DISTRICT DEPARTMENT OF THE ENVIRONMENT

RESPONSE TO COMMENTS ON
PROPOSED STORMWATER MANAGEMENT GUIDEBOOK

This document responds to public comments on the District Department of the Environment's proposed Stormwater Management Guidebook (SWMG), which provides technical guidance on complying with the proposed rule for Stormwater Management and Soil Erosion and Sediment Control. The proposed rule was published in the August 10, 2012 issue of the DC Register (59 DCR 009486), and about one week later, the proposed SWMG was made available for review via ddoe.dc.gov/proposedstormwaterrule. The formal comment period closed on November 8, 2012.

In response to the publication of the proposed rule, the District Department of the Environment (Department or DDOE) received twenty-one formal comment letters. Overall, the comments received were very useful and resulted in numerous revisions to the proposed rule.

The rule and SWMG were revised and issued for an informal, thirty day public comment period on March 29, 2013. This Response to Comments document only reflects the Department's views and changes up to that point in time.

This Response to Comments document includes a summary of each commenter's comments. It also describes the Department's response to these comments. Specifically, each comment letter is identified by a unique comment number, the organization or agency on behalf of which the comment was submitted (if any), the name of the person submitting the comment (where provided), and the date of the comment. The page number provided refers to the page number in the document submitted by the commenter.

Throughout this document, DDOE refers to the version of the rule published on August 10, 2012 as the "proposed rule" and the accompanying SWMG as the "proposed SWMG." DDOE refers to the March 29, 2013 version of the rule as the "revised rule" and the accompanying SWMG as the "revised SWMG." From the proposed rule to the revised rule, DDOE changed section and subsection numbers to accommodate new sections and provisions. To avoid confusion, this document indicates whether a reference to a section or subsection is a reference to the proposed rule or SWMG or revised rule or SWMG.

Additional information is available on the rule website at ddoe.dc.gov/proposedstormwaterrule.

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Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
AWDZ	Anacostia Waterfront Development Zone
BMP	Best Management Practice
CDA	Contributing Drainage Area
CF	Cubic Foot
CGP	Construction General Permit
CN	Curve Runoff Number
CSS	Combined Sewer System
DCRA	Department of Consumer and Regulatory Affairs
DDOE	District Department of the Environment
DDOT	District Department of Transportation
DOD	Department of Defense
FHWA	Federal Highway Administration
FTE	Full-time Equivalent
GAR	Green Area Ratio
HEC	Hydrologic Engineering Center
IGCC	International Green Construction Code
ILF	In-Lieu Fee
LOD	Limit of Disturbance
MDA	Maryland Department of Agriculture

MDE	Maryland Department of the Environment
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NJCAT	New Jersey Corporation for Advanced Technology
NJDEP	New Jersey Department of Environmental Protection
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
Offv	Off-Site retention Volume
OTC	Over-the-Counter
PICP	Permeable Interlocking Concrete Pavers
PMR	Protected Membrane Roof
PROW	Public Right-of-Way
RSR	RiverSmart Rewards
SESCP	Soil Erosion and Sediment Control Plan
SOR	Surface Overflow Rate
SRC	Stormwater Retention Credit
STA	Seal of Testing Assurance
SWEMA	Stormwater Equipment Manufacturers Association
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Permit
SWRv	Stormwater Retention Volume
TARP	Technology Acceptance Reciprocity Partnership
TMDL	Total Maximum Daily Load

TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
WLA	Waste Load Allocation

1. American Hydrotech, Inc., Nathan Griswold (November 6, 2012)

a. **(p. 1)** In Section 3.1.1, the Commenter asks how 25% was selected as the size limit for the contributing drainage area.

DDOE Response: Limiting the size of the external drainage area is recommended (similar to permeable pavements) for a variety of reasons: water retention capacity, possibility for erosion, introduction of fines and clogging materials from the external area, rooftop loading, etc. However, the guidebook has been revised to allow larger external drainage areas if the designer can provide supporting documentation and justification.

b. **(p. 1)** In the first paragraph of Section 3.1.4 Green Roof Design Criteria, the Commenter suggests requiring the supplier/manufacturer to provide the saturated weight of their green roof media with supporting laboratory analysis and performance specifications.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

c. **(p. 1)** In Figure 3.1.1 (changed in revised guidebook to Figure 3.1), the Commenter notes that the root layer is shown above the insulation and contends that it should be below the insulation in a PMR, which is the ideal green roof type.

DDOE Response: As there are a variety of systems, the intent of the specification is to provide general standards that can span all the systems. Some of the systems have the root barrier above the insulation, some below (e.g., PMR), and some make these components optional based on the characteristics of the other layers. Clarifications have been added to the Insulation Layer and the Root Barrier sections of the revised guidebook.

d. **(p. 1)** In Section 3.1.4 Functional Elements of a Green Roof System, Design Layer 3 - Insulation Layer, the Commenter suggests addressing the difference between open and closed cell insulation and states that, as a rule of thumb, closed cell is above the waterproofing membrane and open cell is below.

DDOE Response: As there are a variety of systems, the intent of the specification is to provide general standards that can span all the systems. Some of the systems have the root barrier above the insulation, some below (e.g., PMR), and some make these components optional based on the characteristics of the other layers. Clarifications have been added to the Insulation Layer and the Root Barrier sections of the revised guidebook.

e. **(p. 1)** In Section 3.1.4 Functional Elements of a Green Roof System, Design Layer 4 - Root Barrier Layer, the Commenter disagrees with the recommendation to avoid chemical or physical root barriers that have been impregnated with pesticides, metals, or other chemicals. The Commenter contends that there are different types of products on the market that use them to stop roots, some that will allow runoff and others that do not. The Commenter suggests allowing use of products that do not allow water to come into

contact with pesticides, metals, or chemicals or products that impregnate them into paints that are not soluble in water. The Commenter also suggests prohibiting any product that allows water to pass through the treated fabric or layer.

DDOE Response: As there are a variety of systems, the intent of the specification is to provide general standards that can span all the systems. However, clarifications have been added to the Insulation Layer and the Root Barrier sections of the revised guidebook in recognition of this concern.

f. **(p. 1)** In Section 3.1.4 (Functional Elements of a Green Roof System, Design Layer 5 - Drainage Layer and Drainage System), the Commenter suggests changing "recycled polyethylene" to "high-density polyethylene."

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

g. **(p. 1)** In Section 3.1.4 (Functional Elements of a Green Roof System, Design Layer 6 - Root-Permeable Filter Fabric), the Commenter suggests requiring a non-rotting, needle punched product and contends that woven filter layers are not recommended. The Commenter also suggests including a flow rate or range.

DDOE Response: DDOE has revised this paragraph to better match Table 3.1.1 (changed in revised guidebook to Table 3.1) and added a note regarding flow through the filter.

h. **(p. 2)** In Section 3.1.4 Functional Elements of a Green Roof System, Design Layer 7 - Growing Media, the Commenter references the requirement that the media "should be no more than 20% organic matter" and suggests explaining that compost is not completely organic and that the terms "organic matter" and "compost" are not the same product.

DDOE Response: While this comment is factually correct, DDOE disagrees with the need to include the distinction in the guidebook. Since the organic matter content is noted as a maximum, the fact that compost is not 100% organic will not affect the specifications.

(p. 2) In Section 3.1.4 Functional Elements of a Green Roof System, Design Layer 7 - Growing Media, the Commenter contends that not all media is created equally and suggests that this section call for proof of water retention from the supplier and/or manufacturer of the media.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

i. **(p. 2)** In Section 3.1.4 Functional Elements of a Green Roof System, Design Layer 7 - Growing Media, the Commenter contends that not all trees require a 48-inch growing media depth and that many small tree options can thrive in 18–24 inches. The Commenter also contends that a 48-inch depth requirement will limit use of trees because

most roof decks cannot hold the amount of weight associated with this depth. Therefore, the Commenter suggests allowing the designer to decide what trees fit their particular project.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

j. **(p. 2)** In Section 3.1.4 Functional Elements of a Green Roof System, Design Layer 8 - Plant Cover, the Commenter suggests expanding the sentence about guidance on plant selection to say that qualified manufacturers are also able to help with selections and may have full time landscape architects on staff.

DDOE Response: DDOE has made a revision to note that green roof manufacturers may be able to assist with plant selection.

k. **(p. 2)** In Section 3.1.4 Functional Elements of a Green Roof System, Design Layer 8 - Plant Cover, the Commenter contends that irrigation should not be optional in this region and does not have to be a full-time system, but, at minimum, a manual system with hose bibs. The Commenter provides their water-related guide for reference.

DDOE Response: DDOE agrees with the substance of this comment and has revised Section 3.1.5, which is a more appropriate place for this information.

(p. 2) In Table 3.1.1 (changed in revised guidebook to Table 3.1) in the Waterproof Membrane section, the Commenter suggests requiring written manufacturer approval for a waterproof layer that is also going to act like the root barrier.

DDOE Response: DDOE disagrees with this comment. The intent of the specification is to provide general standards that can span all the systems.

l. **(p. 2)** In Table 3.1.1 (changed in revised guidebook to Table 3.1), the Commenter contends that the Drainage Layer section does not cover materials typically used in intensive applications and mentions their own product that has a 2-inch profile.

DDOE Response: In Section 3.1.4 (Drainage Layer and Drainage System), both prefabricated and traditional systems can be used, allowing flexibility in choosing a manufacturer or system.

m. **(p. 2)** In Table 3.1.1 (changed in revised guidebook to Table 3.1) in the specification for filter fabric, the Commenter suggests replacing the word “needled” with “needle punched.”

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

(p. 2) In Table 3.1.1 (changed in revised guidebook to Table 3.1), the Commenter contends that filter fabric density greater than 16 ounces per square yard is unreasonable and is over four times heavier than the type their company and most of the industry uses. The Commenter attaches the data sheet for their 3.5-ounce product.

DDOE Response: DDOE has modified the requirements for filter fabric to better match industry standards and included flexibility in the submittal of alternative products.

n. **(p. 2)** In Table 3.1. (changed in revised guidebook to Table 3.1), the Commenter contends that their product, with 60-pound puncture resistance, is very similar to what is used in the industry and notes that the 220-pound material specified here is more like a moisture retention layer (thick felt) than a system filter drainage fabric.

DDOE Response: DDOE has modified the requirements for filter fabric to better match industry standards and included flexibility in the submittal of alternative products.

o. **(p. 2)** In Table 3.1. (changed in revised guidebook to Table 3.1), the Commenter suggests adding "Apparent Opening (ASTM D4751)" to the specification for filter fabric. The Commenter contends this standard is commonly used in the industry and notes that their product is equal to 50 (0.3mm) under this standard test.

DDOE Response: DDOE has modified the requirements for filter fabric to better match industry standards and included flexibility in the submittal of alternative products.

p. **(pp. 2–3)** In Table 3.1. (changed in revised guidebook to Table 3.1), the Commenter contends that some manufacturers' growth media blends are slightly different than this 80/20 specification and suggests inserting ranges, such as 70% to 80% inorganic and 20% to 30% organic. Once again, the Commenter notes that compost is not completely organic and states a need to clarify that it is not equivalent to organic matter.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change. However, as noted previously, the distinction between organic matter and compost is not essential to this specification.

q. **(p. 3)** In Table 3.1.1 (changed in revised guidebook to Table 3.1) in the Growth Media section, the Commenter agrees that a 30% water-retention capacity is acceptable for extensive roofs but suggests stating "at least 30%" rather than "around 30%."

DDOE Response: DDOE disagrees with the contention that the water retention capacity should be "at least 30%." Since retention value is assigned based upon the porosity of the green roof, it is not necessary to include a minimum.

r. **(p. 3)** In Table 3.1.1 (changed in revised guidebook to Table 3.1), the Commenter suggests adding the following language at the end of the Growth Media section: "Manufacturers should be able to provide a performance specification and testing for their media that proves they meet DDOE recommendations."

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

s. **(p. 3)** In Table 3.1.1 (changed in revised guidebook to Table 3.1) in the Plant Materials section, the Commenter contends that extensive roofs are low maintenance, not "self-sustaining," and that this is a misunderstanding within the industry that should not be stated in the proposed guidebook. The Commenter also contends that suggesting that green roofs do not need maintenance will lead to projects that fail and look bad.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

t. **(p. 3)** The Commenter contends that there should be a water source on every green roof and that this approach should be the industry standard. The Commenter notes that, while plants may not need full-time irrigation, they will need water during establishment and times of drought.

DDOE Response: DDOE agrees with the substance of this comment and has revised Section 3.1.5, which is a more appropriate place for this information..

u. **(p. 3)** In Section 3.1.4 Green Roof Sizing, the Commenter suggests adding the following language to the first paragraph: "Not all green roofs will provide the same performance characteristics and the design team should know the difference and select the proper system for their project needs."

DDOE Response: DDOE disagrees with this comment. Since retention value will be assigned to green roofs based upon their porosity, performance variability between different types of green roofs will be captured in the retention value calculations.

v. **(p. 3)** The Commenter states that Equation 3.1.1 (changed in revised guidebook to Equation 3.1) Storage Volume of Green Roofs is blurry and difficult to read.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

w. **(p. 3)** The Commenter suggests adding the following language to the end of the section for Equation 3.1.1 (changed in revised guidebook to Equation 3.1): "Some manufacturers can provide calculators that are capable of providing accurate estimations of performance for the products that they provide. These system specific calculations should be based on known engineering means and methods as well as be backed up by third party observations of their products."

DDOE Response: DDOE disagrees with this comment. Sufficient calculations for stormwater performance have been included in the guidebook.

x. **(p. 3)** In Section 3.1.5 Green Roof Landscaping Criteria, the Commenter suggests changing the first paragraph to require a maintenance plan in addition to the landscaping plan by stating, "Therefore, a landscaping and maintenance plan shall be provided for green roofs."

DDOE Response: DDOE agrees that a maintenance plan is important but contends that the language in Section 3.1.7. Green Roof Maintenance Criteria addresses these concerns and, therefore, has not made a change.

y. **(p. 3)** In Table 3.1.3, the Commenter suggests adding their company as a green roof plant vendor for the Mid-Atlantic States.

DDOE Response: DDOE has removed Table 3.1.3 from the document.

z. **(p. 4)** At the end of the third-to-last bulleted item of Section 3.1.5, the Commenter suggests adding the following language: "It is suggested that designers and contractors check with their selected manufacturers for recommendations. Some manufacturers have specific "plant windows" that they will provide warranties on the plants they supply. It is important to know what these dates are. They can change dependent on plant selection and warranty requirements."

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

aa. **(p. 4)** In Section 3.1.6 Green Roof Installation, the Commenter suggests revising the third bulleted item to say, "… for 48 hours or potentially using electronic vector mapping to confirm …"

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

bb. **(p. 4)** In Section 3.1.6 Green Roof Installation, the Commenter notes that root barriers are typically under the insulation layers and suggests revising the first sentence of the fourth bulleted item to say, "Add additional system components (e.g., root barrier, insulation, drainage layer and interior drainage system, and filter fabric) taking care not to damage the waterproofing; if damage occurs it must be reported immediately."

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

cc. **(p. 4)** In Section 3.1.6 Green Roof Installation, the Commenter suggests revising the second sentence of the fifth bulleted item to say, "Media should be spread evenly and lightly compacted over the filter fabric surface as required by the manufacturer."

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

dd. **(p. 4)** In Section 3.1.6 Green Roof Installation, the Commenter disagrees with the last sentence of the fifth bulleted item. The Commenter contends that growing media should be lightly compacted, that foot traffic should not cause any harm to an unplanted roof, and notes that their company requires the surface to be compacted with a 300- to 400-pound water-filled roller.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

ee. **(p. 4)** In Section 3.1.6 Green Roof Installation, the Commenter suggests revising the seventh bulleted item to say, "… fertilization is not required. At the very minimum all extensive green roofs should receive supplemental irrigation during the first few months of establishment. If drought conditions present themselves a temporary irrigation system may be needed. Contact the supplying manufacturer for specific warranty requirements. Hand weeding …"

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

ff. **(p. 4)** In Section 3.1.6 Green Roof Installation, the Commenter contends that the numbers in the eighth bulleted item are not correct and provides the following industry standards:

"Plugs - 50% coverage for plugs after one year when planted at 8-inch centers, 80% for the same plugs at two years. Most manufacturers require that a certain level of maintenance be performed to receive this warranty. Pitched roofs and flat roofs are treated the same.

Sedum Carpet/Tile - 90% coverage after the first and second year if properly maintained to manufacturer requirements. Pitched roofs and flat roofs are treated the same.

Sedum cuttings - 50% coverage after one year and 80% after two years if properly maintained to manufacturer requirements. Pitched roofs and flat roofs are treated the same.

Survival versus coverage - The industry typically does not give thrive warranties. If they do the same requirements stand as far as maintenance requirements."

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

gg. **(p. 5)** In Section 3.1.6 the Commenter suggests revising the "Construction Inspections" paragraph to say, "… ensure that the vegetated roof is built in accordance with the specifications for the project. Any differences between manufacturers' products and their orientation should be noted. Detailed inspection…"

DDOE Response: DDOE disagrees with this comment. Vegetated roofs must be built according to the specifications in the guidebook.

hh. **(p. 5)** In Section 3.1.6 Construction Inspections, the Commenter suggests avoiding "finger pointing" at the installation stage by clearly stating who will be the supervisor or the person to sign off on the bulleted list of requirements.

DDOE Response: To clarify the distinction between the applicant's and DDOE's responsibilities, the Construction Inspections section for each specification has been revised to consistently say "construction supervision". The Inspection (and Maintenance) checklists in Appendix K are noted to be specifically for DDOE inspectors.

ii. **(p. 5)** In the first paragraph of Section 3.1.7 Green Roof Maintenance Criteria, the Commenter suggests revising the first sentence to say, "A green roof should be inspected at least twice a year or potentially more frequently as directed by manufacturer supplying the warranty to assess vegetative cover…" The Commenter notes that their company has very specific maintenance guidelines for its plant warranty, which could require as many as 12–18 visits in the first year, at least four visits in the second year, and that two visits per year would only be appropriate after two years of establishment.

DDOE Response: DDOE disagrees with this comment. The maintenance activities included in the guidebook represent the minimum requirements. They do not preclude more frequent maintenance.

jj. **(p. 5)** In the third paragraph of Section 3.1.7 Green Roof Maintenance Criteria, the Commenter contends that herbicides, insecticides, and fungicides do not affect all membranes and suggests revising the language to say, "The use of herbicides, insecticides, and fungicides should be avoided, since there presences could hasten the degradation of the waterproofing dependent on membrane type (some membranes are not affected by these chemicals). If any of these chemicals are used it is advisable to check with membrane manufacturer for approval, recommendations, and warranty issues. The same goes for power washing and other exterior maintenance operations where cleaning agents and other chemicals could harm the plant communities."

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

kk. **(p. 5)** In the fourth paragraph of Section 3.1.7 Green Roof Maintenance Criteria, the Commenter suggests revising the first sentence to say, "While fertilization is generally not recommended due to the potential for leaching of nutrients from the green roof, it might be required from time to time. Getting the approval of the green roof manufacturer or plant supplier that holds the vegetative warranty is critical. Supplemental…"

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

ll. **(p. 5)** In Table 3.1.4 (changed in revised guidebook to Table 3.3), the Commenter suggests revising the text in the top right box in the "Schedule" column to say, "As needed or as required by manufacturer." The Commenter also contends that, in the second bulleted item of the bottom left box, digging with pointed tools in not a problem on protected membrane roofs where there are multiple layers of protection between the growing media and the waterproofing membrane.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change in response to the comment.

mm. **(p. 5)** In the first paragraph after Table 3.1.4 (changed in revised guidebook to Table 3.3), the Commenter states a need to clarify how the requirements regarding a declaration of covenants will be enforced, who will track them, how they should be specified by design teams, and if there is a cost associated with the service.

DDOE Response: As noted in the paragraph regarding the declaration of covenants, the property owner is ultimately responsible for maintenance. DDOE inspections will ensure that maintenance activities are performed as specified in the maintenance schedule.

nn. **(p. 6)** In Section 3.1.8 Green Roof Stormwater Compliance Calculations, the Commenter asks what type of verification is needed to show that the manufacturers and contractors are providing the performance that is being awarded. The Commenter suggests DDOE require the manufacturer to supply information and performance data about the products used to calculate storage volume and contends that not all green roofs will perform the same; thus, not all are created equal or should be given the same values.

DDOE Response: DDOE agrees with the substance of this comment, and has noted that evidence of the porosity used in the storage volume calculations must be provided.

oo. **(p. 6)** In Section 3.1.8 Green Roof Stormwater Compliance Calculations, the Commenter suggests adding the following language to the end of the last paragraph: "… may be used as well. Ideally a green roof manufacturer will be able to provide a system specific calculation that calculates the exact performance of the products being supplied to the project. If no such calculation or performance data is available the design team should evaluate is the manufacturer unable to deliver this information is the right choice for their project." The Commenter also includes detailed information about their products.

DDOE Response: DDOE disagrees with this comment. Sufficient calculations for stormwater performance have been included in the guidebook.

2. Anacostia Watershed Society, Mike Lucy (September 17, 2012)

a. In Design Layer 5 of Section 3.1.4, the Commenter states a need to revise the following sentence: "The drainage layer should consist of synthetic or inorganic materials (e.g., a 1- to 2-inch layer of clean, washed granular material (ASTM D448 size No. 8 stone or lightweight granular mix), recycled polyethylene) that are capable of retaining water and providing efficient drainage."

DDOE Response: This paragraph has been revised to include other materials, and to state the dual purpose of the drainage layer to provide both storage and drainage.

b. In Table 3.1.3, the Commenter states a need to change "Emery Knoll Farm" to "Emory Knoll Farms."

DDOE Response: DDOE has removed Table 3.1.3 from the document.

3. Mike Artes (November 8, 2012)

Note: These comments have been addressed in the rule Response to Comments instead of in this document.

4. Mary Blakeslee (November 6, 2012)

a. The Commenter contends that the proposed guidebook is too technical for private property owners, such as churches, condominiums, cooperatives, and private schools, to understand without hiring a professional engineer.

DDOE Response: As SWMPs require the seal of a professional engineer, the information in the guidebook is directed toward the engineering and design community.

b. The Commenter contends that the terms and definitions for qualifying BMPs are unclear because they are defined differently in the proposed rule, the proposed guidebook, and the Stormwater Discount Fee rule. The Commenter suggests adopting identical terms and definitions in all three documents and provides recommendations for specific language.

DDOE Response: DDOE is developing outreach materials to provide clarity on the distinctions between these programs and guidance on how to participate.

c. In the second paragraph of Section 3.5.5 Bioretention Landscaping Criteria, the Commenter contends that the list of minimum elements is missing elements that are generally on plant lists provided by landscape professionals and contends that this omission could result in improper plant selections and maintenance issues. Therefore, the Commenter suggests specific language that would require additional information about each plant submitted in the plan.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

d. In the second paragraph of Section 3.5.5 Bioretention Landscaping Criteria, the Commenter states a need to ensure that planting plans will be reviewed by a professional with a bachelor's or master's degree. Therefore, the Commenter suggests changing the second sentence to: "It is highly recommended that the planting plan be prepared by a knowledgeable landscape professional (e.g., landscape designer, landscape architect, horticulturalist) in order to tailor the planting plan to the site-specific conditions."

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

e. The Commenter contends that many other native plants would provide the same functionality as those identified in Section 3.5.5 Bioretention Landscaping Criteria, and suggests specific language (for the fourth paragraph and Tables 3.5.2 and 3.5.3 (changed in revised guidebook to Tables 3.22 and 3.23, respectively)) to indicate that these lists should be examples and not inadvertently become the official list of plants.

   DDOE Response: DDOE disagrees with this comment. References to other more extensive plant lists are noted in the guidebook.

f. In Section 3.5.5 Bioretention Landscaping Criteria, the Commenter contends that plants require more than annual maintenance in a bioretention setting and suggests specific language for a more comprehensive description of maintenance requirements.

   DDOE Response: DDOE disagrees with the need to add additional information about vegetation maintenance here. Specific vegetation maintenance plans are dependent on vegetation selection as well as management scheme.

g. In the fifth paragraph of Section 3.5.5 Bioretention Landscaping Criteria, the Commenter suggests adding information about minimizing introduction of weeds to the engineered soils. The Commenter also contends that the order of the bulleted information is confusing and suggests specific language to revise it.

   DDOE Response: DDOE disagrees with need to add additional information about introduction of weeds. Replacement of soils near bioretention areas to avoid the spread of weeds is beyond the scope of this guidebook. DDOE agrees with the suggestion to re-order the bulleted information in this paragraph, and has made a change.

h. In Section 3.5.6 Bioretention Construction Sequence, Step11, the Commenter suggests specific language to include installation of mulch and make corrections to post-planting watering requirements.

   DDOE Response: While this comment is too specific for the typical construction sequence included in the guidebook, Steps 10–11 have been revised to better reflect proper planting practice.

i. In the first paragraph of Section 3.5.7 Bioretention Maintenance Criteria, the Commenter suggests that these criteria should apply to all properties installing bioretention since these guidelines do not otherwise include specific maintenance criteria for commercial and governmental properties.

   DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

j. In the first bulleted item of Table 3.5.4 (changed in revised guidebook to Table 3.24), the Commenter states a need to define the acronym "CDA."

DDOE Response: Contributing Drainage Area (CDA) is spelled out at the beginning of Section 3.5.

k. In the second paragraph of Section 3.5.7 Bioretention Maintenance Criteria, the Commenter suggests adding specific language that refers to grounds maintenance instead of landscape maintenance, clarifies contract details for management and maintenance contractors, and encourages use of Integrated Pest Management to help reduce use of synthetic pesticides.

DDOE Response: DDOE disagrees with this comment. The specificity provided in the comment is beyond the scope of the guidebook.

l. The Commenter provides specific text and formatting changes for Table 3.5.4 (changed in revised guidebook to Table 3.24) "Recommended maintenance tasks for bioretention practices." The major change is to group tasks into post-construction increments of first year, second year, third year, and beyond.

DDOE Response: DDOE disagrees with this comment, as Table 3.5.4 (changed in revised guidebook to Table 3.24) represents a general summary of maintenance tasks.

m. In the fifth paragraph of Section 3.5.7 Bioretention Maintenance Criteria, the Commenter states a need to clarify the spring maintenance requirement and asks if it applies to the filter bed or the entire BMP.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

5. Bohler Engineering, Patrick Gorman (September 7, 2012)

a. The Commenter suggests using a higher retention value for new and preserved trees. The Commenter contends that the 20 and 10 CF values are too low, and increasing to the 40 CF range will encourage developers to opt for more plantings, which will also increase aesthetic value.

DDOE Response: DDOE disagrees with this comment. The retention values assigned to planted and preserved trees are consistent with credits provided by other communities.

6. Contech Engineered Solutions, Derek M. Berg (November 5, 2012)

a. The Commenter states a need to clarify how and why 60% TSS was chosen as the performance standard for providing treatment and contends that this benchmark is lower than what most jurisdictions require.

DDOE Response: Based upon several public comments, the TSS removal requirements have been changed to a discharged effluent standard as well as acceptable practices.

b. The Commenter contends that the TSS ratings given to the treatment BMPs are quite low compared with ratings for the same BMPs in other areas and asks how these decisions were made.

   DDOE Response: Since the TSS removal requirements have been changed to a discharged effluent standard as well as acceptable BMPs, the TSS removal percentages no longer apply.

c. The Commenter contends that it is important to have a consistent process to ensure future BMP submissions are evaluated and rated in the same manner and suggests adding this information as an appendix to ensure it is readily available and understood.

   DDOE Response: Acceptable BMPs were determined based upon data and analysis from the International Stormwater BMP Database. Evaluation procedures for proprietary practices have been revised, and are included in Appendix T.

d. Since a number of BMPs are rated less than 60% TSS, the Commenter asks if BMPs will need to be used in treatment drains to achieve 60% TSS.

   DDOE Response: TSS removal requirements have been changed to a discharged effluent standard and no longer rely on percent removal.

e. The Commenter asks if pretreatment devices can be added and suggests creating a process to review and approve acceptable pretreatment practices, such as hydrodynamic separators. The Commenter also suggests considering a single field study rather than three field studies or three years of data for pretreatment devices.

   DDOE Response: Pretreatment with a proprietary device has been added to the Infiltration specification. Developing a separate evaluation process for just pretreatment may be confusing, but Appendix T has been revised significantly to simplify evaluation of proprietary devices for both pretreatment and as stand-alone practices.

f. The Commenter notes that Figure 3.2.1 (changed in revised guidebook to Figure 3.2) shows a sample rainwater harvesting system with a proprietary pretreatment “Vortex” filter and suggests it would be more appropriate to depict a generic example. The Commenter repeats this suggestion for the last bulleted item in Section 3.2.3 and for Table 3.2.2 (changed in revised guidebook to Table 3.6) and suggests using generic language such as “pretreatment filter or biodynamic separator.”

   DDOE Response: DDOE accepts the substance of this comment and has incorporated a change. In these instances, the use of the term “Vortex” was meant to refer to the cyclonic action in a hydrodynamic separation device—not a proprietary product.

However, to avoid confusion, the term vortex filter has been replaced with "hydrodynamic separator."

g. In Figure 3.2.1 (changed in revised guidebook to Figure 3.2), the Commenter contends that it is not necessary to specify stainless steel for the smoothing inlet and suggests simply specifying a "smoothing/calming inlet." The Commenter states a need to include an access riser, which is a key component of the cistern. The Commenter also contends that pressure tanks are not often needed for simple systems and suggests making them optional as needed.

   DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

h. In Section 3.2.3, the Commenter notes that the language only addresses first flush diverters that are combined with pretreatment systems and leaves out designs where they are separate. Therefore, the Commenter suggests revising the language to acknowledge both types of designs.

   DDOE Response: Section 3.2.3 has been revised to indicate that pretreatment is required, but first flush diversion is not the only acceptable form of pretreatment.

i. In Section 3.2.4 under the Storage Tanks heading, the Commenter contends that it is now common to use cisterns up to 100,000 gallons on larger projects and suggests updating the range accordingly. In the third bullet of this section, the Commenter also suggests requiring a 30-inch minimum access opening.

   DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

j. The Commenter contends that all cisterns should have a design life equal to that of the building in order to maximize runoff reduction for the life of the project. The Commenter notes that many cistern liners are only rated for a 20-year life and suggests that DDOE consider whether that span is acceptable, and if not, develop language that dictates the acceptable life of a cistern.

   DDOE Response: As the stormwater management requirements for a development persist indefinitely, many stormwater BMPs may require significant maintenance or replacement at some point. The guidebook will not specify a required design life for a given BMP installation.

k. Regarding Section 3.5 Bioretention, the Commenter notes that several companies offer engineered tree pit biofilters in proprietary configurations and asks if they will be acceptable for use or required to go through the proprietary practice approval process in Appendix T.

DDOE Response: If proprietary configurations are substantially similar to the specifications, including ponding depth, filter media composition, and other characteristics, they will be acceptable for use. If not, they would be required to go through the proprietary practice approval process.

l. The Commenter contends that many of the pretreatment practices listed in Chapter 3.7 are not suited to underground infiltration systems and suggests including a list of appropriate practices and establishing a means of vetting these technologies.

DDOE Response: The list of pretreatment practices has been revised. However, hydrodynamic devices will require evaluation as described in Appendix T.

m. The Commenter asks if hydrodynamic separators can be used as pretreatment to underground storage facilities and recommends including them along with a consistent sizing methodology based on documented performance.

DDOE Response: Section 3.11.3 Underground Detention Pretreatment has been updated to state that an appropriately sized pretreatment structure (sediment sump, vault chamber, or proprietary practice) should be placed upstream of any inflow points to underground detention.

n. In Section 3.12, the Commenter states a need to explain how to calculate the appropriate flow rate treated by water quality practices and suggests specifying the level of performance expected at the design treatment rate. The Commenter provides examples and also suggests using the method in Appendix D.10 of the Maryland Stormwater Manual.

DDOE Response: Flow rate calculations have been included in Appendix T and referenced in Section 3.12.

o. The Commenter asks if proprietary practices and applicable sizing criteria will be added to the guidebook once they are approved and contends that this information would be helpful to include, similar to other BMPs.

DDOE Response: Proprietary practices will not be added to the guidebook. However, DDOE will maintain a list of proprietary practices that have been accepted as a part of stormwater management plans.

p. The Commenter states a need to correct a typographical error in Chapter 2 where the Proprietary Practices Approval process is referenced as Appendix X and should be Appendix T. Also, in Section T.1, there are multiple references to Table X that should be corrected to Table T.

DDOE Response: DDOE accepts the substance of this comment and has incorporated changes.

q. The Commenter notes that Section T.0 lists 1.7 inches as the design storm for proprietary practices and suggests changing it to 1.2 inches to ensure consistency for all BMPs.

DDOE Response: DDOE disagrees with this comment. The maximum volume that a practice may treat is 1.7 inches, and all practices are compared to this event.

r. In Appendix T, the Commenter states a need to describe how data from three different studies will be compiled into a single TSS rating and asks how it equates to the rating process for land based systems. The Commenter contends that the TSS rating process needs to be consistent for all BMPs.

DDOE Response: Appendix T has been revised significantly to simplify evaluation of proprietary practices based upon several public comments.

s. The Commenter suggests creating a less stringent approval path for pretreatment systems (such as hydrodynamic separators) than the one for proprietary practices seeking full treatment credit. The Commenter contends it is unlikely that many of the viable pretreatment practices available will be subjected to Technology Acceptance Reciprocity Partnership (TARP) level 3 studies and suggests a lower entry barrier for devices seeking pretreatment credit, such as a 1 TARP study.

DDOE Response: Appendix T has been revised significantly to simplify evaluation of proprietary practices, for both pretreatment and as stand-alone practices.

t. The Commenter provides a paper they prepared titled, "BMP Performance Expectation Functions – A Simple Method for Evaluating Stormwater Treatment BMP Performance Data." This paper outlines a method an agency can use to analyze qualified performance data relative to defined performance expectations. It addresses percent removal versus effluent-based guidelines, whether to use concentration or load-based reduction, and can be used for various types of pollutants.

DDOE Response: Appendix T has been revised significantly to simplify evaluation of proprietary practices based upon several public comments.

7. DC Appleseed, Walter Smith, Brooke DeRenzis (November 8, 2012)

Note: Some comments have been addressed in the rule Response to Comments instead of in this document.

a. **(p. 7)** The Commenter suggests including timelines for key SRC milestones (proposed guidebook, p. 311) and contends that they will be benefit marketing and sales. The Commenter suggests specific language to incorporate in this section, including allowing DDOE the flexibility to extend timelines where appropriate.

DDOE Response: DDOE Response: For the review of a SWMP, including one for SRC generation, chapter 5.0.1 of the proposed guidebook notes that this will happened within ten to thirty working days of the submission date of an accepted complete application.

For a final construction inspection of a BMP, chapter 5.2.2 specifies that the Department requires one (1) week of notice.

For review of an application for SRC certification, DDOE is reluctant to specify a time given the variability between review for new retention capacity and review for existing retention capacity. For new retention capacity, a person who intends to generate SRCs is expected to secure DDOE approval of a SWMP prior to construction, and that person will submit an as-built SWMP after a final construction inspection. At the time when DDOE receives a complete application for SRC certification, review should be fairly straightforward and quick since the complicated task of review a SWMP to determine eligible retention capacity will have been completed. In this circumstance, DDOE expects that it will be able to complete its review within fifteen (15) business days, if not sooner.

By contrast, for existing retention capacity, though DDOE may have previously reviewed an SWMP for the site, such a SWMP would have been designed to meet the existing water quality treatment and detention requirements, before the technical specifications for the new SWMG were finalized. Consequently, DDOE will have to carefully review the as-built SWMPs for these sites to determine the eligible retention volume in light of the technical specifications in the new SWMG, and it is possible that DDOE will require additional information if the as-built SWMP does not contain all of the information required. In such cases, review may take up to thirty business days or, in some cases, even longer.

To avoid penalizing an applicant for a delay by DDOE in reviewing a complete application for SRC certification, DDOE intends to certify SRCs as of the date that the Department receives the complete application, as stated in Section 531 of the rule.

b. **(p. 10)** The Commenter states a need (in the proposed rules and the proposed guidebook) to clearly and consistently: define and use the terms “SRC seller” and SRC buyer”, to differentiate an “SRC owner” from a “BMP owner”, and specify ownership and transfer responsibilities for each of these entities.

   DDOE Response: DDOE reviewed its use of the terms, taking into consideration the range of possible scenarios for participation in SRC trading. DDOE has determined that the terms convey the intended meaning, except that the meaning of “original SRC owner” would benefit from clarification. Accordingly, DDOE added a definition for “original SRC owner” to the definitions section.

c. **(pp. 11–12)** The Commenter states a need to include more rigorous inspection requirements in order to ensure sufficient maintenance of BMPs and suggests requiring annual inspections and allowing the use of third-party nongovernmental inspectors. The

Commenter also points out an inconsistency between the regulations, which describe a three-year inspection cycle for BMPs generating SRCs, and the proposed guidebook, which describes biannual site inspections for all stormwater BMPs during the first five years and annual inspections in subsequent years.

DDOE Response: DDOE will inspect completed BMPs once every three years, and has revised Section 5.2.4 accordingly. The property owner is responsible for maintenance. DDOE's inspections are intended to ensure that the maintenance is consistently performed.

d. **(p. 14)** The Commenter contends that the As-Built Certification form is inconsistent with the proposed rule. The form allows the engineer to document "substantial deviations" from the original SWMP, while, pursuant to Section 503.3(a), "substantial deviations" require submission of a new plan. Therefore, the Commenter suggests changing either the submission requirements or the form.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

e. **(p. 14)** The Commenter suggests revising the proposed rule and proposed guidebook to define and consistently use the terms "maintenance agreement," "maintenance schedule," "maintenance responsibility," and "maintenance standards," or, if there is no substantive difference among these terms, to choose a single term and use it consistently.

DDOE Response: DDOE has added definitions of these terms to Appendix V. Definitions.

f. **(p. 14)** The Commenter contends that Sections 5.0.1 and 5.3.2 of the proposed guidebook and Section 518.9 of the proposed rule contain contradictory language and suggests revising them to clarify which should occur first, approving the SWMP or executing a Declaration of Covenants. Alternatively, the Commenter suggests (per Section 518.10), simply requiring the applicant to provide proof that the maintenance agreement or schedule was filed with the Recorder of Deeds (as part of the Declaration of Covenants) in order to receive SWMP approval.

DDOE Response: DDOE has clarified Section 5.3.2 to be consistent with the process outlined in Section 5.0.1.

8. DC Greenworks, Peter Ensign (October 22, 2012)

a. The Commenter contends that it is critically important to perform maintenance and verify it with on-site inspections, and suggests requiring annual maintenance reports with soil/media testing and photographs.

DDOE Response: Understood. Section 519 of the revised rule contains information on SWMP maintenance requirements.

b. Regarding Section 3.2.2 Green Roof Conveyance Criteria, the Commenter asks if flashing is the same as edging.

   DDOE Response: Flashing is not the same as edging. Flashing is used to waterproof joints and angles on a roof.

c. In Section 3. 1.5 Green Roof Landscaping Criteria, the Commenter states a need to clarify the phrase "other experienced professional" and asks what the criteria are and if this means a green roof professional.

   DDOE Response: The planting plan should be developed by a professional with prior experience with green roofs. There are not specific criteria beyond this.

d. Regarding Section 3.1.6 Green Roof Construction Sequence, the Commenter suggests adding alternatives for the flood test specified in the third bulleted item under Green Roof Installation.

   DDOE Response: DDOE accepts the substance of this comment and has added electronic vector mapping as an alternative to the flood test.

e. Regarding Section 3.1.6 Green Roof Construction Sequence, the Commenter contends that, since maintenance is required, a warranty should also be required that specifies 80% survival. The Commenter also contends that, at 2.5 sedum per square foot, it may be unrealistic to achieve 75 % effective ground cover after the first growing season and asks what the first season plating cut-off date is to meet that requirement.

   DDOE Response: Effective coverages have been revised. Since a maintenance covenant is required for all BMPs, DDOE does not find it necessary to also require a warranty.

f. In Section 3.1.7 Green Roof Maintenance Criteria, the Commenter notes that Electric Field Vector Mapping needs to be installed prior to green roof assembly.

   DDOE Response: DDOE accepts the substance of this comment and has incorporated a change to reflect this order.

g. In Section 3.1.7 Green Roof Maintenance Criteria, the Commenter states a need to clarify what constitutes "waste material" and to include the federal and District legal requirements.

   DDOE Response: The last paragraph in the maintenance criteria section for each specification has been replaced with the following sentence and qualified with more customized language where appropriate.

   "Waste material from the repair, maintenance, or removal of a BMP or land cover changes shall be removed and disposed of in compliance with applicable federal and District law."

h. ‘In Section I.1. Rooftop Storage Design Guidance and Criteria, the Commenter states a need to clarify “emergency overflow measures.”

DDOE Response: Emergency overflow measures are necessary to safely convey the 100-year storm. Examples are provided in Appendix I.

i. The Commenter states a need to provide more explanation in Section I.1.7 Rooftop Storage Design Guidance and Criteria, which states, “The maximum time of drawdown on the roof shall not exceed 17 hours.”

DDOE Response: Rooftop storage, as described in this Appendix, is intended as a method of detention only. The rules and guidelines presented in Appendix I do not apply to green roofs (Section 3.1). This exemption has been noted in Appendix I.

j. The Commenter asks how the illustration showing a 3-inch high detention ponding ring (Figure I.2) complies with the requirement to protect roof drains with flashing extending at least 3 inches above the growing media (Section 3.1.2).

DDOE Response:
Rooftop storage, as described in this Appendix, is intended as a method of detention only. The rules and guidelines presented in Appendix I do not apply to green roofs (Section 3.1). This exemption has been noted in Appendix I.

k. The Commenter notes that the GAR is a set of standards for landscape and site design to reduce stormwater runoff, improve air quality, and reduce heat island effect. The Commenter asks if the GAR is redundant with the proposed rule and what solar panels have to do with the GAR’s intent.

DDOE Response: The GAR is a zoning ordinance advanced by the Office of Planning. It is not a stormwater ordinance so it is not redundant with stormwater regulations. It is a zoning requirement that applies science based environmental performance standards to new development or major redevelopment projects. The proposed GAR would require lot-level development to achieve a GAR score relative to the parcel’s zoning code. DDOE initially provided an overview of the concept in Appendix J, which has been removed. The GAR will have its own guidance manual.

9. Department of the Navy, Christine H. Porter (November 8, 2012)

a. The Commenter contends that (pursuant to General Services Administration guidance) federal agencies, including DOD facilities, are not authorized to record an easement or covenant on property owned by the United States. Therefore, in relation to Sections, 518.9, 518.10, 529.1 and 529.2 (and the proposed guidebook) , the Commenter suggests revising the language to state that an agency of the federal or District government shall not be required to make or record a Declaration of Covenants.

DDOE Response: Chapter 3 already states that government properties are exempt from recording a Declaration of Covenants. DDOE has incorporated a change in Chapter 5 to make it consistent with Chapter 3.

b. The Commenter notes that DOD facilities and other federal agencies in the District may already retain the rainfall from a 1.7-inch storm in order to comply with certain Energy Independence and Security Act requirements and related USEPA guidance. In reference to Sections 520.5(a)–(c), 522.5(a)–(c), and 531.3, the Commenter suggests verifying in the proposed rule and proposed guidebook that DOD projects are eligible for SRC certification for the volume retained in excess of 1.2 inches, providing they also meet the eligibility requirements in Section 531.

   DDOE Response: While DDOE does not disagree with this assertion, inclusion in the rule or guidebook is not necessary. EISA requirements will not affect DDOE's retention requirements or SRC certification.

10. District of Columbia Building Industry Association, David Tuchmann (November 8, 2012)

Note: Some comments have been addressed in the rule Response to Comments instead of in this document.

a. **(p. 3)** The Commenter contends that not all BMPs are created equal, and, while DDOE meant well in including a large number of options, the allowed BMPs do not offer enough flexibility because developers prefer to use proven, durable, cost-effective technologies rather than emerging ones. The Commenter suggests revising the proposed rule to allow for more extensive utilization of favored BMP technologies. (proposed rule at 7, 14, 15 and proposed guidebook at 18–22.)

   DDOE Response: The specifications in the SWMG for BMPs are intended to ensure that BMPs are designed and constructed properly, and to provide certainty regarding accepted performance. Several revisions have been made throughout Chapter 3 to allow for greater utilization of some BMPs. The guidebook also allows Developers to propose proprietary BMPs or other technologies which they can demonstrate meet the stormwater performance requirements.

b. **(p. 3)** The Commenter contends that regulated sites should be free to innovate with already-favored BMPs to achieve the applicable performance standards and should not be forced to comply with strict construction parameters. Specifically, the Commenter notes that bioretention is a preferred option that will often be impractical due to the 18-inch ponding requirement and dependency on ponding volume, and suggests reducing the percentage of ponding volume required from the ponding depth.

   DDOE Response: DDOE agrees that the ponding volume requirement was higher than necessary. The MDE "Draft Surface Storage Volume Tables for Bioretention, Bioswales, Rain Gardens, and Landscape Infiltration" provides a thorough analysis of the surface ponding requirements for various combinations of drainage area and BMP characteristics.

While Maryland's stormwater rules and guidance differ from the District's, most notably with Maryland's "P_E" calculations, conclusions can still be drawn from this document. In the District, most bioretention areas will be designed based on a 1.2- to 1.7-inch rain event and have a filter area that is 2% to 10% of the size of a highly impervious contributing drainage area. Corresponding areas of the applicable storage volume tables indicate that a minimum surface storage volume requirement of approximately 50% is appropriate. However, the 50% requirement applies only to practices with an underdrain or with a measured infiltration rate of at least 2 inches per hour. Infiltration-based practices with a lower infiltration rate still have a surface storage volume requirement of 75%.

c. **(p. 4)** The Commenter contends that the proposed rule significantly undervalues the stormwater retention capacity of many BMPs and fails to account for innovations that could dramatically improve their efficiency. Specifically, the Commenter contends that 13 of the approved BMPs have retention values of 50% or more, 5 provide no retention value at all, and that the suggested method of scaling is impractical or impossible for densely developed sites that have little or no access to adjacent open space. The Commenter gives several examples of scenarios in which it would be difficult to achieve compliance and suggests that the contributing drainage area for green roofs is too limited, the pretreatment credits for rainwater harvesting facilities are excessive and associated building setbacks should be eliminated, and the percentage storage volume required from the ponding depth should be reduced significantly or eliminated.

   DDOE Response: DDOE acknowledges the concerns regarding feasibility of some of the BMPs in the guidebook and has revised the green roof contributing drainage area requirements, the pretreatment calculations for rainwater harvesting, and the surface storage percentage for bioretention based upon this and several other public comments.

d. **(p. 4)** The Commenter contends that volume credits for certain bioretention facilities are set too low and notes specifically that the 0% retention value for ponds, wetlands, and open channels does not account for the fact these surface features will involve some amount of evaporation.

   DDOE Response: The credits provided in the proposed rule were derived from a recent thorough review of published studies of stormwater BMPs (Hirschman et al., 2008). While surface stormwater BMPs should intuitively reduce runoff volumes through evaporation, very few performance studies have evaluated this effect. The limited data available suggests that the reduction provided through evaporation is very low or negligible.

e. **(pp. 4–5)** In order to help regulated facilities select the optimal stormwater management strategy, the Commenter states a need to clarify detention calculations and provide a predevelopment curve number for sites where geotechnical analysis cannot be performed.

DDOE Response: Appendix H has been revised to state that a Hydrologic Soil Group of C shall be used in cases where the Hydrologic Soil Group is not available through the Soil Survey because the soil type is listed as “Urban Soils” or something similar.

f. **(pp. 7–8)** Regarding Appendix R, the Commenter contends that sites of one acre or larger should not be required to obtain a SWPPP from the District because they are already subject to USEPA's CGP. Additionally, the Commenter contends that adding the District’s permit requirement would not likely achieve any additional environmental protection and would only increase administrative burdens and delays for regulated sites. Therefore, the Commenter suggests DDOE simply accept USEPA's CGP as proof of compliance in these cases.

   DDOE Response: DDOE agrees that this language was unclear and has incorporated a change to remove duplicative requirement for sites complying with USEPA’s CGP.

g. **(p. 8)** The Commenter suggests revising the regulation to clearly indicate when during the construction process DDOE intends to inspect on-site stormwater retention facilities. The Commenter specifically asks if inspections will only be required at selected stages listed in the proposed guidebook (Section 5.2) or throughout the installation process.

   DDOE Response: Section 5.2 identifies the general inspection approach. Select stages of inspections for BMP construction are identified in Chapter 3.

h. **(p. 8)** The Commenter requests guidance on how regulated sites should prepare underground retention facilities for inspection without creating safety issues or hindering their performance. The Commenter suggests revising the proposed rule to clearly identify which parts of an underground BMP facility must remain exposed for a final stormwater inspection, and, in particular, to confirm whether DDOE can approve underground BMP facilities during final inspection, even though they will remain at least partially covered.

   DDOE Response: Inspection points for underground retention facilities are described in Section 5.2.2. Specific concerns regarding safety and construction sequence will be best handled on a case-by-case basis at a pre-construction meeting.

i. **(pp. 12–13)** Regarding Sections 3.4.6, 3.5.6, and 3.7.6, the Commenter notes the requirement for the footprint of on-site stormwater retention facilities to remain “outside the LOD during construction to prevent soil compaction by heavy equipment.” The Commenter contends that decompacting areas after completing construction would return them to their original condition and offer a more flexible way to achieve the same goal. Therefore, the Commenter suggests allowing regulated sites to utilize the entire site during construction, as long as they take care to restore areas for future BMP facilities once construction is complete.

   DDOE Response: DDOE agrees that it may be difficult to completely avoid proposed BMP areas while constructing a site and has revised these sections to allow a degree of impact to proposed BMP areas and provide for their restoration.

j. **(p. 13)** Regarding the third bulleted item after Table 3.1.3 (this table has been removed from the revised guidebook), the Commenter asks if the statement that regulated sites should purchase plantings for green roofs 6–12 months prior to installation is a requirement or a suggestion. The Commenter asks why builders should only be able to purchase green roof plantings within this narrow timeframe and suggests removing this language or clearly stating that it is a suggestion and not a requirement.

   DDOE Response: DDOE has revised this statement to clarify that is a suggestion rather than a requirement.

k. **(p. 13)** The Commenter notes the requirement for final compaction to occur during final backfill around the perimeter of a building and contends that it will be impossible to comply when these areas are used as BMP facilities. Therefore, the Commenter suggests that DDOE consider options to resolve the conflict between compaction and BMP installation requirements and clearly allow non-compaction of areas that are used for specified BMP facilities.

   DDOE Response: DDOE agrees that it may be difficult to completely avoid proposed BMP areas while constructing a site and has revised these sections to allow a degree of impact to proposed BMP areas and provide for their restoration.

l. **(pp. 13–14)** The Commenter contends that the requirement to cover pervious paving for seven days (Section 3.4.6) is too specific and does not allow flexibility to accommodate on-site operations and development of new products that might have different specifications. The Commenter suggests removing this requirement and directing builders to follow the manufacturer's specifications to the extent allowed by on-site conditions.

   DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

m. **(p. 14)** Regarding the recommendation to purchase soil media used for bioretention purposes from an approved supplier (Section 3.5.6), the Commenter notes that the proposed guidebook does not identify any approved suppliers or indicate the criteria a supplier would have to satisfy in order to become approved. Instead of recommending individual suppliers, the Commenter suggests that DDOE approve and recommend specific types of soil media, or at least the specific performance standards that a given type of soil media should satisfy.

   DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

11. Filterra Bioretention Solutions, Chris French (November 8, 2012)

a. **(p. 2)** The Commenter suggests that DDOE meet with representatives from the SWEMA to discuss Chapter 3.12 and Appendix T. The Commenter contends that SWEMA could

share new laboratory and field testing protocol developed for manufactured stormwater systems in New Jersey and provide lessons learned.

DDOE Response: Appendix T has been revised significantly to simplify evaluation of proprietary devices, and draws on New Jersey's protocols.

b. **(p. 2)** In Section 3.4, the Commenter notes that concrete grid pavers and plastic grid pavers are not the same as Permeable Interlocking Concrete Pavement and suggests classifying them as a separate category.

DDOE Response: While this comment is technically correct, DDOE is grouping paver categories by material (concrete versus plastic) and, therefore, will not make the requested change.

c. **(p. 2)** In Section 3.4.1, the Commenter suggests allowing pervious contributing drainage areas and contends that potential clogging can be addressed by enforcing permeable pavement maintenance requirements. The Commenter also contends that permeable pavement systems can obtain greater landscape treatment and that scientific studies have shown them (and street sweeping) to effectively eliminate pollutants that are a concern.

DDOE Response: Section 3.4.1 suggests that the contributing drainage area be as close to 100% impervious as possible, but this is not a requirement. Further, pretreatment options for pervious areas are described in Section 3.4.3.

d. **(p. 2)** Regarding Section 3.4.1 Soils, the Commenter agrees with the requirement to verify soil permeability using the on-site investigation methods in Appendix P. The Commenter contends that all permeable pavement practices should require on-site soil investigations to determine the practicality of utilizing this BMP and determine whether underdrains should and can be used.

DDOE Response: DDOE has noted your support.

e. **(p. 2)** Regarding Section 3.4.1 Pavement Bottom Slope, the Commenter notes that underdrains work hydraulically based on head conditions and not slope and states a need to clarify why an underdrain slope is required. The Commenter also suggests that DDOE consider the inspection process required to verify that underdrains are installed as specified.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change with regard to underdrain slopes. Inspection of underdrains is included on the construction inspection forms in Appendix L.

f. **(p. 2)** In Table 3.4.2 (changed in revised guidebook to Table 3.14) Reservoir Layer, the Commenter states a need to change PCIP to PICP.

DDOE Response: DDOE has updated the table.

g. **(p. 2)** In Section 3.4.5, the Commenter agrees with using bioretention and micro-bioretention systems in a treatment train configuration and contends that it is feasible for such systems to wholly treat the Q10 and Q25 storms for both quality and quantity.

DDOE Response: DDOE has noted your support.

h. **(p. 3)** The Commenter suggests revising Section 3.5.4 Bioretention Design Criteria to allow use of alternative bioretention media mixtures. The Commenter contends that high-flow bioretention media mixtures are important in small scale/urban bioretention practices, also known as micro-bioretention, and notes that their company's product provides pollution removal equivalent to traditional bioretention media blends. The Commenter suggests requiring suppliers to provide third party test analysis of their products to prevent system failure from improperly blended media and also offers to share information about their quality assurance and control methods with DDOE.

DDOE Response: High-flow media mixtures represent a substantial divergence from the specifications and may have differing retention and pollutant removal capabilities. These types of practices will be reviewed based upon the procedures for Proprietary Practices described in Appendix T.

i. **(p. 3)** In Chapter 3.5 Bioretention, the Commenter suggests allowing limited irrigation during the establishment period for bioretention systems because it can increase plant survival during periods of drought or limited rainfall, which will also increase pollution removal through biological processes.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

j. **(p. 3)** In Section 3.5.3 Bioretention Pretreatment Criteria, the Commenter suggests acknowledging that the mulch layer in bioretention systems acts as a pretreatment measure, protects the bioretention media, and prevents premature occlusion.

DDOE Response: DDOE disagrees with this comment. While mulch does act to protect the bioretention media, it is important to have a separate pretreatment device that allows for removal of sediment.

k. **(p. 3)** The Commenter notes that improper design and installation contribute to premature failure of bioretention systems and suggests requiring infiltration tests to verify whether newly installed bioretention systems will function as designed. The Commenter also suggests using an infiltrometer for testing.

DDOE Response: The assumptions made with this guidebook—proper design and careful construction—allow for a consistent product with minimal variation in infiltration rates from the initial testing.

l. **(p. 3)** In Section 3.5.1 Required Space, the Commenter contends that small-scale microbioretention systems can usually function with less surface area (than the suggested 3% to 6% of the contributing drainage area) if the bioretention media provides high hydraulic conductivity. The Commenter offers to provide third party research supporting this position.

DDOE Response: This section has been revised to clearly state that it is a recommendation, not a requirement, to have 3% to 6% of the contributing drainage area available for a bioretention area.

m. **(pp. 3–4)** Regarding Section 3.5.4 Geotextile, the Commenter contends that research of field installations throughout the United States shows that geotextile fabric can contribute to premature failure in rain gardens and bioretention systems when they become clogged by fine sediments. The Commenter suggests that DDOE consider whether the risk of system failure is worth the benefit of including geotextile fabric in the bioretention specifications.

DDOE Response: DDOE acknowledges that geotextile has been found to clog in some instances and encourages the use of choker stone. However, geotextile can be an effective component in bioretention when designed with proper opening size and flow rate.

n. **(p. 4)** In Section 3.12.2 Proprietary Practice Criteria, the Commenter contends that the definitions of on-line and off-line systems could be misinterpreted and result in misclassification of a proprietary practice. Specifically, the definition of on-line systems states that most or all runoff from storms larger than the stormwater quality design storm bypass the devices through an upstream diversion. However, some proprietary practices provide bypass through the use of a downstream drop inlet or catch basin. The Commenter suggests revising or eliminating that portion of the definition and provides specific language used by the NJDEP and NJCAT in their revised filter testing protocol for proprietary practices.

DDOE Response: While DDOE believes that the existing definition is sufficient for purposes of the guidebook, DDOE agrees that there are several potential mechanisms for bypass and has incorporated a change.

o. **(p. 4)** The Commenter notes a potential discrepancy between Section T.0., which refers to percent reductions from a 1.7-inch design storm event for proprietary practices, and Table T.1, which refers to the runoff volume from a 1.2-inch storm for other practices. The Commenter asks if the 1.7-inch design storm requirement is a typographical error. The Commenter states a need to clarify which design storm is applicable to proprietary practices and contends that all BMPs should be treated equally and have the same design storm criteria.

DDOE Response: Based upon several public comments, Appendix T has been revised significantly to simplify the evaluation of proprietary devices. The potential confusion in the design event has been eliminated.

p. **(pp. 4–5)** Regarding Appendix T, Section T.1, the Commenter suggests allowing other established technology testing protocols in addition to TARP, such as: the State of Washington Department of Ecology's Technology Assessment Protocol - Ecology; monitoring protocols from Geosyntec Consultants and Wright Water Engineers via the International Stormwater BMP Database; NJCAT, and others.

DDOE Response: Appendix T has been revised significantly to simplify the evaluation of proprietary devices and acknowledge select established protocols.

q. **(p. 5)** Regarding Appendix T, Section T.1, the Commenter also suggests amending the requirement for using ASTM sampling methods to include other water quality sampling methods such as USEPA methods, USGS methods and Standard Methods for the Examination of Water and Wastewater. The Commenter contends that this change would allow more flexibility in a monitoring program and provide DDOE potential flexibility in utilizing the data to meet local and regional TMDL implementation and MS4 requirements.

DDOE Response: Based upon several public comments, Appendix T has been revised significantly to simplify the evaluation of proprietary devices, including acceptable sampling methodologies.

r. **(p. 5)** The Commenter notes that Section T.1 requires proprietary BMPs to have a minimum of three sites and/or three years of annual performance data for each supporting study. The Commenter also notes that research related to non-proprietary systems varies due to their site specific designs, field conditions, and variation in monitoring protocols and techniques. The Commenter suggests requiring non-proprietary systems to follow the same monitoring protocols as manufactured systems in order to promote equity compare performance data equally.

DDOE Response: Based upon several public comments, Appendix T has been revised significantly to simplify evaluation of proprietary devices.

s. **(p. 5)** In Section T.1 Approval Requirements, the Commenter contends that the requirement for continuous inflow and outflow monitoring could be interpreted to mean that monitoring should also occur in dry weather conditions. The Commenter states a need to define the term "continuous" and the conditions it applies to.

DDOE Response: Based upon several public comments, Appendix T has been revised significantly to simplify evaluation of proprietary devices.

t. **(p. 5)** The Commenter suggests providing a conditional approval level between the minimum criteria in section T.1 and the laboratory criteria in Section T.1.2 The Commenter contends that the original language could limit the number of proprietary BMP installations, while the change to a tiered approval program would provide an incentive for manufacturers to obtain a higher level of field monitoring.

DDOE Response: Based upon several public comments, Appendix T has been revised significantly to simplify evaluation of proprietary devices.

u. **(p. 5)** In Section T.1 Approval Requirements, the Commenter suggests stating that previously installed proprietary practices do not count toward installation limits for preliminary or conditional approval of a manufacturer's BMP. The Commenter contends that the installation limitations should not apply until the proposed rule and proposed guidebook are final and codified.

DDOE Response: The proposed rule and proposed guidebook each state that they apply only to new, rather than existing, development. In addition, Appendix T has been revised and the "installation limits" have been removed.

v. **(p. 5)** The Commenter announces that the NJCAT filter laboratory and field protocols are being updated and are expected to be publicly available once approved by NJDEP in the fourth quarter of 2012. The Commenter provides a contact for obtaining more information.

DDOE Response: Based upon several public comments, DDOE has drawn on New Jersey's protocols to significantly revise Appendix T and simplify evaluation of proprietary devices.

w. **(p. 6)** The Commenter states a need to correct typographical errors where Sections T.1 and T.1.1 refer to Appendix X sections when they should refer to Appendix T sections.

DDOE Response: DDOE has made these corrections.

12. Fresh Creek Technologies, Inc., Hans de Bruijn (November 6, 2012)

a. The Commenter contends that increased use of evapotranspiration and infiltration methods will cause a severe accumulation of solids (i.e., sediment, trash, heavy metals, nutrients, leaf-litter, and traffic dust) because the swept up solids from urban surfaces are no longer washing down with stormwater runoff. The Commenter also contends that the proposed rule and proposed guidebook do not clearly address this potential accumulation or list scientifically proven methods, called for in NPDES Permit 000221, to intercept it.

DDOE Response: The guidebook addresses these issues by specifying the use of pretreatment devices for many BMPs and requiring consistent maintenance for all BMPs.

b. The Commenter suggests stipulating that, "All runoff shall pass through a ¼-inch opening prior to discharge from the conveying conduit. The collected material shall be removed by maintenance crews when the collected material blinds the openings and causes more than five inches of pressure loss across the collection device."

DDOE Response: DDOE disagrees with this comment. Collection devices of the type described are inappropriate for many BMPs.

c. The Commenter provides a chart comparing technical data for gravity separation of various materials and suggests stipulating that, "All runoff shall pass through a gravity separation facility, where the Q/A, or SOR does not exceed 10 gpm/ft^2 during the water quality flow event. Exceeding events shall direct the flow to discharge untreated without loss of previously collected matter. Separated accumulated matter shall be collected by maintenance services to maintain water quality flow intensity without loss of the separated matter."

   DDOE Response: DDOE disagrees with this comment. The guidebook already requires use of BMPs and pretreatment devices that remove pollutants effectively.

d. The Commenter suggests requiring filtration for all water-quality runoff allowed post construction. Specifically, the Commenter suggests stipulating that, "The water quality flow shall be filtered prior to discharge from the permitted site. The filtering period may be extended to 24 hours from the beginning of the rain event and the water quality volume may be detained or retained for groundwater recharge or evapotranspiration."

   DDOE Response: DDOE disagrees with this comment. The guidebook already requires the use of BMPs that remove pollutants from runoff.

13. Institute for Local Self Reliance, Brenda Platt (November 8, 2012)

a. The Commenter agrees with having a specification for compost amended soils (Appendix K: Soil Compost Amendment Requirements) and promoting their use in several BMPs (such as Impervious Surface Disconnection filter paths; growing or filter media for rain gardens, green roofs, and bioretention systems; channel systems; vegetated swales; stormwater wetlands; and tree planting and preservation).

   DDOE Response: DDOE has noted your support.

b. The Commenter suggests adding "Amend Soil with Compost" as a 14th Stormwater Management (stand-alone) practice in Chapter 3.

   DDOE Response: DDOE disagrees with this comment. It would be impractical to review and enforce compost amendments for areas that do not receive additional runoff.

c. The Commenter suggests requiring a minimum soil quality and depth for post-construction development or redevelopment to improve on-site capture of stormwater flow and water quality. (This requirement could be included in the previously recommended stand-alone practice, "Amend Soil with Compost.")

   DDOE Response: DDOE disagrees with this comment. The runoff coefficient assigned to compacted cover in the proposed rule accounts for the expected runoff from pervious areas.

d. The Commenter suggests identifying and promoting compost blankets, compost berms, and compost sock filters as BMPs for stormwater control as well as erosion and sedimentation control. The Commenter provides several links to related information on the USEPA website for the public record.

   DDOE Response: While these practices may have benefits as part of other BMPs, measuring their retention capabilities as stand-alone BMPs is difficult.

e. The Commenter suggests updating Appendix K to reflect state-of-the-art science and best practices on compost amended soils and to offer flexibility for using compost that has not received the U.S. Composting STA, such as allowing use of MDA registered compost. In contrast to language in the proposed guidebook, the Commenter contends that composting is inherently aerobic, not anaerobic, and suggests DDOE allow use of compost amendments for slopes up to 30%. The Commenter also contends that many regional composters do not have STA certification because it is very expensive and notes that the Maryland Department of Environment's statewide compost study group is recommending that procurement policies specify compost that is registered with MDA.

   DDOE Response: DDOE has included alternative certifications in Appendix K and revised the slope limitation.

f. The Commenter suggests that DDOE fully review and update its specifications on compost. The Commenter notes that the proposed guidebook specifies leaf compost several times and suggests allowing additional types, such as compost from non-leaf yard trimmings and food scraps. The Commenter contends that manure-based composts may need to be restricted due to high phosphorus content.

   DDOE Response: References to leaf compost have been revised to read "compost, as specified in Appendix K." Appendix K has been updated to improve the compost specifications and to clarify compost amendment procedures.

g. The Commenter suggests that DDOE review the Washington State Department of Ecology's *Stormwater Management Manual for Western Washington* and *Guidelines and Resources for Implementing Soil Quality and Depth BMP T5.13* by the Building Soil network. The Commenter provides links to these documents for the public record and cites several benefits of amending soil with compost. The Commenter contends that establishing minimum soil quality and depth criteria will help ensure that stormwater can infiltrate the soil, organic matter is the least water-soluble form of nutrients that can be added to the soil, and increasing soil organic content with compost amendments increases the water-holding capacity of the soil manifold.

   DDOE Response: DDOE has elected to focus compost amendment use on specific stormwater BMPs, rather than a general site amendment.

h. In summary, the Commenter states that, if these recommendations were adopted, the proposed guidebook could serve as an important model for neighboring jurisdictions to replicate.

DDOE Response: DDOE feels that its specification of compost relative to stormwater BMPs is appropriate.

14. KriStar Enterprises, Inc., Marc Lelong (November 8, 2012)

a. Regarding Section T.1 Approval Requirements, the Commenter suggests determining performance data by a minimum number of storm events (10–12) of a minimum duration and intensity. The Commenter contends that three years of data from one site does not yield any greater insight into a device's performance than one year of data and does not satisfy the "demonstration of compliance."

DDOE Response: Based upon several public comments, Appendix T has been revised significantly to simplify evaluation of proprietary devices.

b. Regarding Section T.1 Approval Requirements, the Commenter contends that three years of test data from one site constitutes a significant cost burden that will restrict many manufacturers from the market. The Commenter suggests requiring one field study in conjunction with lab testing to demonstrate compliance. The Commenter also contends that it is unfair to require a proprietary BMP to prove its performance to this level if other types of traditional BMP's have not been required to do so, and that all BMP's, proprietary or not, must be tested in the same manner.

DDOE Response: Based upon several public comments, Appendix T has been revised significantly to simplify evaluation of proprietary devices.

c. The Commenter notes that Section T.1.2 Approval Requirements: Laboratory Testing references a 2009 NJDEP filter protocol and suggests referencing the new NDJEP filter protocol, which will be approved in the coming months, as an acceptable laboratory testing method.

DDOE Response: Based upon several public comments, Appendix T has been revised significantly to simplify evaluation of proprietary devices and draws on New Jersey's existing and proposed protocols.

d. The Commenter suggests that DDOE approach the SWEMA for input because they could share their experience in helping other jurisdictions develop protocols and procedures for allowing proprietary devices.

DDOE Response: DDOE has received numerous comments on the proprietary practice approval process and has revised Appendix T to better align with other jurisdictions' protocols.

15. John Lickso (November 8, 2012)

a. Regarding Appendices B and P, the Commenter asks how the proposed guidebook addresses the cumulative effects of infiltration BMPs on groundwater levels. For example, The Commenter contends that the mounding effects of groundwater can increase the hydrostatic pressure on roads, buried structures, or utilities, causing them to fail. The Commenter also contends that mounded groundwater can result in preferential flow paths for water that runs along buried utilities causing damage to utility connections or junction boxes.

   DDOE Response: DDOE disagrees with this comment. Several studies have shown the effects of infiltration on groundwater mounding to be minimal.

16. The Low Impact Development Center, Inc., Neil Weinstein (November 6, 2012)

a. **(p. 1)** The Commenter contends that some of the methods for calculating sizes of facilities appear to be independent of time, which does not fit well with standard hydrologic and hydraulic approaches (e.g., Rational, NRCS, HEC, etc.) and results in facilities, particularly those that filter stormwater, being larger in size than they have to be.

   DDOE Response: DDOE disagrees with this comment. While the retention standard included in the proposed rule is independent of time, time constraints and considerations have been included where appropriate for certain practices.

b. **(p. 1)** The Commenter contends that the proposed rule contains several hydrologic "short cuts" from the modified Runoff Reduction Method (such as simply subtracting volumes) that should not be used or included in other hydrologic models.

   DDOE Response: DDOE disagrees with this comment. Subtraction of the retention volume when calculating detention requirements is a simplified, conservative approach. More advanced modeling techniques may be used instead.

c. **(p. 1)** The Commenter contends that the methods in the proposed rule are not approved for use by the FHWA, which will result in additional calculations.

   DDOE Response: While this comment is factually correct, DDOE's unique retention requirements necessitate different calculation methods.

d. **(p. 1)** The Commenter contends that the designs of the bioretention, permeable pavements, and other infiltration devices do not account for soil structure and are primarily based on Hydrologic Soils Groups, which may be problematic as it will change the structural characteristics.

   DDOE Response: The specific intent of the comment is unclear; however, the design requirements include detailed setbacks that inherently account for the soil structure impacts a practice may have. Additionally, the designer for permeable pavement should

take sub-soils into account during the design phase (e.g., if sub-soils are expansive clays, permeable pavement would not be a good choice due to the potential for failure).

e. **(p. 1)** The Commenter suggests requiring preparation of a general soils/geotechnical report for infiltration and making the geotechnical engineer responsible for the type, location, and density of the borings. The Commenter also contends that the variability is too great in urban areas and the falling head test may not be the most appropriate.

   DDOE Response: The intent of Appendix P: Geotechnical Information Requirements for Underground BMPs is to provide a consistent framework to achieve adequate testing; however, there may be a need for flexibility for some sites. Sections P.2 and P.5 have been amended to provide the geotechnical professional the ability to modify testing procedures to meet specific needs.

f. **(p. 1)** The Commenter contends that there are many instances where references to building codes are incomplete or missing. The Commenter notes that this issue is particularly evident in the green roof and the water capture specifications.

   DDOE Response: The chief intent of the guidebook is to outline the stormwater aspects of green roofs, rainwater harvesting, etc. While it is beyond the scope of the guidebook to reference all applicable building codes for each BMP, efforts were made to highlight key ones.

g. **(p. 1)** The Commenter contends that the bioretention soil mix is not very good because there is too much sand. The Commenter asks for an explanation of soil fines and notes that there are numerous instances of references to materials or specifications.

   DDOE Response: In Section 3.5.4, the Filter Media and Surface Cover information has been updated to provide more clarification and better match industry standards. There is a more generous range of percent composition of sand, top soil, and organic matter to maintain long-term permeability while providing enough nutrients to support plant growth. Exact filter media criteria have been detailed in Tables 3.5.1 and 3.3.3 (changed in revised guidebook to Tables 3.21 and 3.10, respectively).

h. **(p. 1)** The Commenter contends that the geotechnical fabric specification is too limited, particularly with respect to liners and drainage fabrics, and the distinction or choice between woven and nonwoven drainage fabrics should be a function of the soils and use instead of one or the other. The Commenter also suggests limiting use of fabrics because of the potential for clogging.

   DDOE Response: The specifications have been amended to give the designer discretion to select the most appropriate fabric based on the application and to conform with AASHTO M-288 Class 2 requirements (as well as with DDOT specifications where appropriate). This change applies to all BMP sections that include specifications for geotextiles/fabrics.

i. **(p. 1)** The Commenter asks why a storage volume is not given for the green roof. The Commenter contends that the media should totally absorb a small storm and that the initial abstraction of the roof would permit some detention.

DDOE Response: The storage volume for green roofs is calculated in Equation 3.1.1 (changed in revised guidebook to Equation 3.1) and is assigned a 100% retention value, as indicated in Section 3.1.8.

j. **(p. 2)** The Commenter contends that the specification for roof loads and structural requirements is incomplete and oversimplified. The Commenter also contends that there are a limited number of citations and references on materials, and, although they are good references, they are not really tested or verified through rigorous procedures.

DDOE Response: The chief intent of this specification is to outline the stormwater aspects of green roofs: storage, crediting, etc. It is beyond the scope of the specification or the guidebook to provide additional architectural and structural engineering details on green roofs, as this topic is thoroughly covered by other sources. The specification correctly notes that architects and structural engineers must be consulted on these matters. Section 3.1 has been amended to clarify this point.

k. **(p. 2)** The Commenter asks if there are provisions for supplemental watering of the roofs.

DDOE Response: DDOE agrees with the substance of this comment and has revised Section 3.1.5, which is a more appropriate place for this information.

l. **(p. 2)** The Commenter contends that the drainage time for facilities is conflicting or inconsistent.

DDOE Response: DDOE agrees with this comment and has amended the revised guidebook to include a 72-hour drawdown time for most practices (48 hours for permeable pavement).

m. **(p. 2)** In Section 3.2.1, the Commenter contends that the criteria for hot spots are very vague and asks what the exact criteria are.

DDOE Response: The sentence referring to industrial roof surfaces as potential hotspots has been removed. Treatment requirements for rainwater harvesting from different types of roofs and surfaces are delineated in Appendix N.

n. **(p. 2)** The Commenter contends that treatment of water from rain harvesting is not very complete or specific and suggests that it should also tie into the building and plumbing codes.

DDOE Response: While building and plumbing codes will be important considerations for design of a rainwater harvesting system, inclusion of all pertinent rules is beyond the scope of the guidebook.

DCRA is in the process of adopting an amended version of the 2012 IGCC which speaks to the inclusion of rainwater harvesting in the building and plumbing codes. DDOE has participated as a reviewer and commenter in this process. The public comment period closed January 25, 2013. See dcra.dc.gov/DC/DCRA/About+DCRA/News+Room/rulemaking/DCRA+Proposes+New+2013+D.C.+Construction+Codes.

o. **(p. 2)** The Commenter contends that there is no real data or rationale to support the sheet flow buffer lengths.

DDOE Response: DDOE acknowledges that there is limited data available on retention for disconnection BMPs. Therefore, the required dimensions and retention values included in the guidebook are intentionally conservative.

p. **(p. 2)** The Commenter asks if the soil/compost buffer has vegetation.

DDOE Response: Yes. In Appendix K Soil Compost Amendment Requirements, Section K.3 Construction Sequence indicates the requirement for vegetation establishment.

q. **(p. 2)** The Commenter contends that 1foot/second of flow on disconnection is quite a significant flow.

DDOE Response: In Section 3.3.4, the intent of (D-2) "Simple Disconnection to a conservation area with Natural Cover designation." is to normalize the level spreader lengths required for handling flows of any type. The minimum required width of the level spreader is as follows:

- 13 linear feet per each 1 cubic foot/second of inflow if the receiving conservation area has 90% ground cover
- 40 linear feet per 1 cubic foot/second of inflow if the receiving conservation area is forested

An inflow of 0.5 cubic foot/second would give a 6.5-foot wide level spreader when the receiving conservation area has 90% ground cover. The level spreader requirements would be 20 feet if this same 0.5 cubic foot/second flow was being received by a forested conservation area.

r. **(p. 2)** The Commenter asks if the grasses in Table 3.3.4 (changed in revised guidebook to Table 3.11) match up with commercially available types and the Sediment and Erosion Control manual.

DDOE Response: The recommendations in Table 3.3.4 (Chapter 3.3) match Section J – VEGETATIVE STABILIZATION of DDOE's Soil Erosion and Sediment Control Handbook (ddoe.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/Section%20J%20-

%20Vegetative%20Stabilization.pdf) fairly well. Additionally, all grasses on the list should be commercially available. If using vegetation outside of this table, the designer must provide documentation to ensure excessive erosion will not occur.

s. **(p. 2)** The Commenter contends that the permeable pavement design criteria are incomplete and that some significant areas and considerations are not covered. The Commenter suggests citing ASTM and AASHTO design procedures and specifications or the industry standards.

DDOE Response: It is not clear exactly what omissions the commenter is referring to. However, the permeable pavement design criteria are meant to inform hydrologic and hydraulic design of the practice. Structural design is typically covered in the manufacturer's recommendations or other sources, such as AASHTO design procedures.

t. **(p. 2)** The Commenter contends that it is going to be very hard to find areas that meet the slope requirements, especially for alleys and parking lanes.

DDOE Response: DDOE has revised the pavement surface slope requirements to better match industry standards.

u. **(p. 2)** The Commenter asks for further explanation of slope and head.

DDOE Response: The paragraphs regarding pavement bottom slope have been moved from Section 3.4.1 to Section 3.4.4 and revised to include a diagram to clarify slope and head requirements and recommendations.

v. **(p. 2)** The Commenter asks for clarification on infiltration rates.

DDOE Response: It appears that the commenter is referring to an inconsistency in the crediting of infiltration rates for permeable pavements. Section 3.4.4 notes that one-half of the field-verified infiltration rate shall be used for design calculations. However, a review of the design calculations revealed that infiltration had been under-credited. Equation 3.4.3 has been modified accordingly.

w. **(p. 2)** The Commenter states a need to include specifications on how liners are to be joined and tested in the pavement areas.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

x. **(p. 2)** The Commenter asks about the use of hand tamping or smaller vibrators for pavers for the depth of scarification in Section 3.4.6, Step 4.

DDOE Response: The beginning of the Permeable Pavement Installation section notes that modifications may be needed to the general construction sequence. This would include alternative compaction techniques in some cases.

y. **(p. 2)** The Commenter asks why there is a requirement to wash the stone for the pavement while it is being constructed.

DDOE Response: The guidebook requires use of washed stone but does not include a requirement to wash the stone as it is being constructed. However, Step 7 in the Permeable Pavement Installation sequence has been revised to remove the need to moisten the aggregate before spreading.

z. **(p. 2)** The Commenter contends that the maintenance considerations for pavement are incomplete.

DDOE Response: The maintenance activities included in the guidebook represent the minimum required activities. Additional or more frequent activities may be necessary in certain cases.

aa. **(p. 2)** The Commenter states a need to clarify the methods and rigor of determining pollution credits. The Commenter contends that the data from well researched sources, such as the ASCE Database, or from local monitoring do not appear to be used, and asks if the stated values tie into the Chesapeake Bay TMDL.

DDOE Response: While the proposed guidebook originally provided a TSS removal percentage for each BMP, the TSS removal standards have been revised.

bb. **(p. 3)** The Commenter states a need to clarify how one should insure that the bioretention sump will infiltrate within 72 hours. The Commenter contends that this process does not seem to have a good rationale and will probably make the facility much larger. The Commenter suggests that it would probably be more reasonable to have the bioretention sump partially infiltrate and then discharge the excess within the time period.

DDOE Response: An option for including both an infiltration sump and an underdrain is included in the guidebook. The infiltration sump depth may be adjusted so that it will completely drain within 72 hours.

cc. **(p. 3)** The Commenter contends that a bioretention cell drainage area of up to 2.5 acres is much too large and that these practices function best when the drainage area is less than 0.5 acres.

DDOE Response: DDOE disagrees with this comment. The 2.5-acre drainage area is limited to traditional bioretention. Other types of bioretention have a smaller drainage area maximum.

dd. **(p. 3)** The Commenter suggests that it would be better to have a licensed landscape architect or certified horticulturalist prepare the landscape plan.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

ee. **(p. 3)** The Commenter contends that the plant palette is very limited for bioretention areas.

DDOE Response: The plant lists included in Tables 3.5.2 and 3.5.3 (changed in revised guidebook to Tables 3.22 and 3.23, respectively) are not intended to be exhaustive. Other resources are indicated in the guidebook that provide more extensive plant lists.

ff. **(p. 3)** The Commenter states a need to clarify the maintenance criteria for bioretention areas.

DDOE Response: DDOE disagrees with this comment. The maintenance criteria indicated in the guidebook represent the minimum requirements. Additional maintenance activities may be necessary in certain situations.

gg. **(p. 3)** The Commenter contends that it will be very difficult to use the design criteria for disconnection and filter strips for linear projects and trails, and that this issue has been a significant problem in Maryland, where the same approach was used. The Commenter also contends that the slope and length criteria are excessive.

DDOE Response: DDOE contends that the length and slope criterion are suitable but acknowledges that linear projects may be better served with other practices. Additionally, the potential for disconnection of impervious area in a linear project may be limited due to a relatively small amount of imperviousness.

hh. **(p. 3)** The Commenter states a need for more supporting information on the sizing of the filter surface area and asks what it is based on.

DDOE Response: It is assumed that this comment is related to disconnection. DDOE acknowledges that there is limited data available on retention for disconnection BMPs. Therefore, the required dimensions and retention values included in the guidebook are intentionally conservative.

ii. **(p. 3)** The Commenter asks the reason for the amount of head on the infiltration devices.

DDOE Response: The hydraulic head indicated for infiltration devices is a recommendation only. It describes the minimum depth of the practice, including ponding volume and stone layers, not the required ponding depth.

jj. **(p. 3)** The Commenter asks where the pretreatment criteria for infiltration and ponds come from.

DDOE Response: These criteria were adapted from existing specifications from Virginia, Georgia, West Virginia, and several other pre-existing stormwater manuals and specifications. They have since been modified based on review of public comments.

kk. **(p. 3)** The Commenter asks what the residence time is in the dry swales and how to determine the volume reduction.

DDOE Response: The retention value for dry swales is calculated in the same manner as bioretention.

ll. **(p. 3)** The Commenter states a need to evaluate the testing/submittal requirements for proprietary products.

DDOE Response: DDOE agrees that the proprietary practice testing/submittal requirements were inadequate and has revised them accordingly.

17. Natural Resources Defense Council, Rebecca Hammer (November 8, 2012)

Some comments have been addressed in the rule Response to Comments instead of in this document.

a. **(pp. 11–12)** The Commenter suggests eliminating the exemption that allows projects in the PROW to have a shortfall in on-site retention without being required to use SRCs or pay the ILF (proposed rule, Preamble p. 23 and Section 521.4). The Commenter contends that this exemption creates a huge missed opportunity to protect District water bodies because 25% of the District's impervious surface is located in the PROW (proposed rule, Preamble p. 23), and that the District should voluntarily implement the change now because this exemption may not be allowed under the next MS4 permit. The Commenter suggests that, at a minimum, the exemption must expire after five years.

DDOE Response: DDOE disagrees with this comment. The Maximum Extent Practical Process for Existing Public Right-of-Way was developed to comply with the District's current MS4 permit.

b. **(p. 12)** In Section 526.1, the Commenter states a need to define the term "technically infeasible" within the proposed rule and to explain it in further detail in the guidebook using objective, clearly defined criteria. The Commenter contends that is unclear if "infeasible" means that it must it be impossible or something less demanding.

DDOE Response: The criteria for "technically infeasible" are described in detail in Appendix E Relief for Extraordinarily Difficult Site Conditions.

c. **(pp. 17–18)** The Commenter compares and gives examples of some of the District and Maryland standards for contributing drainage area allowances and contends that some of the District's criteria may be too lenient, including those for green roofs and some types of bioretention and permeable pavement. The Commenter recommends that DDOE

review the Maryland Stormwater Design Manual and also specifications for Philadelphia and other neighboring jurisdictions to compare and double-check the accuracy and appropriateness of the proposed design criteria.

DDOE Response: DDOE disagrees with this comment. The drainage area allowances are generally in line with industry standards.

d. **(pp. 18–19)** The Commenter suggests that crediting 25% for the balance of pore space (media void space) retention volumes and 75% for ponding volumes is inaccurate and suggests basing them on the particular dimensions and media characteristics of each practice and site. The Commenter contends that these percentages may grossly under-represent the actual runoff volume capture of the device; could be a barrier to innovation in ultra-urban uses of bioretention; and may encourage bioretention devices with unduly large surfaces areas, or that appear to be deep trenches (which would not be aesthetically balanced and could cause safety hazards).

   DDOE Response: DDOE agrees that the ponding volume requirement was higher than necessary. MDE's Draft Surface Storage Volume Tables for Bioretention, Bioswales, Rain Gardens, and Landscape Infiltration provides a thorough analysis of the surface ponding requirements for various combinations of drainage area and BMP characteristics. While Maryland's stormwater rules and guidance differ from the District's, most notably with Maryland's "P_E" calculations, conclusions can still be drawn from this document. In the District, most bioretention areas will be designed based on a 1.2- to1.7-inch rain event, and have a filter area between 2% and 10% of a highly impervious contributing drainage area. Corresponding areas of the applicable storage volume tables indicate that a minimum surface storage volume requirement of approximately 50% is appropriate. However, the 50% requirement applies only to practices with an underdrain or with a measured infiltration rate of at least 2 inches per hour. Infiltration-based practices with a lower infiltration rate still have a surface storage volume requirement of 75%.

e. **(p. 19)** The Commenter contends that the proposed landscaping criterion for rainwater harvesting are too vague and lenient. The Commenter suggests providing more specificity for the soil and vegetation conditions of the overflow receiving area and the minimum size of the runoff-generating and runoff-receiving areas. The Commenter suggests that DDOE refer to the Maryland Stormwater Design Manual specifications for a detailed example.

   DDOE Response: The Overflow paragraph in Section 3.2.2 has been revised to note the need for stable conveyance. In an urban area like the District, the main uses of harvested rain water will be indoors, and overflows may be directed to the storm system rather than to a pervious area. For all cases, users must indicate the drainage area to the cistern and, if applicable, the area to be irrigated. These characteristics will affect the overall retention value assigned to the practice as indicated in the Cistern Design Spreadsheet.

f. **(p. 20)** Regarding impervious surface disconnection (proposed guidebook Section 3.3), the Commenter suggests tightening the standards for sizing, soil, and vegetation

conditions. The Commenter also suggests that DDOE refer to Chapter 5 of the Maryland Stormwater Design Manual for examples of more stringent requirements.

DDOE Response: DDOE has reviewed and finds the retention values allowed for disconnection represent the more conservative end of the spectrum.

g. **(pp. 20–21)** In Section 3.3.1, the Commenter contends that the single minimum size factor for disconnection practices is inadequate and suggests requiring vegetation quality criteria and a size ratio for rooftop and non-rooftop runoff (based on receiving area and contributing impervious surface drainage area).

DDOE Response: DDOE disagrees with this comment. Since the retention values assigned to disconnection practices are based upon the surface area available for disconnection, there is an inherent benefit to keeping the ratio of impervious surface to disconnection area small.

h. **(p. 21)** The Commenter contends that Appendix K, Soil Compost Amendment Requirements, establishes a voluntary protocol for soil compost amendments but does not make them a mandatory step. The Commenter suggests requiring turf decompaction and soil compost amendments rather than simply encouraging them, particularly for Hydrologic Soil Group Class C and D soils.

DDOE Response: DDOE requires compost amendment for specific stormwater BMPs rather than for the overall site.

i. **(p. 21–22**) The Commenter suggests requiring soil compost amendments for compacted soils when installing impervious surface disconnection or rainwater harvesting in conjunction with landscape irrigation. The Commenter also suggests listing soil compost amendment as a separate (14th) stormwater practice in Chapter 3 and adapting and requiring soil quality standards similar to those recommended for Seattle.

DDOE Response: DDOE disagrees with this comment. The guidebook provides greater retention value for disconnection to compost amended soils, but it does not require the practice. Compost amended soils would be difficult to enforce in the long term; therefore, they have not been included as a practice.

j. **(p. 22)** The Commenter contends that landscaping criteria for impervious surface disconnection practices are inadequate, including the recommended grass types in Table 3.3.5. The Commenter suggests establishing minimum criteria for vegetation quality and mandatory requirements for size, area coverage, planting criteria, and maintenance.

DDOE Response: The recommendations in Table 3.3.4 (changed in revised guidebook to Table 3.11) match Section J – VEGETATIVE STABILIZATION of DDOE's Soil Erosion and Sediment Control Handbook (see ddoe.dc.gov/sites/default/files/dc/sites/ddoe/publication/attachments/Section%20J%20-%20Vegetative%20Stabilization.pdf). When using a vegetation type not included in this

table, the designer must provide documentation to ensure excessive erosion will not occur.

k. **(p. 22)** The Commenter notes that soil can be amended with compost as a stand-alone practice or in tandem with other green infrastructure. The Commenter suggests that, as a stand-alone practice, soil compost amendments are aimed at reducing the curve number for turf and other areas down to that of meadow. When used in tandem with other practices, they enable the soil of turf lawns and planting beds to better absorb runoff from outlets of rain barrels, cisterns, and downspouts.

DDOE Response: The runoff coefficient assigned to compacted cover in the proposed rule accounts for the expected runoff from pervious areas. It would be impractical to review and enforce compost amendments for areas that do not receive additional runoff.

18. PaveDrain, Dan Bishop (October 26, 2012)

a. In Section 3.4 Permeable Pavement Systems, the Commenter suggests changing design variant P-4 to a new category called "Permeable Articulating Concrete Block/Mats" and making "Plastic grid pavers" item P-5. The Commenter also provides several supporting documents and links, including information about their proprietary products and specifications, an infiltration calculator, a project profile for St. John's College High School, Shaw Group's Flyer and White Paper on permeable articulating concrete block/mats, and information about the HydroCad stormwater modeling software program.

DDOE Response: This type of product does not appear to differ substantially from PICP. Certain products may differ from those described in this chapter of the guidebook, and this is noted in several locations.

b. In Figure 3.4.1 (changed in revised guidebook to Figure 3.13) Cross Section of a Standard Permeable Pavement Design, the Commenter notes that their proprietary product is large enough to sit directly on the number 57 stone, which eliminates the need to use a bedding layer.

DDOE Response: The note "as directed by manufacturer" is included for the bedding layer on the cross section drawings in the guidebook. This language sufficiently covers cases where no bedding layer is necessary.

c. In Table 3.4.1 (changed in revised guidebook to Figure 3.13) Different Permeable Pavement Specifications, the Commenter suggests adding a section for Permeable Articulating Concrete Block/Mats.

DDOE Response: This type of product does not appear to differ substantially from PICP. Certain products may differ from those described in this chapter of the guidebook, and this is noted in several locations.

d. The Commenter suggests adding a section for P-ACB/M in Steps 8 and 9 of Permeable Pavement Installation (Section 3.4.6) and in Section 3.4.7 Permeable Pavement Maintenance Criteria.

DDOE Response: This type of product does not appear to differ substantially from PICP. Certain products may differ from those described in this chapter of the guidebook, and this is noted in several locations.

19. Scarlett Sinclair (November 8, 2012)

Note: These comments have been addressed in the rule Response to Comments instead of in this document.

20. Casille Systermans (November 8, 2012)

Note: These comments have been addressed in the rule Response to Comments instead of in this document.

21. United States Environmental Protection Agency, Region III, Jon M. Capacasa (November 26, 2012)

Note: These comments have been addressed in the rule Response to Comments instead of in this document.

22. US Army Corps of Engineers Baltimore, Erin Mahoney (October 2, 2012)

a. The Commenter notes that Design Example 2 in Appendix A says 75% of the roof will be green and 25% will be regular roof, but then it identifies 11,250 square feet for roof area and 3,750 square feet for BMP area. The Commenter asks for clarification and suggests that the numbers should be reversed.

DDOE Response: DDOE accepts the substance of this comment and has incorporated a change.

23. William H. Gordon Associates, Inc., Feiquan Luo (November 2, 2012)

a. The Commenter notes that Equation 3.5.1 (changed in revised guidebook to Equation 3.5) Bioretention Storage Volume requires the surface storage volume of a system (including pretreatment) to store at least 75% of the SWRv or alternative design storm prior to filtration. The Commenter asks if the pretreatment storage volume can be included in the surface storage volume no matter whether it is above ground or underground, dry storage or wet storage.

If that is possible, the Commenter asks if it is acceptable to fulfill the requirement of the surface storage volume by designing a pretreatment with wet storage of 75% of the SWRv to collect all the flows before they enter the bioretention cell. The Commenter notes that, if this kind of design is allowable, there is no way to regulate the size of surface area of the filter media, which means that a small bioretention cell can treat huge

impervious area as long as the pretreatment storage surface area does not exceed the filter media surface area (since the total surface ponding area may not be more than twice filter media surface area).

DDOE Response: Wet storage is not indicated in the guidebook as a pretreatment option for bioretention. While it may be appropriate in certain cases, a pretreatment cell is the only type of pretreatment that would be included in the surface storage requirements. This information has been clarified in the descriptions of the storage volume equations.

24. Focused Session on Stormwater BMP Technical Specifications, Daniel Duke (Boehler), Elizabeth Squires (Vika Capital) (October 23, 2012)

a. The Commenter asks what a regulated private parcel development is responsible for when land disturbance occurs in the adjacent PROW as part of the project's LOD. Can stormwater generated by a private parcel be sent to a BMP facility in the public space? Are there any special provisions for sites with land disturbances that are primarily streetscape improvements? Can the Maximum Extent Practicable process defined in Appendix B be used when a private parcel reconstructs adjacent PROW as part of the project's LOD?

   DDOE Response: A separate SWRv shall be calculated for the portion of the project in the PROW. In the MEP process, that SWRv must be managed with retention practices to the MEP. DDOE has modified Section 521 of the revised rule and Chapter 2 and Appendix B of the SWMG to reflect this change.

b. The Commenter notes that to determine 2-year and 15-year quantity requirements for runoff computations, a designer needs to compare the predevelopment rate to the postdevelopment rate. The Commenter contends that developers need more guidance on the predevelopment CN. They understand a "good meadow" CN is required; however, the CN for good meadow conditions can range from 30 to 78 depending on the soil type. In the District, soils are often "Ub" which ranges throughout all soil types. What CN should be assumed for sites where there is an existing building and a soils report cannot be performed?

   DDOE Response: Appendix H now states that, in cases where the Hydrologic Soil Group is not available through the Soil Survey due to the listed soil type being "Urban Soils" or similar, a Hydrologic Soil Group of C shall be used.

c. In Section 2.4, the Commenter suggests providing a resource (e.g., a map) that indicates where extreme flood analysis needs to be performed.

   DDOE Response: This resource exists in the Floodplain Management guidebook.

d. Regarding Chapter 2 (BMP Group 12), the Commenter notes that there is no Appendix X.

   DDOE Response: DDOE has made a correction to refer to Appendix T.

e. Regarding Section 3.1 Green Roofs, the Commenter contends that the contributing drainage area is too restricted

   DDOE Response: Revisions have been made to allow greater drainage areas for green roofs when appropriate precautions are taken.

f. Regarding Section 3.1 Green Roofs, the Commenter asks what the maximum drainage layer depth is for an intensive green roof system.

   DDOE Response: The current guidelines for the drainage layer specify a range from 0.25 to 1.5 inches but do not make a distinction between requirements for intensive versus extensive systems.

g. Regarding Section 3.1 Green Roofs, the Commenter contends that roof areas are a critical amenity in the District and that having a 60% to 70% green roof (approximate area to achieve 100% SWRv) will reduce the ability to utilize this area.

   DDOE Response: The guidebook does not require the use of green roofs to meet stormwater performance requirements. There are 12 other BMP categories. Additionally, there are off-site options.

h. Regarding Section 3.1 Green Roofs, the Commenter asks if there has been coordination with District historical sites and if green roofs will be allowed on such buildings.

   DDOE Response: DCRA coordinates the various agencies with review authority. Oversight of historical buildings is outside DDOE's purview.

i. Regarding Section 3.2.1 Rainwater Harvesting Feasibility Criteria, the Commenter refers to the requirement to have building setbacks 10 feet from the foundation and notes that they typically put these facilities inside the building.

   DDOE Response: The guidebook does not include setback requirements for rainwater harvesting tanks. The only requirement is that the overflow not cause ponding or saturated soils within 10 feet of an existing building foundation.

j. Regarding Section 3.2.3 Rainwater Harvesting Pretreatment Criteria, the Commenter notes that pretreatment requires first flush diverters to the send dirty water away from the storage tank. The Commenter states a need to clarify where this water should go. The sewer system? Another on-site BMP?

   DDOE Response: Pretreatment is an essential part of a functioning rainwater harvesting system. However, the 95% filter efficiency assumed in the guidebook and Cistern Design Spreadsheet may be too low in some cases. A variable efficiency will be allowed instead. Diverted water must be sent to a settling tank or other BMP, as noted in the revised Pretreatment section.

k. Regarding Section 3.2.4 Rainwater Harvesting Design Criteria, the Commenter contends that there appear to be many errors in the spreadsheet directions.

DDOE Response: DDOE has reviewed and corrected the spreadsheet directions.

l. Regarding utility coordination in Chapter 3.4 Permeable Pavement Systems, the Commenter asks who is to restore the permeable paving system after utility maintenance. Does a trench through a facility require reinstallation of the entire system? Who is liable for the cost of reconstruction/restoration of the BMP, the owner or the utility company? (Section 3.4.1 regarding Proximity to Utilities) Same question for Bio Gardens (Section 3.5.1 regarding Proximity to Utilities), infiltration (Section 3.7.1 regarding Proximity to Utilities), and Open Channels (Section 3.8.1 regarding Utilities).

DDOE Response: On private property, the property owner holds the ultimate responsibility to maintain, in good working order, all BMPs that are part of the site's approved stormwater management plan. In the public space, DDOT is playing the lead role in coordinating with the various utility companies to detail responsibility for replacement costs, but additional coordination will be necessary. DDOE has clarified this issue in the guidebook.

m. Regarding Erosion and Sediment Controls in Section 3.4.6, the Commenter asks what happens if you cannot remain outside the permeable pavement area.

DDOE Response: Section 3.4.6 and several other sections of the revised guidebook have been modified to include site modifications that will be required when it is not possible to remain outside of the permeable pavement area.

n. The Commenter asks if DDOE is going to attend the "spring maintenance inspection."

DDOE Response: DDOE will not attend the spring maintenance inspection. The maintenance activities for each BMP specified in the guidebook represent the minimum required maintenance for the owner of the site. This has been clarified in the revised guidebook.

o. Regarding Chapter 3.5 Bioretention, the Commenter notes the requirement for the storage volume to be 75% of ponding, which results in a required soil depth that is less than the ponding depth. The Commenter contends that this scenario discourages installing trees and deep-root plants and will encourage use of dry swales instead.

DDOE Response: DDOE agrees that the ponding volume requirement was higher than necessary. MDE's Draft Surface Storage Volume Tables for Bioretention, Bioswales, Rain Gardens, and Landscape Infiltration provides a thorough analysis of the surface ponding requirements for various combinations of drainage area and BMP characteristics. While Maryland's stormwater rules and guidance differ from the District's, most notably with Maryland's "P_E" calculations, conclusions can still be drawn from this document. In

the District, most bioretention areas will be designed based on a 1.2- to1.7-inch rain event, and have a filter area between 2% and 10% of the size of a highly impervious contributing drainage area. Corresponding areas of the applicable storage volume tables indicate that a minimum surface storage volume requirement of approximately 50% is appropriate. However, the 50% requirement applies only to practices with an underdrain or with a measured infiltration rate of at least 2 inches per hour. Infiltration-based practices with a lower infiltration rate still have a surface storage volume requirement of 75%.

p. In Section 3.5.4 Bioretention Design Criteria, the Commenter asks if the suggested 18-inch ponding depth is safe and contends that it is discouraged in both the Prince George's and the Delaware standards referenced in the proposed guidebook.

DDOE Response: DDOE agrees that an 18-inch ponding depth may not be appropriate in many cases. It is included as an option for situations where safety can still be maintained. Additional language has been included that stresses the need for safety features where ponding depths exceed 12 inches.

q. The Commenter contends that the language in Section 3.5.4 Bioretention Design Criteria increases required surface area to attain retention, but sites in the District do not have ample surface area to meet this requirement.

DDOE Response: DDOE agrees that the ponding volume requirement was higher than necessary. MDE's Draft Surface Storage Volume Tables for Bioretention, Bioswales, Rain Gardens, and Landscape Infiltration provides a thorough analysis of the surface ponding requirements for various combinations of drainage area and BMP characteristics. While Maryland's stormwater rules and guidance differ from the District's, most notably with Maryland's "P_E" calculations, conclusions can still be drawn from this document. In the District, most bioretention areas will be designed based on a 1.2- to1.7-inch rain event, and have a filter area between 2% and 10% of a highly impervious contributing drainage area. Corresponding areas of the applicable storage volume tables indicate that a minimum surface storage volume requirement of approximately 50% is appropriate. However, the 50% requirement applies only to practices with an underdrain or with a measured infiltration rate of at least 2 inches per hour. Infiltration-based practices with a lower infiltration rate still have a surface storage volume requirement of 75%.

r. Regarding Section 3.5.4 Bioretention Design Criteria, the Commenter contends that it is poor engineering to put sitting water next to a building foundation.

DDOE Response: Figure 3.5.4 has been revised to show a clear separation of structure. The planter is no longer using the building wall as part of its construction.

s. Regarding Chapter 3.6 Filtering Systems, the Commenter notes that the CDA is described as entirely impervious on page 137 and as heavily vegetated on page 144. The Commenter states a need to clarify what is required.

DDOE Response: DDOE has clarified in Section 3.6.1 that the CDA can be either impervious or "stable" vegetation. Turf is acceptable.

t. Regarding Chapter 3.7 Infiltration, the Commenter notes that the proposed regulations state that infiltration is "not good for redeveloped areas," and contends that those areas compose most of the District.

DDOE Response: The discussion regarding urban fill soils and redevelopment sites clearly states that, while these sites can be difficult for infiltration, it is allowed if a geotechnical investigation shows that sufficient infiltration rates exist.

u. Regarding Chapter 3.7 Infiltration, the Commenter notes that pretreatment requirements are 100% on page 154, while page 155 says 25% and 50%. The Commenter asks which "rule" dictates?

DDOE Response: While 100% of the inflow must be routed through a pretreatment facility, there are varying volume requirements for different pretreatment techniques. This has been clarified in Section 3.7.3.

v. Regarding Chapter 3.7 Infiltration, the Commenter notes that CDA's greater than 20,000 square feet (0.46 acres) need a sand filter/forebay pretreatment and that sand filters in themselves require 25% pretreatment. The Commenter asks if that means three facilities are needed.

DDOE Response: DDOE has revised section 3.7.3 to clarify that a pretreatment facility will not need a separate pretreatment facility.

w. Regarding Chapter 3.7 Infiltration, the Commenter asks if infiltration rates refer to actual rates or the 50% factor of safety rate.

DDOE Response: Infiltration rates stated in the guidebook are actual measured rates unless otherwise noted. The 50% factor of safety is included in the design calculations. DDOE has clarified this distinction where necessary.

x. Regarding Chapter 3.10 Wetlands, the Commenter why the constructed wetland BMP receives a zero retention value when there are plants, evaporation and infiltration.

DDOE Response: The credits provided in the proposed rule were derived from a recent thorough review of published studies of stormwater BMPs (Hirschman et al., 2008). While surface stormwater BMPs should intuitively reduce runoff volumes through evaporation, very few performance studies have evaluated this effect, and the limited data available suggests that the reduction provided through evaporation is very low or negligible.

y. Regarding Chapter 3.11 Storage, the Commenter notes the requirement for a 10-foot setback from the building and contends that they have put vaults in the building before. The Commenter notes that this is the same issue as with rainwater harvesting setbacks.

DDOE Response: The setback requirement for storage practices has been revised to apply specifically to practice S-2, dry detention ponds.

z. Regarding Appendix A, Design Example 3, the Commenter contends that they could not draw this site and make all of the BMPs and necessary set back fit into 25,000 square feet. The Commenter requests a mockup of sites.

DDOE Response: DDOE has provided site sketches to support the design examples in Appendix A.

aa. Regarding Appendix F, the Commenter notes that DC Water specifies a roughness coefficient of 0.015 for concrete pipes 24 inches or smaller.

DDOE Response: Table F-1 has been revised to include roughness coefficients of 0.013 for concrete pipe 27 inches and greater; 0.015 for concrete pipe 24 inches and smaller; 0.011 for PVC pipes; and 0.022 for corrugated metal.

bb. Regarding Appendix H, the Commenter asks if the soil adjustments are for pre- or post-computations.

DDOE Response: The soil type adjustment table in Appendix H has been removed from the revised guidebook.

cc. Regarding Appendix T, the Commenter asks if there will be a list of all approved Proprietary Practices.

DDOE Response: DDOE is considering maintaining a webpage with lists of BMP providers, installers, etc. However, DDOE cannot provide endorsements, certifications, or approvals of proprietary practices. The webpage may include a list of proprietary practices that have been installed in the District as part of an approved stormwater management plan.

dd. Regarding the Rainwater Harvesting Calculator Spreadsheet, the Commenter contends that the daily demand is not constant throughout the year.

DDOE Response: Monthly demands have been incorporated for Cooling Tower Use and the “Other” category to better accommodate variable demand.