

Section 1: Basic Project Information

This worksheet must be filled out for all projects required to implement the *2015 Post-Construction Stormwater Standards Manual*. A licensed professional engineer or landscape architect is not required for the development of the project plan for Small Projects.

Project Site Address	
Owner Information	
Name	Resham Singh
Title, if applicable	
Company or Affiliation	Palm, Jr. LLC
Address	113 Palm Avenue Modesto, CA 95350
Telephone Number	(209)422-3011
Email Address	resham@valleyoakca.com
Professional Engineer/Landscape Architect Information (not required for Small Projects)	
Name	Sergio Carrera
Title	Registered Civil Engineer
Company or Affiliation	Benchmark Engineering
Address	1121 Oakdale Rd Modesto, CA 95355
Telephone Number	(209)548-9300
Email Address	scarrera@bmeng.net; scarrera@cvengeers.net
Professional Engineer/ Landscape Architect Stamp and Signature	

Type of Project

Is the proposed project:

- A linear underground/overhead utility project (LUP) that creates and/or replaces at least 2,500, but less than 5,000 square feet of impervious surface?
- A detached single-family home that is not part of a common plan of development?
- A routine maintenance or repair project that maintains the original line and grade, hydraulic capacity, and original purpose of the facility?
 - Exterior wall surface replacement
 - Pavement resurfacing within an existing footprint
 - Replacement of damaged pavement (e.g., pothole repair, short-non-contiguous sections of roadway)
 - Re-roofing regardless of whether it is a full roof replacement or an overlay
- Interior remodels that do not modify the existing footprint?
- Excavation, trenching, and resurfacing associated with LUPs?
- Pavement grinding and resurfacing of existing roadways and parking lots?
- Construction of new sidewalks, pedestrian ramps, or bicycle lanes on existing roadways?
- Construction of sidewalks and bicycle lanes built as part of new streets or roads that are graded to runoff to adjacent vegetated areas?
- Construction of impervious trails that are graded to runoff to adjacent vegetated areas or other non-erodible areas?
- Construction of sidewalks, bicycle lanes, and trails with permeable surfaces?

The above projects are exempt from the requirements of the *2015 Post-Construction Stormwater Standards Manual*. See Section 1.5 of the *2015 Post-Construction Stormwater Standards Manual* for details on project exceptions. Submit Section 1 of the Project Stormwater Plan as part of the application submittal.

Project Stormwater Plan

If the proposed project is not exempt as identified above, identify the type of project:

- Small Project – These are projects that create and/or replace at least 2,500, but less than 5,000 square feet of impervious surface; or detached single-family homes that create and/or replace a minimum of 2,500 square feet of impervious surface and are not part of a larger plan of development.
- Regulated Project – These are projects that create and/or replace greater than or equal to 5,000 square feet of impervious surface and LUPs that create 5,000 square feet or more of newly constructed contiguous impervious surfaces.
 - New development
 - Redevelopment that increases the impervious surface area by 50 percent or more of the existing development
 - Redevelopment that increases the impervious surface area by less than 50 percent of the existing development
- Hydromodification Management Projects – These are projects that create and/or replace one acre or more of impervious surface and result in a net increase of impervious surface

Description of the Project

Provide a description of the proposed project.

Development of three (3) two-story townhome buildings. The proposed project includes
associated on-site and off-site improvements such as landscaping, utilities, sidewalk, and curb
gutter.

Owner Certification and Signature

The undersigned owner of the subject property is responsible for the implementation of the provisions of this Project Stormwater Plan consistent with the requirements of the 2015 Post-Construction Stormwater Standards Manual, [City of Manteca] [County of San Joaquin] [insert Ordinance citation], and Provision E.12 of the California State Water Resources Control Board Phase II Permit (Order No. 2013-0001-DWQ). If the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement the Project Stormwater Plan. A copy of the final signed and fully approved Project Stormwater Plan shall be available on the subject site throughout the course of the development.

Owner Signature _____

Date _____

Section 3: Regulated and Hydromodification Management Projects

The following worksheets are applicable to Regulated and Hydromodification Management Projects.

Site Assessment Worksheet

Regulated and Hydromodification Management Projects are required to assess conditions at the project site. This information is used to plan the project site layout and identify potential sources of pollutants of concern. Complete the Site Assessment Worksheet as part of the Project Stormwater Plan submittal. More information is available in Sections 3.1 and 3.3 of the *2015 Post-Construction Stormwater Standards Manual*.

Site Planning Worksheet

Regulated and Hydromodification Management Projects are required to consider, and implement if feasible, site planning principles to maximize the effectiveness of stormwater management for the project site. Complete the Site Planning Worksheet as part of the Project Stormwater Plan submittal. More information is available in Section 3.4 of the *2015 Post-Construction Stormwater Standards Manual*.

Source Control Measures

Regulated and Hydromodification Management Projects are required to implement source control measures to prevent pollutants from contacting stormwater runoff or prevent discharge of contaminated stormwater runoff from the project site. All proposed projects that include landscape irrigation must implement the source control measure for landscape irrigation described in Section 4 of the *2015 Post-Construction Stormwater Standards Manual*. Complete a Source Control Measures Worksheet as part of the Project Stormwater Plan submittal.

Drainage Management Area Worksheet

Regulated and Hydromodification Projects are required to delineate discrete drainage management areas for a project site and manage stormwater runoff according to those drainage management areas (DMA). Complete the Drainage Management Area Worksheet for each DMA at the project site. More information is available in Section 3.2 of the *2015 Post-Construction Stormwater Standards Manual*.

Site Design Measures

Regulated and Hydromodification Management Projects are required to implement site design measures to the extent technically feasible and calculate the stormwater runoff volume credit using the State Water Resources Control Board's Post-Construction Calculator for each DMA. The Post-Construction Calculator is available at: http://www.swrcb.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml. More information is available in Sections 3.5 and 5.4 of the *2015 Post-Construction Stormwater Standards Manual*. Complete a Site Design Measure Worksheet for each DMA as part of the Project Stormwater Plan submittal.

Stormwater Treatment and Baseline Hydromodification Control Measures

Regulated and Hydromodification Management Projects are required to implement stormwater treatment control measures to manage the portion of the stormwater runoff not mitigated by site design measures. Bioretention is the preferred stormwater treatment control measure unless (1) it is determined to be infeasible and an alternative treatment control measure that is equivalent to bioretention is proposed and justified, or (2) a specific exception applies. More information is available in Sections 5 and 6 of the *2015 Post-Construction Stormwater Standards Manual*. Complete a Stormwater Treatment Control Measure Worksheet for each DMA where proposed site design measures do not manage the fully manage stormwater runoff of the DMA and submit as part of the Project Stormwater Plan.

Other Requirements of the Project Stormwater Plan

In addition to completing the applicable worksheets, Regulated and Hydromodification Management Projects must also include the following information:

- Site Conditions Report, prepared by or under the supervision of a competent, licensed professional, that addresses and discusses relevant findings of the geotechnical evaluation. Geotechnical evaluations must be conducted in accordance with local standards, including, but not limited to, approved investigation, evaluation, and testing methodologies.
- Site Layout Plan that, at a minimum, illustrates:
 - Existing natural hydrologic features (e.g., depressions, watercourses, wetlands, riparian corridors, undisturbed areas) and significant natural resources);
 - Proposed locations and footprints of improvements creating new, or replaced impervious surfaces;
 - Existing and proposed site drainage system and connections to off-site drainage;
 - Proposed locations and footprints stormwater control measures (e.g., site design measures, source control measures, stormwater treatment control measures) implemented to manage stormwater runoff;
 - All DMAs with unique identifiers; and
 - Maintenance areas of the project site.
- Operations and Maintenance Plan

Site Assessment Worksheet

General Project Site Information					
Latitude	<u>37.8044635</u>	Longitude	<u>-121.2291589</u>	Elevation	<u>36 ft</u>
Total Project Area (A _T) (ft ²)	<u>38,869 SF</u>				
Total Existing Impervious Area (ft ²)	<u>0 SF</u>	Total Post-Project Impervious Area (ft ²)	<u>24,120 SF</u>		
Receiving Water(s)	<u>10 Year, 48-hour duration storm runoff</u>				
Describe location(s) of discharge from the project site.					
<u>The project will discharge stormwater through a storm drain pipe on the east side of the</u>					
<u>property at the Walnut Avenue entrance.</u>					
Describe Environmentally Sensitive Areas, if applicable.					
<u>n/a</u>					
Pollutants of Concern					
Post-Project Land Use Type(s)	<u>Multifamily Townhouses</u>				
Describe expected pollutant-generating activities.					
Pre-project	<u>n/a</u>				
Post-project	<u>Car traffic, littering, maintaining landscaped areas</u>				
Identify pollutants of concern.					
<u>Trash and debris, oil and grease, sediment, pesticides and herbicides,</u>					
<u>organic materials, metals, bacteria and viruses, and nutrients</u>					

Site Planning Worksheet

Describe how the following site planning principles were considered and implemented in developing and optimizing the site layout for the project.

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

The building development is focused on the center of the project site. No area will be left undisturbed.

Concentrate development on portions of the site with less permeable soils and preserve areas that can promote infiltration.

According to the USGS soils report for the area, all site soils can be utilized for infiltration as all soils belong to HSG B.

Limit overall impervious coverage of the site with paving and roofs.

This project includes bioretention basins throughout the site to limit the amount of concrete.

Set back development from creeks, wetlands, and riparian habitats.

n/a

Preserve significant trees.

No trees will be preserved.

Conform the site layout along natural landforms.

The site slopes slightly from the east to west and north to south. The proposed grading will maintain the general drainage pattern.

Avoid excessive grading and disturbance of vegetation and soils.

The entire site will be graded and/or disturbed to some degree. Deep excavations will be limited to excavation for the detention basin and the underground piping.

Replicate the site's natural drainage patterns.

The existing site slopes slightly from east to west and north to south. The proposed grading will maintain the general drainage pattern.

Detain and retain stormwater runoff throughout the site.

The project will detain and retain runoff through the implementation of treatment and runoff reduction detention basins.

Source Control Measures Worksheet

Describe source control measures to be implemented for each potential pollutant generating activity or source present at the project site. If a potential pollutant generating activity or source is not present at the project site, indicate it as "N/A".

Parking/storage areas and maintenance

All pollution from the parking lot will be drained to the bioretention basins and treated.

Landscape/outdoor pesticide use

Any pesticides that will be washed away will drain into the bioretention basins where they will be treated.

Building and grounds maintenance

Any pollution coming from building maintenance will run to the bioretention basins and be treated.

Refuse areas

A trash enclosure will be provided to contain any trash that may fall on the ground. A drain inlet and p-trap leading to the sewer line will capture any liquid from the trash.

Outdoor storage of equipment or materials

n/a

Vehicle and equipment cleaning

n/a

Vehicle and equipment repair and maintenance

n/a

Fuel dispensing areas

n/a

Pools, spas, ponds, decorative fountains, and other water features

n/a

Source Control Measures Worksheet (cont'd)

Indoor and structural pest control

All residue from pest spraying will be washed to the bioretention basin where it will be treated.

Accidental spills or leaks

Any accidental spills or leaks will be treated in the bioretention basins.

Restaurants, grocery stores, and other food service operations

n/a

Interior floor drains

n/a

Industrial processes

n/a

Loading docks

n/a

Fire sprinkler test water

All fire sprinkler test water will drain into the bioretention basins where it will be treated.

Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources

Two of the multi-family buildings roofs will drain into a pretreatment swale before draining into bioretention basins. The other building will drain straight into a bioretention basin.

Unauthorized non-stormwater discharges

Any unauthorized non-stormwater discharges will drain into the nearest bioretention basin.

Drainage Management Area Worksheet

Drainage Management Area (DMA) # 1

Type of DMA:

- | | |
|---|---|
| <input type="checkbox"/> Self-treating area | <input checked="" type="checkbox"/> Areas draining to self-retaining areas |
| <input checked="" type="checkbox"/> Self-retaining area | <input checked="" type="checkbox"/> Areas draining to bioretention facility |

Describe the DMA Downspout drainage to pre-treatment swale leading to Bioretention Area #1.

Sheet flow from parking lot into Bioretention Area #2, which drains into Bioretention Area #1.

Total Drainage Area (ft ²)	<u>8,507</u>		
Existing Impervious Area (ft ²)	<u>0</u>	Soil Type	<u>B</u>
Post-Project Impervious Area (ft ²)	<u>5,719</u>	Infiltration Rate (in/hr)	<u>0.5-1</u>
Mean Annual Runoff-Producing Rainfall Depth (P ₆) (in)			<u>.37</u>
Drawdown time (t _{max}) (hr) (48)			<u>48</u>
Regression constant (a) (1.963 for 48-hr drawdown)			<u>1.963</u>

Pre-Project Condition:

Imperviousness ratio (i) = Existing Impervious Area ÷ Total Drainage Area (decimal)	<u>0</u>
Stormwater runoff coefficient (C) = 0.858 x i ³ - 0.78 x i ² + 0.774 x i + 0.04	<u>0.04</u>
Unit stormwater volume (P ₀) (in) = a x C x P ₆	<u>0.03</u>
Stormwater Runoff Volume for the DMA (ft ³)	<u>13.25</u>

Post-Project Condition:

Imperviousness ratio (i) = Post-Project Impervious Area ÷ Total Drainage Area (decimal)	<u>0.67</u>
Stormwater runoff coefficient (C) = 0.858 x i ³ - 0.78 x i ² + 0.774 x i + 0.04	<u>0.47</u>
Unit stormwater volume (P ₀) (in) = a x C x P ₆	<u>0.34</u>
Stormwater Design Volume for the DMA (SDV) (ft³) = A x P₀ ÷ 12	<u>241</u>

Site Design Measure Worksheet

Drainage Management Area (DMA) # 1

For this DMA, identify the following information:

Stormwater Design Volume without credits (ft³) = SDV 241

Stormwater Design Volume with credits (ft³) = $SDV_{adj} = SDV - SDM_{credit}$
 (This volume must be treated by stormwater treatment control measures.) 0

Do proposed site design measures completely manage the SDV for this DMA?

- Yes, stormwater management requirement met for this DMA.
- No, proceed to Stormwater Treatment and Baseline Hydromodification Measure Worksheet.

Proposed Site Design Measure	Stormwater Runoff Volume Credit (ft³)
<input type="checkbox"/> Stream setbacks and buffers	<u>0</u>
<input type="checkbox"/> Soil quality improvement and maintenance	<u>0</u>
<input checked="" type="checkbox"/> Tree planting and preservation	<u>62</u>
<input checked="" type="checkbox"/> Rooftop and impervious area disconnection	<u>229</u>
<input type="checkbox"/> Porous pavement	<u>0</u>
<input checked="" type="checkbox"/> Vegetated swales	<u>291</u>
<input type="checkbox"/> Rain barrels/cisterns	<u>0</u>
Total Stormwater Runoff Volume Credit (SDM_{credit})	<u>582</u>

For site design measures not implemented for this DMA, describe why they are not selected.

The other site design measures were not implemented because there are no streams near the site, the soil is good enough for infiltration and does not need improvement, there is not enough room with the improvements to preserve any trees and it is unknown if any trees will be planted at this time, pourous pavement will not be used because it is not cost effective, rain barrels will not be used because the drains will drain into the bioretention basins.

Drainage Management Area Worksheet

Drainage Management Area (DMA) # 2

Type of DMA:

- | | |
|---|---|
| <input type="checkbox"/> Self-treating area | <input checked="" type="checkbox"/> Areas draining to self-retaining areas |
| <input checked="" type="checkbox"/> Self-retaining area | <input checked="" type="checkbox"/> Areas draining to bioretention facility |

Describe the DMA Sheet flow and downspout drainage to Bioretention Area #3.

Total Drainage Area (ft ²)	<u>12,618</u>		
Existing Impervious Area (ft ²)	<u>0</u>	Soil Type	<u>B</u>
Post-Project Impervious Area (ft ²)	<u>6,565</u>	Infiltration Rate (in/hr)	<u>0.5-1</u>
Mean Annual Runoff-Producing Rainfall Depth (P ₆) (in)			<u>.37</u>
Drawdown time (t _{max}) (hr) (48)			<u>48</u>
Regression constant (a) (1.963 for 48-hr drawdown)			<u>1.963</u>

Pre-Project Condition:

Imperviousness ratio (i) = Existing Impervious Area ÷ Total Drainage Area (decimal)	<u>0</u>
Stormwater runoff coefficient (C) = 0.858 x i ³ - 0.78 x i ² + 0.774 x i + 0.04	<u>0.04</u>
Unit stormwater volume (P ₀) (in) = a x C x P ₆	<u>0.03</u>
Stormwater Runoff Volume for the DMA (ft ³)	<u>13.25</u>

Post-Project Condition:

Imperviousness ratio (i) = Post-Project Impervious Area ÷ Total Drainage Area (decimal)	<u>0.52</u>
Stormwater runoff coefficient (C) = 0.858 x i ³ - 0.78 x i ² + 0.774 x i + 0.04	<u>0.35</u>
Unit stormwater volume (P ₀) (in) = a x C x P ₆	<u>0.25</u>
Stormwater Design Volume for the DMA (SDV) (ft³) = A x P₀ ÷ 12	<u>262</u>

Site Design Measure Worksheet

Drainage Management Area (DMA) # 2

For this DMA, identify the following information:

Stormwater Design Volume without credits (ft³) = SDV 262

Stormwater Design Volume with credits (ft³) = $SDV_{adj} = SDV - SDM_{credit}$
 (This volume must be treated by stormwater treatment control measures.) 0

Do proposed site design measures completely manage the SDV for this DMA?

- Yes, stormwater management requirement met for this DMA.
- No, proceed to Stormwater Treatment and Baseline Hydromodification Measure Worksheet.

Proposed Site Design Measure	Stormwater Runoff Volume Credit (ft³)
<input type="checkbox"/> Stream setbacks and buffers	<u>0</u>
<input type="checkbox"/> Soil quality improvement and maintenance	<u>0</u>
<input checked="" type="checkbox"/> Tree planting and preservation	<u>52</u>
<input checked="" type="checkbox"/> Rooftop and impervious area disconnection	<u>195</u>
<input type="checkbox"/> Porous pavement	<u>0</u>
<input checked="" type="checkbox"/> Vegetated swales	<u>195</u>
<input type="checkbox"/> Rain barrels/cisterns	<u>0</u>
Total Stormwater Runoff Volume Credit (SDM_{credit})	<u>442</u>

For site design measures not implemented for this DMA, describe why they are not selected.

The other site design measures were not implemented because there are no streams near the site, the soil is good enough for infiltration and does not need improvement, there is not enough room with the improvements to preserve any trees and it is unknown if any trees will be planted at this time, porous pavement will not be used because it is not cost effective, rain barrels will not be used because the drains will drain into the bioretention basins.

Drainage Management Area Worksheet

Drainage Management Area (DMA) # 3

Type of DMA:

- | | |
|---|---|
| <input type="checkbox"/> Self-treating area | <input checked="" type="checkbox"/> Areas draining to self-retaining areas |
| <input checked="" type="checkbox"/> Self-retaining area | <input checked="" type="checkbox"/> Areas draining to bioretention facility |

Describe the DMA Sheet flow into Bioretention Area #4.

Total Drainage Area (ft ²)	<u>1,453</u>		
Existing Impervious Area (ft ²)	<u>0</u>	Soil Type	<u>B</u>
Post-Project Impervious Area (ft ²)	<u>978</u>	Infiltration Rate (in/hr)	<u>0.5-1</u>
Mean Annual Runoff-Producing Rainfall Depth (P ₆) (in)			<u>.37</u>
Drawdown time (t _{max}) (hr) (48)			<u>48</u>
Regression constant (a) (1.963 for 48-hr drawdown)			<u>1.963</u>

Pre-Project Condition:

Imperviousness ratio (i) = Existing Impervious Area ÷ Total Drainage Area (decimal)	<u>0</u>
Stormwater runoff coefficient (C) = 0.858 x i ³ - 0.78 x i ² + 0.774 x i + 0.04	<u>0.04</u>
Unit stormwater volume (P ₀) (in) = a x C x P ₆	<u>0.03</u>
Stormwater Runoff Volume for the DMA (ft ³)	<u>13.25</u>

Post-Project Condition:

Imperviousness ratio (i) = Post-Project Impervious Area ÷ Total Drainage Area (decimal)	<u>0.67</u>
Stormwater runoff coefficient (C) = 0.858 x i ³ - 0.78 x i ² + 0.774 x i + 0.04	<u>0.47</u>
Unit stormwater volume (P ₀) (in) = a x C x P ₆	<u>0.34</u>
Stormwater Design Volume for the DMA (SDV) (ft³) = A x P₀ ÷ 12	<u>41</u>

Site Design Measure Worksheet

Drainage Management Area (DMA) # 3

For this DMA, identify the following information:

Stormwater Design Volume without credits (ft³) = SDV 41

Stormwater Design Volume with credits (ft³) = $SDV_{adj} = SDV - SDM_{credit}$
 (This volume must be treated by stormwater treatment control measures.) 3

Do proposed site design measures completely manage the SDV for this DMA?

- Yes, stormwater management requirement met for this DMA.
- No, proceed to Stormwater Treatment and Baseline Hydromodification Measure Worksheet.

Proposed Site Design Measure	Stormwater Runoff Volume Credit (ft³)
<input type="checkbox"/> Stream setbacks and buffers	<u>0</u>
<input type="checkbox"/> Soil quality improvement and maintenance	<u>0</u>
<input checked="" type="checkbox"/> Tree planting and preservation	<u>19</u>
<input checked="" type="checkbox"/> Rooftop and impervious area disconnection	<u>19</u>
<input type="checkbox"/> Porous pavement	<u>0</u>
<input type="checkbox"/> Vegetated swales	<u>0</u>
<input type="checkbox"/> Rain barrels/cisterns	<u>0</u>
Total Stormwater Runoff Volume Credit (SDM_{credit})	<u>38</u>

For site design measures not implemented for this DMA, describe why they are not selected.

The other site design measures were not implemented because there are no streams near the site, the soil is good enough for infiltration and does not need improvement, there is not enough room with the improvements to preserve any trees and it is unknown if any trees will be planted at this time, pourous pavement will not be used because it is not cost effective, rain barrels will not be used because the drains will drain into the bioretention basins.

Stormwater Treatment and Baseline Hydromodification Control Measure Design Worksheet

For each drainage management area (DMA), in which proposed site design measures did not fully manage the difference in pre- and post-project stormwater runoff volume, complete this worksheet.

Drainage Management Area (DMA) # 3

Design bioretention facility to manage the adjusted stormwater design volume (SDV_{adj}). Calculate the bottom surface area of a bioretention facility:

Stormwater Design Volume for the DMA (SDV) (ft^3) See Drainage Management Area Worksheet.	41
Total Stormwater Runoff Credit Volume (SDM_{credit}) (ft^3) See Site Design Measure Worksheet.	19
Adjusted Stormwater Design Volume (SDV_{adj}) (ft^3) = $SDV - SDM_{credit}$	22.2
Design infiltration rate of underlying soils (f_{design}) (in/hr)	0.50
Ponding zone depth (d_{pz}) (ft) (0.5-1.5 ft)	0.5
Planting media layer depth (d_{pm}) (ft) (min 1.5 ft)	1.5
Planting media porosity (η_{pm})	0.10
Gravel layer depth (d_{gl}) (ft) (min 1 ft)	1
Gravel layer porosity (η_{gl})	0.35
Bottom surface area of a bioretention facility (ft^2) = $\frac{SDV_{adj}}{d_{pz} + (\eta_{pm} \times d_{pm}) + (\eta_{gl} \times d_{gl})}$	22.2

Verify that: $d_{pz} + (\eta_{pm} \times d_{pm}) + (\eta_{gl} \times d_{gl}) \leq f_{design} \times t_{max} \div 12$. If not, redesign factors above.

Verify that the DMA has adequate space to implement bioretention facility sized above. If not, redesign factors above or provide additional stormwater treatment control measures to manage remaining portion of the SDV .

Describe and provide justification for any variations to the bioretention facility for site-specific conditions. See Section 6.2 of the *2015 Post-Construction Stormwater Standards Manual* for more information.

Project Stormwater Plan

Describe and provide justification if an alternative stormwater treatment control measure is proposed in lieu of a bioretention facility. An alternative stormwater treatment control measure proposed for a project must meet all the requirements of Section 6.2 of the *2015 Post-Construction Stormwater Standards Manual*.

Describe and provide justification for any exceptions to the requirements for bioretention. Exception to bioretention must meet all the requirements of Section 6.2 of the *2015 Post-Construction Stormwater Standards Manual*. Identify and describe the proposed biotreatment or media filter system that will be used in lieu of bioretention.

Summary of Stormwater Treatment and Baseline Hydromodification Control Measure Design

Stormwater Design Volume for DMA (SDV) (ft ³)	41
1. Total Stormwater Runoff Credit Volume (SDM _{credit}) (ft ³)	19
2. Volume of Stormwater Runoff Managed by Bioretention Facility (ft ³)	117
3. Volume of Stormwater Runoff Managed by Other Stormwater Treatment Control Measure (identify each control measure)	
a.	0
b.	
Total Stormwater Runoff Volume Managed for DMA (ft ³) = sum of items 1-3 above.	136

If Total Stormwater Runoff Volume Managed for this DMA equals or exceeds the Stormwater Design Volume for this DMA, then design for stormwater management for this DMA is complete. If the Total Stormwater Runoff Volume Managed for this DMA is less than the Stormwater Design Volume for this DMA, redesign site design measures and stormwater treatment control measures until the entire Stormwater Design Volume for this DMA has been managed. Complete this exercise for each DMA.

Drainage Management Area Worksheet

Drainage Management Area (DMA) # 4

Type of DMA:

- | | |
|---|---|
| <input type="checkbox"/> Self-treating area | <input checked="" type="checkbox"/> Areas draining to self-retaining areas |
| <input checked="" type="checkbox"/> Self-retaining area | <input checked="" type="checkbox"/> Areas draining to bioretention facility |

Describe the DMA Sheet flow to Bioretention Area #5.

Total Drainage Area (ft ²)	<u>2,446</u>		
Existing Impervious Area (ft ²)	<u>0</u>	Soil Type	<u>B</u>
Post-Project Impervious Area (ft ²)	<u>2,183</u>	Infiltration Rate (in/hr)	<u>0.5-1</u>
Mean Annual Runoff-Producing Rainfall Depth (P ₆) (in)			<u>.37</u>
Drawdown time (t _{max}) (hr) (48)			<u>48</u>
Regression constant (a) (1.963 for 48-hr drawdown)			<u>1.963</u>

Pre-Project Condition:

Imperviousness ratio (i) = Existing Impervious Area ÷ Total Drainage Area (decimal)	<u>0</u>
Stormwater runoff coefficient (C) = 0.858 x i ³ - 0.78 x i ² + 0.774 x i + 0.04	<u>0.04</u>
Unit stormwater volume (P ₀) (in) = a x C x P ₆	<u>0.03</u>
Stormwater Runoff Volume for the DMA (ft ³)	<u>13.25</u>

Post-Project Condition:

Imperviousness ratio (i) = Post-Project Impervious Area ÷ Total Drainage Area (decimal)	<u>0.89</u>
Stormwater runoff coefficient (C) = 0.858 x i ³ - 0.78 x i ² + 0.774 x i + 0.04	<u>0.72</u>
Unit stormwater volume (P ₀) (in) = a x C x P ₆	<u>0.52</u>
Stormwater Design Volume for the DMA (SDV) (ft³) = A x P₀ ÷ 12	<u>106</u>

Site Design Measure Worksheet

Drainage Management Area (DMA) # 4

For this DMA, identify the following information:

Stormwater Design Volume without credits (ft³) = SDV 106

Stormwater Design Volume with credits (ft³) = $SDV_{adj} = SDV - SDM_{credit}$
 (This volume must be treated by stormwater treatment control measures.) 0

Do proposed site design measures completely manage the SDV for this DMA?

- Yes, stormwater management requirement met for this DMA.
- No, proceed to Stormwater Treatment and Baseline Hydromodification Measure Worksheet.

Proposed Site Design Measure	Stormwater Runoff Volume Credit (ft³)
<input type="checkbox"/> Stream setbacks and buffers	<u>0</u>
<input type="checkbox"/> Soil quality improvement and maintenance	<u>0</u>
<input checked="" type="checkbox"/> Tree planting and preservation	<u>109</u>
<input checked="" type="checkbox"/> Rooftop and impervious area disconnection	<u>109</u>
<input type="checkbox"/> Porous pavement	<u>0</u>
<input type="checkbox"/> Vegetated swales	<u>0</u>
<input type="checkbox"/> Rain barrels/cisterns	<u>0</u>
Total Stormwater Runoff Volume Credit (SDM_{credit})	<u>218</u>

For site design measures not implemented for this DMA, describe why they are not selected.

The other site design measures were not implemented because there are no streams near the site, the soil is good enough for infiltration and does not need improvement, there is not enough room with the improvements to preserve any trees and it is unknown if any trees will be planted at this time, porous pavement will not be used because it is not cost effective, rain barrels will not be used because the drains will drain into the bioretention basins.

Drainage Management Area Worksheet

Drainage Management Area (DMA) # 5

Type of DMA:

- | | |
|---|---|
| <input type="checkbox"/> Self-treating area | <input checked="" type="checkbox"/> Areas draining to self-retaining areas |
| <input checked="" type="checkbox"/> Self-retaining area | <input checked="" type="checkbox"/> Areas draining to bioretention facility |

Describe the DMA Downspout drainage to pre-treatment swale leading to Bioretention Area #6.

Total Drainage Area (ft ²)	<u>12,644</u>		
Existing Impervious Area (ft ²)	<u>0</u>	Soil Type	<u>B</u>
Post-Project Impervious Area (ft ²)	<u>8,675</u>	Infiltration Rate (in/hr)	<u>0.5-1</u>
Mean Annual Runoff-Producing Rainfall Depth (P ₆) (in)			<u>.37</u>
Drawdown time (t _{max}) (hr) (48)			<u>48</u>
Regression constant (a) (1.963 for 48-hr drawdown)			<u>1.963</u>

Pre-Project Condition:

Imperviousness ratio (i) = Existing Impervious Area ÷ Total Drainage Area (decimal)	<u>0</u>
Stormwater runoff coefficient (C) = 0.858 x i ³ - 0.78 x i ² + 0.774 x i + 0.04	<u>0.04</u>
Unit stormwater volume (P ₀) (in) = a x C x P ₆	<u>0.03</u>
Stormwater Runoff Volume for the DMA (ft ³)	<u>13.25</u>

Post-Project Condition:

Imperviousness ratio (i) = Post-Project Impervious Area ÷ Total Drainage Area (decimal)	<u>0.69</u>
Stormwater runoff coefficient (C) = 0.858 x i ³ - 0.78 x i ² + 0.774 x i + 0.04	<u>0.48</u>
Unit stormwater volume (P ₀) (in) = a x C x P ₆	<u>0.35</u>
Stormwater Design Volume for the DMA (SDV) (ft³) = A x P₀ ÷ 12	<u>369</u>

Site Design Measure Worksheet

Drainage Management Area (DMA) # 5

For this DMA, identify the following information:

Stormwater Design Volume without credits (ft³) = SDV 369

Stormwater Design Volume with credits (ft³) = $SDV_{adj} = SDV - SDM_{credit}$
(This volume must be treated by stormwater treatment control measures.) 0

Do proposed site design measures completely manage the SDV for this DMA?

- Yes, stormwater management requirement met for this DMA.
- No, proceed to Stormwater Treatment and Baseline Hydromodification Measure Worksheet.

Proposed Site Design Measure	Stormwater Runoff Volume Credit (ft ³)
<input type="checkbox"/> Stream setbacks and buffers	<u>0</u>
<input type="checkbox"/> Soil quality improvement and maintenance	<u>0</u>
<input checked="" type="checkbox"/> Tree planting and preservation	<u>76</u>
<input checked="" type="checkbox"/> Rooftop and impervious area disconnection	<u>323</u>
<input type="checkbox"/> Porous pavement	<u>0</u>
<input checked="" type="checkbox"/> Vegetated swales	<u>380</u>
<input type="checkbox"/> Rain barrels/cisterns	<u>0</u>
Total Stormwater Runoff Volume Credit (SDM_{credit})	<u>779</u>

For site design measures not implemented for this DMA, describe why they are not selected.

The other site design measures were not implemented because there are no streams near the site, the soil is good enough for infiltration and does not need improvement, there is not enough room with the improvements to preserve any trees and it is unknown if any trees will be planted at this time, pourous pavement will not be used because it is not cost effective, rain barrels will not be used because the drains will drain into the bioretention basins.

Post-Construction Water Balance Calculator

1	Post-Construction Water Balance Calculator									
2										
3	User may make changes from any cell that is orange or brown in color (similar to the cells to the immediate right). Cells in green are calculated for you.			(Step 1a) If you know the 85th percentile storm event for your location enter it in the box below		(Step 1b) If you can not answer 1a then select the county where the project is located (click on the cell to the right for drop-down): This will determine the average 85th percentile 24 hr. storm event for your site, which will appear under precipitation to left.		SAN JOAQUIN		
4				0.37	(Step 1c) If you would like a more precise value select the location closest to your site. If you do not recognize any of these locations, leave this drop-down menu at location. The average value for the County will be used.		STOCKTON DISPOSAL PLANT			
5	Project Information				Runoff Calculations					
6	Project Name: NORTH WALNUT TOWNHOUSES				(Step 2) Indicate the Soil Type (dropdown menu to right):		Group B Soils	Moderate infiltration. Silt loam or loam. Infiltration rate 0.15 to 0.3 inch/hr when wet.		
7	Waste Discharge Identification (WDID):		Optional		(Step 3) Indicate the existing dominant non-built land Use Type (dropdown menu to right):		Open Space: grass cover >75%			
8	Date:		8/14/2017		(Step 4) Indicate the proposed dominant non-built land Use Type (dropdown menu to right):		A mix of lawn, grass, pasture and tress covering less than 50% of the open space			
9	Sub Drainage Area Name (from map):		DMA 1				Complete Either			
10	Runoff Curve Numbers						Sq Ft	Acres	Acres	
11	Existing Runoff Curve Number		61		(Step 5) Total Project Site Area:		38869		0.89	
12	Proposed Development Runoff Curve Number		91		(Step 6) Sub-watershed Area:		8507		0.20	
13	Design Storm				Percent of total project :		22%			
14	Based on the County you indicated above, we have included the 85 percentile average 24 hr event - P85 (in)^ for your area.		0.37		in					
15	The Amount of rainfall needed for runoff to occur (Existing runoff curve number -P from existing RCN (in)^)		1.29		In					
16	P used for calculations (in) (the greater of the above two criteria)		1.29		In					
17	*Available at www.cabmphandbooks.com									
18					Existing Rooftop Impervious Coverage		0		0.00	
19					Existing Non-Rooftop Impervious Coverage		0		0.00	
20					Proposed Rooftop Impervious Coverage		3274		0.08	
21					Proposed Non-Rooftop Impervious Coverage		2445		0.06	
22					Credits		Acres		Square Feet	
23					Porous Pavement		0.00		0	
24					Tree Planting		0.03		1,307	
25	Pre-Project Runoff Volume (cu ft)		0		Cu.Ft.		Downspout Disconnection		0.05	2,178
26	Project-Related Runoff Volume Increase w/o credits (cu ft)		416		Cu.Ft.		Impervious Area Disconnection		0.06	2,614
27							Green Roof		0.00	0
28							Stream Buffer		0.00	0
29							Vegetated Swales		0.14	6,098
30	Project-Related Volume Increase with Credits (cu ft)		0		Cu.Ft.		Subtotal		0.28	12,197
31							Subtotal Runoff Volume Reduction Credit		582 Cu. Ft.	
32										
33	You have achieved your minimum requirements				(Step 9) Impervious Volume Reduction Credits		Volume (cubic feet)			
34							Rain Barrels/Cisterns		0	Cu. Ft.
35							Soil Quality		0	Cu. Ft.
36							Subtotal Runoff Volume Reduction		0	Cu. Ft.
37							Total Runoff Volume Reduction Credit		582	Cu. Ft.
38										
39										
40										

Post-Construction Water Balance Calculator

1	Post-Construction Water Balance Calculator									
2										
3	User may make changes from any cell that is orange or brown in color (similar to the cells to the immediate right). Cells in green are calculated for you.			(Step 1a) If you know the 85th percentile storm event for your location enter it in the box below		(Step 1b) If you can not answer 1a then select the county where the project is located (click on the cell to the right for drop-down): This will determine the average 85th percentile 24 hr. storm event for your site, which will appear under precipitation to left.		SAN JOAQUIN		
4				0.37	(Step 1c) If you would like a more precise value select the location closest to your site. If you do not recognize any of these locations, leave this drop-down menu at location. The average value for the County will be used.		STOCKTON DISPOSAL PLANT			
5	Project Information				Runoff Calculations					
6	Project Name: NORTH WALNUT TOWNHOUSES				(Step 2) Indicate the Soil Type (dropdown menu to right):		Group B Soils	Moderate infiltration. Silt loam or loam. Infiltration rate 0.15 to 0.3 inch/hr when wet.		
7	Waste Discharge Identification (WDID):		Optional		(Step 3) Indicate the existing dominant non-built land Use Type (dropdown menu to right):		Open Space: grass cover >75%			
8	Date:		8/14/2017		(Step 4) Indicate the proposed dominant non-built land Use Type (dropdown menu to right):		A mix of lawn, grass, pasture and tress covering less than 50% of the open space			
9	Sub Drainage Area Name (from map):		DMA 2				Complete Either			
10	Runoff Curve Numbers						Sq Ft	Acres	Acres	
11	Existing Runoff Curve Number		61		(Step 5) Total Project Site Area:		38869		0.89	
12	Proposed Development Runoff Curve Number		86		(Step 6) Sub-watershed Area:		12618		0.29	
13	Design Storm				Percent of total project :		33%			
14	Based on the County you indicated above, we have included the 85 percentile average 24 hr event - P85 (in)^ for your area.		0.37	in						
15	The Amount of rainfall needed for runoff to occur (Existing runoff curve number -P from existing RCN (in)^)		1.29	in	(Step 7) Sub-watershed Conditions		Complete Either		Calculated Acres	
16	P used for calculations (in) (the greater of the above two criteria)		1.29	in	Sub-watershed Area (acres)		Sq Ft	Acres	0.29	
17	*Available at www.cabmphandbooks.com				Existing Rooftop Impervious Coverage		0		0.00	
18					Existing Non-Rooftop Impervious Coverage		0		0.00	
19					Proposed Rooftop Impervious Coverage		3430		0.08	
20					Proposed Non-Rooftop Impervious Coverage		3135		0.07	
21										
22					Credits		Acres		Square Feet	
23					Porous Pavement		0.00		0	
24					Tree Planting		0.04		1,742	
25	Pre-Project Runoff Volume (cu ft)		0	Cu.Ft.	Downspout Disconnection		0.08		3,485	
26	Project-Related Runoff Volume Increase w/o credits (cu ft)		377	Cu.Ft.	Impervious Area Disconnection		0.07		3,049	
27					Green Roof		0.00		0	
28					Stream Buffer		0.00		0	
29					Vegetated Swales		0.15		6,534	
30	Project-Related Volume Increase with Credits (cu ft)		0	Cu.Ft.	Subtotal		0.34		14,810	
31					Subtotal Runoff Volume Reduction Credit		442 Cu. Ft.			
32										
33	You have achieved your minimum requirements				(Step 9) Impervious Volume Reduction Credits		Volume (cubic feet)			
34					Rain Barrels/Cisterns		0		Cu. Ft.	
35					Soil Quality		0		Cu. Ft.	
36					Subtotal Runoff Volume Reduction		0		Cu. Ft.	
37					Total Runoff Volume Reduction Credit		442 Cu. Ft.			
38										
39										
40										

Post-Construction Water Balance Calculator

1	Post-Construction Water Balance Calculator											
2												
3	User may make changes from any cell that is orange or brown in color (similar to the cells to the immediate right). Cells in green are calculated for you.			(Step 1a) If you know the 85th percentile storm event for your location enter it in the box below		(Step 1b) If you can not answer 1a then select the county where the project is located (click on the cell to the right for drop-down): This will determine the average 85th percentile 24 hr. storm event for your site, which will appear under precipitation to left.		SAN JOAQUIN				
4				0.37	(Step 1c) If you would like a more precise value select the location closest to your site. If you do not recognize any of these locations, leave this drop-down menu at location. The average value for the County will be used.		STOCKTON DISPOSAL PLANT					
5	Project Information				Runoff Calculations							
6	Project Name:		NORTH WALNUT TOWNHOUSES		(Step 2) Indicate the Soil Type (dropdown menu to right):		Group B Soils	Moderate infiltration. Silt loam or loam. Infiltration rate 0.15 to 0.3 inch/hr when wet.				
7	Waste Discharge Identification (WDID):		Optional		(Step 3) Indicate the existing dominant non-built land Use Type (dropdown menu to right):		Open Space: grass cover >75%					
8	Date:		8/14/2017		(Step 4) Indicate the proposed dominant non-built land Use Type (dropdown menu to right):		A mix of lawn, grass, pasture and tress covering less than 50% of the open space					
9	Sub Drainage Area Name (from map):		DMA 3				Complete Either					
10	Runoff Curve Numbers						Sq Ft	Acres	Acres			
11	Existing Runoff Curve Number		61		(Step 5) Total Project Site Area:		38869		0.89			
12	Proposed Development Runoff Curve Number		90		(Step 6) Sub-watershed Area:		1453		0.03			
13	Design Storm				Percent of total project :		3%					
14	Based on the County you indicated above, we have included the 85 percentile average 24 hr event - P85 (in)^ for your area.		0.37	in								
15	The Amount of rainfall needed for runoff to occur (Existing runoff curve number -P from existing RCN (in)^)		1.29	in	(Step 7) Sub-watershed Conditions		Complete Either		Calculated Acres			
16	P used for calculations (in) (the greater of the above two criteria)		1.29	in	Sub-watershed Area (acres)		Sq Ft	Acres	0.03			
17	*Available at www.cabmphandbooks.com				Existing Rooftop Impervious Coverage		0		0.00			
18					Existing Non-Rooftop Impervious Coverage		0		0.00			
19					Proposed Rooftop Impervious Coverage		522		0.01			
20					Proposed Non-Rooftop Impervious Coverage		456		0.01			
21												
22					Credits		Acres		Square Feet			
23					Porous Pavement		0.00		0			
24					Tree Planting		0.01		436			
25	Pre-Project Runoff Volume (cu ft)		0	Cu.Ft.	Downspout Disconnection		0.00		0			
26	Project-Related Runoff Volume Increase w/o credits (cu ft)		57	Cu.Ft.	Impervious Area Disconnection		0.01		436			
27					Green Roof		0.00		0			
28					Stream Buffer		0.00		0			
29					Vegetated Swales		0.00		0			
30	Project-Related Volume Increase with Credits (cu ft)		19	Cu.Ft.	Subtotal		0.02		871			
31					Subtotal Runoff Volume Reduction Credit		38 Cu. Ft.					
32												
33	You need to do more impervious area reduction to meet minimum requirements				(Step 9) Impervious Volume Reduction Credits		Volume (cubic feet)					
34					Rain Barrels/Cisterns		0 Cu. Ft.					
35					Soil Quality		0 Cu. Ft.					
36					Subtotal Runoff Volume Reduction		0 Cu. Ft.					
37					Total Runoff Volume Reduction Credit		38 Cu. Ft.					
38												
39												
40												

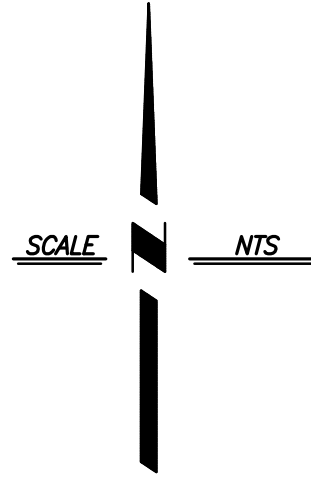
Post-Construction Water Balance Calculator

1	Post-Construction Water Balance Calculator									
2										
3	User may make changes from any cell that is orange or brown in color (similar to the cells to the immediate right). Cells in green are calculated for you.			(Step 1a) If you know the 85th percentile storm event for your location enter it in the box below		(Step 1b) If you can not answer 1a then select the county where the project is located (click on the cell to the right for drop-down): This will determine the average 85th percentile 24 hr. storm event for your site, which will appear under precipitation to left.		SAN JOAQUIN		
4				0.37	(Step 1c) If you would like a more precise value select the location closest to your site. If you do not recognize any of these locations, leave this drop-down menu at location. The average value for the County will be used.		STOCKTON DISPOSAL PLANT			
5	Project Information				Runoff Calculations					
6	Project Name: NORTH WALNUT TOWNHOUSES				(Step 2) Indicate the Soil Type (dropdown menu to right):		Group B Soils	Moderate infiltration. Silt loam or loam. Infiltration rate 0.15 to 0.3 inch/hr when wet.		
7	Waste Discharge Identification (WDID):		Optional		(Step 3) Indicate the existing dominant non-built land Use Type (dropdown menu to right):		Open Space: grass cover >75%			
8	Date:		8/14/2017		(Step 4) Indicate the proposed dominant non-built land Use Type (dropdown menu to right):		A mix of lawn, grass, pasture and tress covering less than 50% of the open space			
9	Sub Drainage Area Name (from map):		DMA 4				Complete Either			
10	Runoff Curve Numbers						Sq Ft	Acres	Acres	
11	Existing Runoff Curve Number		61		(Step 5) Total Project Site Area:		38869		0.89	
12	Proposed Development Runoff Curve Number		94		(Step 6) Sub-watershed Area:		2446		0.06	
13	Design Storm				Percent of total project :		7%			
14	Based on the County you indicated above, we have included the 85 percentile average 24 hr event - P85 (in)^ for your area.		0.37	in						
15	The Amount of rainfall needed for runoff to occur (Existing runoff curve number -P from existing RCN (in)^)		1.29	in	(Step 7) Sub-watershed Conditions		Complete Either		Calculated Acres	
16	P used for calculations (in) (the greater of the above two criteria)		1.29	in	Sub-watershed Area (acres)		Sq Ft	Acres	0.06	
17	*Available at www.cabmphandbooks.com				Existing Rooftop Impervious Coverage		0		0.00	
18					Existing Non-Rooftop Impervious Coverage		0		0.00	
19					Proposed Rooftop Impervious Coverage		532		0.01	
20					Proposed Non-Rooftop Impervious Coverage		1651		0.04	
21										
22					Credits		Acres		Square Feet	
23					Porous Pavement		0.00		0	
24					Tree Planting		0.04		1,742	
25	Pre-Project Runoff Volume (cu ft)		0	Cu.Ft.	Downspout Disconnection		0.00		0	
26	Project-Related Runoff Volume Increase w/o credits (cu ft)		163	Cu.Ft.	Impervious Area Disconnection		0.04		1,742	
27					Green Roof		0.00		0	
28					Stream Buffer		0.00		0	
29					Vegetated Swales		0.05		2,178	
30	Project-Related Volume Increase with Credits (cu ft)		0	Cu.Ft.	Subtotal		0.13		5,663	
31					Subtotal Runoff Volume Reduction Credit		354 Cu. Ft.			
32										
33	You have achieved your minimum requirements				(Step 9) Impervious Volume Reduction Credits		Volume (cubic feet)			
34					Rain Barrels/Cisterns		0		Cu. Ft.	
35					Soil Quality		0		Cu. Ft.	
36					Subtotal Runoff Volume Reduction		0		Cu. Ft.	
37					Total Runoff Volume Reduction Credit		354 Cu. Ft.			
38										
39										
40										

Post-Construction Water Balance Calculator

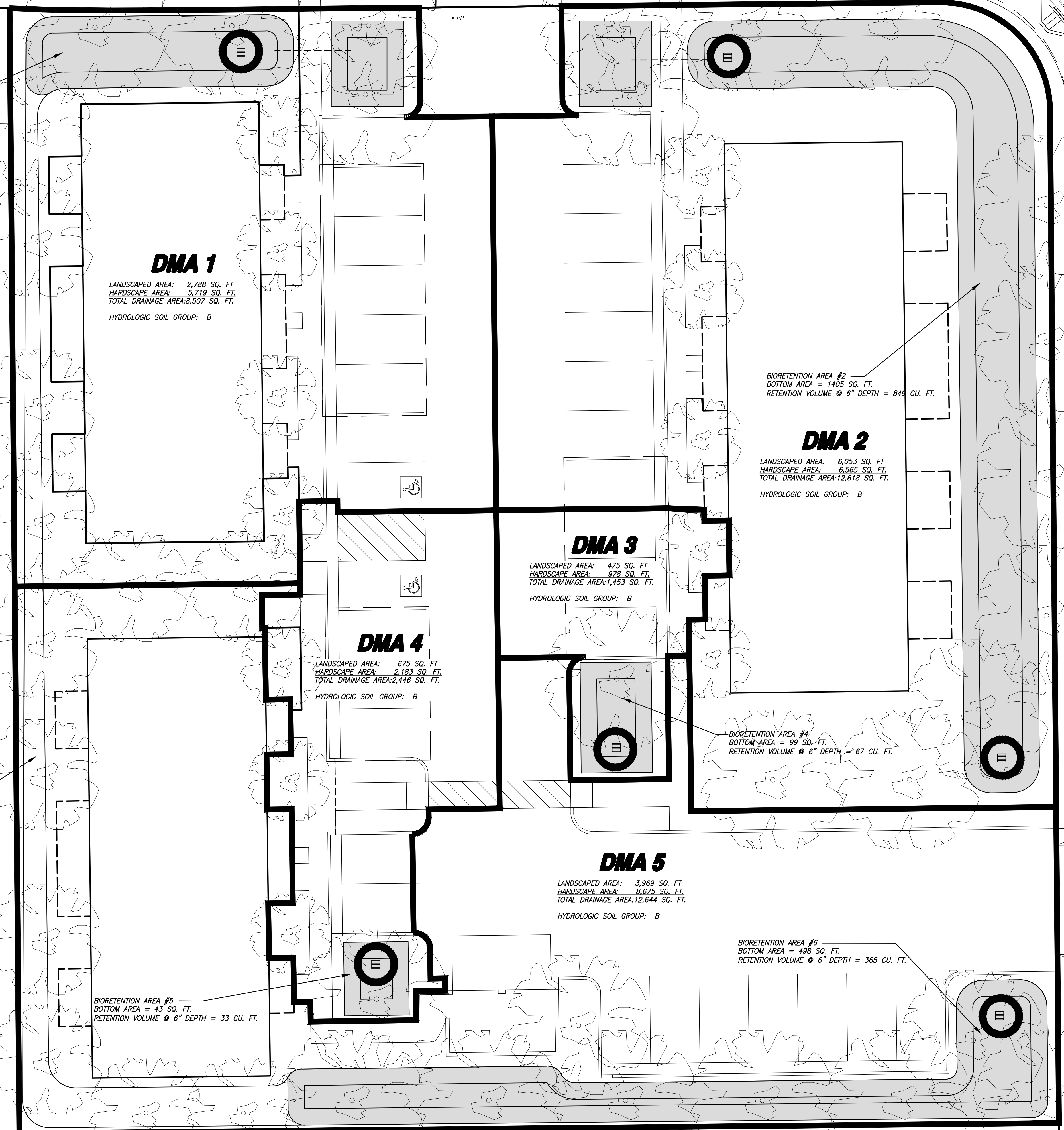
1	Post-Construction Water Balance Calculator									
2										
3	User may make changes from any cell that is orange or brown in color (similar to the cells to the immediate right). Cells in green are calculated for you.			(Step 1a) If you know the 85th percentile storm event for your location enter it in the box below		(Step 1b) If you can not answer 1a then select the county where the project is located (click on the cell to the right for drop-down): This will determine the average 85th percentile 24 hr. storm event for your site, which will appear under precipitation to left.		SAN JOAQUIN		
4				0.37	(Step 1c) If you would like a more precise value select the location closest to your site. If you do not recognize any of these locations, leave this drop-down menu at location. The average value for the County will be used.		STOCKTON DISPOSAL PLANT			
5	Project Information				Runoff Calculations					
6	Project Name: NORTH WALNUT TOWNHOUSES				(Step 2) Indicate the Soil Type (dropdown menu to right):		Group B Soils	Moderate infiltration. Silt loam or loam. Infiltration rate 0.15 to 0.3 inch/hr when wet.		
7	Waste Discharge Identification (WDID):		Optional		(Step 3) Indicate the existing dominant non-built land Use Type (dropdown menu to right):		Open Space: grass cover >75%			
8	Date:		8/14/2017		(Step 4) Indicate the proposed dominant non-built land Use Type (dropdown menu to right):		A mix of lawn, grass, pasture and tress covering less than 50% of the open space			
9	Sub Drainage Area Name (from map):		DMA 5				Complete Either			
10	Runoff Curve Numbers						Sq Ft	Acres	Acres	
11	Existing Runoff Curve Number		61		(Step 5) Total Project Site Area:		38869		0.89	
12	Proposed Development Runoff Curve Number		90		(Step 6) Sub-watershed Area:		12644		0.29	
13	Design Storm				Percent of total project :		33%			
14	Based on the County you indicated above, we have included the 85 percentile average 24 hr event - P85 (in)^ for your area.		0.37	in						
15	The Amount of rainfall needed for runoff to occur (Existing runoff curve number -P from existing RCN (in)^)		1.29	in	(Step 7) Sub-watershed Conditions		Complete Either	Calculated Acres		
16	P used for calculations (in) (the greater of the above two criteria)		1.29	in	Sub-watershed Area (acres)		Sq Ft	Acres	0.29	
17	*Available at www.cabmphandbooks.com				Existing Rooftop Impervious Coverage		0		0.00	
18					Existing Non-Rooftop Impervious Coverage		0		0.00	
19					Proposed Rooftop Impervious Coverage		2400		0.06	
20					Proposed Non-Rooftop Impervious Coverage		6275		0.14	
21										
22					Credits		Acres	Square Feet		
23					Porous Pavement		0.00		0	
24					Tree Planting		0.04		1,742	
25	Pre-Project Runoff Volume (cu ft)		0	Cu.Ft.	Downspout Disconnection		0.03		1,307	
26	Project-Related Runoff Volume Increase w/o credits (cu ft)		551	Cu.Ft.	Impervious Area Disconnection		0.14		6,098	
27					Green Roof		0.00		0	
28					Stream Buffer		0.00		0	
29					Vegetated Swales		0.20		8,712	
30	Project-Related Volume Increase with Credits (cu ft)		0	Cu.Ft.	Subtotal		0.41		17,860	
31					Subtotal Runoff Volume Reduction Credit		779 Cu. Ft.			
32										
33	You have achieved your minimum requirements				(Step 9) Impervious Volume Reduction Credits		Volume (cubic feet)			
34					Rain Barrels/Cisterns		0 Cu. Ft.			
35					Soil Quality		0 Cu. Ft.			
36					Subtotal Runoff Volume Reduction		0 Cu. Ft.			
37					Total Runoff Volume Reduction Credit		779 Cu. Ft.			
38										
39										
40										

BIORETENTION AREA #1
 BOTTOM AREA = 373 SQ. FT.
 RETENTION VOLUME @ 6" DEPTH = 527 CU. FT.



217-059-021
 VACANT

PRE-TREATMENT SWALE



DMA 1
 LANDSCAPED AREA: 2,788 SQ. FT.
 HARDSCAPE AREA: 5,719 SQ. FT.
 TOTAL DRAINAGE AREA: 8,507 SQ. FT.
 HYDROLOGIC SOIL GROUP: B

BIORETENTION AREA #2
 BOTTOM AREA = 1405 SQ. FT.
 RETENTION VOLUME @ 6" DEPTH = 845 CU. FT.

DMA 2
 LANDSCAPED AREA: 6,053 SQ. FT.
 HARDSCAPE AREA: 6,565 SQ. FT.
 TOTAL DRAINAGE AREA: 12,618 SQ. FT.
 HYDROLOGIC SOIL GROUP: B

DMA 3
 LANDSCAPED AREA: 475 SQ. FT.
 HARDSCAPE AREA: 978 SQ. FT.
 TOTAL DRAINAGE AREA: 1,453 SQ. FT.
 HYDROLOGIC SOIL GROUP: B

DMA 4
 LANDSCAPED AREA: 675 SQ. FT.
 HARDSCAPE AREA: 2,183 SQ. FT.
 TOTAL DRAINAGE AREA: 2,446 SQ. FT.
 HYDROLOGIC SOIL GROUP: B

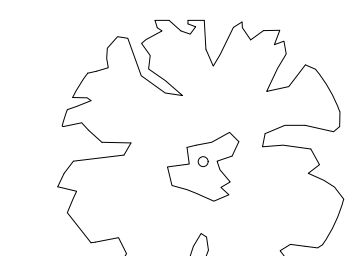
BIORETENTION AREA #4
 BOTTOM AREA = 99 SQ. FT.
 RETENTION VOLUME @ 6" DEPTH = 67 CU. FT.

DMA 5
 LANDSCAPED AREA: 3,969 SQ. FT.
 HARDSCAPE AREA: 8,675 SQ. FT.
 TOTAL DRAINAGE AREA: 12,644 SQ. FT.
 HYDROLOGIC SOIL GROUP: B

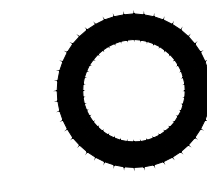
BIORETENTION AREA #5
 BOTTOM AREA = 43 SQ. FT.
 RETENTION VOLUME @ 6" DEPTH = 33 CU. FT.

BIORETENTION AREA #6
 BOTTOM AREA = 498 SQ. FT.
 RETENTION VOLUME @ 6" DEPTH = 365 CU. FT.

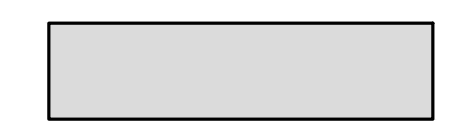
WALNUT AVENUE



PROPOSED INTERCEPTION TREE



STORM DRAIN MESSAGE AND SIGNAGE



BIORETENTION BASIN

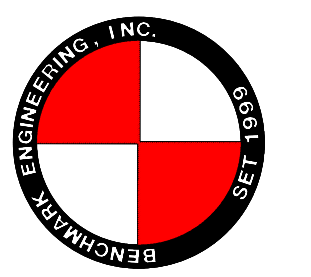
BMP SUMMARY TABLE

DMA	REQUIRED BMP CAPTURE VOLUME	BMPs USED	CAPTURE VOLUME PROVIDED
1	241 CU. FT.	BIORETENTION 1	582 CU. FT.
2	262 CU. FT.	BIORETENTION 2	442 CU. FT.
3	41 CU. FT.	BIORETENTION 3	136 CU. FT.
4	106 CU. FT.	BIORETENTION 4	218 CU. FT.
5	369 CU. FT.	BIORETENTION 5	779 CU. FT.

PREPARED UNDER THE DIRECTION OF:

NO.	DESCRIPTIONS	DATE	APPROVED

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STORMWATER QUALITY DRAINAGE MANAGEMENT AREAS
NORTH WALNUT TOWNHOUSES
 MANTECA, CALIFORNIA

JOB NO. 228400
 DATE: 8/15/17
 DR BY: MR
 CK BY: TG
 SCALE: AS SHOWN



SHEET NUMBER
1
 OF 1 SHEETS