BLUE WATER BALTIMORE

Science and Technical Advisory Committee

September 21, 2012

Via First Class and Electronic Mail

Mr. Brian Clevenger
Manager, Sediment, Stormwater & Dam Safety Program
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21230
bclevenger@mde.state.md.us

RE: Comments on Draft Baltimore City Municipal Separate Storm Sewer System Permit

Dear Maryland Department of the Environment (MDE):

The Scientific and Technical Advisory Committee (STAC) of Blue Water Baltimore, Inc. is composed of experts in the fields of stormwater, monitoring, forestry, landscape design, and watershed sciences, from academia, private industry and government. STAC has reviewed the Draft Baltimore City Municipal Separate Storm Sewer System (MS4) Permit. While the group understands the challenges and effort put forth in developing this strategy, a number of concerns arose during the review process, specifically regarding the monitoring and illicit discharge provisions. These concerns are detailed below:

I. MONITORING PROVISIONS

Monitoring is essential as a part of a restoration program, in order to track progress toward water quality standards and total maximum daily load (TMDL) waste load allocations (WLA) achievement. The monitoring requirements, which are mentioned in the draft permit, are a good start in this regard, but we feel the obligations fall short in a number of areas, detailed below, including 1) specificity and accountability for meeting targeted improvements in water quality, 2) adequate alignment with the goals of the

Chesapeake Bay TMDL, 3) lack of watershed wide monitoring, and 4) shortfalls in regard to the importance of dry weather sampling. For instance, in several places, the permit is described as "adaptive", implying that implementation could be revisited if it is not meeting performance objectives. If the monitoring is not adequate to track water quality changes or WLA reductions, performance will be based solely on implementation, and the adaptive nature of the permit is invalid. The proposed monitoring program should be expanded in scope in order to be effective in evaluation of success and in moving the watershed restoration program forward.

A. Watershed Assessment

An assessment of watershed conditions for all watersheds in the City is necessary to ensure the effectiveness of its pollution and stormwater reduction efforts. Since the City's waterways are tributaries to the Chesapeake Bay, goals for progress and success should be integrated with the newly issued Chesapeake Bay TMDLs and explicitly included in the document. This would ensure compliance at the highest required level for nutrient loading and a more efficient integration between departments at the local and state level.

A robust monitoring program, which tracks the success and effectiveness of the Baltimore City's restoration efforts and stormwater management practices[1] requires specific goals that reflect the obligations of the City. Given the diversity of approaches necessary in the restoration of any particular watershed, it is not reasonable to assume that monitoring of a single watershed will reflect success in all watersheds under restoration in the City. MDE should revise the Draft Permit to require at least one watershed restoration assessment site and one stormwater management assessment site in each of the main watersheds in Baltimore: Jones Falls, Gwynns Falls, Herring Run, and Direct Harbor. Currently, the watershed restoration and stormwater management sites proposed for monitoring both lie in eastern Baltimore: the Moores Run in the Herring Run watershed

[1] MDE should require monitoring for any watershed restoration or stormwater management practices or actions conducted by the City, in order to determine the actual effectiveness of those efforts.

and the Stony Run in the Jones Falls watershed. An additional site in the Gwynns Falls Watershed would be advantageous based on the land use in this watershed and the extensive monitoring already conducted from the headwaters to the mouth by the Baltimore Ecosystem Study[2]. (Bhaskar and Welty, 2012; Claessens et al., 2010; Colosimo and Wilcock, 2007; Duan et al., 2012; Pickett et al, 2007; Sivirichi et al., 2011).

An effective monitoring program for the success of these efforts would at least place monitoring stations at the subwatershed level. This would be true for both stormwater discharge and conditions. The proposed strategy is of limited value for broad understanding of the effectiveness of management practices. A finer scale resolution that is scientifically sound and statistically defensible will allow the City to identify restoration activities that have been a success and those which require improvement.

Through the Draft Permit, MDE should encourage the City to partner with academic and community organizations, such as the Baltimore Ecosystem Study, in order to expand their monitoring effort and take full advantage of scientifically sound monitoring already being performed throughout the watershed. MDE should also require the City to coordinate its watershed restoration and stormwater management monitoring programs with its illicit discharge detection and elimination monitoring program. In order to maximize the benefits derived from limited City resources, data collected pursuant to each program should be utilized to inform the other programs required under this permit.

B. Importance of dry weather flow measurements

While the measurement of wet weather flows is important, baseflow measurements are especially critical in urban systems where the contribution of discharges from leaking pipes, industrial and commercial sites, and other unknown sources present a cumulative water quality concern, affecting local water quality and impacting biological condition. Studies have shown that contamination of waterways continues during dry weather periods in Baltimore, and are a major contributor to the overall pollutant load. (Lilly and Sturm, 2010, attached hereto as Attachment 1; Center for Watershed Protection and

[2] http://beslter.org/frame4-page_3f.html

Biohabitats, 2011, attached hereto as Attachment 2). Furthermore, monitoring dry weather conditions may help identify other events unrelated to weather.

Discrete measurements at storm events (pH, flow and temperature) as suggested in Section F.1.a.ii provide valuable information. However, continuous flow measurements as well as using in stream data loggers will be invaluable. These measurements should include stream temperature, as temperature spikes constitute a primary impact of urban waterways. For the monitoring of benthic macroinvertebrates, it may be an improvement to collect samples at different seasons at as many locations as possible, as many of the spring ephemerals used in evaluating water quality are simply absent from urban waterways. Substantially different invertebrate communities can be found in Summer and Fall collections and this level of temporal variability should be accounted for. Again, we recommend coordination with scientists in the region to offset the additional costs of these practices. Better coordination, particularly in the highly instrumented Gwynns Falls will only benefit the achievement of water quality goals.

C. Need for an integrated analysis of data

While an extensive set of data is collected for biological and chemical parameters, and geomorphologic changes, the use of this data is not detailed in the permit. The value of this data relies on an understanding of the mechanisms that drive changes in these factors. Only then can we assess the effectiveness of restoration and stormwater management practices. For instance, during the development of individual TMDL's for waterbodies, EPA's biological stressor technique is used to understand the causal mechanism for linking biological change to water quality and the physical aspects of the waterbody and its surrounding watershed. MDE should require that Baltimore City implement this approach to effectively improve the strategies for restoring watersheds and improving stormwater management in a way that will improve biology, water quality, and the controlling factors of stream geomorphology.

The suite of parameters to be monitored by the City should include all parameters for which watersheds are listed as impaired on the 303(d) list (both those with and

without TMDLs). In addition, the parameters monitored by the City, the methodology used, and the timing and location of sampling should be consistent, so that rigorous evaluation of the program's effectiveness can be conducted during and following program implementation.

D. Reporting

In order to achieve transparency and accountability, reporting needs to include synthetic products that clearly communicate implementation progress **and** progress towards water quality standard achievement and WLA reductions. Currently, reporting is limited to annual technical reports to MDE on specific and individual components, and is based mostly on implementation goal achievement. Currently, there is no expectation that reports from different components would be synthesized into an overall tracking report. Improving reporting could create opportunities to present information relevant to users and stakeholders with different needs. Perhaps most importantly, the citizens of Baltimore and users of the Patapsco and Back River watersheds need to be provided simple and comprehensive information about annual progress toward achievement of permit conditions, and water quality improvement results.

E. Trash Monitoring

The trash reduction requirements and public education initiative are laudable steps towards tackling an intractable problem. However, there should be monitoring to evaluate the success of this program, with defined criteria for success. There needs to be defined a level of trash input which is considered to be acceptable, along with defined goals along the way. In addition, trash monitoring (both for baseline levels and for tracking of reduction progress) should occur in tributaries to impaired bodies of water in order to localize problem areas of trash input.

II. ILLICIT DISCHARGE DETECTION AND ELIMINATION PROVISIONS

Leaky sewage lines, illegal connections of sewer pipes to the storm drain system and exfiltration from sanitary pipes into the groundwater, pollutes Baltimore's streams and Harbor, contributing significant nutrient and bacteria loads to local waterways. Human sewage pollution represents the largest controllable pollution source into the Baltimore Harbor. The City's current illicit discharge detection and elimination program (IDDE) is one of the primary mechanisms for identifying and eliminating sewage and other dry weather sources of pollution.

A. General Needs for Baltimore City's IDDE program

A robust and effective IDDE program is a necessity for clean water in the City of Baltimore, as has been emphasized in the Healthy Harbor Plan (CWP and Biohabitats, 2011) for the Baltimore Harbor. Five goals related to reducing sewage contamination as identified in the Healthy Harbor Plan are provided below. These goals should provide the backbone and framework for the MS4 permit, particularly the IDDE minimum control measure.

Goal 1: Implement public education campaign to encourage proper disposal of domestic waste and pet waste, proper connection of household drains and inform citizens about the issue.

Goal 2: Eliminate illegal sewage connections to the storm drain system.

Goal 3: Increase capacity to quickly and permanently correct sewer leaks.

Goal 4: Establish water quality benchmarks for "clean" stormwater outfalls.

Goal 5: Establish a water quality monitoring program and public notification system for the Harbor.

B. Specific Comments on Draft IDDE provisions

In light of the above goals, specific comments regarding the proposed IDDE measures in the Draft Baltimore City MS4 permit are provided below.

- Page 4 sect. 3.a. Given the potential nutrient and bacteria reductions that could be met through the IDDE program, MDE should require dry weather screening of both major (>36") and minor (<36") outfalls. As per Lilly & Sturm (2010), dry weather flow from pipes <36" represented 36% of all dry weather flows, 45% of all flows with potential illicit discharges based on water quality screening and contributed an annual load of 1,452 lb. of nitrogen and 52 lb. of phosphorus. Specifically, the Draft Permit should require that the City screen all major outfalls annually and a minimum of 1/5 of all minor outfalls annually (so that each minor outfall is visited at least once per permit cycle). Once an outfall is deemed to be contaminated (i.e. a source of illicit discharges), that outfall should go on a separate "list" which is screened quarterly (at a minimum) until the source of contamination is abated. Flowing outfalls should be screened for the following parameters: ammonia, fluoride, potassium, detergents, and bacteria.
- Page 4 sect. 3.a. The City currently conducts a monthly Stream Impact Sampling ("SIS") program in which it samples approximately 30 sites in receiving waters, most of which are downstream of major outfalls. This sampling program is important for both trend monitoring as well as to inform and prioritize the screening of outfalls. However it cannot be used as a replacement for outfall screening, which allows the identification of specific sources of contamination with the MS4. Therefore the Draft Permit should require that the City continue its SIS program, and the Draft Permit should not allow the City to do so in lieu of the outfall screening recommended above.
- Page 4, sect 3.b. No specification is provided here or later on regarding what is entailed for the visual survey as well as the number of visual surveys the City must perform. More detail should be provided, for example, using the Center for Watershed Protection's (CWP) hotspot site investigation (HSI) field form and

protocols discussed during a training provided to the City and delivered summer, 2011 as required by the EPA's audit of the City. Both the EPA audit (attached hereto as Attachment 3) and the CWP HSI field form (attached hereto as Attachment 4) and protocols are listed under references below. Furthermore, MDE should specify the amount of visual surveys that the City must perform annually and should base this number on the recommendations of EPA in their 2009 audit and what the City has or has not accomplished in response to that audit.

- Page 5, sect 4.a. This section identifies "improving overall efficiency" but is not specific on how trash reduction efforts will be implemented other than through increased education measures and evaluation of current programs. This would require at the very least a timetable and scope for the education plus criteria for empirical evaluation of the success of the program.
- Page 6, sect 6. a. This section requires the City of Baltimore, within one year of permit issuance, to establish a hotline for citizen to report complaints and reports of possible illicit discharge events. However, the City already has a 311 reporting line that is used for this purpose and the permit fails to address a requirement for the City to respond adequately and in a timely manner to those 311 reports. Instead of using that year to establish a hotline that already exists, the permit should require the City to use that time to improve the effectiveness and efficiency of its routing of and response to those calls.
- Page 6, sect 6.b. This section should include requirements for education regarding residential and commercial pollution prevention measures, as well as education regarding residential and commercial fats, oils and grease (FOG) programs.
- Page 15, sect A. The following discharges should not be exempt from the prohibition of non-stormwater discharges:
    - Discharges from potable water sources – Large nutrient loads are associated with water main breaks (Lilly & Sturm, 2010 and Lerner et al, 1999) due to very high volumes.

- Air conditioner condensation – High ammonia levels were detected in Sligo Creek, Montgomery County (CWP, 2012) associated with air conditioner condensate, blowdown or cooling tower water (under investigation).
- Residential car washing – Although this is difficult to control, washwater is detrimental to aquatic life and should not be exempt.

- Page 15, sect A. This section should not only require the City to prohibit non-stormwater illicit discharges into the MS4, but also require the City to bring enforcement actions against commercial and industrial private landowners that are not necessarily regulated under a stormwater pollution prevention plan (SWPPP) or National Pollutant Discharge Elimination System (NPDES) permit but that may be violating local laws by contributing illicit discharges into the MS4.
- Page 15, sec A. The permit should require the City, through its local code, to provide itself with right of entry onto any private property that may be contributing illicit discharges to the MS4. Currently, once the City determines the source of illicit discharges to be a private property owner (individual, industrial, commercial or otherwise) it does not seem to have the authority to enter the property to inspect and take proper enforcement action.
- Attachment A (Annual Report Databases), Page 5, sect I. Ammonia, fluoride, potassium, detergents, and bacteria should all be listed in this table, as well as incorporated as required parameters for outfall chemical screening in Page 4, sec 3. of the permit.
- Page 4, sect 3. and Page 15, sect A. In the Illicit Discharge section of the draft permit (page 4, sect 3) and in the Discharge Prohibitions and Receiving Water Limitations section (page 15, sect A), MDE should make clear that illicit discharges are those non-stormwater discharges *into* the MS4 that are not permitted by MDE. This does not mean that the City is not responsible for any pollutant discharges *from* the MS4 into receiving waters that cause or contribute to the violation of water quality standards, irrespective of the original source of those pollutants. The City and MDE must do whatever possible to eliminate all illicit discharges into the MS4 (including unpermitted sources as well as permitted sources that are violating their permits).

Beyond that, the City must take whatever measures are necessary to prevent pollutants from discharging from the MS4 in levels exceeding water quality standards.

References (incorporated in full into these comments):

Bhaskar, A.S., C. Welty. 2012. Water balances along an urban-to-rural gradient of metropolitan Baltimore, 2001-2009. Environmental and Engineering Geoscience. 18(1):37-50. doi:10.2113/?gseegeosci.18.1.37.

Claessens, L., C.L. Tague, P.M. Groffman, J.M. Melack. 2010. Longitudinal and seasonal variation of stream N uptake in an urbanizing watershed: effect of organic matter, stream size, transient storage and debris dams. Biogeochemistry. 98:45-62. doi:10.1007/s10533-009-9375-z.

Colosimo, M.F., P.R. Wilcock. 2007. Alluvial sedimentation and erosion in an urbanizing watershed, Gwynns Falls, Maryland. Journal of the American Water Resources Association. 43(2):499-521. doi:10.1111/j.1752-1688.2007.00039.x.

Center for Watershed Protection. 2012. DRAFT *Pollution Detection and Elimination in Sligo Creek: Field Findings Supplemental.* Center for Watershed Protection. Ellicott City, MD. Attachment 6 to these comments.

Center for Watershed Protection and Biohabitats. 2011. *Healthy harbor plan: A plan to make Baltimore Harbor swimmable and fishable by 2020*. Prepared for Waterfront Partnership of Baltimore Inc.; Ellicott City, MD: Center for Watershed Protection; Baltimore, MD: Biohabitats. Plan and Appendix C to Plan are attached hereto as Attachment 2.

Duan, S., S.S. Kaushal, P.M. Groffman, L.E. Band, K.T. Belt. 2012. Phosphorus export across an urban to rural gradient in the Chesapeake Bay watershed. Journal of Geophysical Research Biogeosciences. doi:10.1029/2011JG001782.

Lerner, David, Yuesuo Yang, Mike H. Barrett and John H. Tellam. 1999. *Loadings of non-agricultural nitrogen in urban groundwater.* Impacts of Urban Growth on Surface Water and Groundwater Quality (Proceedings of IUGG 99 Symposium HS5, Birmingham, July 1999). IAHS Publ. no. 259. Attachment 5 to these comments.

Lilly, Lori and Paul Sturm. 2010. *Technical Memorandum: Illicit Discharge Monitoring in Baltimore Watersheds.* Center for Watershed Protection. Ellicott City, MD. Attachment 1 to these comments.

Pickett, S.T.A., K.T. Belt, M.F. Galvin, P.M. Groffman, J.M. Grove, D.C. Outen, R.V. Pouyat, W.P. Stack, M.L. Cadenasso. 2007. Watersheds in Baltimore, Maryland: understanding and application of integrated ecological and social processes. Journal of Contemporary Watershed Research & Education. 136(1):44-55.

Sivirichi, G.M., S.S. Kaushal, P.M. Mayer, C. Welty, K.T. Belt, T.A. Newcomer, K.D. Newcomb, M.M. Grese. 2011. Longitudinal variability in streamwater chemistry and carbon and nitrogen fluxes in restored and degraded urban stream networks. Journal of Environmental Monitoring. 13(2):288-303. doi:10.1039/C0EM00055H.

United States Environmental Protection Agency, Office of Compliance and Enforcement. 2009. *MS4 Compliance Inspection: Baltimore City, Maryland* ("EPA Audit"). Environmental Protection Agency. Washington, D.C. Attachment 3 to these comments.

Wright, T., C. Swann, K. Cappiella, T. Schueler. 2005. Manual 11: Unified Subwatershed and Site Reconnaissance: A User's Manual. *Available at:* http://www.cwp.org/documents/cat_view/68-urban-subwatershed-restoration-manual-series/88-manual-11-unified-subwatershed-and-site-reconnaissance-a-users-manual.html

Wright, T., C. Swann, K. Cappiella, T. Schueler. 2005. Appendix A Field Sheets for Manual 11: Unified Subwatershed and Site Reconnaissance: A User's Manual. Hot Spot Investigation form attached as Attachment 4 to these comments. Full Appendix *available at*: http://www.cwp.org/documents/cat_view/68-urban-subwatershed-restoration-manual-series/88-manual-11-unified-subwatershed-and-site-reconnaissance-a-users-manual.html

We appreciate your consideration of our comments and look forward to the implementation of a strong Baltimore City MS4 permit that protects our waterways.

Sincerely,

The Scientific and Technical Advisory Committee (STAC) of Blue Water Baltimore, Inc., on behalf of Blue Water Baltimore, as well as the following individual STAC members[3]:

[3] These comments represent the views of STAC, Blue Water Baltimore, and the indicated individual STAC members, and in no way seek to represent the views of any member's current or former employers or professional affiliations.

- David Carroll

- Marcus Griswold, PhD
  University of Maryland Center for Environmental Science

- R. Heath Kelsey, PhD
  University of Maryland Center for Environmental Science

- Stanley J. Kemp, PhD
  University of Baltimore, Division of Science, Information Arts and Technologies

- Wolf T. Pecher, PhD
  University of Baltimore, Division of Science, Information Arts and Technologies

- Eric J. Schott, PhD
  IMET- University of Maryland Center for Environmental Science

- Theodore E. Scott, PE, CPESC, MSP, LEED AP
  Stormwater Maintenance, LLC
  Stormwater Consulting, Inc.