



**California Environmental Protection Agency
Los Angeles Regional Water Quality Control Board**

Post-Construction Requirements

Order No. 2009-0009-DWQ

NPDES No. CAS000002

Ali Rahmani

Stormwater Compliance and Enforcement Unit

March 25, 2014



1

Post-Construction Requirements

Two parts to post-construction requirements of the
Construction General Stormwater Permit

1- Site Stabilization

2- Post-Construction Best Management Practices
(BMPs)



2

What is the “concern”?

How to “address” the concern?

How to “regulate” it?

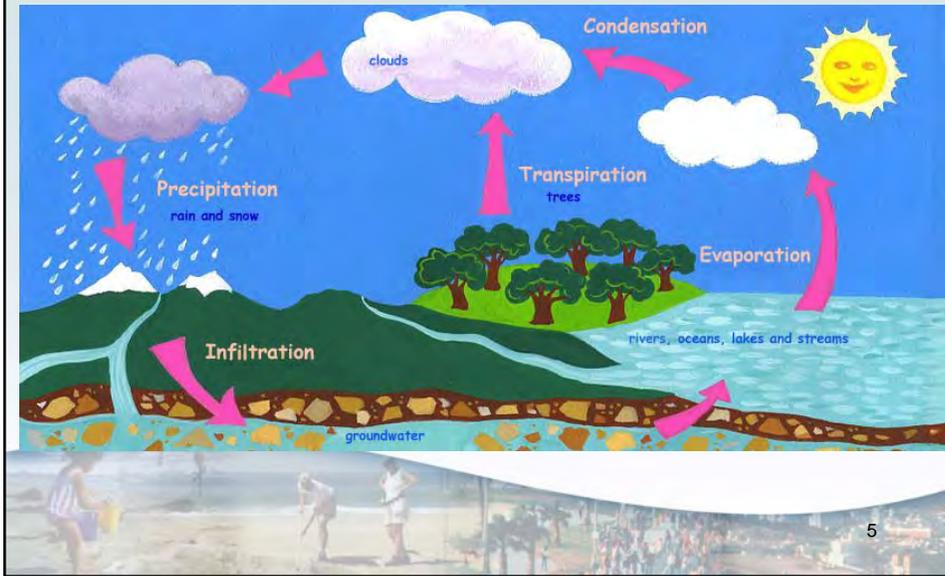


What is the “concern”?

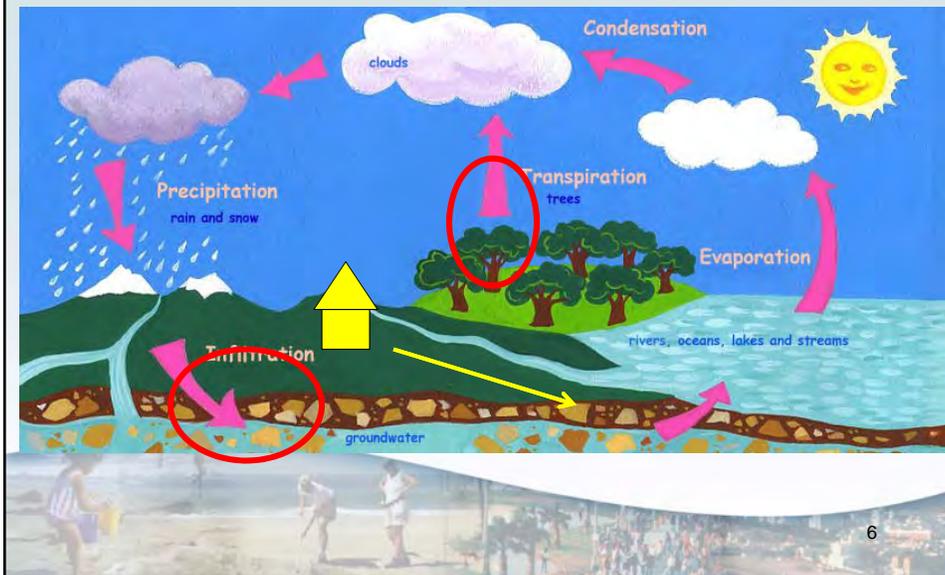
Increase in stormwater runoff due to increase in impervious surface as a result of land development

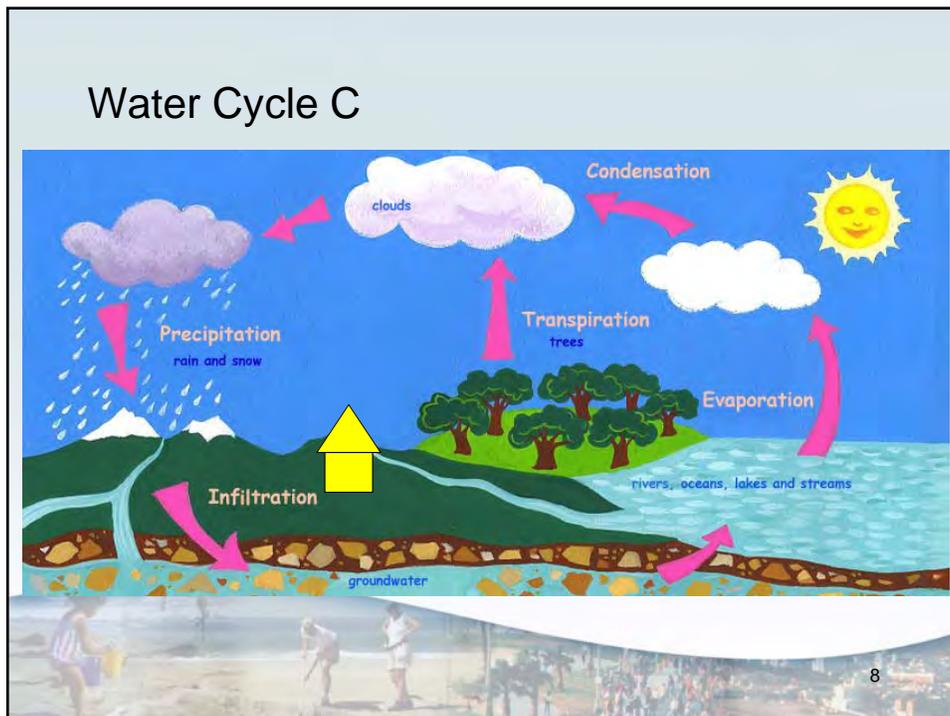
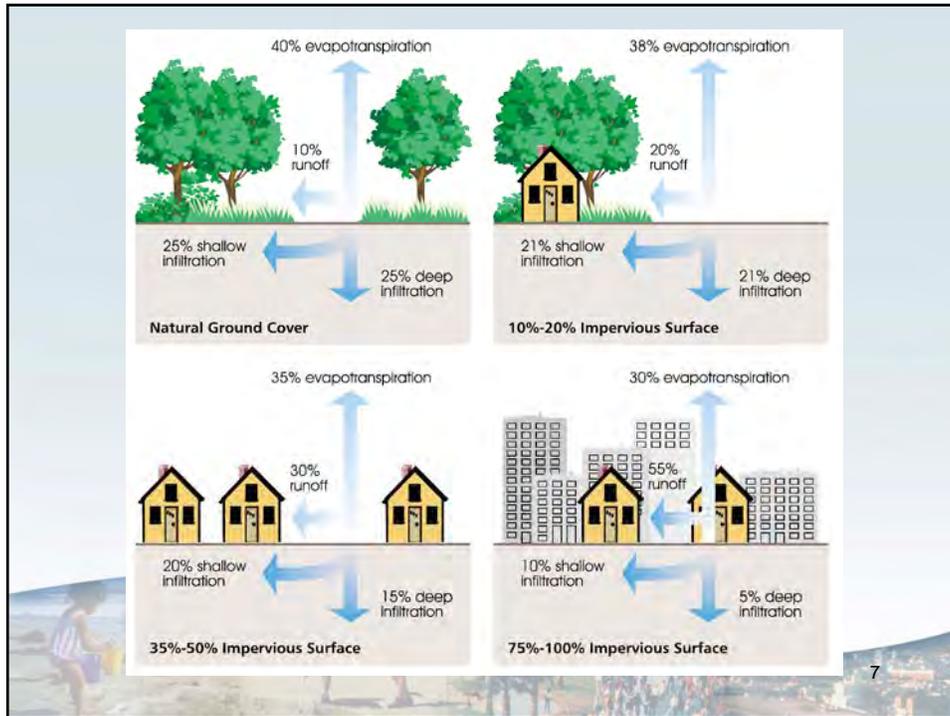


Water Cycle A



Water Cycle B





How to “address” the concern?

By implementing Low Impact Development (LID) designs, also known as Green Infrastructure, as part of the project’s post-construction Best Management Practices



Low Impact Development: Definition

*LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a **resource** rather than a waste product.*



Low Impact Development: Components

- Infiltration (unless shallow groundwater or dense industrial zone)
- Evapo-transpiration
- Retention and Re-use



11

Examples of LIDs as Post Construction BMPs

- Cisterns / Rain Barrels
- Dry Wells
- Green Roofs
- Infiltration Galleries
- Planter Boxes
- Porous Pavement
- Vegetated Swales
- And more...



think GREEN

12

LID: For what volume of stormwater runoff?

Volume of pre-construction stormwater runoff produced by:

- the 85th percentile 24-hour rainfall

or

- the 0.75-inch 24-hour rainfall

whichever is greater

13

LID: Basic Equations

Curve Number (CN) method

$$Q(P, I_a, S) = \frac{(P - I_a)^2}{P - I_a + S} \quad \text{equation 1}$$

Q = Runoff Volume

P = Rainfall

I_a = Initial abstraction, or the amount of water before runoff

S = Potential maximum soil moisture retention after runoff begins

$$I_a = 0.2S \quad \text{equation 2}$$

$$S = \frac{1000}{CN} - 10 \quad \text{equation 3}$$

$$Q(P, CN) = \frac{(P - \frac{200}{CN} + 2)^2}{P - \frac{1200}{CN} + 12} \quad \text{equation 4}$$

14

Regulation of LID Implementation

By requiring a description of LIDs being implemented and a water balance calculation

Post-Construction Runoff \leq Pre-Construction Runoff

Submitted via:

Water Board's Stormwater Multiple Application and Report Tracking System (SMARTS)

or

LID Plans and Calculations

15

Regulation of LID Implementation

Who must comply with Post-Construction requirements of the Construction General Stormwater Permit?

EVERYONE

enrolled in the Construction General Stormwater Permit

16

Compliance Demonstration via SMARTS

Water Boards Storm Water Multiple Application & Report Tracking System [Help](#) [Logout](#)

You are logged-in as: Ali Rahmati - Ali
If this account does not belong to you, please log out. Navigate To:

NOTICE OF INTENT - Post Construction

The Notice of Intent (NOI) is organized into different tabs. Please complete all applicable tabs before submitting the form. If you want to complete the NOI at a later time, please click on 'Save & Exit'.

WID#: _____ Owner: Ali Status: Not Submitted Processed Date: _____
 Certified Date: _____ NOT Effective Date: _____

Permit Type: Construction Site: _____

[Owner Info](#) [Developer Info](#) [Site Info](#) [Addtl Site Info](#) [Risk](#) [Post Construction](#) [Billing Info](#) [Attachments](#) [Certification](#) [Print](#) [Status History](#) [Linked Users](#) [NOTs](#) [COIs](#)

Is the project located within a permitted Phase I or Phase II Municipal Separate Storm Sewer System (MS4) area?

Note: Non-traditional small MS4s that lie within a Phase I or II MS4 area but are NOT designated must comply with the Construction General Permit post construction calculator.

Fields marked with * are mandatory fields.



17

Is the project located within a permitted Phase I or Phase II Municipal Separate Storm Sewer System (MS4) area?

Note: Non-traditional small MS4s that lie within a Phase I or II MS4 area but are NOT designated must comply with the Construction General Permit post construction calculator.

Will the project use an alternative method to calculate runoff volume or use different site design measures than those listed in the CGP calculator?

Will the project be subdivided into smaller sub-areas or drainage management areas?

INPUT FOR WATERSHED: Enter watershed details and click on the Compute & Save button.

I.a. Name:
 I.b. County:
 I.c. Client Location:
 I.d. Subarea(s):

Pre-Construction INPUT

I.a. Dominant Soil Type:
 I.b. Existing Dominant Non-built Land Use Type:
 I.g. Existing rooftop impervious area(acres):
 I.h. Existing non-rooftop impervious area(acres):

Post-Construction INPUT

I.i. Proposed Dominant Non-built Land Use Type:
 I.j. Proposed rooftop impervious area(acres):
 I.k. Proposed non-rooftop impervious area(acres):

OUTPUT:

O.a. Existing Runoff Curve Number:
 O.b. Design Storm(inches):
 O.c. Pre-project Runoff Volume (Cubic Feet):
 O.g. Post-project Runoff Volume minus Volume Credits(Cubic Feet):

O.d. Proposed Runoff Curve Number:
 O.e. Net Credit of Volume Credits (Cubic Feet):
 O.f. Post-project Runoff Volume (Cubic Feet):

***Post-project Runoff Volume > Pre-project Runoff Volume. Please perform volume credit calculations by clicking on the links below.

Volume Credit Calculator Worksheets:

Formula	Credit(Cubic Feet)
A. Paving Pavement	<input type="text" value="0"/>
B. Tree Planting	<input type="text" value="0"/>
C. Dispersed Disconnection	<input type="text" value="0"/>
D. Impervious Area Disconnection	<input type="text" value="0"/>
E. Green Roof	<input type="text" value="0"/>
F. Stream Buffer	<input type="text" value="0"/>
G. Vegetative Swale	<input type="text" value="0"/>
H. Rain Bioretention	<input type="text" value="0"/>
I. Soil Quality	<input type="text" value="0"/>

To delete the watershed please click on the delete button below.

Fields marked with * are mandatory fields.



18

OUTPUT:

O.a. Existing Runoff Curve Number: O.d. Proposed Runoff Curve Number:

O.b. Design Storm(Inches): O.a. Net Credit of Volume Credits(Cubic feet):

O.c. Pre-project Runoff Volume(Cubic Feet): O.f. Post-project Runoff Volume(Cubic Feet):

O.g. Post-project Runoff Volume minus Volume Credits(Cubic Feet):

***Post-project Runoff Volume = Pre-project Runoff Volume. Please perform volume credit calculations by clicking on the link below.

Volume Credit Calculator Worksheets:

Formula **Credit(Cubic Feet)**

A. Porous Pavement

B. Tree Planting

Input	Output
Number of Proposed Evergreen trees to be planted	4 <input type="text" value="271.2"/> (Square feet)
Number of Proposed Deciduous trees to be planted	4 <input type="text" value="222.72"/> (Square feet)
Square feet under an existing tree canopy, that will remain on the property, with an average diameter at 4.5 feet above grade (i.e., diameter at breast height or DBH) is LESS than 12 in diameter	0 <input type="text" value="0"/> (Square feet)
Square feet under an existing tree canopy, that will remain on the property, with an average diameter at 4.5 feet above grade (i.e., diameter at breast height or DBH) is 12 in diameter or GREATER	0 <input type="text" value="0"/> (Square feet)

Total Credit Volume (cubic feet)

C. Downspout Disconnection

D. Impervious Area Disconnection

E. Green Roof

F. Stream Buffer

G. Vegetative Swale

H. Rain Barrels/Cisterns

I. Soil Quality

To delete the watershed please click on the delete button below:

Fields marked with * are mandatory fields.



OUTPUT:

O.a. Existing Runoff Curve Number: O.d. Proposed Runoff Curve Number:

O.b. Design Storm(Inches): O.a. Net Credit of Volume Credits(Cubic feet):

O.c. Pre-project Runoff Volume(Cubic Feet): O.f. Post-project Runoff Volume(Cubic Feet):

O.g. Post-project Runoff Volume minus Volume Credits(Cubic Feet):

***Post-project Runoff Volume minus Volume Credits = Pre-project Runoff Volume. No further calculation is necessary.

Volume Credit Calculator Worksheets:

Formula **Credit(Cubic Feet)**

A. Porous Pavement

B. Tree Planting

C. Downspout Disconnection

D. Impervious Area Disconnection

E. Green Roof

F. Stream Buffer

G. Vegetative Swale

H. Rain Barrels/Cisterns

I. Soil Quality

To delete the watershed please click on the delete button below:

Fields marked with * are mandatory fields.

Note: If you answer yes to all questions, you may subtract all impervious surface draining to each stream buffer that has not been addressed using the Downspout Disconnection credit.

Have all vegetative basins been designed in accordance with treatment control temp 30(TC-30-Vegetated Swale) from the California Stormwater BMP Handbook, New Developments and Redevelopment (available at www.cabmp.org/handbooks.com)?

Is the maximum flow velocity for runoff from the design storm event less than or equal to 1.0 ft per second?

Percentage of the proposed impervious area that will drain into a vegetated swale(%)

Total Credit Volume (cubic feet)



Is the project located within a permitted Phase I or Phase II Municipal Separate Storm Sewer System (MS4) area? No Yes

Note: Non-traditional small MS4s that do not fall within a Phase I or II MS4 area but are NOT designated must comply with the Construction General Permit construction calculator.

Will the project use an alternative method to calculate runoff volume or use different site design measures than those listed in the CSP calculator? No Yes

Will the project be subdivided into smaller sub-areas or drainage management areas? No Yes

INPUT FOR WATERSHED: Enter watershed details and click on the Compute & Save button.

I.a. Name:

I.b. County:

I.c. Closest Location:

I.d. Size (acres):

Pre-Construction INPUT

I.e. Dominant Soil Type:

I.f. Existing Dominant Non-built Land Use Type:

I.g. Existing rooftop impervious area (acres):

I.h. Existing non-rooftop impervious area (acres):

Post-Construction INPUT

I.i. Proposed Dominant Non-built Land Use Type:

I.j. Proposed rooftop impervious area (acres):

I.k. Proposed non-rooftop impervious area (acres):

OUTPUT:

O.a. Existing Runoff Curve Number:

O.b. Design Storm (inches):

O.c. Pre-project Runoff Volume (Cubic Feet):

O.g. Post-project Runoff Volume minus Volume Credits (Cubic Feet):

O.d. Proposed Runoff Curve Number:

O.e. Net Credit of Volume Credits (Cubic feet):

O.f. Post-project Runoff Volume (Cubic Feet):

Post-project Runoff Volume minus Volume Credits = Pre-project Runoff Volume. No further adjustments if necessary!

Volume Credits Calculator Worksheet:

Formula:

A. Pervious Pavement:

B. Tree Planting:

C. Downspout Disconnection:

D. Impervious Area Disconnection:

E. Green Roof:

F. Stream Buffer:

G. Vegetative Swale:

H. Rain Barrels/Cisterns:

I. Soil Stability:

To delete the expanded please click on the delete button below:

Fields marked with * are mandatory fields.

21

Resources and References:

- Ventura County Technical Guidance Manual for Stormwater Quality Control Measures at: <http://www.vcstormwater.org/index.php/component/content/article/5-regulations/32-technical-guidance-manual>
- County of Los Angeles Low Impact Development Standards Manual at: http://dppw.lacounty.gov/wmd/LA_County_LID_Manual.pdf
- County of Los Angeles Department of Public Works Analysis of 85th Percentile 24-hour Rainfall Depth at: http://ladpw.org/wrd/publication/engineering/Final_Report-Probability_Analysis_of_85th_Percentile_24-hr_Rainfall1.pdf
- California Stormwater Quality Association (CASQA) at: <https://www.casqa.org/resources/bmp-handbooks>
- USEPA's website at: <http://www.epa.gov/>

and of course, Google

22

Post-Construction Requirements

Questions?

Ali Rahmani
arahman@waterboards.ca.gov
(213) 620-2122

