting.pdf
- The City of San Diego Rain Water Harvesting Guide www.sandiego.gov/water/pdf/conservation/rainwaterguide.pdf
- Santa Clara Valley Urban Runoff Pollution Prevention Program: Chapter 6 Technical Guidance for Stormwater Treatment and Site Design Measures www.scvurppp-w2k.com/permit_c3_docs/c3_handbook_2012/Chapter_6-Tech_Guidance_Stormwater_Treatment_Site_Design_Measures_2012.pdf

Green Roofs:

- USEPA Design Guidelines and Maintenance Manual for Green Roofs in the Semi-Arid and Arid West; Leila Tolderlund, University of Colorado Denver, November 2010 http://www2.epa.gov/sites/production/files/documents/GreenRoofsSemiAridAridWest.pdf
- City of Berkeley Office of Energy and Sustainable Development webpage: www.ci.berkeley.ca.us/greenroofs/
- City of Watsonville Green Roof Design Criteria webpage: http://cityofwatsonville.org/public-works-utilities/urban-greening-plan/green-roof-design (contains a link to a downloadable 30-page Green Roof Design Criteria Plan published in March 2012)
- Green Roofs for Healthy Cities (private organization) webpage: www.greenroofs.org/ Training, certifications, design manuals, and other resources available for designing green roofs.

Soil Quality Improvement and Compost:

- United States Department of Agriculture's Natural Resources Conservation Service (NRCS) Urban Soil Primer www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052835.pdf
- US Composting Council Fact Sheets and Reports; http://compostingcouncil.org/factsheets-and-free-reports/
- Department of Land, Air and Water Resources at UC Davis and the U.S. Forest Service's Center for Urban Forest Research Report on Engineered Soil, Trees and Stormwater Runoff: the UC Davis Parking Lot Project www.fs.fed.us/psw/programs/uesd/uep/products/psw_cufr686_UCDParkingLot.pdf
- USEPA Stormwater to Street Trees: Engineering Urban Forests for Stormwater Management; (EPA 841-B-13-001, September 2013) http://water.epa.gov/polwaste/green/upload/stormwater2streettrees.pdf

APPENDIX 8 – POST-CONSTRUCTION PROJECT WORKSHEET

POST-CONSTRUCTION WORKSHEET FOR THE CITY OF ESCALON
PROJECT SUMMARY SHEET

Project Owner Information:

Project Owner Name:					
Name of Contact Person:					
Mailing Street Address:					
City:		State:		Zip:	
Telephone:		Email:			

Project Information:

Project Name:					
Name of Contact Person:					
Project Address:					
City:		State:		Zip:	
Anticipated construction start date:		Ending date:			
Project size (ft^2):		Subject to the Construction General Permit? (Yes / No)			
Information of the Post-Construction Standards Plan Preparer:					
Name of Organization:					
Name of Contact Person:					
Mailing Street Address:					
City:		State:		Zip:	
Telephone:		Email:			
Project Applicability:					
Type of Project: (Check one)		Small Project (2,500 to 5,000 ft^2 or detached single family home)			
		Regulated Project (5,000 ft^2)			
		Not applicable to the Post-Construction Standards Plan (*provide reason in the space below*)			
Is this a redevelopment project? (Yes / No)		Will the project result in an increase of more than 50% of the impervious surface? (Yes / No)			
Has the project or the vesting map received approval from the municipality? (Yes, No, or N/A)		Date of project or vesting map approval:			
Describe the nature and scope of the construction project:					
Number of Drainage Management Areas (DMAs):					

POST-CONSTRUCTION WORKSHEET FOR THE CITY OF ESCALON
SMALL PROJECT SUBMITTAL SHEET

Project Information:

Project Name:	
Project Owner Name:	
Project Address:	

Selection of Site Design Measures:

Select one or more of the following Site Design Measures (as identified in Section 4.1 of the Post-Construction Standards Plan) which will be incorporated into the project's design.

Site Design Measures	*Selected? (Yes / No)*
Stream Setbacks and Buffers	
Soil Quality Improvement and Maintenance	
Tree Planting and Preservation	
Rooftop and Impervious Area Disconnection	
Porous Pavement	
Green Roofs	
Vegetated Swales	
Rain Barrels and Cisterns	

Post-Construction Calculator Information:

Enter the following data from the State's Post-Construction Calculator:

Pre-project Runoff Volume (ft^3)	
Post-project Runoff Volume (ft^3)	
Net Credit of Volume Credits (ft^3)	

Small Project Submittal Requirements:

The following must be submitted for Small Projects to the plan checker:

- Completed pages 1 and 2 of this Post-Construction Worksheet.
- Site plans showing the selected Site Design Measure(s) (identified in Section 4.1). The plans must be stamped by a California Civil Professional Engineer if any of the following Site Design Measures were selected: rooftop and impervious area disconnection, porous pavement, or rain cisterns. The plans must be stamped by a California Structural Professional Engineer if a green roof was selected or if there is a significant structural aspect to the rain cisterns and collection system. The plans must be stamped by a California Licensed Landscape Architect if any of the following Site Design Measures were selected: stream setbacks and buffers, soil quality improvement, or vegetated swales. The Site Design Measure(s) must be clearly called out on the submitted plans.
- A printout of the results page from the Water Board's SMARTS or Microsoft Excel™ Post-Construction Calculator.

POST-CONSTRUCTION WORKSHEET FOR THE CITY OF ESCALON
REGULATED PROJECT DMA SUBMITTAL SHEET

Drainage Management Area (DMA) & Project Information:

*A **separate** Regulated Project DMA Submittal Sheet is required to be completed and submitted for each DMA. Refer to Section 5.1 of the Post-Construction Standards Plan for more information about DMAs.*

Project Name:	
Project Owner Name:	
Project Address:	
Name of the DMA:	
DMA area (ft^2)	

Selection of Applicable Source Controls:

*Indicate which of the following activities or pollutant sources are included in **this DMA** of the new development or redevelopment. For more information about required Source Control refer to Section 5.2.*

Site Design Measures	*(Yes / No)*
Accidental spills or leaks	
Interior floor drains	
Parking / storage areas and maintenance	
Indoor and structural pest control	
Landscape / outdoor pesticide use	
Pools, spas, ponds, decorative fountains, and other water features	
Restaurants, grocery stores, and other food service operations	
Refuse areas	
Industrial processes	
Outdoor storage of equipment or materials	
Vehicle and equipment cleaning	
Vehicle and equipment repair and maintenance	
Fuel dispensing areas	
Loading docks	
Fire sprinkler test water	
Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources	
Unauthorized non-storm water discharges	
Building and grounds maintenance	

Hydrologic Soil Group and Soil Type Information:

*Enter information concerning the soil types **within this DMA**. For more information, refer to Table 7 of the Post-Construction Standards Plan.*

Soil Type Name	HSG Group (A, B, C, or D)

Low Impact Development (LID) Design Requirements:

Please describe how the project is meeting each of the following LID design requirements. Provide your response in the text box following each requirement or provide responses on a separate sheet.

1. Define the areas of the project that are to be left undisturbed or protected from soil disturbance. Identify sensitive environmental receptors such as water bodies, stream buffers, existing trees, riparian areas, and habitat areas.

2. How is the project concentrating development on portions of the site with less permeable soils and preserving areas that can promote infiltration?

3. How is the project limiting the overall impervious coverage of the site consisting of paving and roofs?

4. If applicable, how much setback is there of the development from creeks, wetlands, and riparian habitats?

5. List and describe the trees that will be preserved.

6. Describe how the new development or redevelopment site layout will conform along natural landforms.

7. Describe how the project is avoiding excessive grading and disturbance of vegetation and soils.

8. Describe how the new development or redevelopment is replicating the site's natural drainage patterns.

9. Describe how the project will detain and retain runoff through the new development and redevelopment site.

Pre- and Post-Development Project Hydrology Information:

*Provide the following hydrology information for **this DMA**.*

Pre-development Conditions:

Percent Impervious	
Average runoff coefficient for this DMA	
Peak flow rate (ft^3/sec) for this DMA using the 2-year 24-hour design value discussed in Section 5.5.	

Post-development Conditions:

Percent Impervious	
Average runoff coefficient for this DMA	
Peak flow rate (ft^3/sec) for this DMA using the 2-year 24-hour design value discussed in Section 5.5.	

Selection of Site Design and Treatment Control Measures:

*Indicate which Site Design and Treatment Control Measures will be used for **this DMA**. For more information, refer to Table 3. Provide calculations and design drawings for the selected measures per the submittal requirements describe in Section 5.6.*

Site Design or Treatment Control Measure	Sizing Criteria	Selected? (Yes / No)	Enter the Calculated Design Capture Volume or Flow Rate for the Selected Measure
Stream setbacks and vegetated buffers *(Site Design Measure)*	Flow		
Soil quality improvement *(Site Design Measure)*	Volume		
Tree planting and preservation *(Site Design Measure)*	SMARTS Calculator		
Porous pavement *(Site Design Measure)*	Volume		
Green roofs *(Site Design Measure)*	Volume		
Vegetated swales *(Site Design Measure)*	Flow		
Rain harvesting and reuse *(Site Design Measure)*	Volume		
Bioretention and rain gardens *(Treatment Control Measure)*	Volume		
Infiltration trench, Flow-through Planter, or Tree Wells *(Treatment Control Measure)*	Volume and Flow		
Retention and detention basins *(Treatment Control Measure)*	Volume		

Variations and Exceptions:

*Identify any applicable variations or exceptions for **this DMA**.*

Condition	Allowed Variation	Applicable to this DMA? If so, explain.
Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project	May incorporate an impervious cutoff wall between the bioretention / infiltration facility and the structure or other geotechnical hazard	
Facilities with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures	May incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a "flow-through planter")	
Facilities located in areas of high groundwater, highly infiltrative soils or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible	May omit the underdrain	
Facilities serving high-risk areas such as fueling stations, truck stops, auto repairs, and heavy industrial sites	Are required to provide additional treatment to address pollutants of concern prior to the flow reaching the infiltration facility	

*If infiltration is not feasible for **this DMA**, please provide an explanation of the infeasibility and a description of the alternate non-infiltrating treatment control measure(s) that will be used in accordance with the development requirements in Section 5.4.4.*

Regulated Project Submittal Requirements:

The following must be submitted for Regulated Projects to the plan checker:

- The completed Post-Construction Worksheet including page 1 and, for each DMA, pages 3 – 10.
- A separate site plan for each DMA must be submitted. If there are multiple DMAs, a key map showing the location of the DMAs in relationship to one another and the entire site is required to be submitted. Each DMA site plan is required to show the following information:
  - ✓ DMA name and boundary;
  - ✓ The selected Site Design and Treatment Control Measures (identified in Table 3);
  - ✓ The total drainage area in square feet of the DMA;
  - ✓ The pre-development peak flow rate at the point(s) of discharge;
  - ✓ The predicted post-development peak flow rate at the point(s) of discharge;
  - ✓ Areas of existing impervious surfaces (pre-development);
  - ✓ Proposed areas of impervious surfaces (post-development);
  - ✓ Setbacks from creeks, wetlands, and riparian habitats;
  - ✓ Existing topography and drainage patterns (pre-development);
  - ✓ Proposed topography and drainage patterns (post-development);
  - ✓ Soil types, soil type boundaries within the DMA, and their Hydrologic Soil Group Classification rating (A, B, C, or D); and
  - ✓ Trees, vegetation, and sensitive environmental areas to be protected and preserved.

  Each plan must be stamped by a qualified licensed professional. The plans must be stamped by a California Civil Professional Engineer if any of the following control measures were selected: rooftop and impervious area disconnection, porous pavement, rain cisterns, bioretention or rain gardens, infiltration trench, or retention or detention basins. The plans must be stamped by a California Structural Professional Engineer if a green roof was selected or if there is a significant structural aspect to the rain cisterns and collection system. The plans must be stamped by a California licensed Landscape Architect if any of the following Site Design Measures were selected: stream setbacks and buffers, soil quality improvement, vegetated swales, bioretention and rain gardens. The selected Site Design and Treatment Control Measure(s) must be clearly called out on the submitted plans.
- Design drawings for the proposed Treatment Control Measures showing a plan view, elevation view, and subsurface cross-sections must be submitted. Sufficient detail and specifications should be included in these drawings to provide for adequate plan check review and for the construction of the treatment "facility". Each design drawing must be stamped by a qualified licensed professional. The drawings must be stamped by a California Civil Professional Engineer if any of the following control measures were selected: rooftop and impervious area disconnection, porous pavement, rain cisterns, bioretention or rain gardens, infiltration trench, or retention or detention basins. The drawings must be stamped by a California Structural Professional Engineer if a green roof was selected or if there is a significant structural aspect to the rain cisterns and collection system. The drawings must be stamped by a California licensed Landscape Architect if any of the following Site Design Measures were selected: stream setbacks and buffers, soil quality improvement, vegetated swales, bioretention and rain gardens.

- A print out of the results page from the MS Excel™ Volumetric BMP Sizing Tool for each DMA and control measure that requires the volumetric sizing criteria is required to be submitted. (Refer to Appendix 6 for information on how to download the tool.)
- Calculations stamped by the appropriate licensed individual (as described above) for each DMA and control measure that requires flow-based sizing criteria must be included with the submittal.
- An Operation and Maintenance Plan and signed Statement of Responsibility for the proposed treatment control measures must accompany the submittal (refer to Section 6 and Appendix 9).

APPENDIX 9 – O&M PLAN AND CERTIFICATE OF RESPONSIBILITY FORM

OPERATION & MAINTENANCE (O&M) PLAN
and
STATEMENT OF RESPONSIBILITY

Property Owner Information:

Property Owner Name:					
Name of Contact Person:					
Mailing Address:					
City:		State:		Zip:	
Telephone:		Email:			

Development Information:

Name of Development					
Development Address:					
City:		State:		Zip:	
Assessor Parcel No.:					
Name of Person or Organization Responsible for Performing Inspections and Maintenance of the Treatment Control Measures:					
Mailing Street Address:					
City:		State:		Zip:	
Telephone:		Email:			

Treatment Control Measures:

List the treatment control measures at the development and their inspection frequencies (minimum of once per year). For each treatment control measure, describe conditions that require maintenance or repair. Describe preventative maintenance needed to keep the treatment control measure effective.

Treatment Control Measure	Inspection Frequency	Describe Conditions that Require Maintenance / Repair and Describe Routine Preventative Maintenance

STATEMENT OF RESPONSIBILITY

THIS AGREEMENT is made and entered into in _____, California,

this ____ day of _____, by and between _____

hereinafter referred to as "Owner" and the City of Escalon;

WHEREAS, the Owner owns real property ("Property") in the City of Escalon, State of California, depicted on the attached map, which are attached hereto;

WHEREAS, at the time of initial approval of the development project known as _____ within the Property described herein, the City of Escalon required the project to employ on-site control measures to minimize pollutants in urban runoff;

WHEREAS, the Owner has chosen to install the following treatment control measures: _____, hereinafter referred to as "facilities", as the on-site control measures to minimize pollutants in urban runoff;

WHEREAS, said facilities have been installed in accordance with the requirements of the City of Escalon Post-Construction Standards Plan and the Owner's plans and specifications accepted by the City of Escalon;

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

WHEREAS, the Owner is aware that periodic and continuous maintenance (as described on page 1 of this O&M Plan), including, but not necessarily limited to, sediment removal, is required to assure peak performance of the facilities 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, it is mutually stipulated and agreed as follows:

1. Owner hereby provides the City of Escalon or City of Escalon's designee complete access, of any duration, to the facilities and its immediate vicinity at any time, upon reasonable notice, or in the event of emergency, as determined by City of Escalon with no advance notice, for the purpose of inspection, sampling, testing of the facilities, and in case of emergency, to undertake all necessary repairs or other preventative measures at owner's expense as provided in paragraph 3 below. The Owner/Operator shall retain all operation and maintenance records at the facility for City of Escalon inspection, and a copy shall be provided to the City of Escalon if requested. The City of Escalon shall make every effort at all times to minimize or avoid interference with Owner's use of the Property.
2. Owner shall use its best efforts to diligently maintain the facilities 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 facilities and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. When requested from time to time by the City of Escalon, the Owner shall provide the City of Escalon with documentation identifying the material(s) removed, the quantity, and disposal destination.
3. In the event 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 City of Escalon, the City of Escalon 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, attorney fees and interest thereon at the maximum rate authorized by the Municipal Code from the date of the notice of expense until paid in full, and Owner hereby agrees to pay such charge within 30 days of receipt of City of Escalons written demand for payment.

4. The City of Escalon may require the owner to post security in form and for a time period satisfactory to the City of Escalon of guarantee the performance of the obligations stated herein. Should the Owner fail to perform the obligations under the Agreement, the City of Escalon may, in the case of a cash bond, 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. As an additional remedy, the City of Escalon may withdraw any previous storm water related approval with respects to the property on which the facilities have been installed until such time as Owner repays to City of Escalon its reasonable costs incurred in accordance with paragraph 3 above.
5. The Owner will be sent an annual self-certification form each year by the City of Escalon to certify that all of the inspections and maintenance have been performed per page 1 of this O&M Plan and that the facilities are in effective working condition. The Owner has 60 days to complete and return the annual self-certification form to the City of Escalon. If the report is not received within the 60-day period, the City of Escalon will perform the inspection and assessment; and the Owner will be billed for it as described above.
6. In event of legal action occasioned by any default or action of the Owner, or its successors or assigns, then the Owner and its successors or assigns agree(s) to pay all costs incurred by the City of Escalon in enforcing the terms of this Agreement, including reasonable attorney fees and costs, and that the same shall become a part of the lien against said Property.
7. 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 there against.
8. The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto. The term "Owner" shall include not only the present Owner, but also its heirs, successors, 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 City of Escalon at the same time such notice is provided to the successor.
9. Any notice or demand for payment 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 addresses listed on Page 1 of this agreement either for the Owner or the City of Escalon. 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.

IN WITNESS THEREOF, the parties hereto have affixed their signatures as of the date first written above.

City of Escalon

By _____

Name of Development: _____

By _____

PROPERTY OWNER

Name _____

Title _____

APPENDIX 10 – LIST OF COLLABORATING MUNICIPALITIES

Collaborating Phase II MS4s:

Cities

City of Atwater

City of Ceres

City of Shasta Lake

City of Escalon

City of Lathrop

City of Merced

City of Oakdale

City of Redding

City of Ripon

City of Riverbank

City of Turlock

City of West Sacramento

Counties

Shasta County

Stanislaus County

Yuba County

Non-Traditional MS4s

Tracy Unified School District