

## 2016 Stormwater Manual Update

### Public Meeting

Wednesday, September 30, 2015  
Seattle Municipal Tower 2240-46



Presented by:  
**Sherell Ehlers, P.E.**



## Agenda

- Project Background
- Stormwater Manual Changes
- Stormwater Manual by Volume
  - Table of Contents
  - Overview
  - Summary of changes
- Timing



## Project Background

- Why do we have a Stormwater Code & Manual?
  - Protect life, property, surface waters from harm
  - Meet requirements of state and federal law
  - Required under the federal Clean Water Act/NPDES permit
- What is in our current Code & Manual?
  - Source control for on-going practices
  - Construction site pollution prevention
  - Green stormwater infrastructure to maximum extent feasible, flow control & water quality treatment for projects



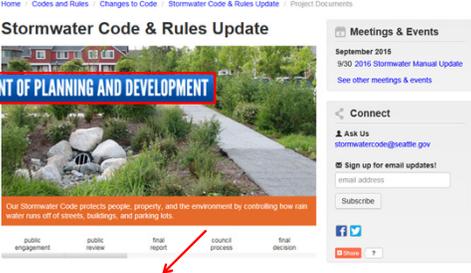
## Project Background

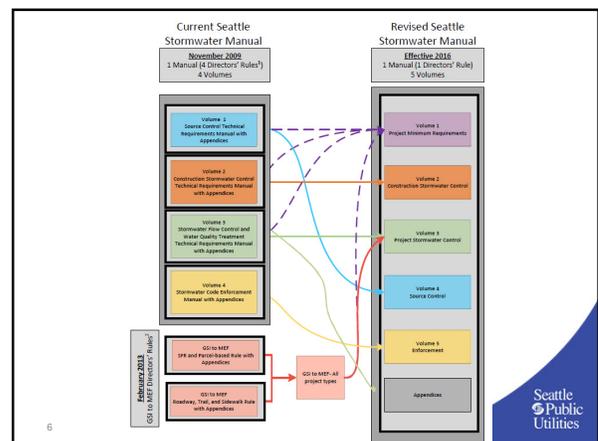
- Achieve equivalency with Ecology Manual (2014) & 2013 – 2018 Stormwater NPDES Permit
  - Ecology reviewing Stormwater Manual concurrently
- Revisit some thresholds
- Use the revision process as an opportunity to:
  - Address shortcomings
  - Streamline requirements
  - Reorganize Stormwater Manual based on feedback
  - Simplify and limit text in Stormwater Manual



## Project Background

- Stormwater Code approved by Council 9/21/15
- Effective January 1, 2016





## Changes

- Manual Organization:
  - Volume 1 – Project Minimum Requirements **\*New\***
  - Volume 2 – Construction Stormwater Control
  - Volume 3 – Project Stormwater Control
  - Volume 4 – Source Control
  - Volume 5 – Enforcement

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## Changes

- Appendices
  - Appendix A - Definitions
  - Appendix B - Background Information on Chemical Treatment
  - Appendix C - On-site List BMP Infeasibility Criteria **\*New\***
  - Appendix D - Subsurface Characterization and Infiltration Testing **\*New\***
  - Appendix E - Additional Design Requirements **\*New\***
  - Appendix F - Hydrologic Analysis and Design **\*New\***
  - Appendix G - Stormwater Control Operations and Maintenance Requirements
  - Appendix H – Financial Feasibility Documentation for Vegetated Roofs and Rainwater Harvesting **\*New\***
  - Appendix I - Integrated Pest Management Plan

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## Changes

1

- Volume 1 – Project Minimum Requirements
  - New volume
  - Content includes:
    - Guide to other volumes for additional information
    - Minimum Requirements for All Projects
    - Minimum Requirements for Project Types
    - Site Assessment, Planning & Documentation
    - Drainage Control Review & Application Requirements

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## Changes

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- Volume 2 – Construction Stormwater Control
  - Renamed volume
  - Condensed text
  - Added “Protect Stormwater BMPs” for equivalency
  - Updated, deleted, and added BMPs
  - Updated figures

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## Changes

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- Volume 3 – Project Stormwater Control
  - Renamed volume
  - Condensed text
  - BMP selection combined into a single chapter (Ch. 3)
  - Added Dispersion and Infiltration Feasibility sections (Ch. 3)
  - General Design Requirements (Ch. 4)
  - BMP Design criteria combined into a single chapter (Ch. 5)
  - Non BMP-specific information moved to appendices

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## Changes

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- Volume 4 – Source Control
  - Condensed text
  - Updated, deleted, and added BMPs
  - Updated figures
- Volume 5 – Enforcement
  - Minor changes

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## Volume 1 – Project Minimum Requirements 1

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## Volume 1 – Table of Contents 1

- Chapter 1 – Introduction
- Chapter 2 – Determining Minimum Requirements
- Chapter 3 – Minimum Requirements for All Projects
- Chapter 4 – Minimum Requirements Based on Project Type
- Chapter 5 – Minimum Requirement Standards
- Chapter 6 – Alternative Compliance
- Chapter 7 – Site Assessment and Planning
- Chapter 8 – Drainage Control Review and Application Requirements

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## Volume 1 – Code Language 1

- Volume 1 – Project Minimum Requirements
  - Code Language will be updated in Final Manual
  - Revised Code Language available online: <http://www.seattle.gov/dpd/codesrules/changestocode/stormwatercode/projectdocuments/default.htm>
  - Terminology change: “Impervious surface” to “hard surface”

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## Volume 1 – Chapter 2 1

- Chapter 2 – Determining Minimum Requirements – 7-step approach:
  - Step 1 - Define the Boundaries of the Project Site
  - Step 2 - Identify the Type of Project
  - Step 3 - Identify the Receiving Water and Downstream Conveyance
  - Step 4 - Perform Site Assessment and Planning
  - Step 5 - Calculate New Plus Replaced Hard Surface and Native Vegetation Conversion
  - Step 6 - Calculate New Plus Replaced Pollution Generating Surface
  - Step 7 - Determine Which Minimum Requirements Apply

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## Volume 1 – Chapter 3 1

- Chapter 3 – Minimum Requirements for All Projects
  - Maintaining Natural Drainage Patters
  - Discharge Point
  - Flood-prone Areas
  - Construction Site Stormwater Pollution Prevention Control
  - Protect Wetlands
  - Protect Streams and Creeks
  - Protect Shorelines
  - Ensure Sufficient Capacity
  - Install Source Control BMPs
  - Do Not Obstruct Watercourses
  - Maintenance and Inspection

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## Volume 1 – Chapter 4 1

- Chapter 4 - Minimum Requirements Based on Project Type

Project Type	Soil Amendment	On-site Stormwater	Flow Control / Water Quality Treatment
Single-family Residential	X	X	
Trail & Sidewalk	X	X	
Parcel-based	X	X	X
Roadway	X	X	X

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## Volume 1 – Chapter 4 1

- Chapter 4 – Updated Parcel-based & Roadway Project flow charts
  - (Figures 4.1A, B, & C and 4.2A, B, & C):

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## Volume 1 – Chapter 5, 6, 7, 8 1

- Chapter 5 - Minimum Requirement Standards
  - On-site Stormwater Management
  - Flow Control
  - Water Quality Treatment
- Chapter 6 - Alternative Compliance
- Chapter 7 - Site Assessment and Planning
  - Added Section 7.2- Site Assessment
- Chapter 8 - Drainage Control Review and Application Requirements
  - Added minimum Site Plan requirements
  - Added On-site Stormwater Management Documentation section
  - \*New\*** On-site Calculator

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## Volume 2 – Construction Stormwater Control 2

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## Volume 2 – Table of Contents 2

- Chapter 1 – Introduction
- Chapter 2 – Construction Stormwater and Erosion Control Plan
- Chapter 3 – Selecting Construction Stormwater Controls
- Chapter 4 – Standards and Specifications for Construction Erosion and Sedimentation Control
- Chapter 5 – Source Control Practices for Construction Pollutants Other than Sediment

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## Volume 2 – Chapter 2 2

- Chapter 2 – Construction Stormwater and Erosion Control Plan
  - Small Projects (≤ 5,000 square feet of new plus replaced hard surface, or <1 acre of land-disturbing activity):
    - Small Project Construction Stormwater and Erosion Control Plan, and
    - Post Construction Soil Management Plan
  - Large Projects (> 5,000 square feet of new plus replaced hard surface, or ≥1 acre of land-disturbing activity):
    - Large Project Construction Stormwater and Erosion Control Plan, and
    - Certified Erosion and Sediment Control Lead (CESCL)

**\*Moved from BMP C1.10 to Section 2.3\***

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## Volume 2 – Chapter 3 and 4 2

- Chapter 3 – Selecting Construction Stormwater Controls
  - Tables 1a and 1b – Applicable BMPs for Small & Large Projects
  - \*New\*** Element 19 - Protect Stormwater BMPs
- Chapter 4 – Standards and Specifications for Construction Erosion and Sedimentation Control
  - Section 4.1 – Cover Practices
  - Section 4.2 – Erosion Control Practices
  - Section 4.3 – Sediment Retention Practices

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## Volume 2 – Chapter 5 2

- Chapter 5 – Source Control Practices for Construction Pollutants Other than Sediment
  - Minor edits to BMPs
  - \*New\*** BMP E1.50: High Visibility Fence
  - Moved to Appendix E:
    - BMP E2.30: Level Spreader, BMP E2.65: Pipe Slope Drains, and BMP E2.85: Outlet Protection
  - Removed:
    - BMP E2.55: Bioengineered Protection of Very Steep Slopes and BMP E2.95 Turbidity Curtain

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## Volume 3 – Project Stormwater Control 3

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## Volume 3 – Table of Contents 3

- Chapter 1 – Introduction
- Chapter 2 – BMP Categories
- Chapter 3 – BMP Selection & Sizing Approach
- Chapter 4 – General Design Requirements
- Chapter 5 – BMP Design
- Chapter 6 – References

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## Volume 3 – Chapter 2 3

- Chapter 2- BMP Categories:
  - BMPs no longer broken up by flow control and water quality treatment
  - Instead by BMP function:
    - 2.2. Soil Amendment
    - 2.3. Tree Planting and Retention
    - 2.4. Dispersion BMPs
    - 2.5. Infiltration BMPs
    - 2.6. Rainwater Harvesting BMPs
    - 2.7. Alternative Surface BMPs
    - 2.8. Detention BMPs
    - 2.9. Non-infiltrating BMPs

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## Volume 3 – Chapter 3 BMP Selection & Sizing 3

- \*New\*** Section 3.1 – Determine Dispersion Feasibility
  - Step 1- Evaluate horizontal setbacks and site constraints
  - Step 2- Evaluate use of dispersion to meet minimum requirements

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## Volume 3 – Chapter 3 BMP Selection & Sizing 3

- \*New\*** Section 3.2- Determine Infiltration Feasibility
  - Step 1- Evaluate Infiltration Investigation Map
  - Step 2- Evaluate horizontal setbacks and site constraints
  - Step 3- Conduct subsurface investigation and evaluate vertical separation requirements (Refers to Appendix D, Table 3.1 and 3.2)
  - Step 4- Conduct infiltration testing (Refers to Appendix D, Table 3.3)
  - Step 5- Determine design infiltration rate (Refers to Appendix D)
  - Step 6- Conduct groundwater monitoring, receptor characterization, and mounding analysis, if applicable (Refers to Appendix D)
  - Step 7- Evaluate use of infiltration to meet minimum requirements

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## Volume 3 – Chapter 3 BMP Selection & Sizing

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• Figure 3.1- Infiltration Feasibility

Figure 3.1. Infiltration Feasibility

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## Volume 3 – Chapter 3 BMP Selection & Sizing

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• **\*New\*** Table 3.1- Minimum Investigation and Testing Requirements for Shallow Infiltration BMPs

Impervious Area Infiltrated on the Site*	Step 3 Subsurface Investigation		Step 4 Infiltration Testing		Groundwater Monitoring		Step 6 Groundwater Mounding and Seepage Analysis		Acceptance Testing
	Minimum Number	Type	Minimum Number	Type	Minimum Number of Wells	Duration and Frequency	Characterization of Infiltrator Receptor	Yes <sup>a</sup>	
< 2,000 ft <sup>2</sup>	1	Simple subsurface investigation	1	Simple Infiltration Test	0	NA	No	No	No
≥ 2,000 to < 5,000 ft <sup>2</sup>	1	Standard subsurface investigation	1 per facility AND 1 per 150 linear feet of a facility <sup>a, d</sup>	Simple Infiltration Test or Small PIT <sup>b</sup> if ≥ 2,000 ft <sup>2</sup> of the site infiltration will occur within a single facility. <sup>a, f</sup> The Small PIT method is required.	0	NA	No	No	No
≥ 5,000 to < 10,000 ft <sup>2</sup>	1	Comprehensive subsurface investigation	1 per facility AND 1 per 150 linear feet of a facility <sup>a, d</sup>	Small PIT <sup>b</sup>	1	Monthly for at least 1 year; monthly for at least 1 year if within 200 feet of a designated receiving water <sup>g</sup> .	No	No	Yes
≥ 10,000 ft <sup>2</sup> to < 1 acre	1	Comprehensive subsurface investigation	1 per facility AND 1 per 150 linear feet of a facility <sup>a, d</sup>	Small PIT <sup>b</sup>	3	Monthly for at least 1 year <sup>g</sup>	Yes for infiltration basins	Yes <sup>h</sup>	Yes
≥ 1 acre	1	Comprehensive subsurface investigation	1 per facility AND 1 per 150 linear feet of a facility <sup>a, d</sup>	Small or Large PIT <sup>b</sup>	3	Monthly for at least 1 year <sup>g</sup>	Yes for infiltration basins	Yes <sup>h</sup>	Yes

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## Volume 3 – Chapter 3 BMP Selection & Sizing

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Table 3.1. Minimum Investigation and Testing Requirements for Shallow Infiltration BMPs.

Impervious Area Infiltrated on the Site*	Step 3 Subsurface Investigation		Step 4 Infiltration Testing	
	Minimum Number	Type	Minimum Number	Type
< 2,000 ft <sup>2</sup>	1	Simple subsurface investigation	1	Simple Infiltration Test
≥ 2,000 to < 5,000 ft <sup>2</sup>	1	Standard subsurface investigation	1 per facility AND 1 per 150 linear feet of a facility <sup>a, d</sup>	Simple Infiltration Test or Small PIT <sup>b</sup> if ≥ 2,000 ft <sup>2</sup> of the site infiltration will occur within a single facility. <sup>a, f</sup> the Small PIT method is required.
≥ 5,000 to < 10,000 ft <sup>2</sup>	1	Comprehensive subsurface investigation	1 per facility AND 1 per 150 linear feet of a facility <sup>a, d</sup>	Small PIT <sup>b</sup>
≥ 10,000 ft <sup>2</sup> to < 1 acre	1	Comprehensive subsurface investigation	1 per facility AND 1 per 150 linear feet of a facility <sup>a, d</sup>	Small PIT <sup>b</sup>
≥ 1 acre	1	Comprehensive subsurface investigation	1 per facility AND 1 per 150 linear feet of a facility <sup>a, d</sup>	Small or Large PIT <sup>b</sup>

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## Volume 3 – Chapter 3 BMP Selection & Sizing

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Table 3.3. Minimum Measured Infiltration Rates.

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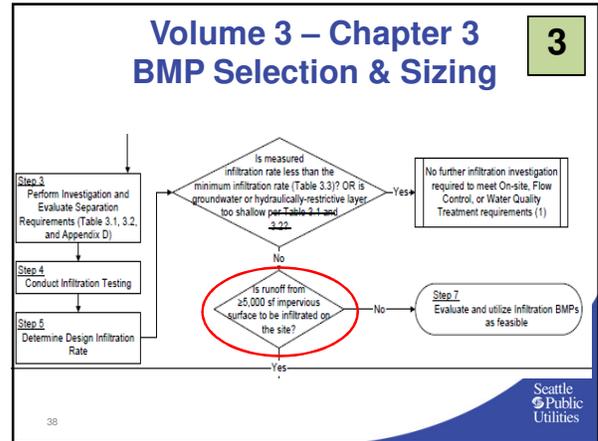
### Volume 3 – Chapter 3 BMP Selection & Sizing

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Table 3.3. Minimum Measured Infiltration Rates.

Infiltration BMP	Minimum Infiltration Rate for On-site List Approach, in/hr	Minimum Allowed Infiltration Rate for Meeting Flow Control, Water Quality Treatment and On-site Performance Standards, in/hr
Infiltration Trenches	5	5
Drywells	5	5
Infiltrating Bioretention without underdrain	0.6	0.6
Infiltrating Bioretention with underdrain	0.3	No minimum
Rain Gardens	0.3	Not applicable (only for On-site List Approach)
Permeable Pavement Facility	0.3	0.3 <sup>a</sup>
Permeable Pavement Surface	0.3 <sup>a</sup>	No minimum
Perforated Stub-out Connections	0.3	Not applicable (only for On-site List Approach)
Infiltration Basins	Not applicable	0.6
Infiltration Chambers	Not applicable	0.6

<sup>a</sup> Infiltration testing not required, only necessary to prove infeasibility.  
<sup>b</sup> No minimum infiltration rate if underdrain is installed.



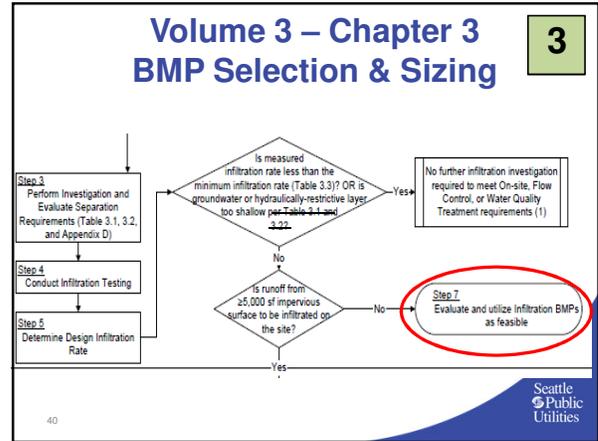
### Volume 3 – Chapter 3 BMP Selection & Sizing

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Step 6

Impervious Area Infiltrated on the Site <sup>a</sup>	Groundwater Monitoring		Characterization of Infiltration Receptor	Groundwater Mounding and Seepage Analysis	Acceptance Testing
	Minimum Number of Wells	Duration and Frequency			
< 2,000 ft <sup>2</sup>	0	NA	No	No	No
> 2,000 to < 5,000 ft <sup>2</sup>	0	NA	No	No	No
≥ 5,000 to < 10,000 ft <sup>2</sup>	1	Monthly for at least 1 wet season; monthly for at least 1 year if within 200 feet of a designated receiving water <sup>b</sup>	No	No	Yes
≥ 10,000 ft <sup>2</sup> to < 1 acre	3	Monthly for at least 1 year <sup>b</sup>	Yes, for infiltration basins	Yes <sup>c</sup>	Yes

<sup>a</sup> Impervious area includes all paved surfaces, roofs, and other non-porous surfaces.  
<sup>b</sup> Evaluation is required for all surfaces of parcel-based projects, unless otherwise noted below.  
<sup>c</sup> Evaluation is not required but is allowed.



- ### Volume 3 – Chapter 3 BMP Selection & Sizing
- 3
- Section 3.3.1 – BMP Selection for On-site List Approach (refer to Code for Applicable On-site Lists)
  - Step 1: Determine if Dispersion and Infiltration are Feasible (Refers to Section 3.1 and 3.2)
  - Step 2: Calculate Areas by Surface Type
  - Step 3: Refer to Applicable On-Site List(s) (Refers to Volume 1)
  - Step 4: Evaluate BMPs by Category
  - Step 5: Evaluate Feasibility of Category 1 BMPs (Refers to Appendix C)
  - Step 6: Select Category 1 BMP(s)
  - Step 7: Document Infeasibility of Category 1 BMPs
  - Step 8: Evaluate/Select Category 2 BMPs
  - Step 9: Evaluate/Select Category 3 BMPs
  - Step 10: Evaluate/Select Category 4 BMPs (SFR and Parcel-based projects only)

#### On-site List for Parcel-based Projects

Category	BMPs	Projects Discharging to a Receiving Water Not Designated by Section 22.801.050, Public Combined Sewer, or Capacity Constrained System, or its Basin		Projects Discharging to a Designated Receiving Water or its Basin	
		R	S	R	S
1	Full Dispersion	R	S	R	S
	Infiltration Trenches	R	S	R	S
	Dry Wells	R	S	R	S
2	Rain Gardens	R <sup>a</sup> , S <sup>a</sup>		R <sup>a</sup> , S <sup>a</sup>	
	Infiltrating Bioretention	R	S	R	S
	Rainwater Harvesting	R <sup>b</sup>		X	
	Permeable Pavement Facilities	R	S	R	S
	Permeable Pavement Surfaces	S		S	
3	Sheet Flow Dispersion	R	S	R	S
	Concentrated Flow Dispersion	S		S	
	Splashblock Downspout Dispersion	R		R	
	Trench Downspout Dispersion	R		R	
	Non-infiltrating Bioretention	R	S	R	S
	Vegetated Roofs	R <sup>c</sup>		X	
	Perforated Stub-out Connections	R		R	
4	Newly Planted Trees	S		S	

R = Evaluation is required for all roof runoff from parcel-based projects.  
S = Evaluation is required for all surfaces of parcel-based projects, unless otherwise noted below.  
X = Evaluation is not required but is allowed.

## Volume 3 – Chapter 3 BMP Selection & Sizing

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- Section 3.3 – BMP Selection for On-site Stormwater Management
  - 3.3.2- On-site Performance Standard:
    - Step 1- Determine if Dispersion and Infiltration are Feasible (Refers to Section 3.1 and 3.2)
    - Step 2- Select BMPs
    - Step 3- Use Modeling Approach for BMP Design (Refers to Chapter 4 and Appendix F)

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## Volume 3 – Chapter 3 BMP Selection & Sizing

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- Section 3.4 – BMP Selection for Flow Control
  - Step 1: Determine if Dispersion and Infiltration are Feasible (Refers to Section 3.1 and 3.2)
  - Step 2: Determine if Water Quality Treatment requirements also apply
  - Step 3: Select Flow Control BMP(s)
  - Step 4: Use Pre-sized or Modeling Approach for BMP Design
    - Step 4a: Use Pre-sized Approach for BMP design
    - Step 4b: Use Modeling Approach for BMP design (Refers to Table 3.4)

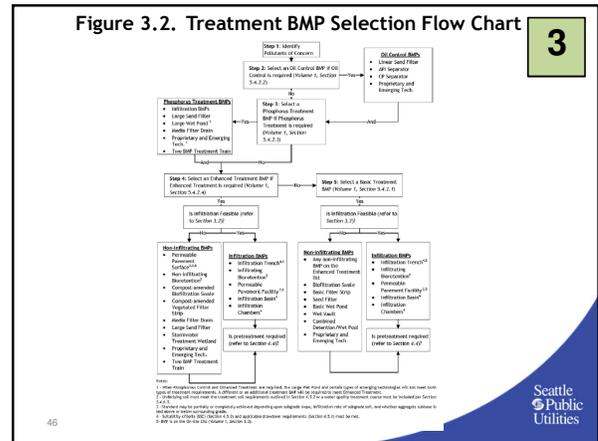
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## Volume 3 – Chapter 3 BMP Selection & Sizing

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- Section 3.5 – BMP Selection for Water Quality Treatment
  - Step 1: Determine the Associated Pollutants of Concern (\*New\* Table 3.5- Zoning categorization and TSS characteristics)
  - Step 2: Select an Oil Control BMP if Oil Control is Required
  - Step 3: Select a Phosphorus Treatment BMP if Phosphorus Treatment is Required
  - Step 4: Select an Enhanced Treatment BMP if Enhanced Treatment is Required
  - Step 5: Select a Basic Treatment BMP
  - Step 6: Use Pre-sized or Modeling Approach for BMP Design
    - Step 6a: Use Pre-sized Approach for BMP design
    - Step 6b: Use Modeling Approach for BMP design

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## Volume 3 – Chapter 4

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- Chapter 4 – General Design Requirements
  - Combined general design requirements:
    - Section 4.1- Sizing Approach
      - On-site Approach
      - Pre-sized Approach
      - Modeling Approach
    - Section 4.2 - Bypass General Design Requirements
    - Section 4.3 - Conveyance General Design Requirements
    - Section 4.4 - Presettling and Pretreatment requirements
    - Section 4.5 - Infiltration BMPs
      - 100% Infiltration on the site
      - Infiltrating to meet Water Quality Treatment
      - Infiltrating to meet Flow Control

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## Volume 3 – Chapter 5

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- Chapter 5 – BMP Design
  - Combined on-site stormwater management, flow control, and water quality BMP design sections into a single chapter
  - BMPs are grouped by function (e.g. infiltrating BMPs)
  - All Presized Tables Available October 5

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## Volume 3 – Chapter 5 3

- Chapter 5 – BMP Design
  - Major changes to BMP Design Criteria:
    - Infiltrating Bioretention
    - Permeable Pavement Facilities & Surfaces
    - Non-infiltrating Bioretention
  - Moderate changes to BMP Design Criteria:
    - Soil Amendment
    - Tree Planting and Tree Retention
    - Dispersion BMPs
    - Infiltration Trenches and Drywells

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## Volume 3 – Chapter 5 3

- Chapter 5 – BMP Design
  - **\*New BMPs\***
    - Rain Gardens
    - Perforated Stub-Out Connections
    - Concentrated Flow Dispersion
    - Infiltration Chambers (**Presized for Flow Control**)
  - Moved BMPs:
    - Control Structures for Flow Control Facilities (to Appendix E)
  - Removed BMPs:
    - Narrow Area Filter Strip
  - Combined BMPs:
    - Biofiltration Swale
    - Filter Strips/Drains

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## Volume 4 – Source Control 4


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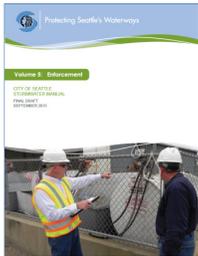

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## Volume 4 – Table of Contents 4

- Chapter 1 – Introduction
- Chapter 2 – Citywide Best Management Practices
- Chapter 3 – Commercial and Industrial Activity Best Management Practices
- Chapter 4 – References

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## Volume 5 – Enforcement 5


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## Volume 5 – Table of Contents 5

- Table of Contents:
  - Chapter 1- Introduction
  - Chapter 2- Penalty Assessment Matrix
- Volume 5 interprets the enforcement provisions described in SMC 22.800 – 22.808 (Stormwater Code)
- Designed to help clarify the application of enforcement in Seattle

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## Appendices

- Appendix A – Definitions
- Appendix B – Background Information on Chemical Treatment
- Appendix C – On-site Stormwater List BMP Infeasibility Criteria **\*New\***
- Appendix D – Subsurface Characterization and Infiltration Testing for Infiltration Facilities **\*New\***
- Appendix E – Additional Design Requirements **\*New\***

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## Appendices

- Appendix F – Hydrologic Analysis and Design **\*New\***
- Appendix G – Stormwater Control Operations and Maintenance Requirements
- Appendix H – Financial Feasibility Documentation for Vegetated Roofs and Rainwater Harvesting **\*New\***
- Appendix I- Integrated Pest Management Plan

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## Appendices – Minor Changes

- Minor changes to the following Appendices:
  - Appendix A – Definitions:
    - Revised definitions for equivalency
    - Includes definitions from all volumes
  - Appendix B – Background Information on Chemical Treatment
    - Removed a section for consistency with Ecology’s SWMMWW
  - Appendix G – Stormwater Control Operations and Maintenance Requirements
    - Updated guidance for LID BMP O&M tables
    - Removed maintenance frequencies
    - Simplified all O&M tables and language
  - Appendix I- Integrated Pest Management Plan
    - Minor edits

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## Appendix C

C

- Appendix C – On-site Stormwater List BMP Infeasibility Criteria **\*New\***
  - Added tables of infeasibility criteria for each BMP to evaluate feasibility when using the On-Site List approach
  - Combined GSI to MEF DRs with Ecology’s SWMMWW infeasibility criteria

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## Appendix D

D

- Appendix D – Subsurface Characterization and Infiltration Testing for Infiltration Facilities **\*New\***
  - Provides the minimum investigation requirements for infiltration BMPs
  - Use with Volume 3, Section 3.2-3.5, and Chapter 5 Infiltration BMPs

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## Appendix D

D

- Changes to 2009 Volume 3, Appendix E - City of Seattle Modified Procedure for Conducting a Pilot Infiltration Test (PIT):
  - Added Subsurface Characterization Reporting requirements
  - Revised to include updated procedures for simple, small PIT, large PITs, and deep infiltration tests
  - Edits to correction factors and correction factor calculations

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## Appendix D

D

- Table of Contents:
  - D-1. Roles and Responsibilities of Licensed Professionals
  - D-2. Subsurface Investigations (General, Simple, Standard, Comprehensive, and Deep)
  - D-3. Infiltration Tests (Simple, Small PIT, Large PIT, Deep)
  - D-4. Infiltration Rate Correction Factor
  - D-5. Groundwater Monitoring
  - D-6. Characterization of Infiltration Receptor
  - D-7. Groundwater Mounding and Seepage Analysis
  - D-8. Acceptance Testing



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## Appendix E

E

- Table of Contents:
  - E-1. Flow Control Structures (From Vol. 3)
  - E-2. Flow Splitters (From Vol. 3)
  - E-3. Flow Spreaders (From Vol. 3)
  - E-4. Level Spreaders (From Vol. 2)
  - E-5. Pipe Slope Drains (From Vol. 2)
  - E-6. Outlet Protection (From Vol. 2)
  - E-7. Facility Liners (From Vol. 3)
  - E-8. Geotextiles (From Vol. 3)
  - E-9. Plant Lists for Bioretention, Biofiltration Swales, Sand Filters, and Wet Ponds \*New\*
  - E-10. Drywell Sizing Tables \*New\*



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## Appendix F

F

- Appendix F – Hydrologic Analysis and Design
  - \*New\* (text from Vol. 3, Chapter 6)
  - F-1. Introduction
  - F-2. Applicability of Hydrologic Analysis Methods
  - F-3. General Modeling Guidance
  - F-4. Continuous Rainfall-runoff methods
  - F-5. Single-Event Rainfall- Runoff Methods
  - F-6. Rational Method
  - F-7. Risk-Based Hydrologic Design Concepts
  - F-8. References
  - Attachment 1- Design Storm Dimensionless Hyetograph Ordinates (From Vol. 3, Appendix B)
  - Attachment 2- Precipitation Magnitude-Frequency Estimates for SPU Rain Gage Locations (From Vol. 3, Appendix C)



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## Appendix H

H

- Appendix H – Financial Feasibility Documentation for Vegetated Roofs and Rainwater Harvesting
  - \*New\*
  - Based on text currently included in the GSI to MEF (DR 15-2012 and DR 16-2012)
  - Short appendix (1 page) that provides submittal requirements for documenting financial infeasibility of vegetated roofs and rainwater harvesting



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## Timeline

- ✓ • **Spring 2013:** Outreach to Frequent Users
- ✓ • **Summer 2013:** Initial Outreach
- ✓ • **Fall 2013 / Winter 2014:** Public Outreach
- ✓ • **Spring 2014:** Initial drafts available for public comment
- ✓ • **Spring/Summer 2015:** Legislative process and formal public review for 2016 Stormwater Code Update
- • **Fall 2015:** Directors’ Rule process and formal public review for 2016 Stormwater Manual Update
  - **October 18, 2015 – Comments Due**
- **January 2016:** Stormwater Manual and Code are scheduled to take effect



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## Questions

**Ede Courtenay**  
 Engineering Services Drainage Review - DPD  
[Ede.Courtenay@Seattle.gov](mailto:Ede.Courtenay@Seattle.gov)  
 (206) 733 – 9679



**Michelle Lange**  
 Development Services Office - SPU  
[Michelle.Lange@Seattle.gov](mailto:Michelle.Lange@Seattle.gov)  
 (206) 727 – 8726

**Sherell Ehlers, P.E.**  
 Stormwater Policy - SPU  
[Sherell.Ehlers@Seattle.gov](mailto:Sherell.Ehlers@Seattle.gov)  
 (206) 386 - 4576



