July 29, 2009

Director George Hawkins
DC Department of the Environment
51 N Street, NE, 6th Floor
Washington, DC 20002

RE: Comments on DRAFT PROPOSED Storm Water Management and DC Soil and Erosion Control Regulations

Dear Mr. Hawkins:

The undersigned organizations thank you for the opportunity to submit these comments. Many of us were signatories to comments submitted by a coalition of environmental organizations on April 22, 2009 and these comments supplement that previous submission, which is attached for your convenience. We support DDOE's intention with the proposed regulations to incorporate volume retention requirements into the stormwater management program. On-site volume retention is critical to reducing the water quality impacts of stormwater runoff and for the long-term success of the District's efforts to minimize and limit combined sewer overflows (CSOs).

These new requirements are a good first step towards improving the management of stormwater in the District, but we believe that the on-site retention requirements need to be strengthened to reduce pollutants to the maximum extent practicable as Section 402(p) of the Clean Water Act requires. Strengthening the on-site retention requirements not only allows for greater improvements in water quality, but also is technically feasible as demonstrated by stormwater programs in other municipalities and in the attached modeling analysis. Our specific comments on the proposed regulations follow:

*(1) The on-site stormwater retention requirement should be increased to 1.7 inches for the entire District.*

*The District of Columbia Water Quality Assessment 2008 Integrated Report* to the Environmental Protection Agency and U.S. Congress Pursuant to Sections 305(b) and 303(d) Clean Water Act (P.L. 97-117) reported that no monitored water body in the District fully supported all of its designated uses and that water quality across the District continues to be impaired. The report also identified the major sources of these impairments as CSOs and urban runoff/storm sewers. The commonality between these major sources is the excess volume of stormwater that is generated within the District.

Pollutants impairing the District's waters include bacteria, metals, organics, suspended solids, and oxygen depleting substances. Effective treatment for each of these classes of pollutants will not be accomplished solely by reducing the concentration of these pollutants in stormwater discharges. To adequately address the pollutant loads from both separate sewer discharges and CSOs, reducing the volume of stormwater entering the systems is critical. And, in short, the more volume reduced at the site level, the better the environmental outcome.

Recently published research from the University of Maryland confirms the importance of reducing stormwater volume for water quality improvements. Monitoring of two bioretention cells in the Anacostia River watershed demonstrated that:

> *"Net pollutant mass load removal is achieved through infiltration and corresponding runoff volume reduction for all water quality parameters, except for TOC [total organic carbon]. As such, the hydrologic performance and water quality benefits of bioretention facilities are intrinsically linked."*[1]

The University of Maryland's research demonstrates that stormwater volume reductions are positively correlated to improvements in water quality. Controlling stormwater volume is obviously important in combined sewer areas where excess stormwater inflow is responsible for CSO events; but it is equally important in separate sewer areas where volume reduction is often the best and preferred option for reducing the load of pollutants discharged to receiving streams.

The recommended volume represents the 95$^{th}$ percentile rain event for the District. Requiring that this volume be retained on-site for new and re-developed sites will prevent stormwater discharges for all but a small percentage of rain events. This recommended requirement provides significant additional benefit, in terms of the quantity of stormwater runoff and pollutant load discharged, when compared to the currently proposed retention volumes of 0.75 and 1.0 inches.

NRDC and LimnoTech evaluated the respective runoff volume and pollutant load benefits of 0.75, 1.0, and 1.7 inch retention standards using a variation of the Green Build-Out Model, which has been previously used to assess the stormwater impacts of integrating green infrastructure throughout the District.[2] To simulate the effect of the new development and redevelopment conditions that could take place within the District to which the proposed regulations would apply, a range of different re-development rates were considered in the analysis: five percent (5%), ten percent (10%), twenty percent (20%) and thirty percent (30%). Within the analysis, these development rates were applied proportionally to each of the major contributory land surface types (i.e., for the 10% development rate, 10% of the sidewalk area, 10% of the rooftop area, 10% of the street area, etc. was subject to the retention standard), which had been previously identified in LimnoTech's Green Build-Out analysis.

The retention analysis was performed for each of the 750 plus sewersheds in the District; the results were then aggregated by sewershed type and watershed. Table 1 shows the results of the retention analysis.

[1] Houng Li and A.P. Davis, *Water Quality Improvements through Reductions of Pollutant Loads Using Bioretention*, Journal of Environmental Engineering, Vol. 135, No. 8, August 1, 2009.
[2] The full modeling technical report is attached to these comments as part of this submission.

**Table 1 – Summary of Average Year Modeled Volumetric Runoff Reductions**

| Redevelopment Scenario | 0.75" Retention and 0.25" Treatment | | 1.00" Retention | | 1.70" Retention | |
|---|---|---|---|---|---|---|
| | Runoff Reduction (MG) | Runoff Reduction (%) | Runoff Reduction (MG) | Runoff Reduction (%) | Runoff Reduction (MG) | Runoff Reduction (%) |
| Five percent (5%) | 301.85 | 1.8% | 326.53 | 2.0% | 411.44 | 2.5% |
| Ten percent (10%) | 603.67 | 3.7% | 669.93 | 4.1% | 822.86 | 5.0% |
| Twenty percent (20%) | 1,207.35 | 7.4% | 1,339.87 | 8.2% | 1,645.72 | 10.0% |
| Thirty percent (30%) | 1,811.13 | 11.0% | 2,009.88 | 12.2% | 2,468.65 | 15.0% |

Notes: MG = million gallons
The baseline runoff in the District in an average year is 16,423 MG.

The retention analysis supports DDOE's proposal for on-site retention standards. The model demonstrates that after 5% of the District has been redeveloped, the proposed standards would reduce stormwater runoff by more than 300 million gallons annually; when the redevelopment rate reaches 30%, the runoff reduction increases to more than 1.8 billion gallons annually. However, the model also demonstrates the additional runoff reductions that can be achieved by implementing a 1.7 inch retention standard. Under each of the development scenarios, the amount of stormwater runoff from the District would be decreased by an additional 36% if a 1.7 inch standard were adopted, resulting in a nearly 2.5 billion gallon annual reduction in stormwater runoff with a 30% re-development scenario.

The model was then used to assess the predicted annual pollutant load discharges under each of the redevelopment scenarios. Pollutant loads were determined from the volumetric runoff reductions based on the Simple Method, which is a commonly used approach for planning level calculations. The Simple Method estimates pollutant loads for chemical constituents as a product of annual runoff volume and a flow weighted mean concentration of the pollutant in runoff (*e.g.*, event mean concentrations (EMCs)). Typically, published EMCs are available for generalized land use types (*e.g.*, commercial, residential, industrial, *etc.*). This pollutant loading analysis requires EMC values for more specific land surface types (*e.g.*, rooftops, roads, sidewalks, *etc.*). LimnoTech compiled the EMC values used in this analysis from previously compiled literature values.

Selected pollutant removals for this analysis included 80% TSS and metals removal and 60% total phosphorus removal. The results of the pollutant loading analysis are shown in Tables 2 and 3 for the 5% and 30% redevelopment scenarios. Complete results are included in the attached technical report.

**Table 2 – Summary of Average Year Pollutant Load Reductions (5% Redevelopment)**

| | Total Suspended Solids | Copper | Lead | Zinc | Total Phosphorus | Percent Load Reduction |
|---|---|---|---|---|---|---|
| **Units** | **Pounds, lbs** | **lbs** | **lbs** | **lbs** | **lbs** | **%** |
| Pollutant Reduction for 0.75" Retention and 0.25"Treatment Standard | | | | | | |
| Anacostia | 145,917 | 35 | 115 | 211 | 461 | 1.96% |
| Potomac | 76,493 | 18 | 61 | 111 | 252 | 1.86% |
| Rock Creek | 68,706 | 15 | 56 | 105 | 218 | 1.73% |
| Total | 291,116 | 68 | 231 | 426 | 931 | 1.88% |
| Pollutant Reduction for 1" Retention Standard | | | | | | |
| Anacostia | 148,087 | 35 | 111 | 214 | 475 | 2.00% |
| Potomac | 77,707 | 19 | 59 | 112 | 261 | 1.90% |
| Rock Creek | 69,821 | 16 | 54 | 107 | 225 | 1.77% |
| Total | 295,615 | 70 | 224 | 433 | 960 | 1.92% |
| Pollutant Reduction for 1.7" Retention Standard | | | | | | |
| Anacostia | 184,736 | 44 | 139 | 267 | 593 | 2.48% |
| Potomac | 98,685 | 24 | 74 | 142 | 331 | 2.40% |
| Rock Creek | 89,120 | 20 | 70 | 137 | 288 | 2.25% |
| Total | 372,541 | 88 | 283 | 546 | 1,211 | 2.40% |

**Table 3 – Summary of Average Year Pollutant Load Reductions (30% Redevelopment)**

| | Total Suspended Solids | Copper | Lead | Zinc | Total Phosphorus | Percent Load Reduction |
|---|---|---|---|---|---|---|
| **Units** | **Pounds, lbs** | **lbs** | **lbs** | **lbs** | **lbs** | **%** |
| Pollutant Reduction for 0.75" Retention and 0.25"Treatment Standard | | | | | | |
| Anacostia | 893,137 | 213 | 701 | 1,289 | 2,806 | 12.0% |
| Potomac | 468,812 | 112 | 371 | 679 | 1,539 | 11.4% |
| Rock Creek | 421,235 | 94 | 342 | 645 | 1,331 | 10.6% |
| Total | 1,783,183 | 419 | 1,414 | 2,613 | 5,677 | 11.5% |
| Pollutant Reduction for 1" Retention Standard | | | | | | |
| Anacostia | 910,558 | 217 | 684 | 1,314 | 2,919 | 12.3% |
| Potomac | 478,566 | 114 | 361 | 693 | 1,604 | 11.7% |
| Rock Creek | 430,168 | 96 | 336 | 659 | 1,389 | 10.9% |
| Total | 1,819,292 | 428 | 1,381 | 2,666 | 5,912 | 11.8% |
| Pollutant Reduction for 1.7" Retention Standard | | | | | | |
| Anacostia | 1,108,436 | 264 | 835 | 1,602 | 3,559 | 14.9% |
| Potomac | 592,078 | 141 | 447 | 855 | 1,984 | 14.4% |
| Rock Creek | 534,739 | 120 | 417 | 819 | 1,727 | 13.5% |
| Total | 2,235,253 | 525 | 1,699 | 3,276 | 7,269 | 14.4% |

Again the model demonstrates the significant reduction in pollutant loadings that can be achieved with on-site retention. As with the retention analysis, adopting the 1.7 inch standard would also reduce pollutant loadings by a substantial amount over the proposed standard: TSS and copper would be reduced by an additional 25-30%; lead by 20-22%; zinc by 25-28%; and total phosphorus by 28-30%. The additional decrease in pollutant loads is significant in the MS4 area and for compliance with future water quality limitations.

The selected standard will influence directly the District's ability to comply with its TMDL Waste Load Allocations. Increasing the retention standard to 1.7 inches allows greater pollutant load reductions to be realized by the new regulation. Table 4 compares the estimated required TMDL load reductions for TSS and total phosphorus to the modeled load reductions for the 0.75 inch and 1.7 inch retention standard for the 30% development scenario. This analysis was not conducted for metals because of the relatively small required reduction to meet TMDL requirements. Additional TMDL analysis is currently being conducted for $BOD_5$ and bacteria, the results of which will be provided in a supplement to these comments.

**Table 4 – Comparison of Modeled Pollutant Load Reductions to TMDL Requirements (30% Redevelopment)**

| Constituent | TMDL Reduction from Baseline (lbs) | Modeled Pollutant Reduction (0.75-0.25 inch Standard) (lbs) | % of TMDL Reduction | Modeled Pollutant Reduction (1.7 inch Standard) (lbs) | % of TMDL Reduction | Difference (lbs) |
|---|---|---|---|---|---|---|
| Anacostia TSS | 5,728,159 | 893,137 | 15.5% | 1,108,436 | 19.3% | 215,299 |
| Anacostia Total Phosphorus | 18,707 | 2,806 | 15.0% | 3,559 | 19.0% | 753 |

Retaining an additional volume of stormwater on site allows the proposed standards to have a more significant impact on the District's Waste Load Allocations. These results are also a conservative estimate for the TSS and total phosphorus load reductions, because the modeled results only represent the contribution of runoff and do not account for the significant contribution of streambank erosion, which is also influenced by the volume of runoff.

The difference in volume and pollutant load reductions also has economic consequences for the District. The District faces significant economic expenditures in order to reduce the pollutant loads associated with its stormwater discharges. Increasing the on-site retention requirement to 1.7 inches allows this cost to be re-apportioned to a greater extent to the private sector, which will bear a greater responsibility for the pollution generated by its activities. Retaining the lower on-site retention standard will require that the District expend more money on retrofits and public initiatives to meet its pollutant load requirements.

Finally, adopting the recommended 1.7 inch retention volume requirement throughout the District would match the recently adopted stormwater management requirements for Federal facilities. Section 438 of the Energy Security and Independence Act stipulates that development or re-development exceeding 5,000 square feet on Federal facilities requires

that stormwater discharges be equivalent to pre-development hydrology. U.S. EPA has drafted guidance setting on-site retention of the volume of the 95th percentile rain event as constituting pre-development hydrology conditions for compliance purposes. Adopting a 1.7 inch on-site retention requirement would provide a consistent standard for non-Federal sites and the large percentage of Federal sites that are present in the District.

*(2) The strengthening of the on-site stormwater retention standard in the Draft Proposed Storm Water Management Regulations is consistent with the mandates of the Clean Water Act and other applicable legal standards.*

The importance of on-site retention to pollutant load reduction is indisputable. A research project on stormwater recently conducted by the National Academies stated that stormwater runoff "volume reductions lead to pollutant load reductions, even if pollutant concentrations in stormwater are not decreased." The same study found that stormwater controls focused on retention through infiltration and evapotranspiration, like green roofs, vegetated swales and other LID measures, "reduce streambank erosion, capture suspended solids, and remove other pollutants from water" in addition to reducing peak flow overall.[3]

Section 402(p) of the Clean Water Act requires controls to reduce the discharge of pollutants from municipal storm sewers to the "maximum extent practicable" (the "MEP" standard).[4] Courts have found that "[t]he phrase 'to the *maximum extent practicable* does not permit unbridled discretion. It imposes a clear duty on the agency to fulfill the statutory command to the extent that it is *feasible* or *possible*."[5]

In the same vein, the District's current NDPES permit for its MS4 sewer defines the MEP standard to mean:

> *A technology based level of pollution reduction achieved through the use of a combination of non structural and/or structural best management practices (BMPs) for controlling the quantity as well as the quality of a particular pollutant or pollutants in storm water at their sources before entering the MS4* (NPDES Permit No. DC0000221, p. 42).

The District's unique definition indicates a desire to set the maximum practical pollution reduction standards based on technology and a wide array of possible practices.

Our practicability study demonstrates that an on-site retention standard of 1.7 inches is practicable based on the Opportunity Analysis conducted in the Green Build-Out Model assessment of the recommended retention standard. The Opportunity Analysis for six (6) sewersheds within the District is included in the attached technical report. The 1.7 inch standard is technologically feasible through LID practices, as required by the District's

[3] Urban Stormwater Management in the United States, National Research Council of the National Academies, p. 371-74 (2009).
[4] 33 U.S.C. § 1342(p)(3)(B)(iii).
[5] *Defenders of Wildlife v. Babbit*, 130 F.Supp.2d 121, 131 (D.D.C. 2001) (citing *Fund for Animals v. Babbit*, 903 F.Supp 96, 107 (D.D.C. 1995)) (emphasis added).

definition of "maximum extent practicable," and therefore must be set in order to comply with the Clean Water Act.

We have shown that 1.7 inches is practicable for on-site retention in the District of Columbia. DDOE can only set a lower standard by showing that 1.7 inches is *not* practicable. Even if it is able to make such a showing in direct opposition to our research, DDOE must then demonstrate that the alternative standard it proposes is, in fact, the maximum practicable. In the face of our research, which shows a standard more than double DDOE's draft suggestion to be feasible, DDOE will be hard pressed to prove that 0.75 inches is the maximum standard that can be attained, a showing the current Draft does not make.

The 1.7 inch standard we identify proves even more practicable when coupled with other components of the regulations. A process for demonstrating infeasibility of the standard for a portion of the stormwater on a particular site in addition to an alternative compliance provision, like the off-site mitigation option in the Proposed Draft, would make the standard universally attainable, and therefore practicable.

By failing to set a more aggressive on-site retention standard for stormwater, as we have demonstrated is practicable, DDOE will fail to meet the Clean Water Act's clear mandate that pollutant reduction measures reduce discharges to the maximum extent practicable.

*(3) On-site stormwater retention has been demonstrated to be technically feasible in highly urban areas like the District.*

On-site retention is being adopted with greater frequency as municipalities adopt new and more effective approaches to managing stormwater. Battery Park City in New York requires that the first 2.4 inches of rainwater falling on all building roofs and setbacks be collected, treated, and stored on-site for reuse. West Virginia's recently adopted MS4 General Stormwater Permit requires on-site retention of the first inch of rainfall.

In addition, Philadelphia has recently adopted an approach similar to the District's proposed regulations. Philadelphia, like the District, has some areas of combined and separate sewers. On January 1, 2006 the Philadelphia Water Department (PWD) instituted new stormwater regulations whose water quality requirement is on-site management of the first inch of runoff from all directly connected impervious areas (DCIA) on newly developed and re-developed sites. The regulations contain alternative provisions for extended stormwater detention and metered release if on-site retention is proven to be technically infeasible; incentives are also provided to encourage the use of green infrastructure practices. The experiences and results related to the new regulations are informative to the process of establishing new stormwater standards for the District.

Since the regulations took effect, approximately 1.5 square miles of land within the city have been developed or re-developed. A majority of the city is urban fill. PWD has issued 304 permits and has compiled the following estimates of the effects of the new standards.[6,7]

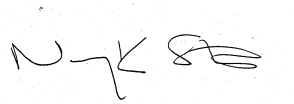
[6] Personal communications with PWD staff, May – July 2009.

- The compliance rate with the new regulations is nearly 100%.
- Seventy-one (71) projects, 23%, proposed a green roof and/or porous pavement.
- Approximately 40% of the projects utilize on-site infiltration.
- Stormwater runoff has been reduced by 1 billion gallons per year as a result of the new regulations. This represents 4% of the estimated annual runoff of 25 billion gallons.

PWD's analysis has determined that requiring on-site retention and encouraging techniques that infiltrate or evapotranspirate stormwater was essential to meeting its CSO and water quality goals. PWD also looked at the stormwater regulations as an important tool for meeting future water quality requirements, specifically identifying future Total Maximum Daily Load (TMDL) requirements as a driver for adopting the retention standards. In addition, it is anticipated that the stormwater regulations, by acting as one of several drivers, will stimulate greening within the city. These greening efforts are anticipated to have benefits beyond water quality. A draft analysis of anticipated benefits to be gained from a greater adoption of green infrastructure within Philadelphia is attached to these comments.

Thank you for the opportunity to comment on these draft proposed regulations. We would appreciate the opportunity to meet with you and your staff to explain the analysis underlying these comments and will be contacting your office to set up such a meeting. If you have any questions, please feel free to contact Nancy Stoner at 202-289-2394.

Sincerely,



Nancy Stoner
Co-Director, Water Program
Natural Resources Defense Council

James R. Foster
President
Anacostia Watershed Society

Brent Blackwelder
President
Friends of the Earth

Neal Fitzpatrick
Executive Director
Audubon Naturalist Society of the Central Atlantic States, Inc.

Katherine Baer
Senior Director, Clean Water
American Rivers

Attachments

[7] Memo to Carter H. Strickland, Senior Policy Advisor for Air and Water – New York Mayor's Office of Long Term Planning and Sustainability, *Philadelphia Stormwater Program Inquiry*, Christine Marjoram, Manager – Philadelphia Stormwater Plan Review & Incentive Program, December 12, 2008.