

# Tips for Preparing/Reviewing Storm Water Control Plans (SWCP)

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EOA, Inc.

Santa Clara Valley Urban Runoff  
Pollution Prevention Program

June 13, 2017

# Presentation Outline

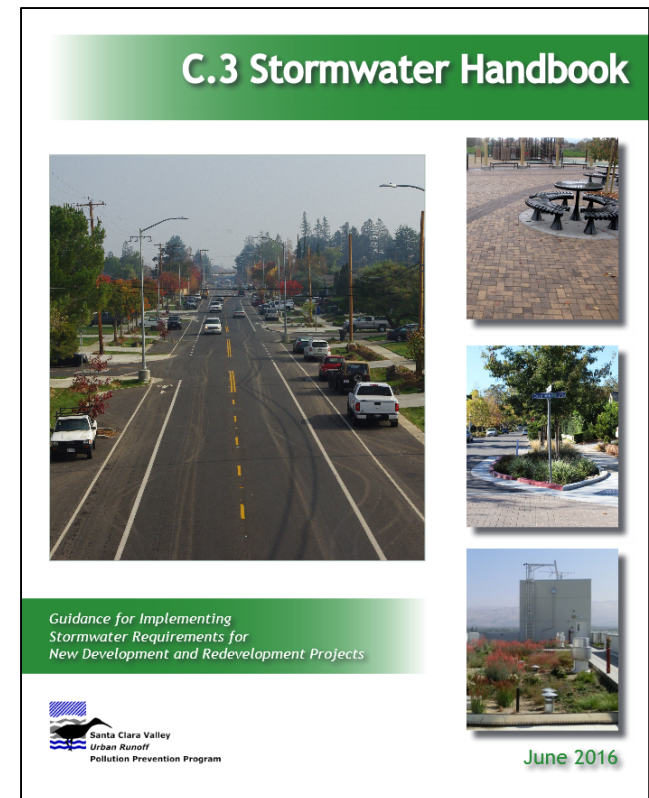
- Important Resources
- SWCP Components
- C3 Data Form
- Reporting Impervious Areas
- Site Design and Source Control Measures
- Drainage Management Areas
- Treatment Measure Details
- Plant List, Soil Mix Requirements
- Maintenance Plan

# Important Resources

- 2016 SCVURPPP C3 Handbook
  - Describes all components of SWCP
  - Used by all SCVURPPP agencies
- SCVURPPP Website
  - [www.SCVURPPP.org](http://www.SCVURPPP.org)
    - All C.3 products posted here
    - What's New – C3 Handbook
    - Quick Links – Low Impact Development webpage

# 2016 SCVURPPP C3 Handbook

- Main updates
  - Design guidance
  - Biotreatment soil specs – Appendix C
  - Plant list – Appendix D
  - Deleted LID Infeasibility worksheets (App. I)
  - Pervious pavement design details and specifications

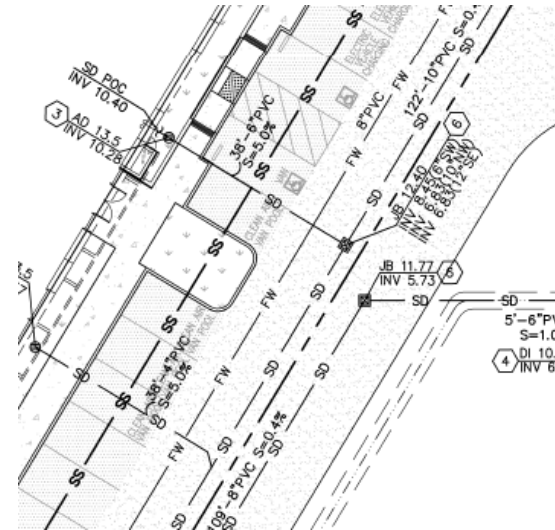


# SWCP Components

- For MRP compliance, must include:
  - C3 Data Form
  - Special Projects worksheet, if applicable
  - Stormwater treatment plan sheets
    - Location of site design measures
    - Drainage Management Areas
    - Location of treatment measures
    - Runoff flow lines and entry points


# SWCP Components (Continued)

- Must include, continued:
  - Sizing calculations
  - DMA summary table
  - Stormwater treatment measure details
- Good to have
  - Grading plan sheets
  - Utility plan sheets
  - Landscape plan



# C3 Data Form

- Critical part of the SWCP Submittal
- Used to fill out the Annual Report which is submitted to the Water Board
- Applicants must complete all fields on the C3 Data Form



Santa Clara Valley  
Urban Runoff  
Pollution Prevention Program

PROVISION C.3 DATA FORM

**Which Projects Must Comply with Stormwater Requirements?**  
All projects that create and/or replace 10,000 sq. ft. or more of impervious surface on the project site must fill out this worksheet and submit it with the development project application.  
All restaurants, auto service facilities, retail gasoline outlets, and uncovered parking lot projects (stand-alone or part of another development project, including the top uncovered portion of parking structures) that create and/or replace 5,000 sq. ft. or more of impervious surface on the project site must also fill out this worksheet.  
Interior remodeling projects, routine maintenance or repair projects such as re-roofing and re-paving, and single family homes that are not part of a larger plan of development are NOT required to complete this worksheet.

**What is an Impervious Surface?**  
An impervious surface is a surface covering or pavement that prevents the land's natural ability to absorb and infiltrate rainfall/stormwater. Impervious surfaces include, but are not limited to rooftops, walkways, paved patios, driveways, parking lots, storage areas, impervious concrete and asphalt, and any other continuous watertight pavement or covering. Pervious pavement, underlain with pervious soil or pervious storage material (e.g., drain rock), that infiltrates rainfall at a rate equal to or greater than surrounding unpaved areas OR that stores and infiltrates the water quality design volume specified in Provision C.3.d of the Municipal Regional Stormwater Permit (MRP), is not considered an impervious surface.

**For More Information**  
For more information regarding selection of Best Management Practices for stormwater pollution prevention or stormwater treatment contact: \_\_\_\_\_

1. Project Information  
Project Name: \_\_\_\_\_ APN # \_\_\_\_\_  
Project Address: \_\_\_\_\_  
Cross Streets: \_\_\_\_\_  
Applicant/Developer Name: \_\_\_\_\_  
Project Phase(s): \_\_\_\_\_ of \_\_\_\_\_ Engineer: \_\_\_\_\_  
Project Type (Check all that apply):  New Development  Redevelopment

# C3 Data Form: Common Errors

- Reporting replaced and new impervious area



	Existing Area (ft <sup>2</sup> )	Proposed Area (ft <sup>2</sup> )		Total Post-Project Area (ft <sup>2</sup> )
		Replaced	New	
<b><i>Impervious Area (IA)</i></b>				
Roof	76,600	0	90,000	90,000
Parking	45,200	0	40,000	40,000
Sidewalks & streets	102,800	0	94,600	94,600
Total IA	224,600	0	224,600	224,600
Total new and replaced IA		224,600		

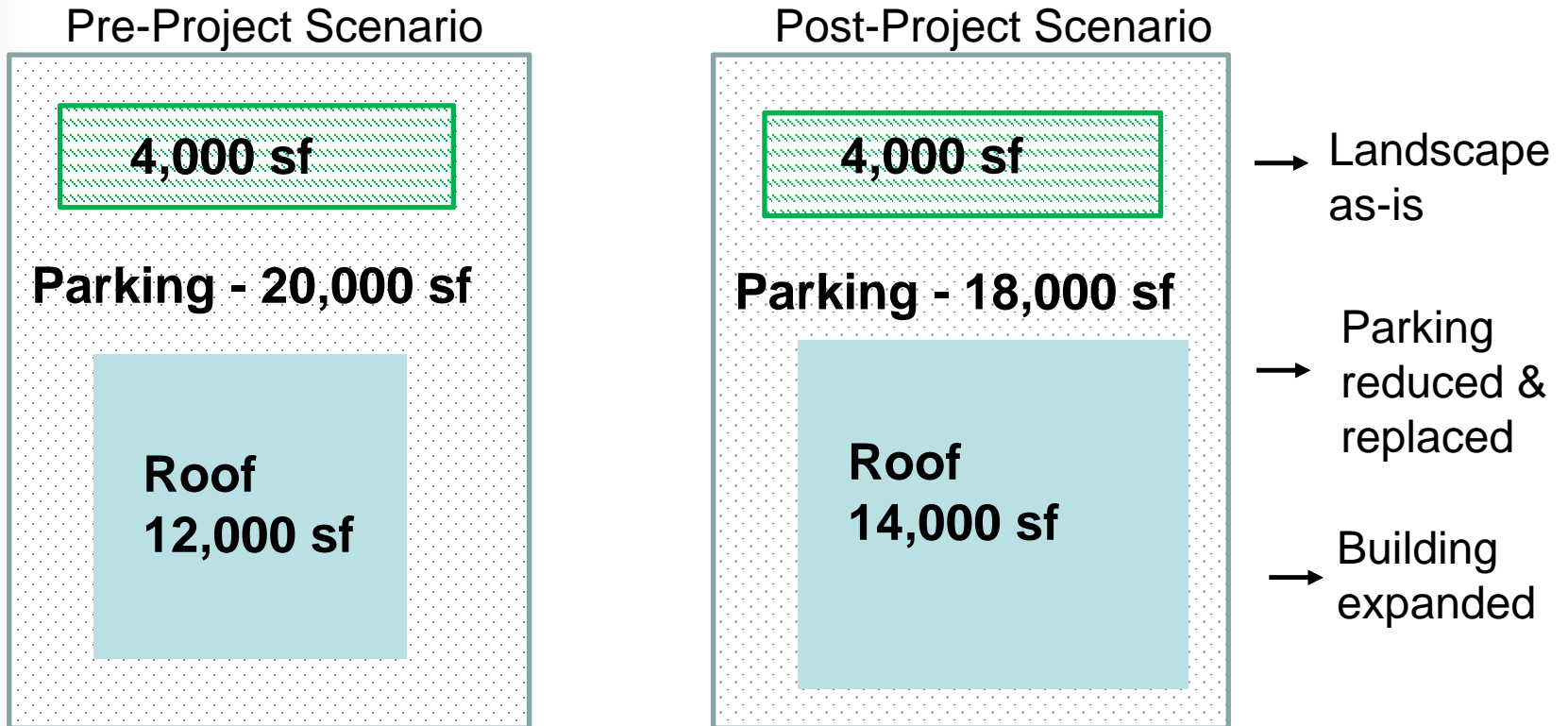
# C3 Data Form: Common Errors

- Reporting replaced and new impervious area



	Existing Area (ft <sup>2</sup> )	Proposed Area (ft <sup>2</sup> )		Total Post-Project Area (ft <sup>2</sup> )
		Replaced	New	
<b><i>Impervious Area (IA)</i></b>				
Roof	76,600	90,000	0	90,000
Parking	45,200	40,000	0	40,000
Sidewalks & streets	102,800	94,600	0	94,600
Total IA	224,600	224,600	0	224,600
Total new and replaced IA		224,600		

# Reporting Impervious Areas (IA)



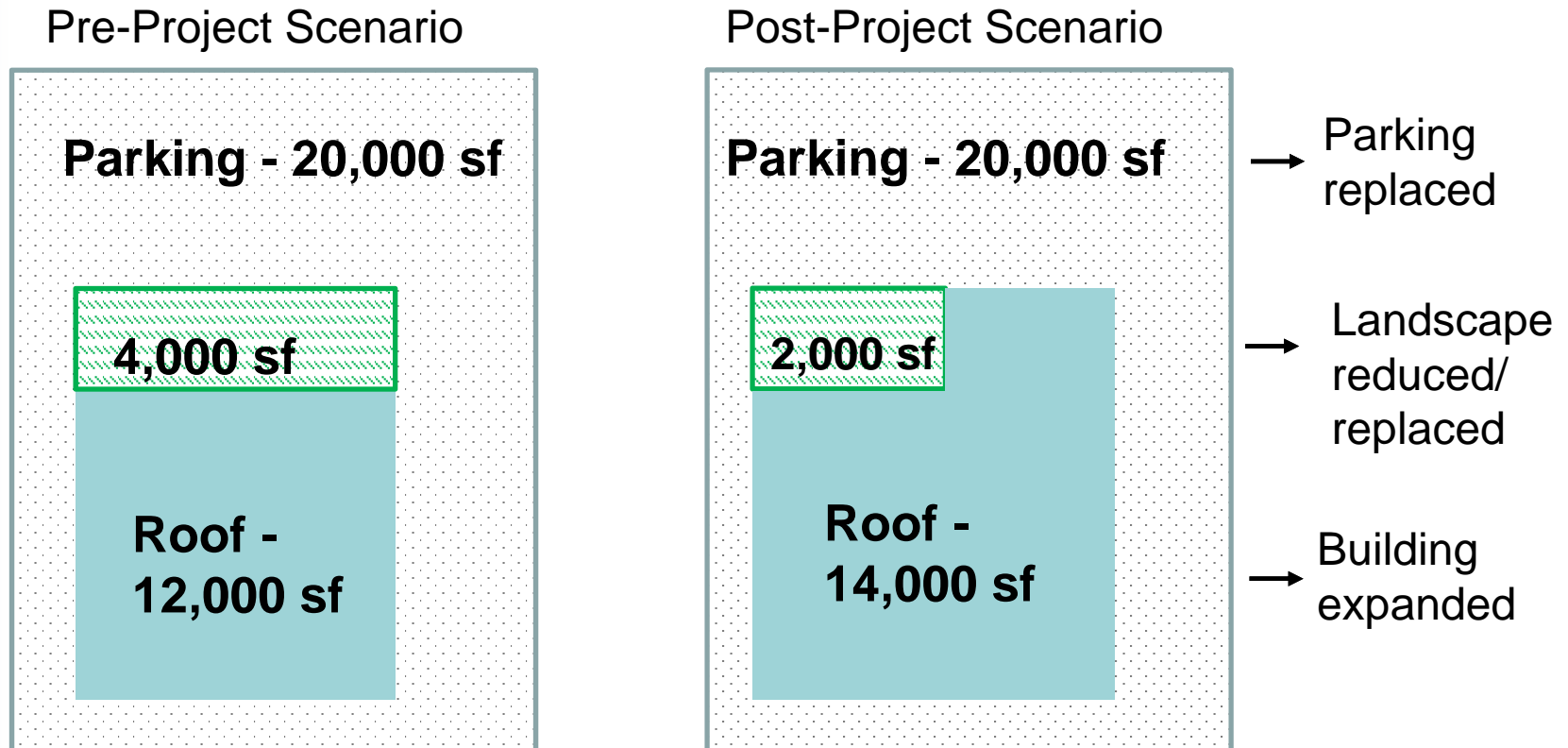
Pre-project IA - 32,000 sf  
Post-project IA - 32,000 sf  
Replaced IA - 32,000 sf  
New - 0 sf

# Reporting Impervious Areas (IA)

	Existing Area (ft <sup>2</sup> )	Proposed Area (ft <sup>2</sup> )		Total Post-Project Area (ft <sup>2</sup> )
		Replaced	New	
<b><i>Impervious Area (IA)</i></b>				
Roof	12,000	14,000	0	14,000
Parking	20,000	18,000	0	18,000
Total IA	32,000	32,000	0	32,000
Total new and replaced IA		32,000		
<b><i>Pervious Area (PA)</i></b>				
Landscaping	4,000	0	0	4,000
Total PA	4,000	0	0	4,000

Percent Replacement= (Replaced Total IA/Existing Total IA)\*100 =  
 $32,000/32,000*100 = 100\%$

# Reporting Impervious Areas



Pre-project IA - 32,000 sf  
Post-project IA - 34,000 sf  
Replaced IA - 32,000 sf  
New IA - 2,000 sf

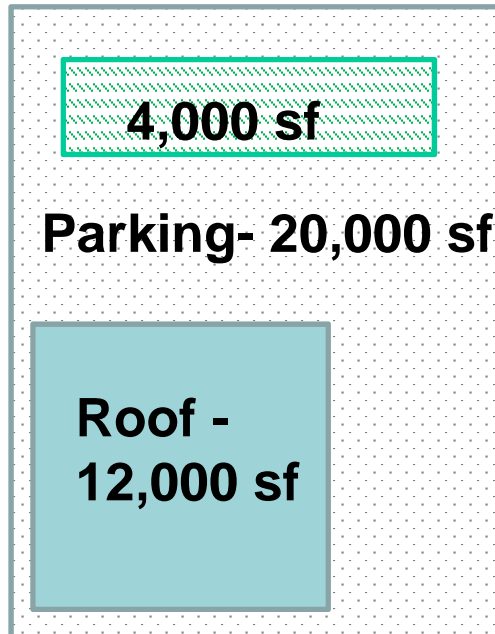
# Reporting Impervious Areas (IA)

	Existing Area (ft <sup>2</sup> )	Proposed Area (ft <sup>2</sup> )		Total Post-Project Area (ft <sup>2</sup> )
		Replaced	New	
<b><i>Impervious Area (IA)</i></b>				
Roof	12,000	12,000	2,000	14,000
Parking	20,000	20,000	0	18,000
Total IA	32,000	32,000	2,000	34,000
Total new and replaced IA		34,000		
<b><i>Pervious Area (PA)</i></b>				
Landscaping	4,000	2,000	0	2,000
Total PA	4,000	2,000	0	2,000

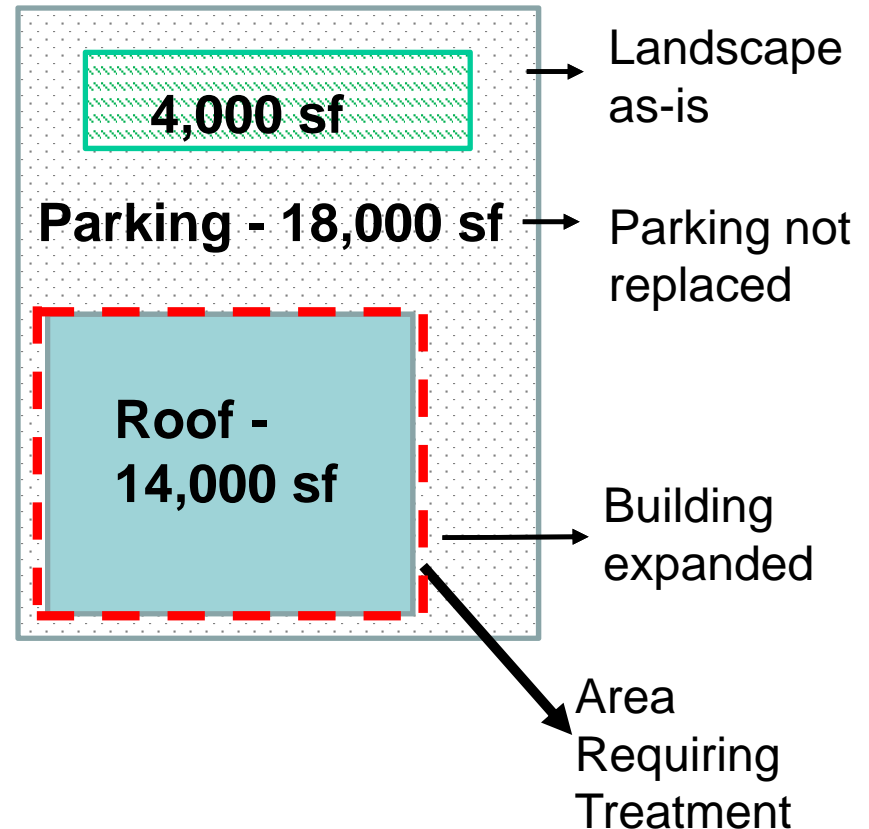
Percent Replacement= (Replaced Total IA/Existing Total IA)\*100 =  
 $32,000/32,000*100 = 100\%$

# Reporting Impervious Areas

Pre-Project Scenario



Post-Project Scenario



Pre-project IA - 32,000 sf

Post-project IA - 32,000 sf

Replaced IA - 14,000 sf

Percent replaced –  $14,000/32,000 = 43.75\%$

New IA – 0 sf; Existing IA retained – 18,000 sf

# Reporting Impervious Areas (IA)

	Existing Area (ft <sup>2</sup> )	Proposed Area (ft <sup>2</sup> )		Total Post-Project Area (ft <sup>2</sup> )
		Replaced	New	
<b><i>Impervious Area (IA)</i></b>				
Roof	12,000	14,000	0	14,000
Parking	20,000	0	0	18,000
Total IA	32,000	14,000	0	32,000
Total new and replaced IA		14,000		
<b><i>Pervious Area (PA)</i></b>				
Landscaping	4,000	0	0	4,000
Total PA	4,000	0	0	4,000

Percent Replacement= (Replaced Total IA/Existing Total IA)\*100 =  
 $14,000/32,000*100 = 43.75\%$

# C3 Data Form: Common Errors

- C3 data form not updated as plan sheets are updated

_____ acre	
Area (ft <sup>2</sup> )	Total Post-Project Area (ft <sup>2</sup> )
New	
0	191,320
23,980	65,910
(Replaced Total Impervious Area ÷ _____ %	

## BMP Volume Calculations - CASQA BMP Handboc

Drainage Area ID	Area (SF)	Imperv Area (SF)	% Imperv
H1	191,340	156,412	82%
H2	59,930	47,944	80%
H3	5,960	0	0%
<b>Total</b>	<b>257,230</b>	<b>205,784</b>	<b>80%</b>

# C3 Data Form: Common Errors

- Incorrect totals

## 2. Project Size -

<b>a. Total Site Area:</b> 5.51 acre	<b>b. Total Site Area Disturbed:</b> 5.01 acre (including clearing, grading, or excavating)			
	<b>Existing Area (ft<sup>2</sup>)</b>	<b>Proposed Area (ft<sup>2</sup>)</b>		<b>Total Post-Project Area (ft<sup>2</sup>)</b>
		<b>Replaced</b>	<b>New</b>	
<i>Impervious Area</i>				
Roof				
Parking				
Sidewalks and Streets				
<b>c. Total Impervious Area</b>	199,500	187,720	0	187,720
<b>d. Total new and replaced impervious area</b>		187,720		
<i>Pervious Area</i>				
Landscaping				
Pervious Paving				
Other (e.g. Green Roof)				
<b>e. Total Pervious Area</b>	36,000	36,000	16,300	52,300
<b>f. Percent Replacement of Impervious Area in Redevelopment Projects</b> (Replaced Total Impervious Area ÷ Existing Total Impervious Area) x 100% = 94.1 %				

235,500 sf

240,020 sf

# Special Projects Worksheet

- Provide supporting documentation for project characteristics identified
  - Gross density credit calculation
    - Dwelling Units per acre (DU/ac)
    - Floor Area Ratio (FAR)
  - Location credit – include map showing distance to transit station
  - Parking credit – show that surface parking is <10 % of total post-project impervious area
- Provide LID Feasibility narrative

# Selecting Site Design and Source Control Measures

- List of measures provided on C3 Data form
- Select measures that apply to your project
- Indicate/explain measures on plan sheets or SWCP narrative

## Site Design Measures

- Minimize land disturbed
- Minimize impervious surfaces
- Minimum-impact street or parking lot design
- Cluster structures/pavement
- Disconnected downspouts
- Pervious pavement
- Green roof
- Microdetention in landscape
- Other self-treating area
- Self-retaining area
- Rainwater harvesting and use (e.g., rain barrel, cistern connected to roof drains)<sup>1</sup>
- Preserved open space: \_\_\_\_\_ ac. or sq. ft.  
(circle one)
- Protected riparian and wetland areas/buffers (Setback from top of bank: \_\_\_\_\_ ft.)
- Other \_\_\_\_\_

## Source Control Measures

- Alternative building materials
- Wash area/racks, drain to sanitary sewer<sup>2</sup>
- Covered dumpster area, drain to sanitary sewer<sup>2</sup>
- Sanitary sewer connection or accessible cleanout for swimming pool/spa/fountain<sup>2</sup>
- Beneficial landscaping (minimize irrigation, runoff, pesticides and fertilizers; promotes treatment)
- Outdoor material storage protection
- Covers, drains for loading docks, maintenance bays, fueling areas
- Maintenance (pavement sweeping, catch basin cleaning, good housekeeping)
- Storm drain labeling
- Other \_\_\_\_\_

# Site Design Measures

- Minimize land disturbed
- Minimize impervious surfaces
- Minimum-impact street or parking lot design
- Cluster structures/ pavement
- Disconnected downspouts
- Pervious pavement
- Green roof
- Microdetention in landscape
- Other self-treating area
- Self-retaining area
- Rainwater harvesting and use

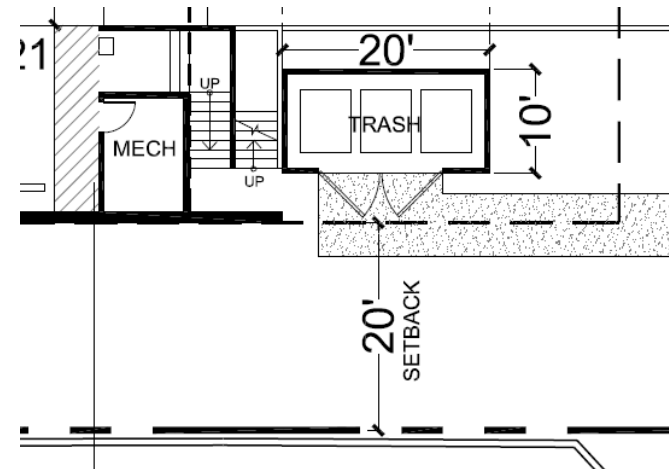
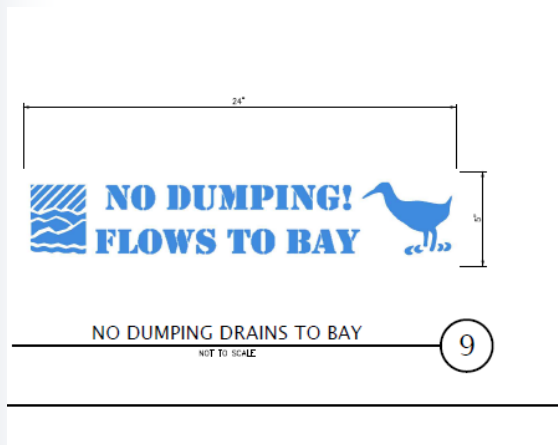
# Source Control Measures

- Alternative building materials
- Wash area/racks, drain to sanitary sewer
- Covered dumpster area, drain to sanitary sewer
- Sanitary sewer connection or accessible cleanout for swimming pool/spa/fountain
- Beneficial landscaping (minimize irrigation, runoff, pesticides and fertilizers; promotes treatment)
- Outdoor material storage protection
- Covers/drains for loading docks, maintenance bays, fueling areas
- Maintenance (pavement sweeping, catch basin cleaning)
- Storm drain labeling

# Showing Source Controls on Plans

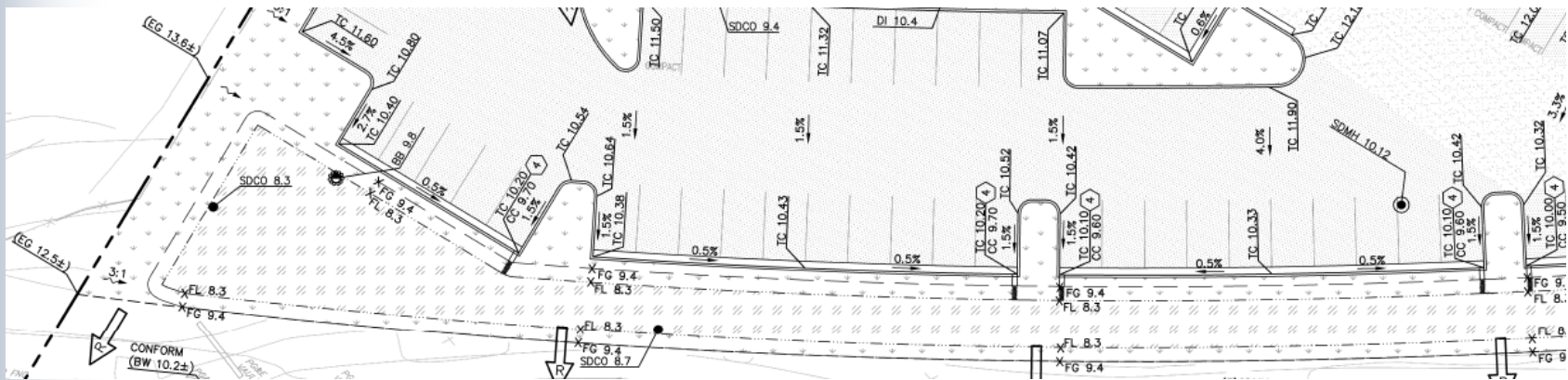
## STORMWATER SOURCE CONTROLS

1. COVERED DUMPSTER AREA CONNECTED TO SANITARY SEWER.
2. BENEFICIAL LANDSCAPING, INCLUDING MINIMIZING IRRIGATION, RUNOFF, SYNTHETIC PESTICIDES, AND QUICK RELEASE FERTILIZER.
3. MAINTENANCE ACTIVITIES, INCLUDING PAVEMENT SWEEPING, CATCH BASIN CLEANING, AND GOOD HOUSEKEEPING.
4. STORM DRAIN LABELING.



# Determining Drainage Management Areas (DMAs)

- Stormwater management should not be an after-thought
- Review site topography/grading
  - Runoff should flow toward the treatment measures



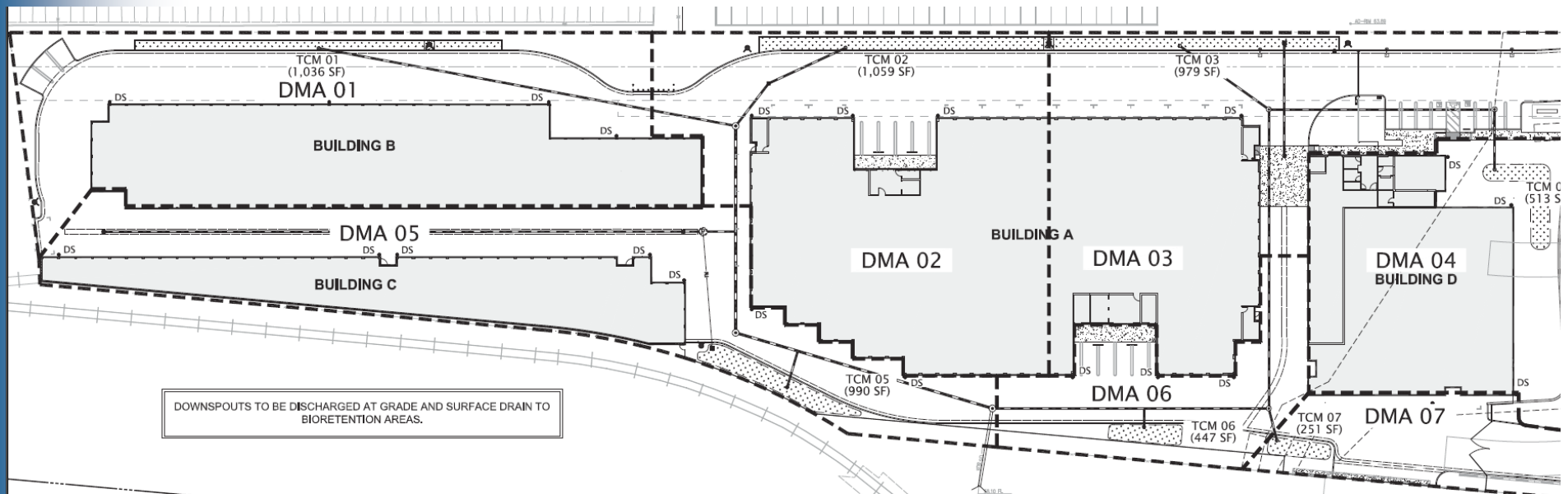
# Determining DMAs

- Design for gravity flow
  - Drainage into and out of the treatment measures should be by gravity flow
- Pumping runoff into treatment measures is strongly discouraged
  - Extra maintenance required
  - Failure during storm events
  - Mosquito problems



# Determining DMAs

- Divide the site into DMAs
- Indicate self-treating areas, self-retaining areas, or treatment measures for all DMAs

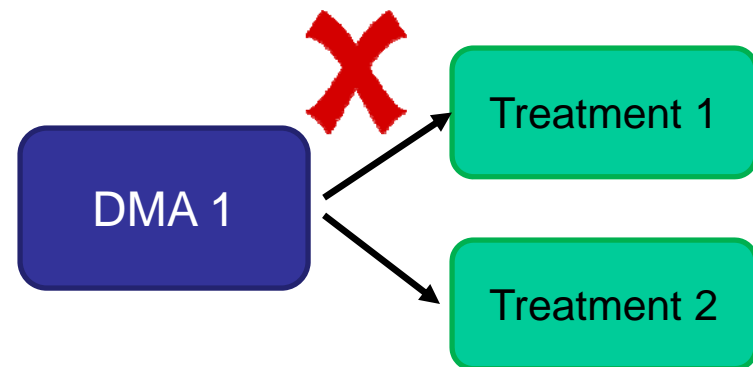
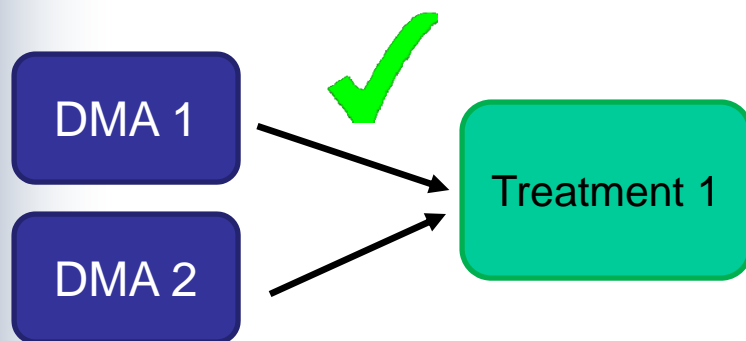


# Determining DMAs

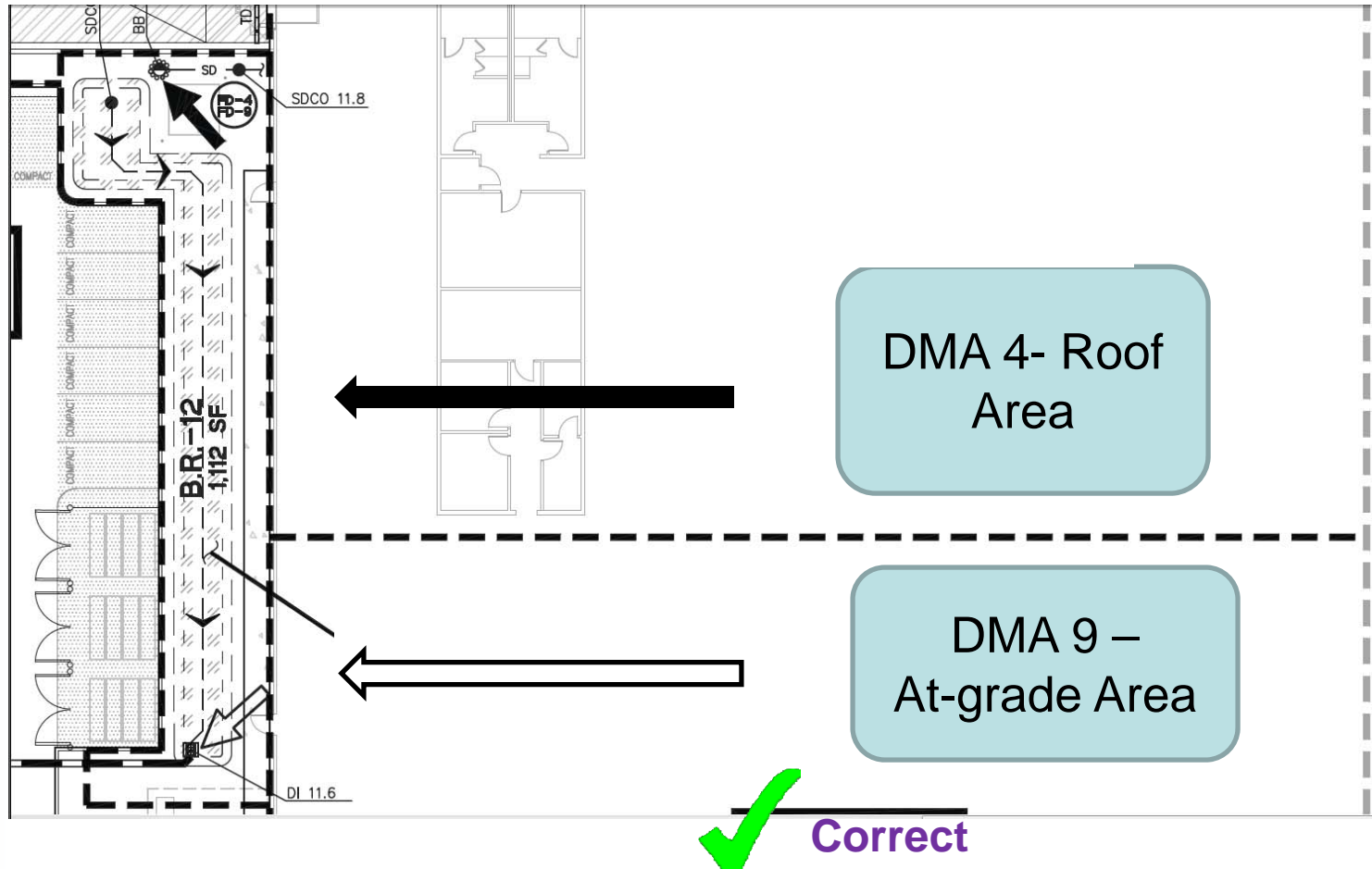
- All impervious areas within the DMA should drain toward the treatment measure or self-retaining area
  - Roofs, driveways, walkways
- Indicate DMAs and treatment measures on plan sheets
- DMAs on the plan sheet should match those on the DMA summary table

# Determining DMAs

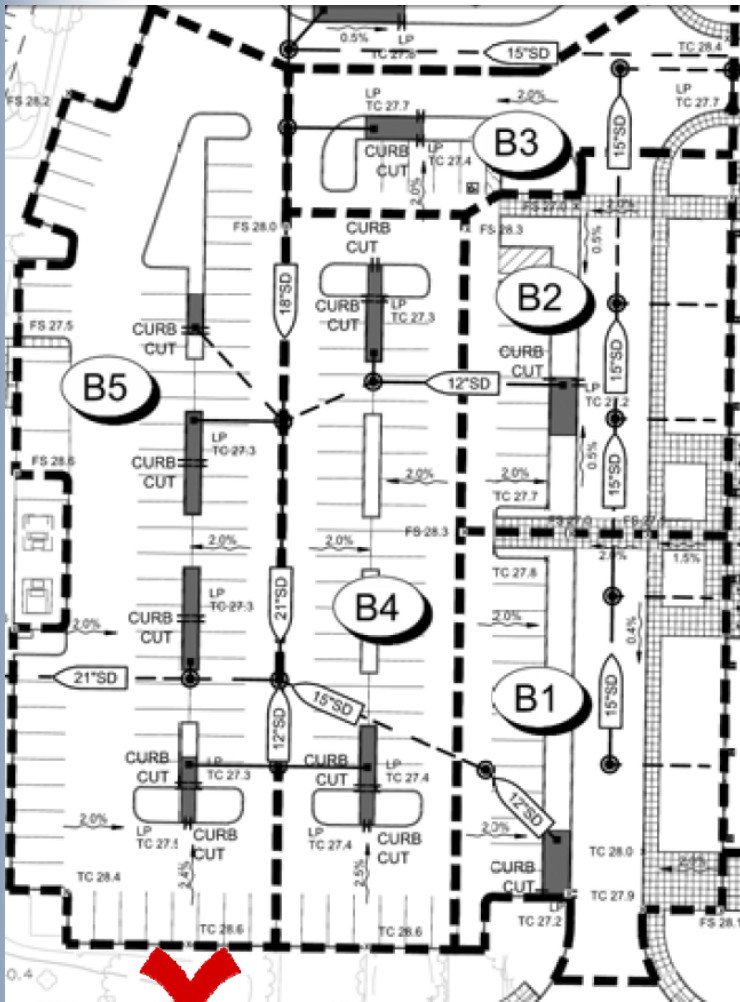
- Multiple DMAs may flow to same treatment measure
  - TM should be sized adequately
  - Flow path should be indicated
- One DMA should not flow to multiple treatment measures



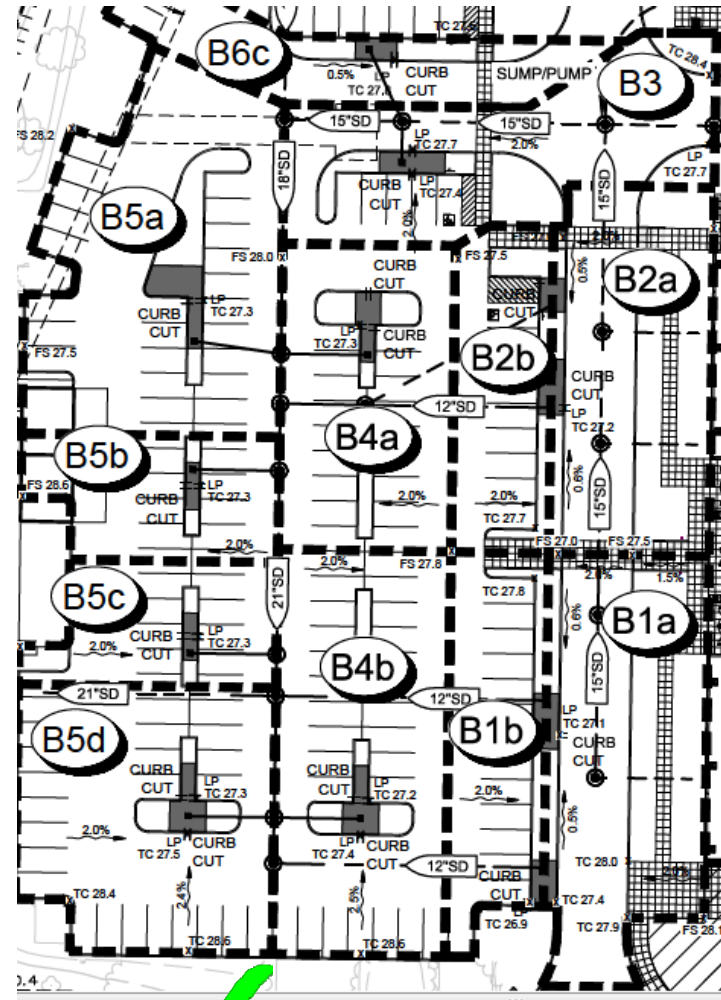
# Multiple DMAs Flowing to Same Treatment Measure



# Each DMA Flowing Into One TM



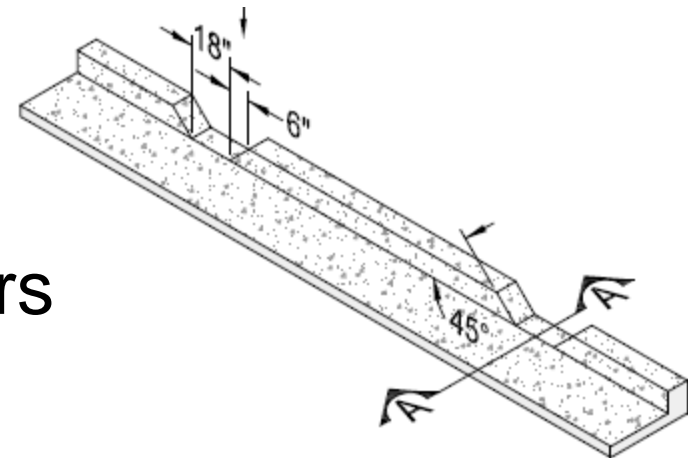
**Incorrect**



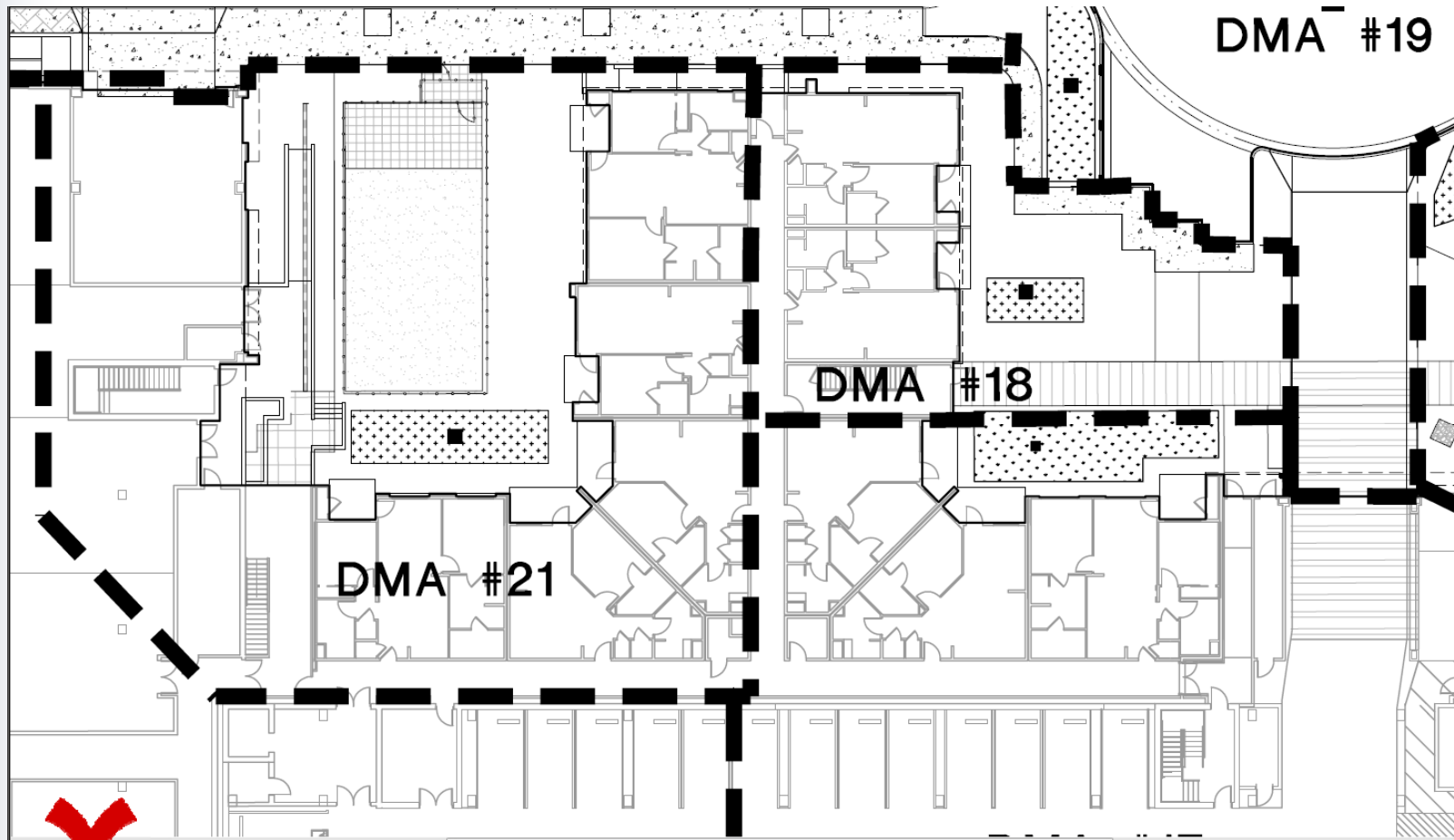
**Correct**

# Indicate Flow Lines and Runoff Entry Points

- Show direction of flow and how runoff enters treatment measures
  - Roof downspouts
  - Area drain inlets
  - Bubblers/pop-up emitters
  - Curb cuts
  - Flush curb

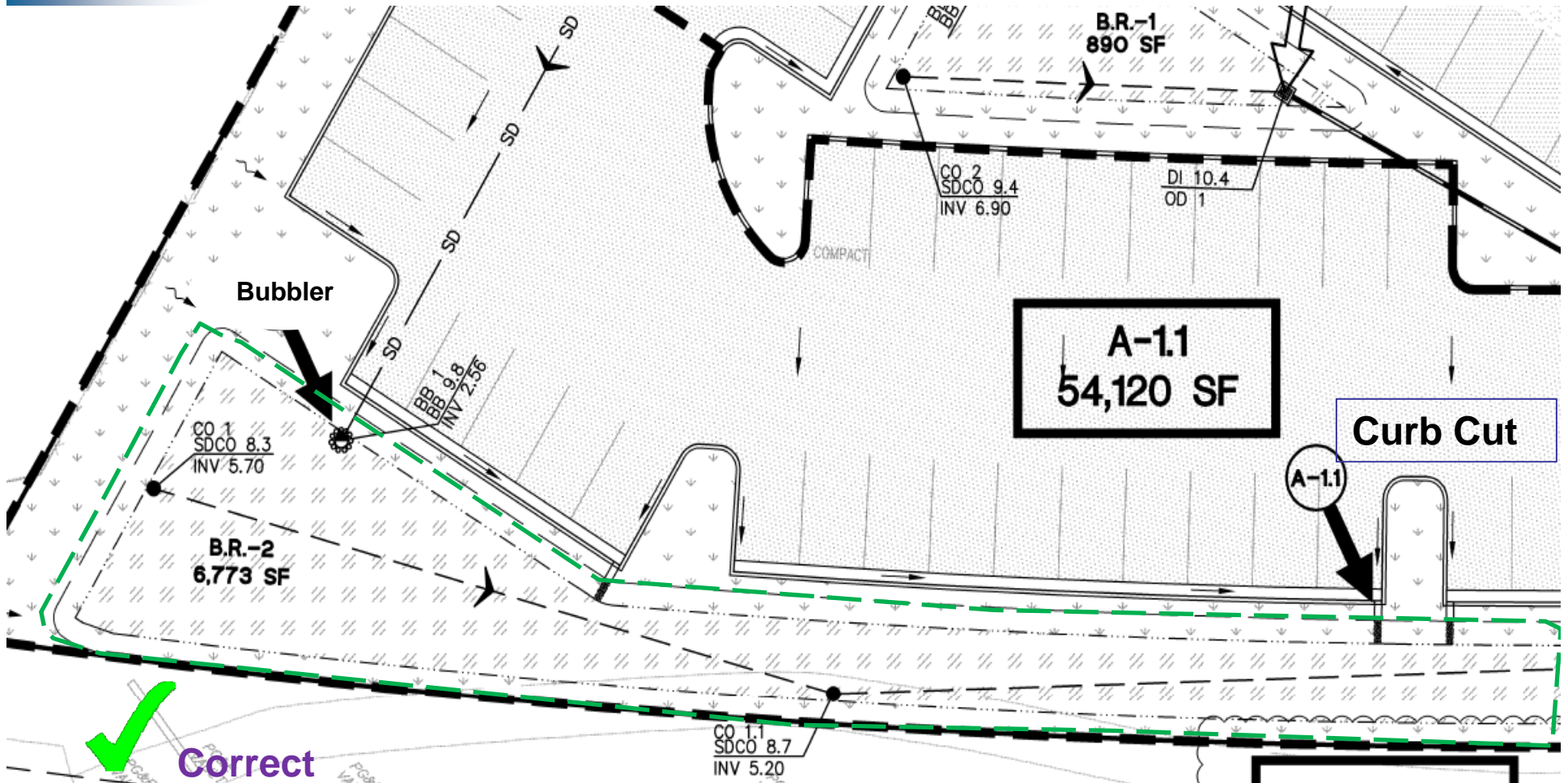


# Indicate Flow Lines and Runoff Entry Points

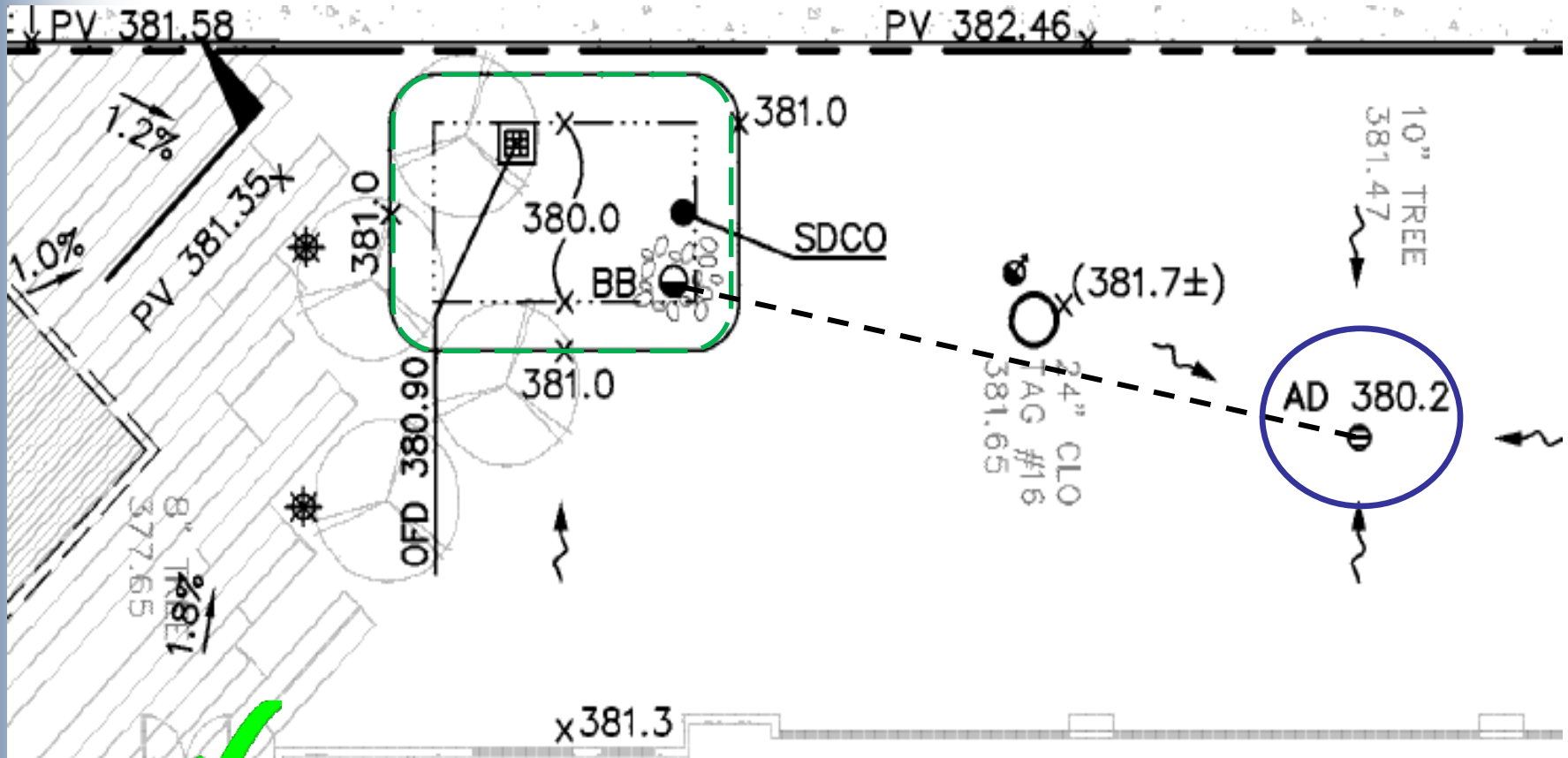


Incorrect

# Indicate Flow Lines and Runoff Entry Points

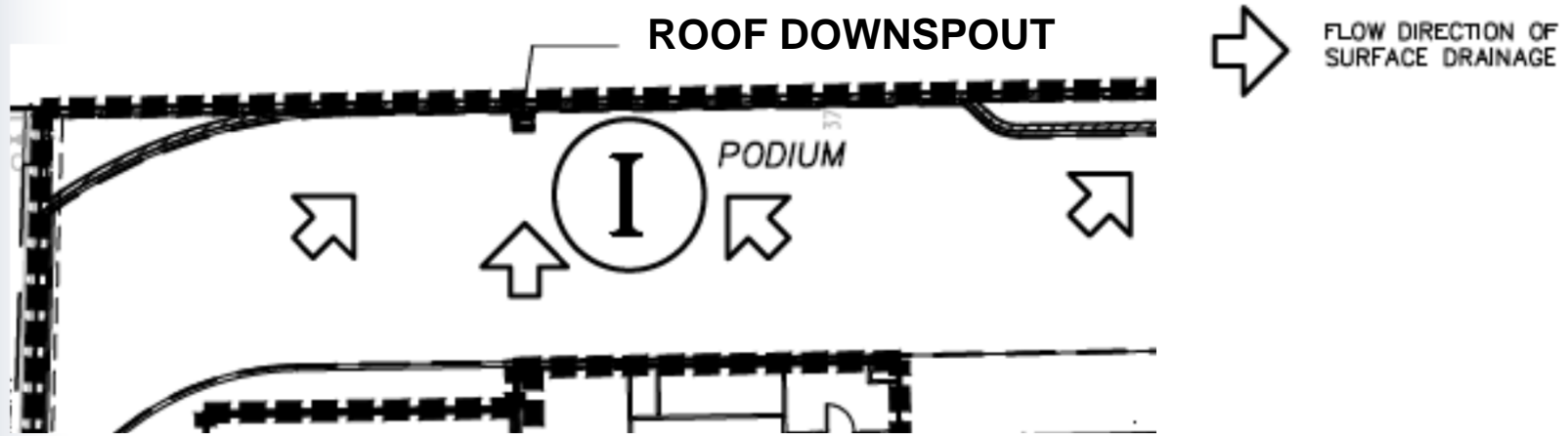


# Indicate Flow Lines and Runoff Entry Points



 **Correct**

# Indicate Flow Lines and Runoff Entry Points

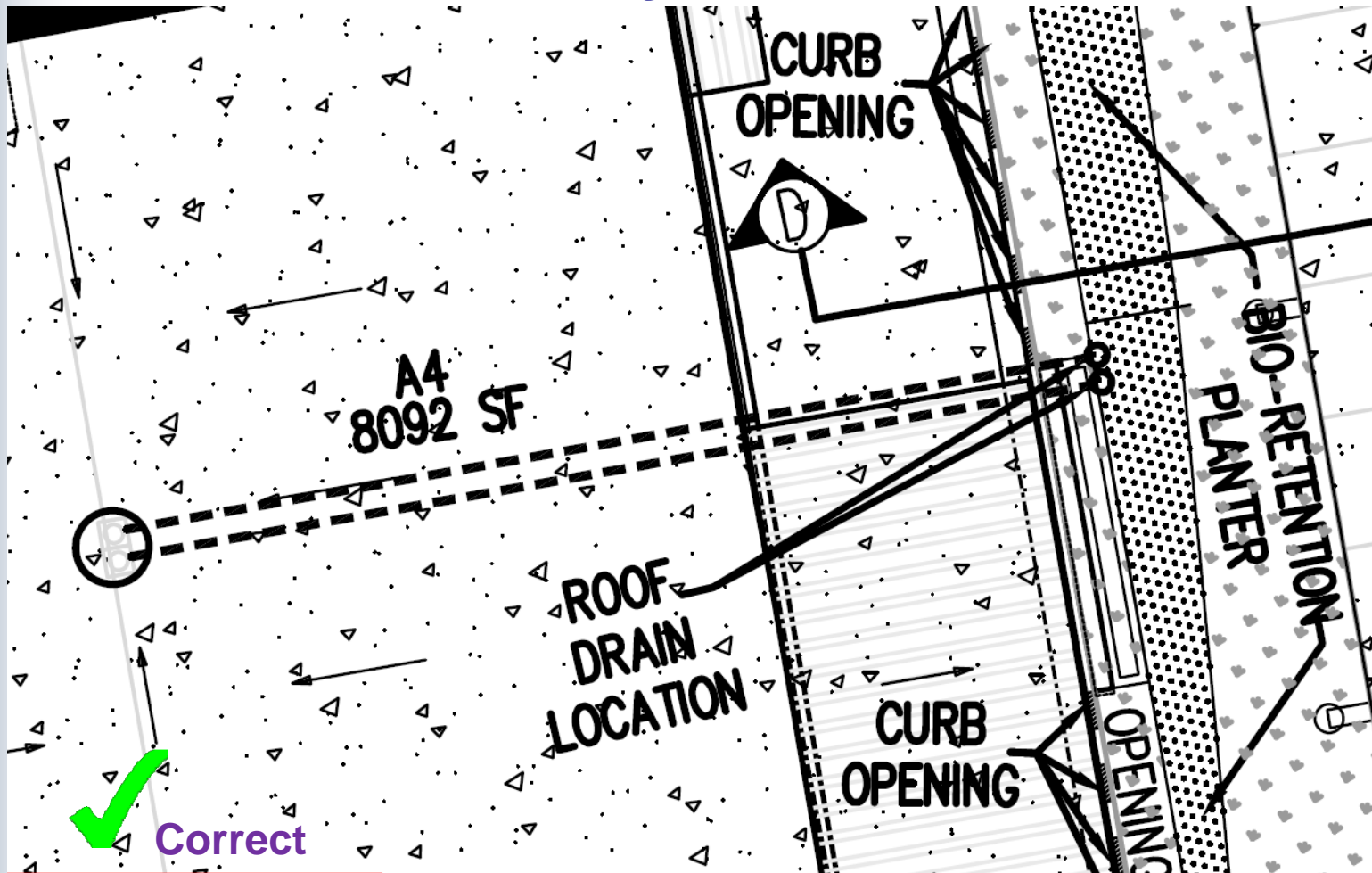


## GENERAL NOTES

1. DOWNSPOUTS ARE TO BE EITHER:
  - 1.1. DISCONNECTED FROM STORM DRAIN PIPE AND HAVE STORMWATER RUNOFF SHEET FLOW TO BIORETENTION AREAS; OR
  - 1.2. HARD PIPED TO BIORETENTION AREAS.



# Indicate Flow Lines and Runoff Entry Points



# Treatment Measure Details

- Review typical detail guidance shown in C3 Handbook
- Submit detail specific to your project

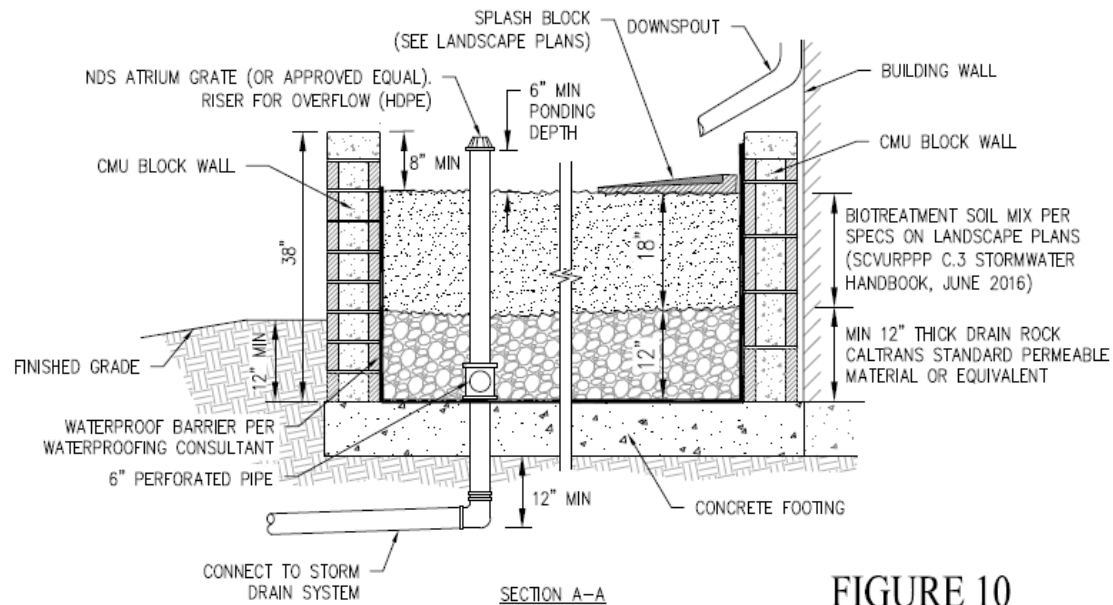
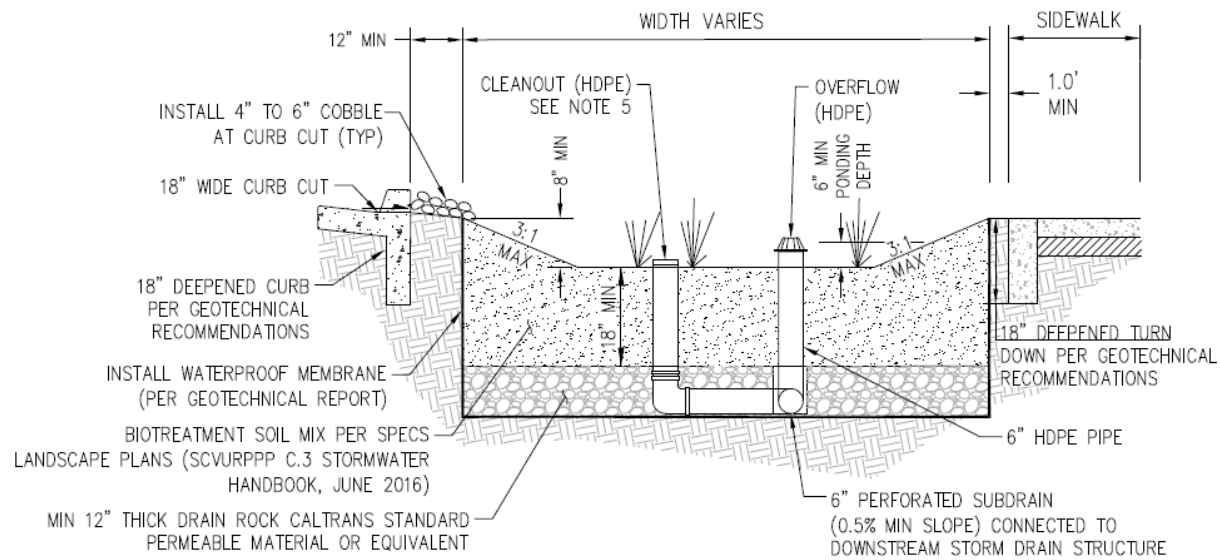


FIGURE 10

# Treatment Measure Details

- Submit multiple views so inlets, outlet and cleanout are visible



BIORETENTION AREA IN LANDSCAPE AREAS

NOT TO SCALE

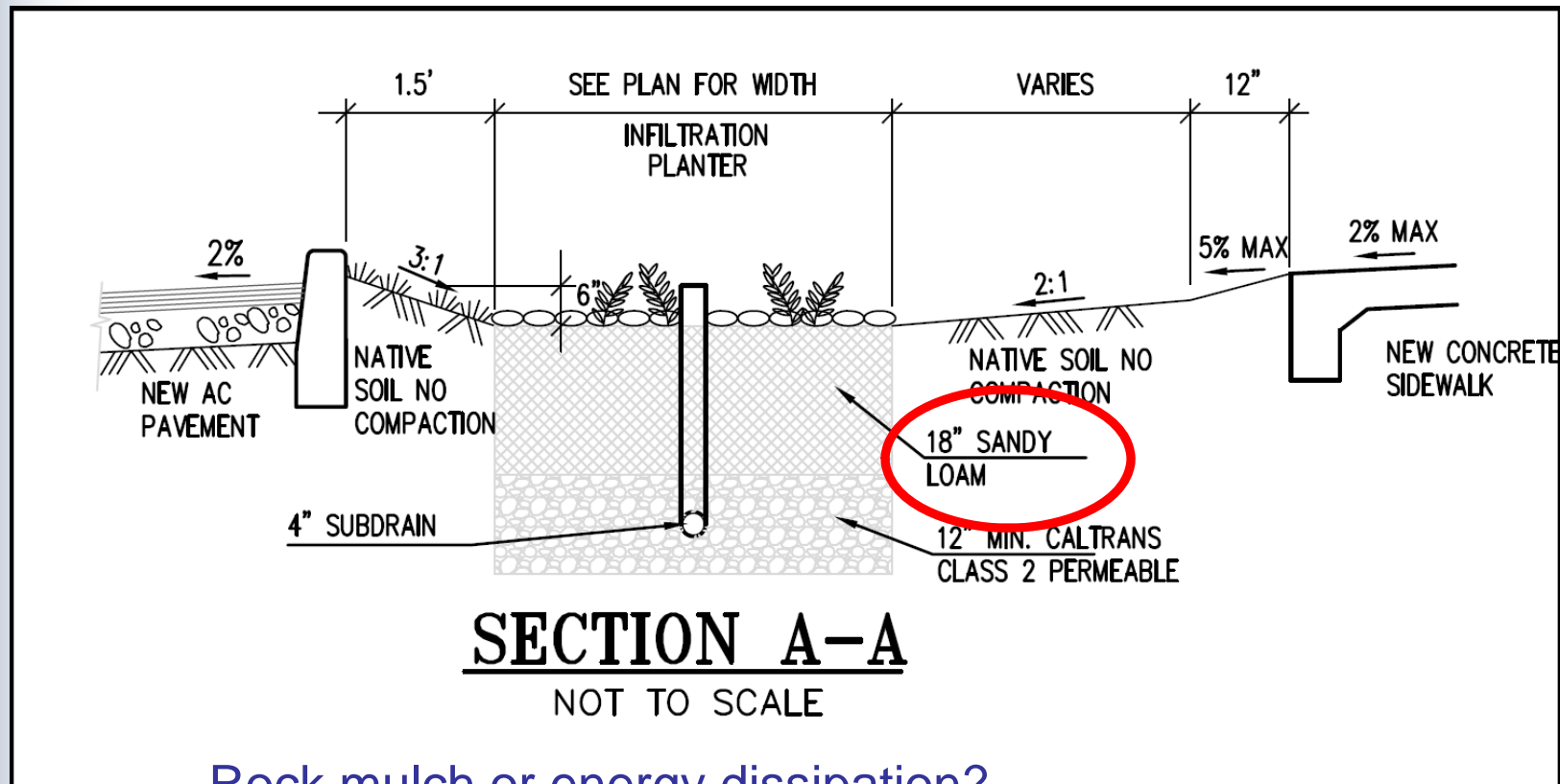
# Treatment Measure Details: Common Errors

- Inlets for runoff not shown
- Overflow inlet not set above ponding depth
- Specific ponding depth not indicated
- Cleanout not shown
- Underdrain placement not correct
- Energy dissipation not shown
- Filter fabric between biotreatment soil and drain rock (never allowed)

# Treatment Measure Details: Common Errors

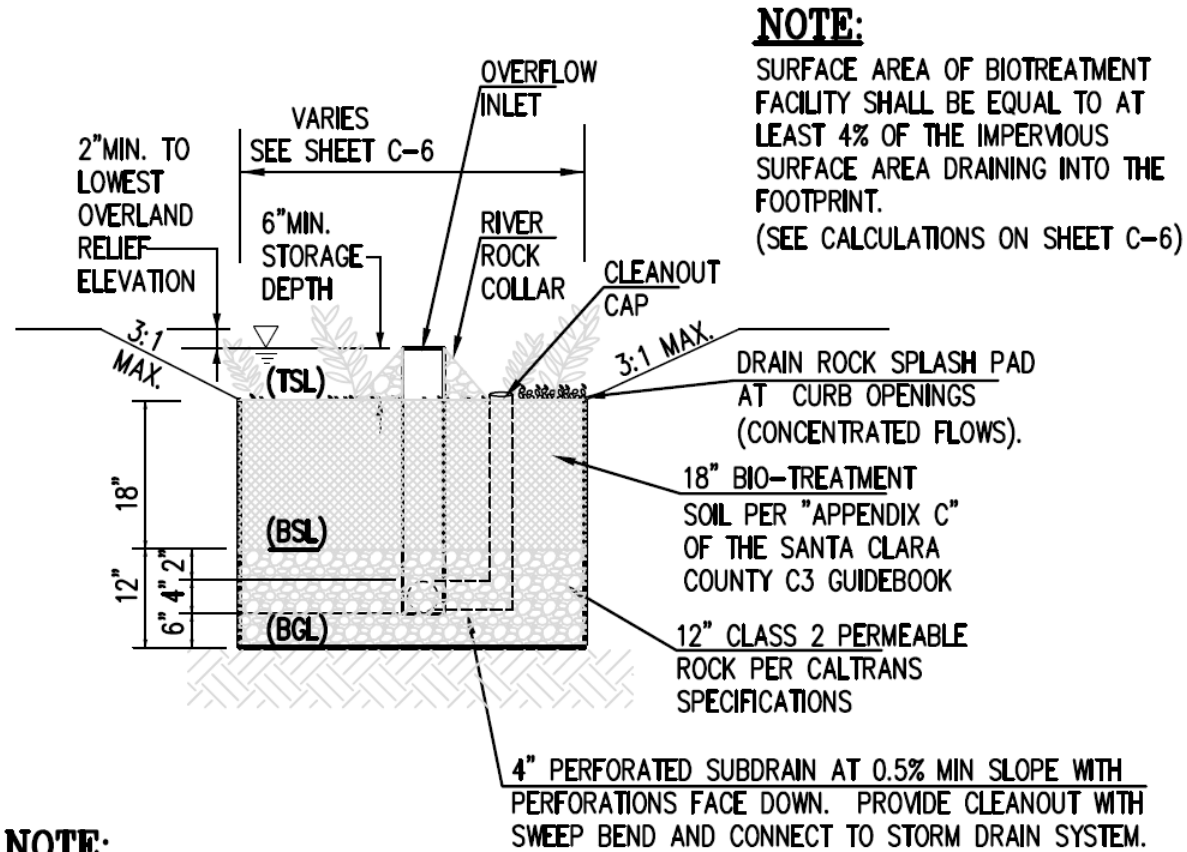
- Bioretention Area/Flow-through Planter
  - Biotreatment soil mix not mentioned or wrong reference
  - Mulch not mentioned – need 3” of aged (composted) mulch or rock mulch
- Bioretention Area
  - Bottom lined without providing justification
    - Less than 5’ separation from base to groundwater
    - Located within 10’ of building
    - Infiltration not permitted on site

# Treatment Measure Details: Common Errors



- Rock mulch or energy dissipation?
- No cleanout shown
- Incorrect soil specification

# Treatment Measure Details: Good Notes



**NOTE:**  
3" COMPOSTED MULCH  
OVER SURFACE

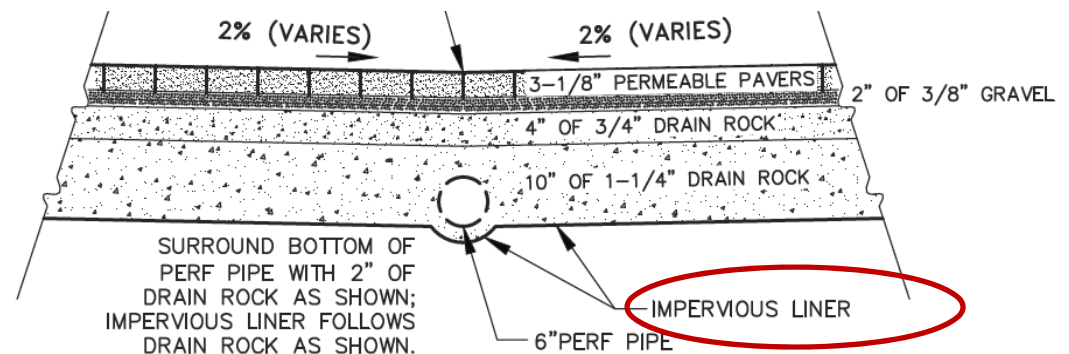
NOT TO SCALE

# Biotreatment Soil Mix

- BSM = 60-70% sand + 30-40% compost
- MRP 1.0 (revised Nov. 2011)
  - Specification included in Attachment L
- MRP 2.0 (adopted Nov. 2015)
  - No Attachment L
  - Allows permittees to develop and adopt revisions to soil specification (with Water Board approval)
  - Revised soil specifications posted on WB website
  - Included in Appendix C of C3 Handbook


# Treatment Measure Details: Common Errors


- Infiltration Trench
  - Lined with impervious liner
- Pervious Pavement
  - Not consistent with C3 Handbook guidance
  - Lined with impervious liner
  - Designed to allow surface ponding
  - Underdrain placement not correct



# Treatment Measure Sizing

- Indicate TM & sizing method on C3 Data Form

Treatment System Component	Hydraulic Sizing Criteria Used <sup>3</sup>	Design Flow or Volume (cfs or cu.ft.)
See Appendix G of Stormwater Control Plan	4% 	

Treatment System Component	Hydraulic Sizing Criteria Used <sup>3</sup>	Design Flow or Volume (cfs or cu.ft.)
Bioretention Area	2c 	

# Treatment Measure Sizing

- Submit complete sizing calculations

TREATMENT CONTROL MEASURE SUMMARY TABLE

Area	TCM#	Type	Drainage Area (s.f)	Impervious Area (s.f.)	Pervious Area (s.f)	Bioretention Area Required (s.f)	Bioretention Area Provided (s.f)
A	1	Planter Box	4,571	4,219	352	131 *	140
B	2	Planter Box	4,947	4,625	322	143 *	150
C	3	Planter Box	2,559	2,377	182	74 *	75
D	4	Planter Box	5,317	4,985	332	154 *	155
E	5	Planter Box	5,015	4,675	340	144 *	150
F	6	Planter Box	2,540	2,357	183	73 *	75
G	7	Planter Box	5,141	4,953	188	149 *	152
H	8	Planter Box	4,545	4,295	250	131 *	131

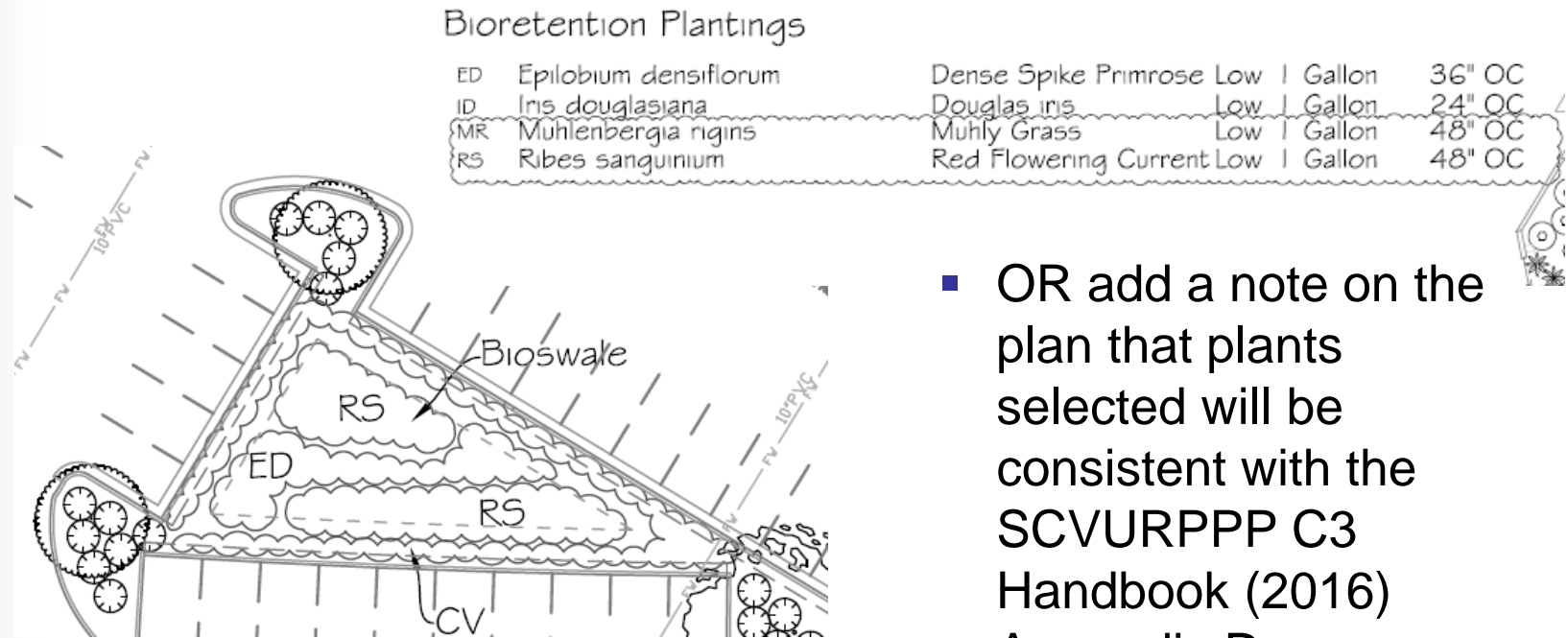
\* REQUIRED BIORETENTION SQUARE FOOTAGE OF BASE ON COMBINATION FLOW AND VOLUME CALCULATION ON SHEET TM6.1.

# Landscape Plan

- Choose plants consistent with the Plant List in the SCVURPPP C.3 Stormwater Handbook, Appendix D
- If choosing different plants, submit documentation from landscape architect
- Select plants that can tolerate the ponding depth provided

# Landscape Plan

- Clearly indicate the plants that will be planted in the treatment areas



- OR add a note on the plan that plants selected will be consistent with the SCVURPPP C3 Handbook (2016) Appendix D

# Maintenance Plan

- Submit a maintenance plan with the SWCP
- Templates available in the C3 Handbook, Appendix G

**Bioretention Area Maintenance Plan for**  
**[[= Insert Project Name =]]**

[[= Insert Date =]]

Project Address and Cross Streets \_\_\_\_\_

Assessor's Parcel No.: \_\_\_\_\_

Property Owner: \_\_\_\_\_ Phone No.: \_\_\_\_\_

Designated Contact: \_\_\_\_\_ Phone No.: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

The property contains [[= insert number =]] bioretention area(s), located as described below and as shown in the attached site plan<sup>1</sup>.  
**Bioretention Area No. 1** is located at [[= describe location =]].  
[[= Add descriptions of other bioretention areas, if applicable. =]]

**I. Routine Maintenance Activities**

The principal maintenance objective is to prevent sediment buildup and clogging, which reduces pollutant removal efficiency and may lead to bioretention area failure. Routine

# Questions?

Kristin Kerr

510-832-2852, X122

[kakerr@eoainc.com](mailto:kakerr@eoainc.com)