

# **Preparing a Stormwater Control Plan**

*Stormwater C.3 Guidebook  
6<sup>th</sup> Edition*

# Better and More Complete Plans

## ■ Regulatory Climate

- Intense focus on LID
- Confusion and debate about LID
  - Objectives
  - LID Stormwater Treatment Methods
  - Continuous Simulation Hydrology
- Requirements for studies and proposals
- More reporting requirements and data requests

## ■ Need to learn from real-world experience

## ■ Better and more consistent documentation

# Guidance

- *Guidebook* Chapter 3
  - Checklist
  - Step-by-step instructions
  - Outline
- Template
- Example

## STORMWATER CONTROL PLAN CHECKLIST

### CONTENTS OF EXHIBIT

Show all of the following on drawings:

- Existing natural hydrologic features (depressions, watercourses, related wetlands, and other significant natural resources). (Step 1 in the following step-by-step instructions)
- Existing and proposed site drainage network and connections to drainage system
- Layout of buildings, pavement, and landscaped areas. (Step 3)
- Impervious areas proposed (roof, plaza/sidewalk, and streets/parking) and their locations
- Entire site divided into separate Drainage Management Areas, with each area either self-retaining (zero-discharge), draining to a self-retaining area, or draining to a water body. Each area, one surface type (roof, paving, or landscape), is labeled, and square footages are provided
- Locations and sizes of proposed treatment and flow-control facilities. (Step 4)

# **STORMWATER CONTROL PLAN**

for

**[NAME OF PROJECT]**

[date]

[This template is to be used in conjunction with the instructions, criteria, and minimum requirements in the Contra Costa Clean Water Program *Stormwater C.3 Guidebook, 6<sup>th</sup> Edition*.

Check the Contra Costa Clean Water Program website at [www.cccleanwater.org/c3.html](http://www.cccleanwater.org/c3.html) for new information and updates to the Guidebook and this template. ]

[Name of Owner]

[Owner's Representative and Contact Information]

*prepared by:*

[Preparer's Name]

[Preparer's Contact Information]

OVERVIEW

# Table of Contents

- I. Project Data (table)
- II. Setting
- III. LID Design Strategies
- IV. Documentation of Drainage Design
- V. Source Control Measures
- VI. Stormwater Facility Maintenance
- VII. Construction Plan C.3 Checklist
- VIII. Certifications

Attachment: Exhibit

# Project Data

- Name/Number
- Application Submittal Date
  - To be verified by municipal staff
- Location
- Name of Developer
- Phase No.
- Project Type and Description
- Watershed
  - Obtain from municipal staff
- Site Area (sum of parcel areas)
- Total Area of Land Disturbed

DATA TABLE



# Impervious Surface

- Thresholds
- 50% rule

- 1 New Impervious Surface Area
- 2 Replaced Impervious Surface Area
- 3 Pre-Project Impervious Surface Area
- 4 Post-Project Impervious Surface Area



# Project Data

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- Project Density
  - DU/Acre or FAR
- Applicable Special Project Categories
  - **A:** Lot line to lot line, <math>< \frac{1}{2}</math> acre, no surface parking
  - **B:**  $\frac{1}{2}$  acre to 2 acres, no surface parking FAR > 2:1 or > 50 DUs/acre
  - **C:** Transit-oriented, no limit on size FAR > 2:1 or > 25 DUs/acre
- Percent LID/non-LID Treatment
- HMP Compliance Option

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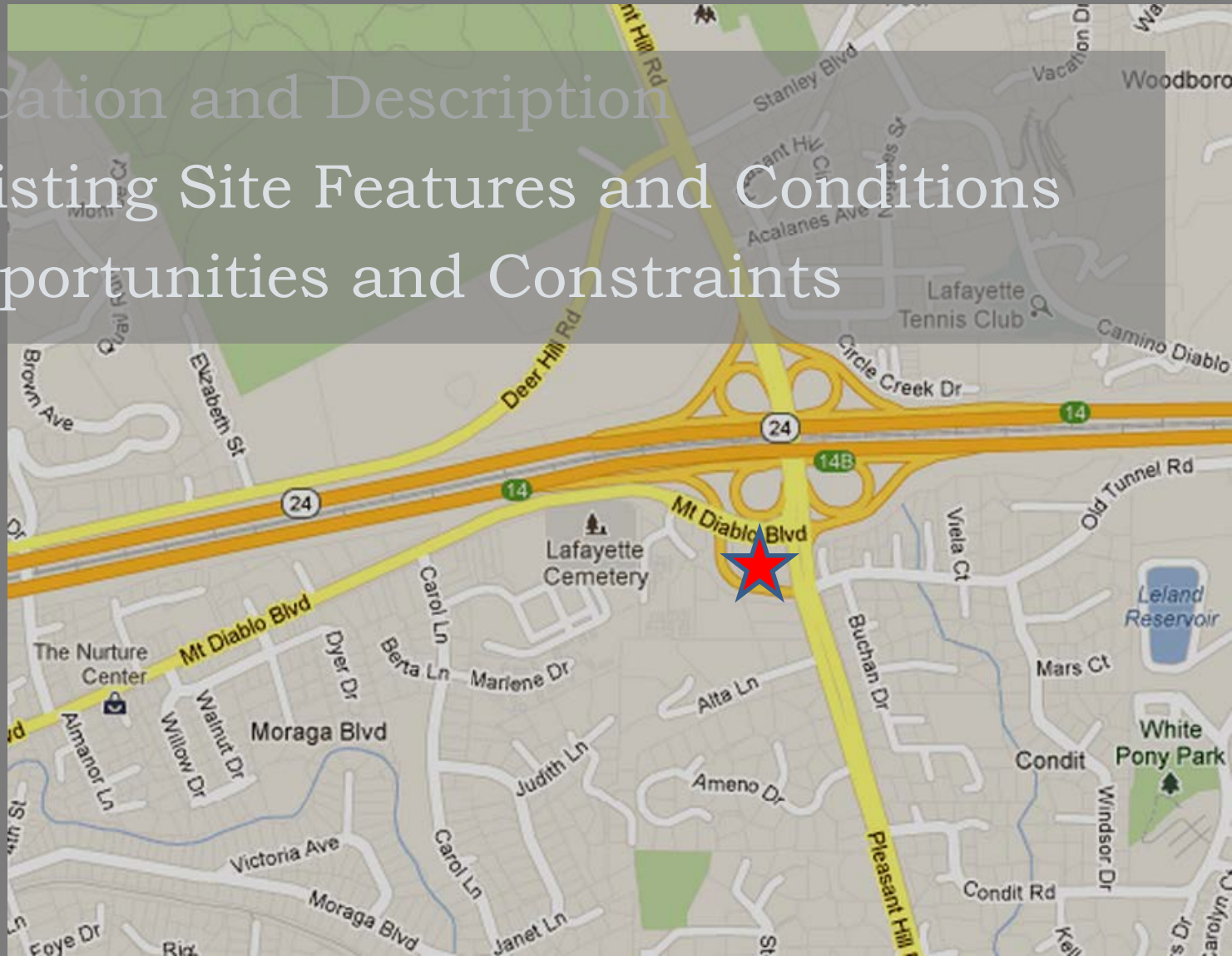
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DATA TABLE



# Project Setting

- Location and Description
- Existing Site Features and Conditions
- Opportunities and Constraints



# Optimization of Site Layout

- Limitation of development envelope
- Preservation of natural drainage
- Riparian setbacks
- Minimization of imperviousness
- Use of drainage as a design element



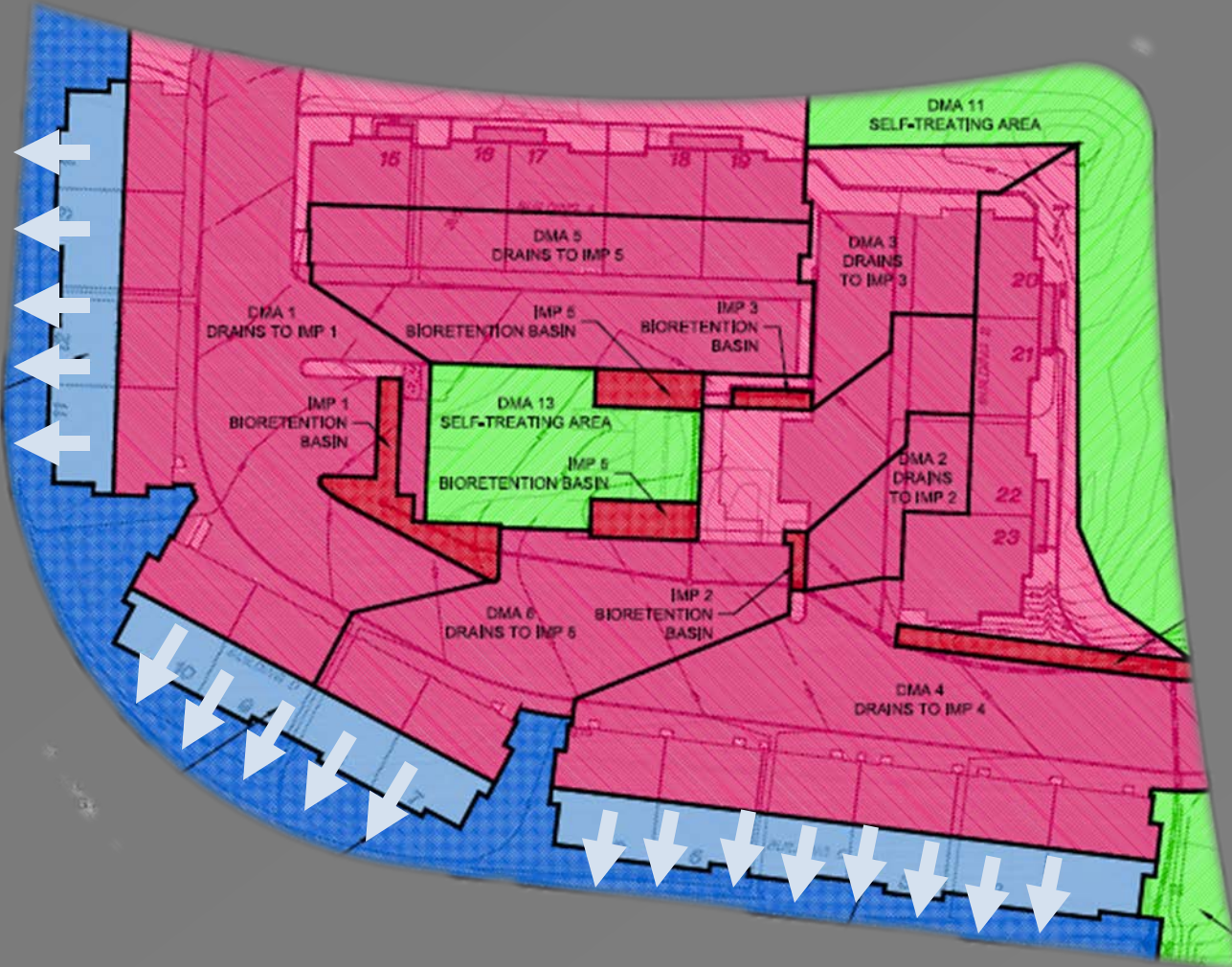
# Use of Permeable Pavements

- Not used in this project



# Dispersal of Runoff

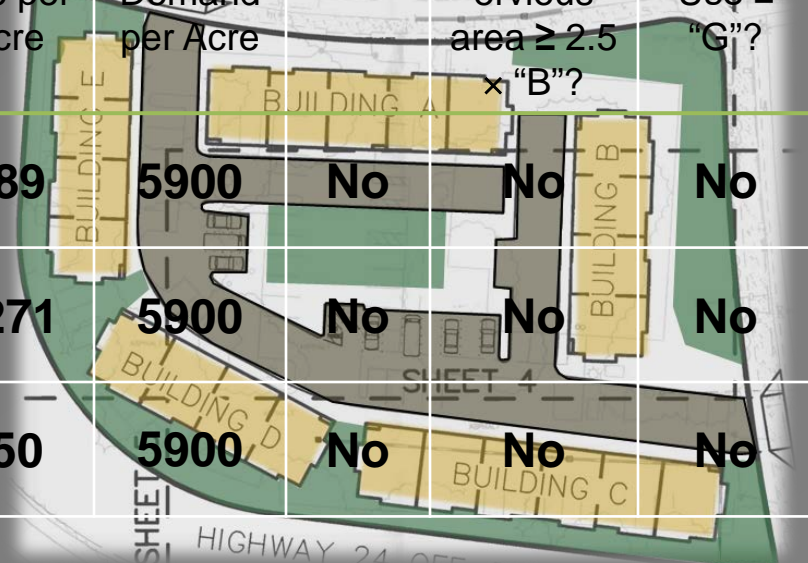
LID DESIGN



# Harvesting and Use Assessment

- Discuss potential opportunities
- Explain and justify selection of impervious areas for analysis.

A	B	C	D	E	F	G	H	I	J
Area	SF	Acres	Uses and User Units	Toilet and Urinal Usage (gal/day)	Water Use per Acre	Req'd Demand per Acre	F>G?	Adjacent impervious area $\geq 2.5 \times$ "B"?	Other Use $\geq$ "G"?
<b>All</b>	<b>41102</b>	<b>0.94</b>	<b>23 DUs</b>	<b>554</b>	<b>589</b>	<b>5900</b>	<b>No</b>	<b>No</b>	<b>No</b>
<b>Bldgs</b>	<b>18975</b>	<b>0.44</b>	<b>23 DUs</b>	<b>554</b>	<b>1271</b>	<b>5900</b>	<b>No</b>	<b>No</b>	<b>No</b>
<b>Bldg A</b>	<b>4125</b>	<b>0.09</b>	<b>23 DUs</b>	<b>554</b>	<b>5850</b>	<b>5900</b>	<b>No</b>	<b>No</b>	<b>No</b>





# Integrated Management Practices

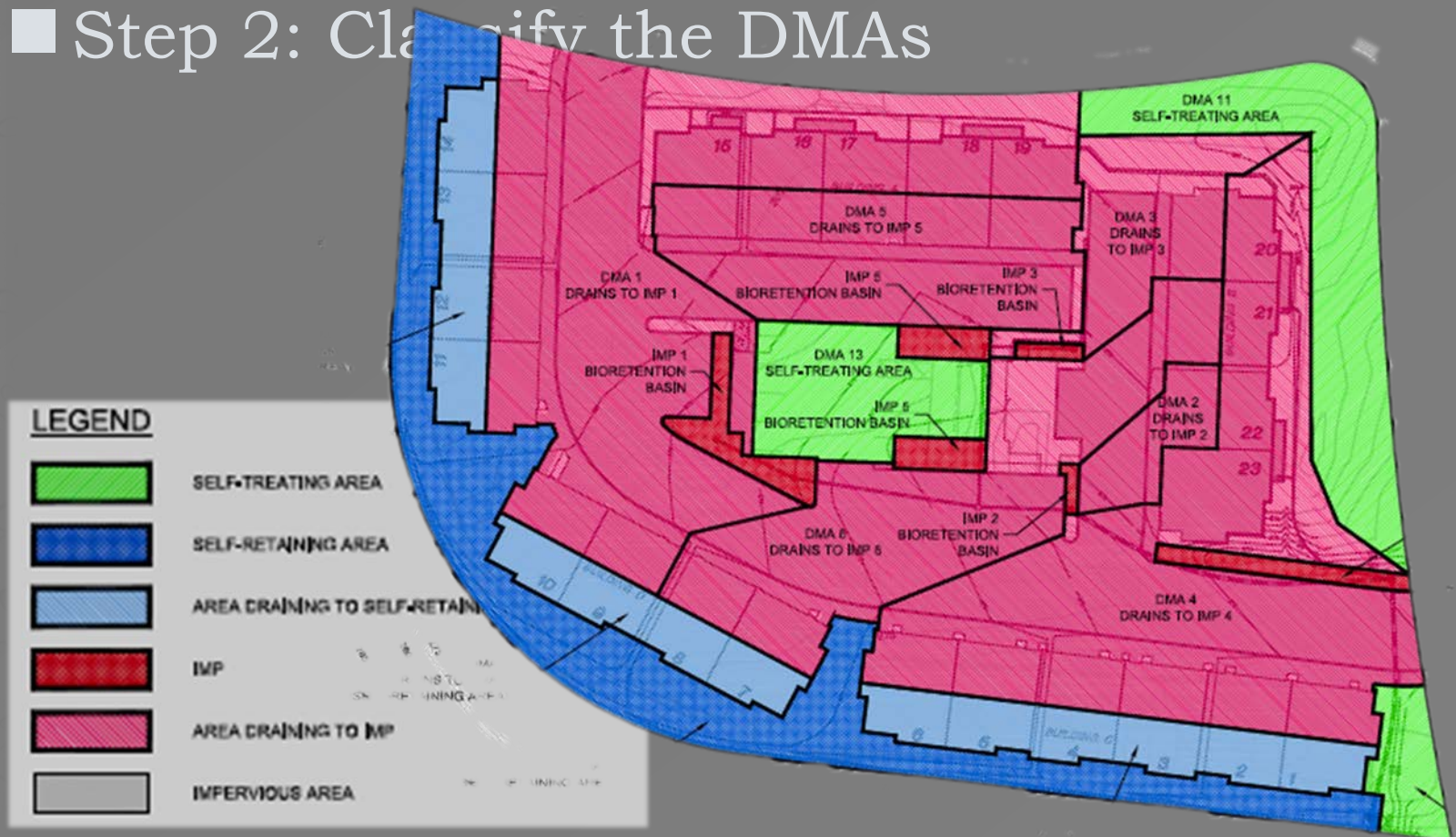
- Describe the facilities
  - Bioretention
  - Flow-through planter
  - Bioretention + Vault
  - Cistern + Bioretention

Page

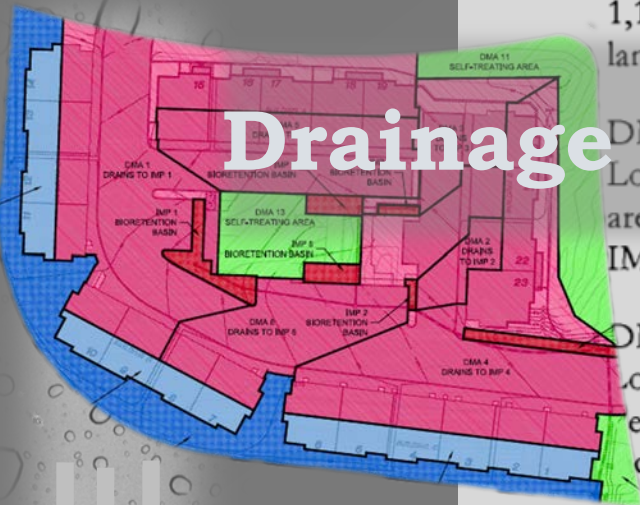
**69**

# Drainage Management Areas

- Step 1: Delineate the DMAs
- Step 2: Classify the DMAs



# Drainage Management Areas



Lots 1-6, Lot 23, and the rear half of Lots 20-22, 3,813 square feet of pavement, and 1,171 square feet of sidewalk. Pervious areas include 2,104 square feet of landscaping. DMA 4 drains to bioretention facility IMP 4.

DMA 5: Impervious areas include 2,141 square feet of roof for the front half of Lots 15-19, 2,265 square feet of pavement, and 665 square feet of sidewalk. Pervious areas include 50 square feet of landscaping. DMA 5 drains to bioretention facility IMP 5.

DMA 6: Impervious areas include 1,355 square feet of roof for the front half of Lots 7, 8, and 21, 3,915 square feet of pavement, and 531 square feet of sidewalk. Pervious areas include 946 square feet of landscaping. DMA 6 drains to bioretention facility IMP 6.

## Areas Draining to Self-Retaining Areas

DMA 8: Impervious area includes 1,822 square feet of roof for the rear half of Lots 11-14. DMA 8 drains to self-retaining area DMA 7.

DMA 9: Impervious area includes 1,712 square feet of roof for the rear half of Lots 7-10. DMA 9 drains to self-retaining area DMA 7.

DMA 10: Impervious area includes 2,558 square feet of roof for the rear half of Lots 1-6. DMA 10 drains to self-retaining area DMA 7.

## Self-Retaining Areas

DMA 7: DMA 7 is 7,981 square feet of pervious landscaped area that is designed to retain the first 1" of runoff.

## Self-Treating Areas

DMA 11: DMA 11 is 4,614 square feet of undeveloped pervious area that drains off-site per current conditions.

DMA 12: DMA 12 is 926 square feet of undeveloped pervious area that drains off-site per current conditions.



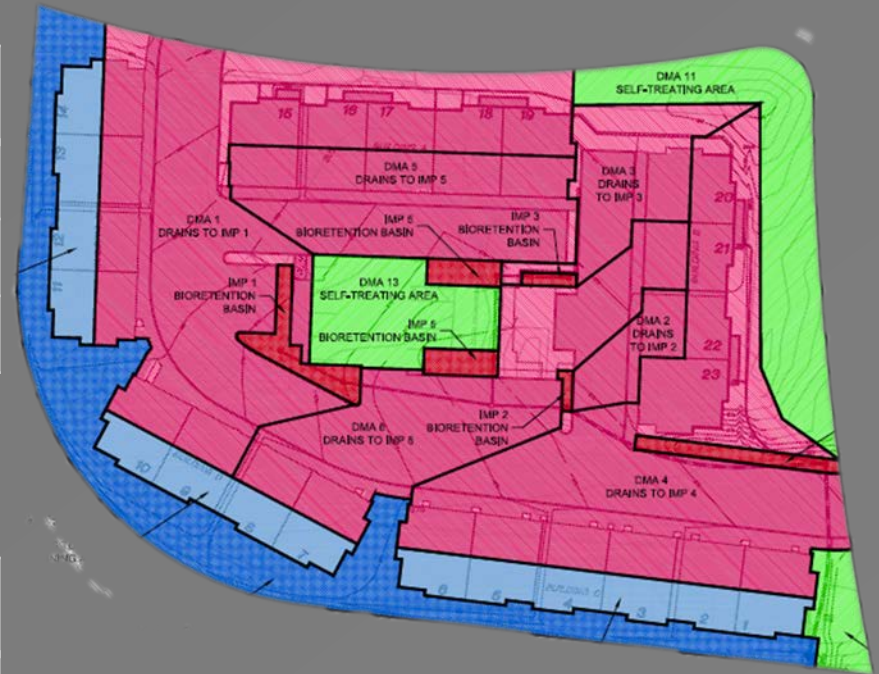
# Tabulation and Calculations

## ■ Self-treating areas

DMA Name	Square Feet
DMA 13	2570
DMA 11	4614
DMA 12	926

## ■ Self-retaining areas\*

DMA Name	Square Feet
DMA 7	7918

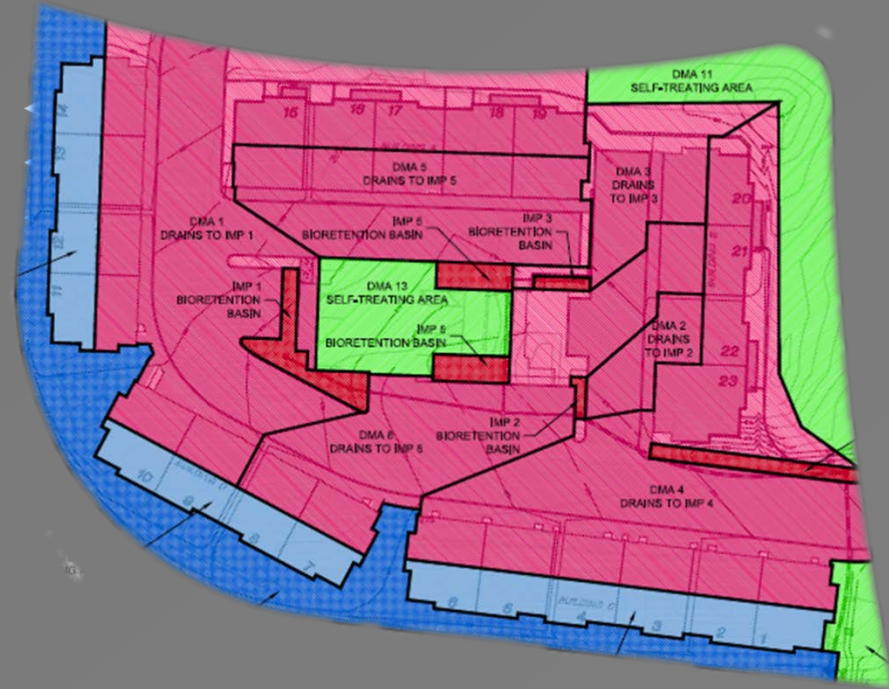


\*Include green roofs and areas draining to harvest and reuse facilities

DRAINAGE

# Tabulation and Calculations

- Areas draining to self-retaining areas

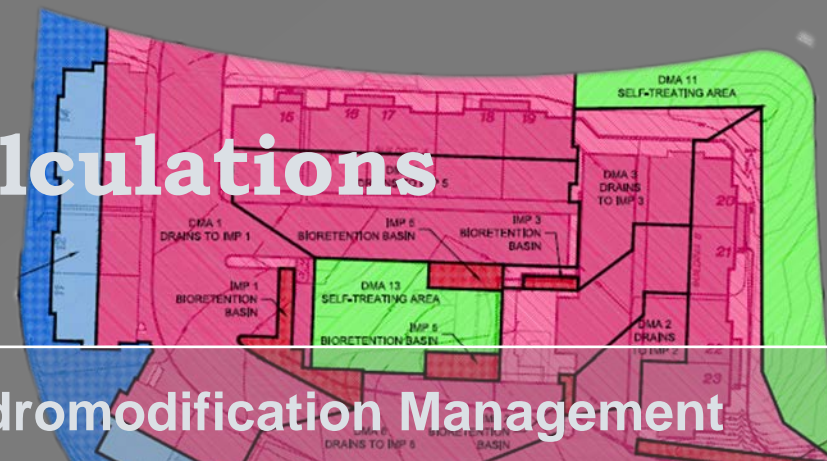


IMAGE

DMA	Square Feet	Surface	Runoff Factor	Product	Receiving DMA	Receiving DMA Area	Ratio
8	1822	Roof	1.0	1822	DMA-7	7981	
9	1712	Roof	1.0	1712	DMA-7	7981	
10	2558	Roof	1.0	2588	DMA-7	7981	
Σ				6092		7981	0.76



# Tabulation and Calculations

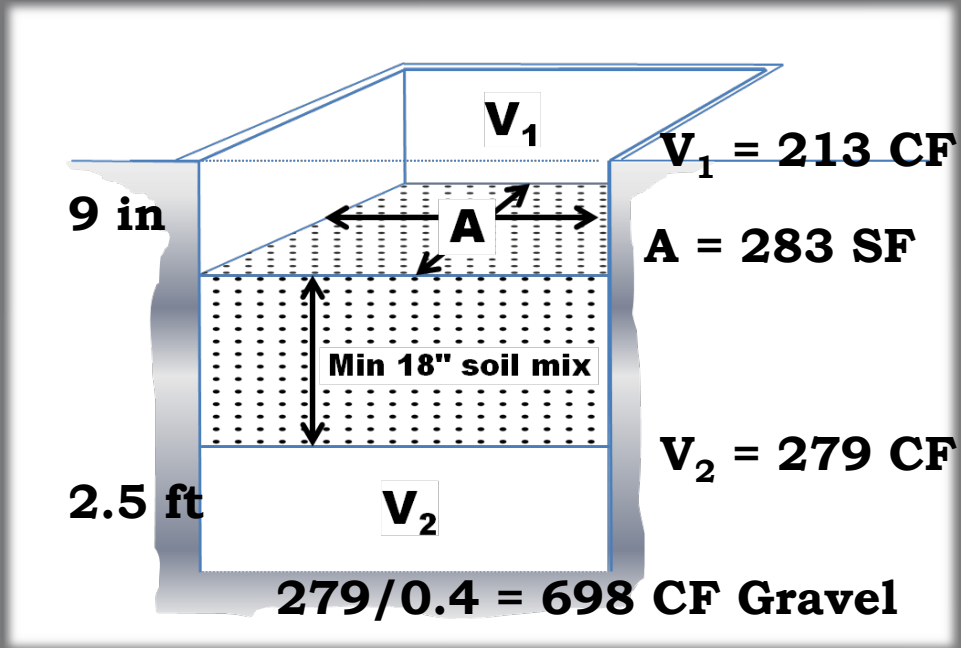


## Example: IMP 5 Calculation with Hydromodification Management

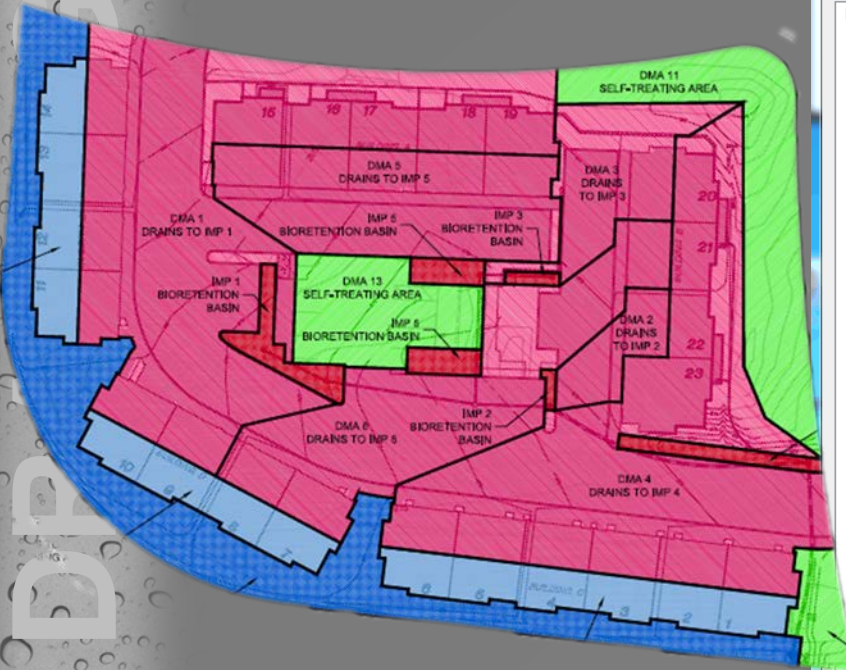
DMA	Area	Surface	Runoff Factor	Area × Runoff Factor	Soil Type				
5	2145	Roof	1.0	2145	D				
5	2265	Pave	1.0	2265					
5	946	LS	0.7	662					
					IMP Sizing Factor	Rain Adjust Factor	Min Area or Volume	Proposed Area or Volume	
				A	0.05	1.0	254	283	
				V1	0.042	1.0	213		
				V2	0.055	1.0	279		
				Orifice Size:					

# Sizing Bioretention Layer Depths

DRAINAGE



# Using the IMP Calculator



Integrated Management Practice Calculator

File Tools Help

Project Information

All of the project information is required. Please fill in all of the information before editing the DMAs and IMPs.

Project Name  Design Goal  
 Treatment Plus Flow Control  
 Treatment Only

Location

APN

Total Area  sq ft Mean Annual Precip  in

Drainage Management Areas (DMAs) Integrated Management Practices (IMPs) Calculation Warnings Summary Report

Total Area (Calculated)  sq. ft.  
Drainage Management Areas  sq. ft.  
Integrated Management Practices  sq. ft.  
Total  sq. ft.

## IMP Name: IMP6 (Soil Type: D)

IMP Type: Bioretention Facility

Soil Type: D

DMA Name	DMA Area (sq ft)	Post-Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing				
					IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume	
DMA6-ROOF	1,355	Conventional Roof	1.00	1,355					
DMA6-PAV	3,915	Concrete or Asphalt	1.00	3,915					
DMA6-CONC	531	Concrete or Asphalt	1.00	531					
DMA6-LS	946	Landscape	0.10	95					
<b>Total</b>				<b>5,896</b>					
					<b>Area</b>	0.040	1.000	236	285

# Special Projects Reporting

## ■ Narrative: Onsite LID feasibility

- Infiltration, evapotranspiration, harvesting/reuse
- Description of site and DMAs
- Need for pavement where proposed
- Why any landscaped areas can't be bioretention

## ■ Narrative: Offsite LID feasibility

- Owner owns land in same watershed?
- In-lieu program exists?

## ■ Technical Criteria for Non-LID Facilities



## APPENDIX D—STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

**How to use this worksheet (also see instructions on page 28 of the *Stormwater C.3 Guidebook*):**

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your Stormwater Control Plan drawings.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in a table in your Stormwater Control Plan. Use the format shown in Table 3-1 on page 27 of the *Guidebook*. Describe your specific BMPs in an accompanying narrative. Note any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR STORMWATER CONTROL PLAN SHOULD INCLUDE THESE SOURCE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on Stormwater Control Plan Drawings	3 Permanent Controls—List in Stormwater Control Plan Table and Narrative	4 Operational Controls—List in Stormwater Control Plan
<input type="checkbox"/> <b>A.</b> On-site storm drain inlets	<input type="checkbox"/> Locations of inlets.	<input type="checkbox"/> Mark all inlets with the words “No Dumping! Flows to Bay” or similar.	<input type="checkbox"/> Maintain and replace inlets. <input type="checkbox"/> Provide stormwater prevention measures to property owners, lessees, and tenants. <input type="checkbox"/> See applicable Fact Sheet for Stormwater Maintenance at <a href="http://www.cabq.gov">www.cabq.gov</a> . <input type="checkbox"/> Include the agreement with anyone to store storm drain materials.

## VI. Source Control Measures

The townhomes will create few potential sources of stormwater pollutants. Sources to be controlled include:

- Potential dumping of wash-water or other liquids into storm drains inlets.
- Need for future indoor or structural pest control.
- Fertilizers and pesticides used in community square, garden, and yard maintenance.
- Fire sprinkler test water
- Miscellaneous drain or wash water
- Refuse will be handled by individual trash cans for each homeowner. Each homeowner will be required to store their cans in a covered area.
- A central plaza will be publicly used including for food preparation.

### Sources and Source Control IMPs

Table 2

Potential Source	Permanent Controls (BMPs)	Operational Controls (BMPs)
On-site dumping into storm drain inlets	All accessible on-site inlets will be marked with the words "No Dumping! Flows to Creek"	Markings will be periodically repainted or replaced.  Inlets and pipes conveying stormwater to BMPs will be

# Stormwater Facility Maintenance

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- Ownership and responsibility
  - Commitment to execute agreements
  - Accept O&M until formally transferred
- Maintenance requirements
  - Fact sheets on website

# Construction C.3 Checklist

## IX. Construction Plan C.3 Checklist

Table 3

Stormwater Control Plan Reference	IMP Description	Plan Sheet Number
Section III	Runoff from DMA 1 is directed to IMP 1	
Section III	Runoff from DMA 2 is directed to IMP 2	
Section III	Runoff from DMA 3 is directed to IMP 3	
Section III	Runoff from DMA 4 is directed to IMP 4	
Section III	Runoff from DMA 5 is directed to IMP 5	
Section III	Runoff from DMA 6 is directed to IMP 6	
Section III	Runoff from DMA 8 is directed to DMA 7	
Section III	Runoff from DMA 9 is directed to DMA 7	
Section III	Runoff from DMA 10 is directed to DMA 7	
	Various landscaping and non-treatment planters will be located around the site.	
	On-site drain inlets to be marked with "no dumping" message.	
	Plant selection to minimize irrigation, minimize use of fertilizers and pesticides, and for pest resistance.	



# Certification

- “The selection, size, and preliminary design of treatment BMPs and other control measures in this plan meet the requirements of Regional Water Quality Board Order R2-2009-0074.”