Clarification Sheet for SEATTLE STORMWATER MANUAL

This document contains clarifications for the January 2016 City of Seattle Stormwater Manual.

The Final 2016 City of Seattle Stormwater Manual documents are available on the following website:

http://www.seattle.gov/dpd/codesrules/codes/stormwater/

#	Date Added	Volume / Appendix	Section	Page No.	Figure / Table	Clarification
1	5/9/2016	Volume 1	Chapter 5	Page 5-1 to 5-16	NA	Header for Chapter 5 should be revised as follows: "Chapter ~~4~~ 5- Minimum Requirements~~s~~ Standards ~~Based on Project Type"~~
2	5/9/2016	Volume 1	Section 5.2.2.2	Page 5-6	Table B for 22.805.070.	**On-site List for Trail and Sidewalk Project.** Per Stormwater Code Section 22.805.070.D.3, Table B, revise this table as follows: • Category 2, Column 2, Row 2: revise to "Permeable Pavement ~~Surfaces~~ Facilities" • Category 2, Column 2, Row 3: revise to "Permeable Pavement ~~Facilities~~ Surfaces"
3	5/9/2016	Volume 3	Section 5.3.3.5	Page 5-17	NA	**Splashblock Downspout Dispersion - Contributing Area.** Revise this section as follows: "A maximum of 700 square feet of roof area may drain to each splashblock. If at least 50 percent of the roof is a vegetated roof, contributing roof areas ~~larger than~~ up to ~~700~~ 900 square feet ~~may~~ will be ~~approved~~ allowed."

#	Date Added	Volume / Appendix	Section	Page No.	Figure / Table	Clarification
4	5/9/2016	Volume 3	Section 5.3.5.5	Page 5-28	NA	**Sheet Flow Dispersion - Dispersion Flowpath.** Revise this section as follows: "The general minimum requirements associated with the dispersion flowpath are provided in *Section 5.3.1.2*. An additional flowpath requirement specific to sheet flow dispersion is as follows: • Provide a vegetated flowpath of 10 feet to disperse sheet flow runoff from hard surface with a contributing flow length of 20 feet. If the contributing hard surface is at least 50 percent permeable pavement, the contributing flow length may be increased from 20 to 25 feet. Provide an additional 10 linear feet of vegetated flowpath for each additional 20 linear feet of contributing flow length or fraction thereof. • Down gradient of the required flowpath (per the bullet above), an additional 10 feet shall be provided before the flowpath intersects a property line (excluding the property line abutting the right-of-way) or encounters a structure."
5	5/9/2016	Volume 3	Section 5.3.6.5	Page 5-31	NA	**Concentrated Flow Dispersion - Contributing Area**. Revise this section as follows. "A maximum of 700 square feet of impervious area may drain to each concentrated flow dispersion device (i.e., rock pad or dispersion trench). Larger contributing areas may be approved for other types of hard surfaces (e.g., permeable pavement). If at least 50% of the contributing area is permeable pavement, contributing areas up to 900 square feet will be allowed."

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6	5/9/2016	Volume 3	Section 5.3.6.5	Page 5-33	NA	**Concentrated Flow Dispersion - Dispersion Trench.** Revise this section as follows: "If selected as the dispersion device, the dispersion trench design shall meet the following minimum requirements: • The trench shall be a minimum of 18 inches deep and 2 feet wide. • The trench shall be level and aligned parallel to site elevation contours to disperse the water to the downslope flowpath. The trench shall be constructed to prevent point discharge and erosion. • Trenches serving up to 700 square feet of impervious area shall be 10-foot-long. If the contributing area is not an impervious surface (e.g., permeable pavement), contributing areas larger than 700 square feet may be approved for a 10-foot trench. If at least 50% of the contributing area is permeable pavement, contributing areas up to 900 square feet will be allowed for a 10-foot trench. For contributing areas greater than the contributing areas noted above, the trench length shall be calculated as a minimum of ten feet plus a proportional trench length based on the additional contributing area. For example, trench length for trenches serving non-permeable pavement areas larger than 700 square feet shall be calculated as: Total roof area in square feet x 10 feet ÷ 700 square feet. • A setback of at least 5 feet shall be maintained between any edge of the trench and any structure or property line. A 10-foot setback from a building with a basement is recommended."
7	5/9/2016	Volume 3	Section 5.4.4.5	Page 5-60	NA	**Infiltrating Bioretention - Ponding Area [in the right-of-way].** Third paragraph, first bullet and sub-bullets. Revise as follows: • "To address traffic and pedestrian safety concerns, the following additional minimum requirements apply to bioretention facilities in the right-of-way: ○ The following minimum setbacks shall be provided for facilities with sloped sides: ○ 2 feet minimum from face of curb to top of slope on non-~~major~~ principal arterial streets ○ 4 feet minimum from face of curb to top of slope for ~~major~~ principal arterial street ○ 1 foot minimum from edge of sidewalk to top of slope"

8	5/9/2016	Volume 3	Section 5.4.4.6	Page 5-67 to 5-68	Table 5.18	**On-site List Sizing for Infiltrating Bioretention with and Without Underdrains.** Revise this table as follows:

Bioretention Configuration	Average Ponding Depth	Subgrade Soil Design Infiltration Rate	Sizing Factor for Facility Bottom Area	
			Without Underdrain[a]	With Underdrain[b]
Sloped sides	2 inches	0.15 inch/hour	NA[c]	8.9%[d]
		0.3 inch/hour	4.7%[e]	5.2%[d]
		0.6 inch/hour	4.5%	5.0%
		1.0 inch/hour	4.5%	5.0%
		2.5 inch/hour	4.5%	5.0%
	6 inches	0.15 inch/hour	NA[c, f]	~~NA~~[f] 5.6%[d]
		0.3 inch/hour	3.5%	3.9%
		0.6 inch/hour	3.5%	3.9%
		1.0 inch/hour	3.5%	3.9%
		2.5 inch/hour	3.5%	3.9%
Sloped sides (continued)	12 inches	0.15 inch/hour	NA[c, f]	~~NA~~[f] 3.2%[d]
		0.3 inch/hour	NA[f]	~~NA~~[f] 2.6%
		0.6 inch/hour	2.3%	2.6%
		1.0 inch/hour	2.3%	2.6%
		2.5 inch/hour	2.3%	2.6%
Vertical sides	6 inches	0.15 inch/hour	NA[c, f]	~~NA~~[f] 9.2%[d]
		0.3 inch/hour	5.3%[e]	5.9%[d]
		0.6 inch/hour	5.0%[g]	5.6%[g]
		1.0 inch/hour	5.0%[g]	5.6%[g]
		2.5 inch/hour	5.0%[g]	5.6%[g]
	12 inches	0.15 inch/hour	NA[c, f]	~~NA~~[f] 7.1%[d]
		0.3 inch/hour	NA[f]	~~NA~~[f] 5.6%
		0.6 inch/hour	5.0%	5.6%
		1.0 inch/hour	5.0%	5.6%
		2.5 inch/hour	5.0%	5.6%

NA – not applicable.

[a] Sizing factors are based on achieving a minimum wetted surface area of 5 percent, unless otherwise noted.

[b] Sizing factors are based on a minimum wetted surface area of 5 percent multiplied by a factor of 1.11, unless otherwise noted.

[c] Underdrain systems shall be installed if the subgrade soils have a measured infiltration rate of less than 0.6 inches per hour (note that the infiltration rates listed in the table are design rates).

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						[d] Sizing factor increased to the size required to meet the On-site Performance Standard for a pre-developed condition of forest on till and multiplied by a factor of 1.11. [e] Sizing factor increased beyond the minimum wetted surface area of 5 percent to meet the On-site Performance Standard for a pre-developed condition of forest on till. [f] Ponding depth and infiltration rate combination do not achieve drawdown requirements. [g] To maximize flow control benefit, 12 inch vertical side walls are recommended for design infiltration rates exceeding 0.3 inches per hour. Bioretention Facility Bottom Area = Contributing Hard Surface Area x Factor (%)/100. Hard Surface Area Managed = Bioretention Facility Bottom Area ÷ Factor (%)/100.
9	5/9/2016	Volume 3	Section 5.4.5.5	Page 5-79	NA	**Rain Garden – Ponding Area [in the right-of-way].** First bullet and sub-bullets. Revise as follows: • "The following minimum setbacks shall be provided: ○ 1.5 feet minimum from face of curb to top of slope on non-arterial streets for rain gardens with average ponding depths of 3 inches or less ○ 2 feet minimum from face of curb to top of slope on non-arterial streets for rain gardens with average ponding depths greater than three inches ○ 2 feet minimum from face of curb to top of slope on non-~~major~~ principal arterial streets ~~(1.5-foot setback allowable for rain gardens with average ponding depths of 3 inches or less)~~ ○ 4 feet minimum from face of curb to top of slope for ~~major~~ principal arterial street ○ 1 foot minimum from edge of sidewalk to top of slope"
10	5/9/2016	Volume 3	Section 5.4.7.5	Page 5-102	Figure 5.17	**Perforated Stub-Out Connection.** Revise this figure as follows: • Delete "LEVEL", "SLOPE" and "FLOW" call outs and arrows
11	5/9/2016	Volume 3	Section 5.4.9.6	Page 5-110	Table 5.26	**Pre-sized Sizing Factors and Equations for Infiltration Chambers.** Revise this table as follows: • Reverse bracket on 4th row, 3rd column: [0.0733 x A~~[~~]+ 79.9

#	Date Added	Volume / Appendix	Section	Page No.	Figure / Table	Clarification
12	5/9/2016	Volume 3	Section 5.8.2.6	Page 5-167	NA	**Non-infiltrating Bioretention - Pre-sized Approach for Flow Control and Water Quality Treatment.** First bullet. Revise as follows: • "The bottom area shall be sized using the applicable sizing factor or equation. When used to meet the Peak Control Standard, the facility size shall not be significantly larger (i.e., area shall not be more than 25 percent larger) than prescribed by the Peak Control Standard sizing factor because peak flow control performance may be diminished for larger facilities."
13	5/9/2016	Volume 3	Section 5.8.2.6	Page 5-167	Table 5.45	**Non-infiltrating Bioretention - Pre-Sized Sizing Factors and Equations.** Revise footnote b as follows: "b. When used to meet the Peak Control Standard, the facility size shall not be significantly larger (i.e., area shall not be more than 25 percent larger) than prescribed by the sizing factor (or sizing factor range) because flow control performance may be diminished for larger facilities (larger facilities will not pond water sufficiently to slow flows)."
14	5/9/2016	Appendix D	Section D-3.3	Page D-9	NA	**Small Pilot Infiltration Test (Small PIT) - Step 9.** Change from "At the conclusion of testing, over-excavate the pit…" to "Within 24 hours after the falling head period, over-excavate the pit…"
15	5/9/2016	Appendix F	Section F-3	Page F-9	Table F.7	**Physical Characteristics of Seattle Lakes - Outfalls to Lakes and the Ship Canal.** Revise this table as follows: • Water surface elevation on 2nd row, 5th column [Lake Union] and 6th column [Lake Washington]: ~~16.8~~18.6
16	5/9/2016	Appendix F	Section F-4	New Section	NA	**On-site Performance Standard BMP Design** See Attachment 1 to this Clarification Sheet for additional modeling information related to the On-site Performance Standard.

#	Date Added	Volume / Appendix	Section	Page No.	Figure / Table	Clarification
17	7/22/16	Volume 3	Section 4.3.2.1	Page 4-11	NA	**Requirements for Projects with No Off-site Point of Discharge.** Revise the third paragraph as follows: One option for a small project ((~~overflow scenario~~)) with no approved off-site point of discharge consists of an infiltration BMP (i.e., infiltration trench, drywell or infiltration chamber) situated downstream of a bioretention cell or a permeable pavement facility sized to infiltrate storms up to the conveyance standard (25-year recurrence interval flow). Refer to *Appendix E, Section E-10* for dry well sizing provided for this scenario ((~~information~~)).
18	7/22/16	Volume 3	Section 5.4.3.6	Page 5-48	NA	**BMP Sizing - Sizing for On-site List Approach.** Revised the first paragraph as follows: Drywells can only be selected to meet the On-site List Requirement (refer to *Section 3.3.1* and *Appendix C* for infeasibility criteria) when the site measured infiltration rate is at least 5 inches per hour. The hard surface area managed with a drywell sized according to Table 5.14 meets the requirement. ((~~For sizing a drywell downstream of a bioretention cell or permeable pavement facility, refer to *Appendix E, Section E-10.*~~))
19	7/22/16	Volume 4	Section 3.2.2	Pages 3-11 – 3-15	NA	**BMP 10: Fueling at Dedicated Stations** See Attachment 2 to this Clarification Sheet for clarifications related to BMP 10.
20	7/22/16	Appendix E	Section E-10	Page E-61	NA	**Drywell Sizing Tables.** Revise the first paragraph as follows: ((~~The City has determined that the most common small project overflow scenario consists of a drywell situated downstream of a bioretention cell or a permeable pavement facility.~~)) For small projects with no approved off-site point of discharge (see *Section 4.3.2.1*), Table E.25 and Table E.26 specify the required area for drywells of 4-foot and 6-foot depths to be used ((~~as overflow/point of discharge~~)) downstream of a bioretention cell or a permeable pavement facility for parcel-based and single-family residential projects, respectively.

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21	7/22/16	Appendix E	Section E-10	Page E-62	NA	**Drywell Sizing Tables.** Revise the first paragraph as follows: ((~~Drywells that do not meet the above design criteria and the assumptions shall be sized to meet the Peak Control Standard per *Volume 3, Section 5.4.3.* For projects that discharge directly to a drywell (if a bioretention cell or permeable pavement facility are not feasible upstream), the drywell shall be sized to meet the Peak Control Standard per *Volume 3, Section 5.4.3.*~~)) Table E.27 specifies the required area for drywells of 4-foot and 6-foot depths that are not located downstream of a bioretention cell or permeable pavement facility.
22	7/22/16	Appendix E	Section E-10	Page E-62	NA	**Drywell Sizing Tables.** Add the following after Table E.27: Drywells that do not meet the above design criteria and assumptions shall be sized to meet the requirements for projects with no off-site point of discharge per *Volume 3, Section 4.3.2.1.*
23	7/22/16	Appendix F	Section F-4	Page F-14	NA	**HSPF Parameter Modification.** Revise the first paragraph as follows: In HSPF (and MGSFlood and WWHM) pervious land categories are represented by PERLNDs and impervious land categories are represented by IMPLNDs. The only PERLND and IMPLND parameters that should ~~are authorized to~~ be adjusted by the user are LSUR (length of surface overland flow plane in feet), SLSUR (slope of surface overland flow plane in feet/feet), and NSUR (roughness of surface overland flow plane). These are parameters whose values are observable at an undeveloped site, and whose values can be reasonably estimated for the proposed development site. Any such changes will be recorded in the model output. The user ((~~should~~)) shall submit ~~justifications for~~ PERLND and IMPLND changes with their project submittal.

<table>
<tr><th>#</th><th>Date Added</th><th>Volume / Appendix</th><th>Section</th><th>Page No.</th><th>Figure / Table</th><th>Clarification</th></tr>
<tr><td>23</td><td>7/22/16</td><td>Appendix G</td><td>Section No. 18</td><td>Page G-43</td><td>NA</td><td><u>No. 18 – API Oil/Water Separators.</u> Revise Table No. 18 as follows:
<table>
<tr><th>Maintenance Component</th><th>Defect or Problem</th><th>Condition When Maintenance is Needed</th><th>Results Expected When Maintenance is Performed</th></tr>
<tr><td>Inlet/Outlet Pip</td><td><u>Missing</u></td><td><u>When the required inlet or outlet tee is not installed</u></td><td><u>Tees installed</u></td></tr>
<tr><td></td><td><u>Permanently installed</u></td><td><u>When the tee is grouted to the inlet or outlet pipe and is not removable to allow for maintenance and inspection</u></td><td><u>Tee removable for maintenance and inspection</u></td></tr>
<tr><td></td><td><u>Damaged</u></td><td><u>Cracks, broken welds, seams or any other conditions that allows water to be discharged from other than the submerged portion of the tee</u></td><td><u>Water will be discharged from the submerged portion of the tee.</u></td></tr>
</table></td></tr>
<tr><td>24</td><td>7/22/16</td><td>Appendix G</td><td>Section No. 19</td><td>Page G-45</td><td>NA</td><td><u>No. 19 – Coalescing Plate Oil/Water Separators.</u> Revise Table No. 19 as follows:
<table>
<tr><th>Maintenance Component</th><th>Defect or Problem</th><th>Condition When Maintenance is Needed</th><th>Results Expected When Maintenance is Performed</th></tr>
<tr><td>Inlet/Outlet Pip</td><td><u>Missing</u></td><td><u>When the required inlet or outlet tee is not installed</u></td><td><u>Tees installed</u></td></tr>
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