Clarification Sheet for
2021 SEATTLE STORMWATER MANUAL

This document contains clarifications for the July 2021 City of Seattle Stormwater Manual that was published in July 2021. The published document without these clarifications is available on SDCI's Stormwater Code web page: http://www.seattle.gov/sdci/codes/codes-we-enforce-(a-z)/stormwater-code

<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>1.</td><td>5/24/2022</td><td>1</td><td>2.1.2</td><td>2-2</td><td>NA</td><td>

Closely Related Projects

To add missing municipal code language from 22.805.010.B, revise this section as follows:

<table>
<tr><th>Stormwater Code Language</th><th>References</th></tr>
<tr><td>Closely related projects shall be considered as one project for purposes of applying the Stormwater Code, including but not limited to determining whether the thresholds for applicability of particular Stormwater Code minimum requirements are met. The Director shall determine whether two or more projects are closely related as specified in the joint SPU/SDCI Directors' Rule titled "Seattle Stormwater Manual" at "Volume 1—Project Minimum Requirements."</td><td>

- None provided

</td></tr>
</table>

</td></tr>
<tr><td>2.</td><td>5/24/2022</td><td>1</td><td>2.3</td><td>2-11</td><td>NA</td><td>

Step 3 - Identify the Receiving Water and Downstream Conveyance

To add an e-mail address for capital improvement projects and revise for consistency with the Public Drainage System Director's Rule, revise this section as follows:

"To determine Stormwater Code project requirements for projects that are not required to go through the PAR process, contact the Drainage Review Team at:

1. SideSewerInfo@seattle.gov for projects conducted on private property, ~~or~~
2. SPU_PlanReview@Seattle.gov for developer-related projects conducted in the right-of-way~~.~~, or
3. SPU_CIP_Review@seattle.gov for capital improvement projects."

</td></tr>
<tr><td>3.</td><td>5/24/2022</td><td>3</td><td>4.1.3</td><td>4-6</td><td>NA</td><td>

General Design Requirements - Modeling Approach

To update approval status of MGSFlood, revise this section as follows:

"Unless otherwise specified, all continuous modeling shall be performed using the City of Seattle Design Time Series (consisting of a 158-year precipitation and evaporation time series that is representative of the climatic conditions in the City of Seattle) and a 5-minute computational time step (refer to Table F.12 in Appendix F, Section F-4 for correct time step). ~~At the time of publication of the 2021 Seattle Stormwater Manual, the approval of MGSFlood is limited and was not approved for modeling bioretention (infiltrating or non-infiltrating) by Ecology.~~ Refer to the Approval Status of Continuous Simulation Models section of the SWMMWW for a list of currently approved models and limitations."

</td></tr>
<tr><td>4.</td><td>5/24/2022</td><td>3</td><td>5.3.4.6</td><td>5-26</td><td>5.7</td><td>

Trench Downspout Dispersion - Modeling Approach

To correct precipitation series specified for modeling, revise Table 5.7 as follows:

Table 5.7. Continuous Modeling Assumptions for Trench Downspout Dispersion.

<table>
<tr><th>Variable</th><th>Assumption</th></tr>
<tr><td>Precipitation Series</td><td>~~Seattle 2021 Precipitation Time Series~~
Seattle 158-year, 5-minute Series</td></tr>
</table>

</td></tr>
</table>

#	Date Added	Volume / Appendix	Section	Page No.	Figure / Table	Clarification
5.	5/24/2022	3	5.3.7.6	5-40	5.13	**Sidewalk/Trail Compost Amended Strip - Modeling Approach** To correct precipitation series specified for modeling, revise Table 5.13 as follows:

Table 5.13. Continuous Modeling Assumptions for Sidewalk/Trail Compost-Amended Strips.

Variable	Assumption
Precipitation Series	~~Seattle 2021 Precipitation Time Series~~ Seattle 158-year, 5-minute Series
Computational Time Step	5 minutes
HSPF Parameters	LSUR, SLSUR, NSUR shall be adjusted per *Appendix F*
Precipitation and Evaporation Applied to BMP	Yes
Minimum Pervious Strip Depth	8 inches
Embankment Height	Dependent on width of BMP. BMP surface slope shall not exceed 25 percent or be less than 2 percent.
Compost-Amended Strip Slope	Shall not exceed 25 percent or be less than 2 percent.
Maximum Water Depth	1 inch
Compost-Amended Soil Hydraulic Conductivity	1 inch per hour
Compost-Amended Soil Porosity	30 percent
Subgrade Soil Design Infiltration Rate	Design infiltration rate (*Section 3.2* and *Appendix D*). If no testing is conducted, assume an infiltration rate of 0.15 inch per hour.

The paragraph preceding Table 5.13 is revised as follows:

> "Sidewalk/trail compost-amended strips can also be sized using the forested and pasture On-site Performance Standard. Continuous runoff hydrologic modeling using ~~the~~ a CAVFS element ~~in WWHM~~ may be used to quantify the performance of sidewalk/trail compost-amended strips relative to the On-site Performance Standard using the procedures and assumptions listed in Table 5.13. ~~Modeling in MGSFlood is not currently allowed for this BMP.~~"

<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>6.</td><td>5/24/2022</td><td>3</td><td>5.4.4.5</td><td>5-75 to 5-76</td><td>NA</td><td>
Bioretention (Infiltrating and Non-infiltrating) Overflow Riser and Minimum Required Freeboard

To meet the required 25-year recurrence interval, revise bioretention Overflow section of the Design Criteria as follows:

“Overflow
A bioretention facility overflow controls overtopping with a pipe, an earthen channel, a weir, or a curb cut installed at the designed maximum ponding elevation and is connected to a downstream BMP or an approved point of discharge.

The minimum requirements associated with the overflow design include the following:

Overflows shall convey any flow exceeding the capacity of the facility unless designed to fully infiltrate all flows for the full, required simulation period. Plans shall indicate surface flow paths in case of failure of the BMP (refer to Section 4.3.3).
Freeboard shall be provided to ensure that any overtopping of the facility is safely conveyed to an approved point of discharge without flooding adjacent properties or sidewalks. The minimum freeboard measured from the invert of the overflow point (e.g., standpipe, earthen channel, curb cut) ~~or 25-year recurrence interval water surface elevation~~ (as specified below) to the lowest overtopping elevation of the facility is:

~~2~~ 4 inches measured from the invert of the overflow point for contributing drainage areas less than 3,000 square feet
4 6 inches measured from the invert of the overflow point for contributing drainage areas from 3,000 square feet to ~~5,000~~ 15,000 square feet
~~6~~ 9 inches measured from the invert of the overflow point for contributing drainage areas from greater than ~~5,000~~ 15,000 square feet to ~~10,000~~ 20,000 square feet
For contributing drainage areas greater than 20,000 square feet or when the overflow riser diameter is less than the minimum required, a licensed civil engineer must verify that the freeboard is at least 6 inches ~~of measured from~~ above the 25-year recurrence interval water surface elevation (demonstrated with hydrologic modeling) ~~for contributing drainage areas greater than 10,000 square feet~~ and that the overflow will convey any flow exceeding the capacity of the facility. See the consideration for overflows with grates, such as atrium or dome grates, in the drain riser pipe bullet points below
With a curb and gutter, freeboard may be reduced if the project can demonstrate that any overtopping of the facility for larger events (greater than the 25-year recurrence interval) would be consistent with Section 4.3.3.

The drain riser pipe, if used, shall have a minimum diameter of ~~4 inches.~~:

4 inches for contributing drainage areas less than 3,000 square feet
6 inches for contributing drainage areas from 3,000 square feet to less than 7,500 square feet
8 inches for contributing drainage areas from 7,500 square feet to less than 10,000 square feet
12 inches for contributing drainage areas from 10,000 square feet to 20,000 square feet
For contributing drainage areas greater than 20,000, a licensed civil engineer shall verify that the freeboard is at least 6 inches above the 25-year recurrence interval water surface elevation (demonstrated with hydrologic modeling) for the selected riser diameter and that that the overflow can convey any flow exceeding the capacity of the facility.
When modeling any bioretention facility, the riser diameter used in the hydrologic models must be reduced by at least 50 percent to account for losses from the atrium, dome, beehive or other type of grate that will be fitted on the overflow riser. Also, if available, the engineer shall verify with the manufacturer that the grate has capacity to convey all flows in the simulation period given without overtopping the facility walls/edges (i.e. top of freeboard).

Alternative overflow freeboard depths and drain riser pipe diameters may be proposed by a licensed civil engineer if hydrologic models are provided to demonstrate that the overflow can convey all flows in the required simulation period without overtopping the facility walls/edges (i.e. top of freeboard).

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</table>

<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>7.</td><td>5/24/2022</td><td>3</td><td>5.4.4.6</td><td>5-85</td><td>NA</td><td>

Infiltrating Bioretention - Modeling Approach

To clarify that the new bioretention element in MGSFlood must be used to model bioretention, revise this section as follows:

"When using continuous simulation hydrologic modeling to size bioretention cells, the assumptions listed in Table 5.24 shall be applied. Refer to the *Approval Status of Continuous Simulation Models* section of the SWMMWW for a list of currently approved models. ~~Infiltrating bioretention can be modeled as a layer of soil (with specified design infiltration rate and porosity) with ponding, infiltration to underlying soil and overflow.~~ If MGSFlood is used, the "Ecology Bioretention" element must be used to represent bioretention. The contributing area, cell bottom area, and ponding depth should be iteratively sized until the Minimum Requirements for On-site Stormwater Management, Flow Control and/or Treatment are met (refer to *Volume 1 — Project Minimum Requirements*) or where it has been determined by the Director that there is no off-site point of discharge for the project, the requirements of *Section 4.3.2* are met. General sizing procedures for infiltration facilities are presented in *Section 4.5.1*."

</td></tr>
<tr><td>8.</td><td>5/24/2022</td><td>3</td><td>5.4.4.6</td><td>5-85 to 5-86</td><td>5.24</td><td>

Infiltrating Bioretention - Modeling Approach

To correspond to the inputs for the bioretention element in WWHM and the new bioretention element in MGSFlood, revise the modeling assumptions in Table 5.24 as follows:

Table 5.24. Continuous Modeling Assumptions for Infiltrating Bioretention.

<table>
<tr><th>Variable</th><th>Assumption</th></tr>
<tr><td>Precipitation Series</td><td>Seattle 158-year, 5-minute series</td></tr>
<tr><td>…</td><td></td></tr>
<tr><td>Bioretention Soil Type</td><td>SMMWW 12 in/hr</td></tr>
<tr><td>Bioretention Soil Infiltration Rate</td><td>The design infiltration rate shall be 6 inches per hour. Apply a saturated hydraulic conductivity (KSat) safety factor of 2 when using the SMMWW 12 in/hr bioretention soil type.</td></tr>
<tr><td>Bioretention Soil Porosity</td><td>~~A 30% porosity shall be assumed for facility sizing.~~ Use the default Bioretention Soil Porosity included in WWHM and MGSFlood for the SMMWW 12in/hr soil type.</td></tr>
<tr><td>Bioretention Soil Depth</td><td>For facilities without underdrains, the soil shall have a minimum of 12 inches for flow control and minimum of 18 inches for water quality treatment. For facilities with underdrains, the soil shall have a minimum depth of 18 inches.</td></tr>
<tr><td>Subgrade (Native) Soil Design Infiltration Rate</td><td>Design infiltration rate (*Section 4.5.2*, *Appendix D*)</td></tr>
<tr><td>Liner</td><td>The horizontal footprint of a liner shall be excluded from the infiltration area (bottom area and/or side slopes)</td></tr>
<tr><td>Underdrain (if required)</td><td>If an underdrain is simulated, a gravel aggregate layer must be included for the underdrain layer media. The default underdrain invert elevation is located at the bottom of the lowest soil layer unless a height or offset is specified.
If the underdrain is elevated above the bottom extent of the aggregate layer, water stored in the aggregate below the underdrain invert may be modeled to provide storage and infiltrate to subsurface soil.
For the purposes of this manual, underdrains meeting the bedding requirements shown in Figures 5.13 and 5.14 are considered "elevated" by 6 inches. In order to model the underdrain with underlying storage and infiltration, the aggregate gravel reservoir shall extend across the bottom of the facility. The underdrain pipe could be further elevated for improved flow control performance.</td></tr>
<tr><td>Underdrain Layer Media Type</td><td>Gravel</td></tr>
<tr><td>Overflow Structure</td><td>The overflow elevation shall be set at the maximum ponding elevation (excluding freeboard). It may be modeled as weir flow over a riser edge. Note that the total facility depth (including freeboard) shall be sufficient to allow water surface elevation to rise above the overflow elevation to provide head for discharge.
Vertical risers with grates shall be modeled with a riser diameter that is reduced by at least 50-percent of the overflow diameter that will be constructed to account for losses from the grate.</td></tr>
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<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>9.</td><td>5/24/2022</td><td>3</td><td>5.7.2.6</td><td>5-170</td><td>5.39</td><td>

Detention Pipe - Pre-sizing Equation

To correct pre-sizing equation, Table 5.39 is revised as follows:

Table 5.39. Pre-sized Sizing Equations for Detention Pipe.

<table>
<tr><th rowspan="2">Detention Pipe Diameter[a]</th><th rowspan="2">Contributing Area</th><th colspan="4">Sizing Equation for Pipe Length</th></tr>
<tr><th>Pre-developed Pasture Standard</th><th>Pre-Developed Pasture Standard Orifice Diameter for Construction</th><th>Peak Control Standard</th><th>Peak Control Standard Orifice Diameter for Construction</th></tr>
<tr><td rowspan="4">24 inches</td><td>2,000 – 5,000 sf</td><td rowspan="4">[0.0571 x A] + 49.5</td><td rowspan="4">0.5</td><td rowspan="4">[0.0475 x A] + 27</td><td rowspan="2">0.5</td></tr>
<tr><td>5,001 – 6,000 sf</td></tr>
<tr><td>6,001 – 8,500 sf</td><td>0.625</td></tr>
<tr><td>8,501 – 10,000 sf</td><td>0.75</td></tr>
<tr><td rowspan="3">36 inches</td><td>2,000 – 5,000 sf</td><td rowspan="3">~~[0.0733 x A] - 220.95~~ [0.0257 x A] + 21.8</td><td rowspan="3">0.5</td><td rowspan="3">[0.0236 x A] + 6.75</td><td rowspan="2">0.5</td></tr>
<tr><td>5,001 – 7,000 sf</td></tr>
<tr><td>7,001 – 10,000 sf</td><td>0.625</td></tr>
</table>

</td></tr>
<tr><td>10.</td><td>5/24/2022</td><td>3</td><td>5.8.2.6</td><td>5-194</td><td>NA</td><td>

Non-Infiltrating Bioretention - Pre-sizing Example

To correct the pre-sizing example for non-infiltrating bioretention to correspond to the sizing factor provided, revise this section as follows:

> "The bottom area for the cell is calculated as a function of the hard surface area routed to it. As an example, the bottom area of the bioretention cell with sloped sides would be equal to ~~2.6~~ 0.4 percent of the hard surface area routed to it when the average ponding depth is 12 inches. For facilities with sloped sides, the top area is calculated as a function of the cell bottom area and the side slopes up to the total facility depth (i.e., ponding and freeboard depth)."

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</table>

#	Date Added	Volume / Appendix	Section	Page No.	Figure / Table	Clarification
11.	5/24/2022	B	B-1.1.2	B-1 to B-2	NA	**Preliminary Drainage Control Plans for Short Plats** To clarify when Preliminary Drainage Control Plans are required based on mainline extensions and to move language about construction permits to the correct paragraph as follows, revise this section as follows: *"Short Plats* Short Plats (a.k.a. Short Subdivisions) per SMC 23.24 require a similar level of detail as Full Subdivisions for approval of Preliminary Drainage Control Review. **Deferred Drainage Plans for Some Projects:** The requirement for a Preliminary Drainage Control Plan and Report may be deferred until the construction permit by the Director if all of the following conditions are met: 1. The full development potential in the Short Plat, including all lots, parcels, and tracts, does not exceed the thresholds established for flow control or water quality treatment ~~or require a mainline extension~~, 2. The project has an approved offsite discharge point for drainage (e.g., public storm drain) and any required or planned extension of the public storm drainage system (i.e., mainline extension) is clearly feasible via gravity flow and SPU design requirements, 3. The downstream drainage system has adequate capacity, 4. Drainage Condition #1 in *Section B-1.1.4* is placed on the first sheet of the recorded plat. Otherwise, a Preliminary Drainage Control Plan and Report, and all supporting documents as described in *Volume 1, Section 8.1* must be submitted and approved prior to approval of the Short Plat. ~~Depending on the scope and location, this will require a Grading Permit, Building Permit, or an SDOT SIP Permit.~~ Subsequent construction permits in the short subdivision must demonstrate with Standard or Comprehensive Drainage Control Plans that they are compliant with the intent of the approved Preliminary Drainage Control Plan. Depending on the scope and location, this will require a Grading Permit, Building Permit, or an SDOT SIP Permit. Note: Additional requirements apply to permitting and construction of drainage control facilities and drainage systems that will be shared by multiple parcels, lots, tracts, etc., in the Subdivision. Refer to *Section B-1.1.3*."

<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>12.</td><td>5/24/2022</td><td>F</td><td>F-2</td><td>F-2</td><td>F.1</td><td>

Applicability of Hydrologic Analysis Methods - Applicable Models

To clarify that Ecology manual for list of approved models applies to all continuous models, not only MGSFlood, modify Table F.1 as follows:

Table F.1. Hydrologic Analysis Method Applicability.

<table>
<tr><th>Method</th><th>Applicable Models</th><th>Constraints</th><th>On-site BMP Sizing</th><th>FC BMP Sizing</th><th>WQ BMP Sizing</th><th>Conveyance Sizing</th><th>TESC Design Flow Sizing</th></tr>
<tr><td>Continuous Rainfall-runoff Modeling [a]</td><td>13. HSPF
14. MGSFlood [a]
15. WWHM
16. Other[b]</td><td>Refer to Table F.12 for time step requirements</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Single-event Rainfall-runoff Modeling</td><td>17. NRCS TR-55
18. SBUH
19. StormShed
20. Corps of Engineers HMS and HEC-1
21. EPA SWMM, PCSWMM, and XP-SWMM
22. Other models approved by the Director</td><td>Refer to Table F.14</td><td>NA</td><td>NA</td><td>NA</td><td>✓</td><td>✓</td></tr>
<tr><td>Rational Method</td><td>NA</td><td><10 acres (measured to individual conveyance elements)
Upstream of storage routing and backwater effects</td><td>NA</td><td>NA</td><td>NA</td><td>✓</td><td>✓</td></tr>
</table>

[a] Refer to the *Approval Status of Continuous Simulation Models* section of the SWMMWW for a list of currently approved models.

[b] The following continuous hydrologic models may also be used for project-specific situations: EPA SWMM5, ModFlow, HMS, PCSWMM, and other models approved by the Director.

BMP – Best Management Practice
FC – Flow Control
HSPF – Hydrologic Simulation Program Fortran (US EPA)
NA – Not Applicable
NRCS – Natural Resources Conservation Service
On-site – On-site Stormwater Management
SBUH – Santa Barbara Urban Hydrograph
SWMM – Storm Water Management Model
TESC – Temporary Erosion and Sediment Control
WQ – Water Quality
WWHM – Western Washington Hydrology Model
✓ = acceptable

</td></tr>
<tr><td>13.</td><td>5/24/2022</td><td>F</td><td>F-3</td><td>F-12</td><td>F.7</td><td>

Hydrologic Analysis and Design - Outfalls to lakes and the Ship Canal

To correct the elevation of Lake Union, revise Table F.7 as follows:

Table F.7. Physical Characteristics of Seattle Lakes.

<table>
<tr><th></th><th>Bitter Lake</th><th>Haller Lake</th><th>Green Lake</th><th>Lake Union</th><th>Lake Washington</th></tr>
<tr><td>Water surface elevation (feet, NAVD88)[a]</td><td>434.4</td><td>376.9</td><td>164.3</td><td>~~16.8~~ 18.6</td><td>18.6</td></tr>
<tr><td>Maximum depth (feet)[b]</td><td>31.0</td><td>36.0</td><td>30.0</td><td>50.0</td><td>214</td></tr>
<tr><td>Mean depth (feet)[b]</td><td>16.0</td><td>16.0</td><td>13.0</td><td>34.0</td><td>108</td></tr>
<tr><td>Area (acres)[b]</td><td>19.0</td><td>15.0</td><td>259</td><td>580</td><td>21,500</td></tr>
</table>

[a] SPU Engineering Support Division – Survey Field Books, measurements were all converted to NAVD88 from the old City of Seattle Vertical Datum based on a conversion factor of 9.7 feet.

[b] Sources: King County (2015) and King County (2016).

Note: Water levels may vary from year to year by as much as 3 feet.

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</table>

#	Date Added	Volume / Appendix	Section	Page No.	Figure / Table	Clarification
14.	5/24/2022	F	F-4	F-25	NA	**Continuous Rainfall-Runoff Methods - On-site Performance Standard BMP Design** To clarify text to include specific model versions, revise this section as follows: "The latest versions of MGSFlood (~~as of April 2021~~ Version 4.5.6 and later) include the option to conduct a flow duration analysis based on the 1 to 10 percent exceedance standard. An MGSFlood user can select the option on the LID Duration tab in the Options menu. MGSFlood will then report "pass" or "fail" for the 1 to 10 percent exceedance standard. WWHM does not ~~currently (as of April 2021~~) explicitly report "pass" or "fail" for the 1 to 10 percent exceedance standard. However, WWHM allows the user to define the bounds of duration analysis in term of flow rate (cubic feet per second). A user can calculate the pre-developed pasture 1 and 10 percent exceedance flow rates using the software and manually enter them as the bounds for the flow duration analysis on the Duration Criteria tab in the Options menu. WWHM will then report "pass" or "fail" for the 1 to 10 percent exceedance standard. For users with different or older software, the following procedures may be used to determine compliance with Seattle Stormwater Code. Details are provided for determining compliance with both MGSFlood and WWHM but similar procedures may be applicable to other software programs."
15.	5/24/2022	F	F-4	F-26	NA	**Continuous Rainfall-Runoff Methods - On-site Performance Standard BMP Design** To clarify that compliance with the On-site Performance Standard calculation is not automated for prior versions of MGSFlood, revise this section as follows: "Visual Evaluation of On-site Performance Standard in MGSFlood (Versions prior to 4.5.6) ~~Compliance with the 1 to 10 percent exceedance standard~~ For versions of MGSFlood released prior to Version 4.5.6, evaluation of the 1 to 10 percent exceedance standard is not automated and may be confirmed by visually observing the MGSFlood Flow Duration Plot. The axes on the plot may be adjusted to clearly display the duration curve from 1 to 10 percent exceedance. Step-by-step instructions are provided below."
16.	5/24/2022	F	F-4	F-28	NA	**Continuous Rainfall-Runoff Methods - On-site Performance Standard BMP Design** To clarify that optimization of BMPs for the On-site Performance Standard can be conducted outside of the MGSFlood model, revise this section as follows: "Quantitative Evaluation of the On-site Performance Standard in MGSFlood (Versions prior to 4.5.6) ~~If the user wishes to fully optimize~~ For versions of MGSFlood released prior to Version 4.5.6, BMP sizes can be fully optimized for the 1 to 10 percent exceedance standard~~, values must be calculated and evaluated~~ by conducting calculations outside of the model. Step-by-step procedures are provided below with an example:"

<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>17.</td><td>1/6/2023</td><td>3</td><td>5.8.2</td><td>5-194</td><td>5.45</td><td>

Non-infiltrating Bioretention - BMP Sizing

To clarify that there is no contributing area upper size limit when using On-site List Sizing for Non-infiltrating Bioretention, revise Table 5.45 as follows:

Table 5.45. On-site List Sizing for Non-infiltrating Bioretention.

<table>
<tr><th rowspan="2">Bioretention Configuration</th><th rowspan="2">Average Ponding Depth</th><th rowspan="2">Contributing Area (sf)</th><th>Sizing Factor for Facility Bottom Area</th></tr>
<tr><th>On-site List</th></tr>
<tr><td rowspan="7">Sloped sides</td><td>2 inches</td><td>NA ~~0 – 10,000~~</td><td>1.3%</td></tr>
<tr><td rowspan="3">6 inches</td><td>≤2,000</td><td>[0.0059 x A] - 3.215</td></tr>
<tr><td>2,001 – 10,000</td><td>[0.0097 x A] - 11.297</td></tr>
<tr><td>>10,000</td><td>1.2%</td></tr>
<tr><td rowspan="3">12 inches</td><td>≤2,700</td><td>0.4%</td></tr>
<tr><td>2,001 – 10,000</td><td>[0.0052 x A] - 12.1092</td></tr>
<tr><td>>10,000</td><td>1.0%</td></tr>
<tr><td rowspan="2">Vertical sides</td><td>6 inches</td><td>NA ~~0 – 10,000~~</td><td>1.2%</td></tr>
<tr><td>12 inches</td><td>NA ~~0 – 10,000~~</td><td>1.0%</td></tr>
</table>

NA – not applicable.
Bioretention Bottom Area = Contributing Hard Surface Area x Factor (%)/100.
Hard Surface Area Managed = Bioretention Bottom Area ÷ Factor (%)/100.

</td></tr>
<tr><td>18.</td><td>1/6/2023</td><td>3</td><td>5.8.11.6</td><td>5-249</td><td>NA</td><td>

Proprietary and Emerging Water Quality Treatment Technologies - BMP Sizing

To clarify that project shall confirm water quality design flow rate (typically off-line for proprietary BMPs), revise Step 1 as follows:

Step 1: Determine the water quality design flow rate
Use an approved continuous model to determine the ~~on-line~~ water quality design flow rate using the following assumptions.

</td></tr>
</table>