Post-Construction Stormwater Training

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Today's Agenda

Central Coast Post-Construction Requirements

Where

Who

What

How

Resources
WHERE?

Location Matters

Within MS4 Permit Boundary?

YES

Congratulations! It's time to follow the Central Coast Post-Construction Requirements! (PCRs)

NO

- State Water Board - SWPPP
- May be other local requirements
WHERE?

Know Your Zone

Watershed Management Zones (WMZs)
WHO?
Which types of projects must comply?

New And Replaced Impervious Surface > 2,500 SF

See PCRs for Exemptions:
• Linear utilities
• Temporary structures
• Maintenance
• Etc

PCRS B.1.b Regulated Projects do not include...
### WHAT?

**Project Size Determines Requirements**

<table>
<thead>
<tr>
<th>Tier</th>
<th>Performance Requirement</th>
<th>One Single Family Home</th>
<th>All Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Site Design and Runoff Reduction</td>
<td>≥ 2,500 SF Impervious</td>
<td>≥ 2,500 SF Impervious</td>
</tr>
<tr>
<td>2</td>
<td>Water Quality Treatment</td>
<td>≥ 15,000 SF NET Impervious</td>
<td>≥ 5,000 SF NET Impervious</td>
</tr>
<tr>
<td>3</td>
<td>Retention</td>
<td>≥ 15,000 SF NET Impervious</td>
<td>≥ 15,000 SF Impervious</td>
</tr>
<tr>
<td>4</td>
<td>Peak Flow Management</td>
<td>≥ 22,500 SF Impervious</td>
<td>≥ 22,500 SF Impervious</td>
</tr>
</tbody>
</table>

**Project Types for Thresholds:**
- One Single Family Home
- Everything Else
NET Impervious Area and Reduced Impervious Area Credit

Existing impervious = 21,000 SF
Proposed Impervious = 16,000 SF
Credit = 5,000 SF

New/Replaced Impervious Surface = 9,000 SF
Net Impervious Area = 4,000 SF

Credit = Existing Impervious - Proposed Impervious
Net Impervious Area = New + Replaced - Credit
WHAT?

Required Submittals*

PRELIMINARY SWCP
Demonstrate compliance can be accomplished

FINAL SWCP
Detailed Design

DRAFT O&M PLAN
Based on Final SWCP

CONSTRUCTION
Inspections to document SCM construction

FINAL O&M PLAN
Based on record drawings

MAINTENANCE AGREEMENT
Execute and Record with County

*Confirm required submittals with permitting jurisdiction
WHAT?
O&M Plan and Maintenance Agreement

- Record Drawings
- Certification of Construction by Engineer of Record
- Final O&M Plan
  - O&M Procedures, O&M Cost, Site Plan
- Maintenance Agreement Recorded with County Assessor/Clerk/Recorder
  - B&W, 8-1/2 x 11
- Annual certification of maintenance

The O&M Plan is a living document that will be an attachment to the Maintenance Agreement.
HOW?

SCM Design and Common Challenges
Stormwater Technical Guide

Applicants for development approvals in jurisdictions within the Monterey Regional Stormwater Management Agency are required to prepare Stormwater Control Plans. However, local requirements vary. Checking with the local agency prior to project development is recommended for all projects subject to the requirements.

Key Sections:
- Stormwater Technical Guide
- Stormwater Control Plan Template
- Stormwater Control Plan Template – Small (Tier 1) Projects
- Appendix A: Source Control
- Appendix B: Bioretention Construction Checklist
- Appendix C: Technical Criteria for Non-LID
- Stormwater Control Measures Sizing Calculator
- Sizing Calculator Instructions
- Watershed Management Zone Maps

Follow the Guide

https://montereysea.org/post-construction-requirements/
### Central Coast Region
#### Stormwater Control Measure Sizing Calculator

**1. Project Information**
- **City of Monterey**
- **Type:** Residential
- **Type 3:** Residential
- **Depth analysis:** 0
- **Total area:** 0

**2. DMA Characterization**
- **Name:** DMA Area
- **Type:** Area (H2)
- **Surface Type:** New, Replaced

<table>
<thead>
<tr>
<th>DMA Segment Area</th>
<th>Area (H2)</th>
<th>Surface Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMA</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Non-improved area</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Improved area</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Improved area 1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Total area</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**3. SCM Characterization**
- **Name:** SCM Area
- **Type:** Area (H2)
- **Flow Control:** No

<table>
<thead>
<tr>
<th>Name</th>
<th>SCM Type</th>
<th>Rainfall Duration</th>
<th>Initial Rate (in/hr)</th>
<th>Area (H2)</th>
<th>Outlets</th>
<th>Depth (in)</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**4. Run SRM Model**
- **Launch Model:** Clear Results

**5. SCM Minimum Sizing Requirements**
- **SCM Name:** Min. Required
- **Depth Below Stormwater (in):** 0
- **Drain Time:** 0
- **Outlet Diameter:** 0

**6. Self-Draining Area Sizing Check**
- **Self-Draining DMA Area (H2):** 0
- **Eff. Tributary Area (H2):** 0

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**DMAs by surface type**
- **Rainfall depth per RWQCB mapping**
- **Designate surfaces as new or replaced**

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**Use the Calculator**

https://montereysea.org/post-construction-requirements/
PCRs Attachment D.1.b.i.
Adjustments for Redevelopment Project
Retention Tributary Area

• 0.50 Multiplier
• Apply to replaced impervious surfaces to calculate "Retention Tributary Area"
• PR3 only
PR3: Retention

PR2: Water Quality

PCR B.3.b. Water Quality Treatment Performance Requirements shall apply to the runoff from existing, new, and replaced impervious surfaces on sites where runoff from existing impervious surfaces cannot be separated from runoff from new and replaced impervious surfaces.
NO filter fabric

Bioretention Design
Bioretention Design

optional orifice control

consider piping through weep holes

4% Treatment Area

provide erosion protection
Pervious Concrete & Pavers
Pervious Pavements
Pervious Pavers
Question: What surfaces are considered pervious or impervious for threshold calculations?

PCR's Definition of Impervious Surface:
A hard, non-vegetated surface that prevents or significantly limits the entry of water into the soil mantle, as would occur under natural conditions prior to development.

Pervious Pavements
Question: What surfaces are considered pervious or impervious for threshold calculations?

Pervious Pavements
Question: If a site has high groundwater (less than 10 feet) and very poor infiltration rates, how does the engineer address PR3 (retention)?

PCR C.1.

Technical Infeasibility

c) Technical infeasibility may be caused by site conditions, including:
   i) Depth to seasonal high groundwater limits infiltration and/or prevents construction of subgrade stormwater control measures
   ii) Depth to an impervious layer such as bedrock limits infiltration
   iii) Sites where soil types significantly limit infiltration
   iv) Sites where pollutant mobilization in the soil or groundwater is a documented concern
   v) Space constraints (e.g., infill projects, some redevelopment projects, high density development)
   vi) Geotechnical hazards
   vii) Stormwater Control Measures located within 100 feet of a groundwater well used for drinking water
   viii) Incompatibility with surrounding drainage system (e.g., project drains to an existing stormwater collection system whose elevation or location precludes connection to a properly functioning treatment or flow control facility)
Question: If a site has high groundwater (less than 10 feet) and very poor infiltration rates, how does the engineer address PR3 (retention)?

Dedicate 10% of the site's "Equivalent Impervious Surface Area" (EISA) to retention based SCMs.

PCRs B 4 e. Ten Percent Adjustment for Sites with Technical Infeasibility and Attachment E Ten Percent Adjusment to Retention Requirement

Technical Infeasibility
Technical Infeasibility
• Infiltration testing vs. percolation testing
• Surface SCMs vs. Subsurface SCMs
• Interpreting test results
• Factors of safety
• Multiple tested infiltration rates
• Resources when onsite testing not performed
typical percolation test

Source: Orange County Infiltration Rate Evaluation Protocol

Source: Geosyntec
"Small-scale SCMs are generally those for which the sidewall of the SCM provides a significant component of infiltration relative to the bottom of the SCM."
percolation test

\[ I_t = \frac{\Delta H \pi^2 60}{\Delta t (\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H 60 r}{\Delta t (r + 2H_{avg})} \]

Where:

- \( I_t \) = tested infiltration rate, inches/hour
- \( \Delta H \) = change in head over the time interval, inches
- \( \Delta t \) = time interval, minutes
- \( r \) = effective radius of test hole
- \( H_{avg} \) = average head over the time interval, inches

infiltration rate

Solution? The Porchet Method
Infiltration Testing
**Central Coast Region Stormwater Control Measure Sizing Calculator**

**1. Project Information**
- **Project Name:** City of Monterey
- **Tin 2:** 0
- **Tile 3:** 0

**2. DMA Characterization**

<table>
<thead>
<tr>
<th>DMA Type</th>
<th>Area (ft²)</th>
<th>Surface Type</th>
<th>New Replacement</th>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
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</table>

**3. SCM Characterization**

<table>
<thead>
<tr>
<th>SCM Type</th>
<th>Existing Factor</th>
<th>SCM Type</th>
<th>SCM Area (ft²)</th>
<th>Roof Slope (in/ft)</th>
<th>Rainfall</th>
<th>Depth (in)</th>
</tr>
</thead>
</table>

**4. Run SWMM Model**

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**5. SCM Minimum Sizing Requirements**

<table>
<thead>
<tr>
<th>SCM Name</th>
<th>Min. Required Increase (ft²)</th>
<th>Depth Below End (ft)</th>
<th>Date Time (years)</th>
<th>Outflow Diameter (in)</th>
</tr>
</thead>
</table>

**6. Self-Storing Area Sizing Checks**

<table>
<thead>
<tr>
<th>Self-Storing DMA</th>
<th>Self-Storing DMA Area (ft²)</th>
<th>Tributary DMA Name(s)</th>
<th>Eff. Tributary DMA Area (ft²)</th>
<th>Effective Tributary / DMA Area Ratio</th>
</tr>
</thead>
</table>

**Hydrologic Soil Group (HSG)**

- **HSG A/B** = 0.75 inch/hr
- **HSG C/D** = 0.25 inch/hr

**Infiltration Testing**
SF = 1.0 for Bioretention
SF = 2.0 for "Direct Infiltration"

Infiltration Testing
Question: If underground chambers are used for PR3, can they also be used for PR2? Is pretreatment required for PR2?

Technical Guide Appendix C: Technical Criteria for Non-LID Treatment Facilities

5. Facilities with subsurface storage require permanent structural pre-treatment of stormwater, except in the instance of a one (1) single family dwelling (SFD) project.
MRSWMP - Technical Guide & Attachments, Infiltration Resources
https://montereysea.org/post-construction-requirements/

Santa Barbara County - O&M Plans and Agreements, PCR Workshops
https://countyofsb.org/pwd/sbpcw/development/new-and-redevelopment.sbc

Central Coast Low Impact Development Initiative - Design and Construction Guidance
https://www.centralcoastlidi.org/resources.php

Central Coast Low Impact Development Initiative - Training Video Library
https://www.centralcoastlidi.org/online-training.php

Caltrans Bioswale and Pervious Pavement Design Guidance
https://www.uni-groupusa.org/PDF/Caltrans%20DG-Pervious-Pvm_102913.pdf

Central Coast RWQCB - PCRs, WMZ mapping, rainfall depths
https://www.waterboards.ca.gov/centralcoast/water_issues/programs/stormwater/docs/lid/lid_hydromod_charette_index.html

Riverside County - Infiltration Testing and Porchet Method

Resources
Thank you!

QUESTIONS?

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