BEFORE THE BOARDS OF DIRECTORS OF THE DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY, DISTRICT OF COLUMBIA DEPARTMENT OF THE ENVIRONMENT, AND DISTRICT OF COLUMBIA DEPARTMENT OF TRANSPORTATION

Petition to Support the District of	**)**
Columbia Combined Sewer Overflow	**)**
Long Term Control Plan with Low	**)**
Impact Development Strategies	**)**
	)

For the reasons discussed in detail below, the Anacostia Riverkeeper, Anacostia Watershed Society, DC Environmental Network, Groundwork Anacostia River DC Inc., and Natural Resources Defense Council ("Petitioners") hereby petition the District of Columbia Water and Sewer Authority ("DC Water" formerly "DC WASA") to reexamine the District's Combined Sewer Overflow ("CSO") Long Term Control Plan ("LTCP") for the purpose of examining in detail how Low Impact Development ("LID") can be used to (1) ensure that required effluent reductions are achieved in the District's receiving waters in light of climate change impacts and accompanying expected increases in extreme storm events, (2) update the design for the Potomac and Rock Creek tunnels through the use of LID, as is required by the 2005 Consent Decree between DC Water, EPA, and community and environmental groups, and (3) obtain environmental and economic benefits for DC that are not available through the use of hard infrastructure alone.

Petitioners also petition the District of Columbia Department of the Environment ("DDOE") because DDOE is integrally involved in the management and regulation of DC's waters. The Watershed Protection Division regulates construction site runoff, monitors, and sponsors restoration of, watersheds and riparian habitats, and promotes green roof technology, which is a component of LID. The Stormwater Management Division is responsible for managing the District's NPDES and storm sewer permits and works with DC government agencies and residents to reduce stormwater pollution through erosion control. The Water Quality Division is responsible for managing water quality in the District's surface water, ground water, and wetlands and for developing Total Maximum Daily Loads (TMDLs) for DC's impaired waters. All three divisions will play essential roles in future low impact development.

Petitioners also petition the District of Columbia Department of Transportation ("DDOT") because DDOT is responsible for building and maintaining the District's transportation and roadway infrastructure. Much of the storm runoff that contributes to CSOs could be reduced through modifications of impermeable road surfaces, and improvements in urban landscaping and curb/gutter design. DDOT would play an integral role in implementing LID in the District, by developing and maintaining improved transportation infrastructure, installing permeable street and sidewalk surfaces, improving curbs and gutters, and planting absorbent vegetation in public areas.

To be clear, Petitioners *do not* seek to delay the timeline for the Anacostia tunnel, currently under development, or any other LTCP project. Petitioners request that the Anacostia tunnel proceed on schedule, but that DC Water simultaneously evaluate opportunities to incorporate Low Impact Development, sanitary and storm sewer

separation opportunities, and other water conservation measures into the LTCP to the full extent required by the Consent Decree and to consider the most current information about the impacts of climate change on CSOs.

Many of Petitioners' members use recreationally the receiving waters in and around the District that are impacted by CSO events. These members depend on the LTCP to effectively prevent CSO events from contaminating their community's waterways or from causing back-ups into their homes and businesses, risking their health and wellbeing. The LTCP submitted to the EPA in 2002 was designed to meet the difficult task of preventing almost all CSO events in an average rainfall year, and we believe it is necessary to incorporate proven methods of Low Impact Development and the latest advances in climate science and precipitation modeling in order to ensure that the LTCP will be successful in this task and in providing additional benefits to DC residents and visitors alike.

This petition contains four parts. First, we establish the legal bases for reexamining the District's LTCP. Second, we summarize the impacts of CSOs and the history of the District's CSO control plan. Third, we explore the benefits of Low Impact Development, including CSO reduction as well as money and energy savings. Fourth, we summarize the predicted impacts of climate change on CSOs.

I. Legal Bases for Reexamining the Long Term Control Plan

There are two primary bases for our request that the District's LTCP be reexamined to incorporate Low Impact Development.[1] The first is based on language in the 2005 Consent Decree; the second is based on language in the LTCP. Both legal bases

[1] Low Impact Development (LID), also known as green infrastructure, includes techniques to mimic predevelopment hydrology by allowing for water storage, infiltration, and evaporation. DC WASA, COMBINED SEWER SYSTEM LONG TERM CONTROL PLAN ES-4, 7-8 (2004) [hereinafter DC WASA LTCP].

compel DC Water to reexamine the District of Columbia's LTCP as the execution of the plan proceeds.

The 2005 Consent Decree instructs DC Water to "promote LIDR [Low Impact Development Retrofit][2] in the District of Columbia." To that end, DC Water is directed to spend up to $3 million on "demonstration projects" and then monitor those projects to measure the effectiveness of LIDR in reducing runoff.[3] DC Water must then review this information in determining the design for the Potomac and Rock Creek tunnels.[4] Specifically, DC Water must review the results demonstrated on DC Water's own property, other current LID and LIDR information, and data from other projects in the District and elsewhere.

Because LID and LIDR can greatly reduce stormwater runoff, and EPA studies on LID and a 2008 letter from EPA to DC Water, both discussed below, demonstrate that LID and LIDR can be implemented to help control future CSOs, DC Water is required by the Consent Decree to evaluate these options as it moves forward with the Potomac and Rock Creek tunnels. This does not require a halt in progress or a modification of the timeline for the Anacostia tunnel, or any other aspect of the LTCP. Rather, evaluating LID options while maintaining the current timeline would allow for the benefits from LID to be incorporated with the least impact on the overall long term planning process and construction schedule.

[2] LID-Retrofit, or LIDR, involves techniques similar to LID, but applies them to preexisting sites and projects. Id.
[3] *Anacostia Watershed Soc'y v. Dist. of Columbia Water and Sewer Auth.*, No. 1:CV00183TFH ¶ 43–46 (D.D.C. Mar. 25, 2005), *available at* http://www.epa.gov/compliance/resources/decrees/civil/cwa/wasa2005-cd.pdf [hereinafter Consent Decree].
[4] *See* id.

In addition to the Consent Decree, the Long Term Control Plan itself, consistent with the US EPA's CSO Policy, allows for expansion of CSO controls if necessary to meet the requirements of the Clean Water Act.[5] The District's LTCP can be expanded "so that higher levels of control can be implemented if required in the future." A number of possible ways to expand the plan are listed, including implementing additional Low Impact Development, utilizing new technologies, and more.[6] The Long Term Control Plan's built-in mechanism for expansion aims to allow more controls to protect the District's waters and residents whenever new information reveals that the plan is insufficient.[7] The plan specifies that "[t]he selection of a method of expansion would depend on the desired goal," and "would need to be determined on a case by case basis."[8] Increase in likely CSO events due to climate change constitutes new information requiring expansion of the CSO controls. We urge that expansion be in the form of LID due to its greater benefits.

For these reasons, the District's LTCP should be reexamined to incorporate Low Impact Development and to adjust, as necessary, the capacity of retention tunnels as well as to consider the significant changes in information on climate change and its impacts on CSO events that have developed since the initial LTCP and Consent Decree nearly five years ago.

II. Combined Sewer Overflows Generally and in the District of Columbia

A combined sewer overflow occurs when the capacity of a combined sewer is exceeded due to stormwater runoff from wet weather or backups in the sewer system

[5] *See* Combined Sewer Overflow Control Policy, 59 Fed. Reg. 18,688, 18,693 (Apr. 19, 1994) [hereinafter Control Policy].
[6] DC WASA LTCP, *supra* note 1, at 13-13.
[7] *See* id.
[8] Id.

during dry weather.[9] Excess wastewater containing a combination of raw sewage and stormwater is discharged at specific outfall locations to relieve the system backup.[10] CSOs can cause water quality to violate applicable water quality standards ("WQS") in receiving waters because the discharges can contain microbial pathogens, oxygen-demanding pollutants, suspended solids, nutrients, toxics, and floatable matter dangerous to humans and damaging to fish and other aquatic species.[11]

The District of Columbia's "combined sewers overflow into the Anacostia and Potomac rivers about 75 times annually, spilling nearly 1.5 billion gallons [of untreated wastewater] into the Anacostia and 850 million gallons into the Potomac."[12] There is an average of thirty CSO events into Rock Creek each year, totaling around 52 million gallons of overflow.[13] These CSO events contribute to low dissolved oxygen levels and high bacteria concentrations that impair water quality in the District's receiving waters.[14]

Additionally, CSO incidents contribute to flooding which can cause property damage to private homes and businesses.[15] DC Water has identified six areas of the city, in addition to the Northeast Boundary Sewer, that are especially susceptible to flooding.[16]

Combined sewer overflows are regulated as point sources of pollution under the Clean Water Act ("CWA"). All point source discharges to waters of the United States,

[9] DC WASA, DC WASA Advances Water Pollution Control Efforts (Apr. 2009), *available at* http://www.dcwasa.com/news/publications/cso_april_2009_WEB.pdf) [hereinafter DC WASA Update].
[10] *See* id.
[11] *See* US EPA, REPORT TO CONGRESS: IMPACTS AND CONTROL OF CSOS AND SSOS ES-7, ES-8 (2004), *available at* http://www.epa.gov/npdes/pubs/csossoRTC2004_executive_summary.pdf; *see also* US EPA, COMBINED SEWER OVERFLOWS: GUIDANCE FOR LONG TERM CONTROL PLAN 1-1 (1995), *available at* http://www.epa.gov/npdes/pubs/owm0272.pdf [hereinafter EPA GUIDANCE].
[12] DC WASA Update, *supra* note 9.
[13] Id.
[14] *See* id.
[15] *See* DC WASA, A Guide to Preventing Sewer Backups and Flooding, http://www.dcwasa.com/news/publications/Sewer%20Bkp%20Flood%20Prevention%20Broch%20and%20Insert.pdf, (last accessed Aug. 9, 2010).
[16] DC WASA LTCP, *supra* note 1, at 8–26.

including CSOs, require National Pollutant Discharge Elimination System ("NPDES") permits.[17] CSO permits are granted conditioned on the creation of a Long Term Control Plan aimed at reducing the number of CSO events to a level that will meet WQS.[18] The EPA's Combined Sewer Overflow Control Policy details the requirements for an LTCP, including the following elements:

1. Characterization, Monitoring, and Modeling of the Combined Sewer System
2. Public Participation
3. Consideration of Sensitive Areas
4. Evaluation of Alternatives
5. Cost/Performance Considerations
6. Operational Plan
7. Maximizing Treatment at the Existing Publicly Owned Treatment Works ("POTW") Treatment Plant
8. Implementation Schedule
9. Post-Construction Compliance Monitoring Program.[19]

In the evaluation of alternative CSO prevention measures to be included in a final LTCP, there are two basic approaches. First, a "Presumption" approach lists criteria, including a maximum average of four CSO events per year, and allows a CSO control program to be presumed adequate under the Clean Water Act if it meets the criteria.[20] Second, a "Demonstration" approach allows a permit to be issued to a control program that does not meet the "Presumption" criteria so long as the program meets additional requirements.[21] These additional requirements include a showing that allowed CSO discharges will not prevent attainment of CWA standards, that the program's pollution reduction is the

[17] *See* EPA GUIDANCE, *supra* note 11, at 1–2.
[18] Control Policy, *supra* note 5, at 18,688.
[19] Id. at 18,691-94.
[20] Id. at 18,692-93.
[21] Id. at 18,693.

maximum amount reasonably attainable, and that the program allows expansion if additional controls are determined to be necessary to meet the CWA.[22]

The District of Columbia submitted its Long Term Control Plan to the EPA and District Department of Health in 2002 and received approval in 2004. The DC LTCP is based on the "Demonstration" approach to alternatives.[23] The plan uses records of rainfall levels between 1988 and 1990 to develop goals for future control of CSOs.[24]

Beginning in 2000, the Anacostia Watershed Society, Kingman Park Civic Association, American Canoe Association, Friends of the Earth, Sierra Club, and Mary Stuart Bick Ferguson filed an action against DC Water for violations of the Clean Water Act related to its CSO control plan, focusing on the fact that the WQS were not being met. In 2002, the US EPA also filed a complaint against DC Water. The suits were consolidated and the parties agreed to a consent decree, issued on March 25, 2005, that mandated the selected CSO controls and the schedules by which controls would be put into place for the District's LTCP.[25] As discussed above, the Consent Decree requires that Low Impact Development be a component of the LTCP.[26]

III. Low Impact Development and Combined Sewer Overflow Reduction

For a number of reasons, primarily lack of information, DC Water determined that LID approaches should not be initially implemented as part of the LTCP, but should be "retained for further consideration." The LTCP states that at the time "few studies have been conducted for applying LID-R to urban areas" and "a site specific cost estimation

[22] Id.
[23] DC WASA LCTP, *supra* note 1, at 2-9.
[24] Id. at ES-3.
[25] *See generally* Consent Decree, *supra* note 3.
[26] Id. ¶ 44.

approach is required."[27] Despite failing to include LID as a substantial component of the current plan, the LTCP did include the use of increased LID measures as a strategy for CSO control expansion in the event that expansion was found to be necessary to meet Clean Water Act requirements.[28]

Significantly, the Consent Decree mandated the inclusion of LID measures that had been left out of the 2002 plan.[29] In addition to the numerous control measures, DC Water was instructed to incorporate LID projects up to a cost of $3 million.[30]

In October of 2008, the Director of EPA's Water Protection Division in Region 3 wrote a letter to the General Manager of DC Water. The letter urged DC Water to consider the information contained in the LID studies we detail below as DC Water moves forward with design and construction under the LTCP. The letter reminds DC Water that it is "required to consider LID and LIDR projects in designing and sizing the storage tunnels for Rock Creek and the Potomac River."[31]

A. Low Impact Development Techniques Will Decrease the Occurrence of CSOs

In the last decade, cities across the United States have been increasingly using LID techniques to address CSOs.[32] In 2006, EPA funded a study of the benefits LID could provide to DC in reducing CSOs.[33] The study, completed in 2008, was a collaborative effort between Limnotech and Casey Trees. Their efforts were aided by an Advisory Board consisting of members from the EPA, DC Water, the DC government,

[27] DC WASA LCTP, *supra* note 1, at 7-9.
[28] Id. at 13-13.
[29] *See* Consent Decree, *supra* note 3, ¶ 44–46.
[30] Id. ¶ 44.
[31] Letter from Jon M. Capacasa, Director, Water Protection Division, EPA Region 3, to Jerry N. Johnson, General Manager, DC WASA (Oct. 8, 2008).
[32] *See* US EPA, REDUCING STORMWATER COSTS THROUGH LOW IMPACT DEVELOPMENT (LID) STRATEGIES AND PRACTICES, EPA 841-F-07-006, at iii (2007) [hereinafter REDUCING STORMWATER COSTS].
[33] LIMNOTECH, ENHANCED GREEN BUILD-OUT MODEL: QUANTIFYING STORMWATER MANAGEMENT BENEFITS OF GREEN INFRASTRUCTURE IN THE DISTRICT OF COLUMBIA (2008).

the federal government, the Natural Resources Defense Council, Chesapeake Bay Foundation, and the Low Impact Development Center.

The research detailing the benefits of green infrastructure in DC sought to "quantify the contribution that a full suite of [LID] practices could make towards reducing stormwater runoff, and volumes and frequencies of discharge to the District's rivers."[34] The green infrastructure measures they modeled include rain barrels, rain gardens, green roofs, streetside bioretention planters, curb bumpout bioretention, tree cover, and permeable pavement. The study found that the above listed measures could produce an average yearly stormwater runoff reduction of 26.3%, undoubtedly reducing CSO events.[35] Under an intensive greening scenario, Rock Creek could expect a 60.3% volume reduction in discharge from the combined sewer system, while the Potomac River could expect a 54.1% reduction.[36]

The runoff reductions projected could generate substantial decreases in treatment costs by reducing the amount of runoff into the District's combined sewer system, thereby reducing the amount of water the District must treat. Limnotech estimates that for every gallon that does not enter the sewer system, DC Water saves $0.01 in operational costs. Thus, implementing green infrastructure could save DC Water between $1.4 million and $5.1 million annually.[37]

Citywide application of LID will help the District to meet EPA mandated water quality standards. The CWA requires States and the District to identify impaired water

[34] Id. at 3.
[35] Id. at 20.
[36] Id. at 21.
[37] CASEY TREES & LIMNOTECH, THE GREEN BUILD-OUT MODEL: QUANTIFYING THE STORMWATER MANAGEMENT BENEFITS OF TREES AND GREEN ROOFS IN WASHINGTON, DC 5-8 (2007), *available at* http://www.caseytrees.org/planning/greener-development/gbo/documents/GBO_Model_Full_Report_20051607.pdf.

bodies and develop total maximum daily loads (TMDLs) for certain pollutants to bring identified waters up to standards. Many of the District's identified impaired water bodies (the Anacostia, Potomac, Rock Creek, and others) are affected by CSOs.[38] Reducing CSO events and stormwater pollution in areas covered by separate sewers would have the added benefit of improving water quality in these water bodies and helping the District meet WQS.

B. Low Impact Development Techniques Would Provide Additional Benefits

There are additional benefits to Low Impact Development beyond stormwater runoff reduction that should be considered as DC Water evaluates LID measures in the LTCP.

Additional water quality benefits beyond CSO reduction include pollution abatement through decreased pollutant loads, protection of downstream water resources for recreation and food supplies, increased ground water recharge through infiltration, reduced treatment costs due to decreases in required retention facilities, and improving aquatic habitats.[39]

Philadelphia, Pennsylvania recently completed a study to measure the benefits of increased green infrastructure.[40] The study, conducted by Stratus Consulting, utilized the "triple bottom line" approach which accounts for financial as well as social and environmental costs and benefits. The study examined the impact of varying degrees of LID implementation and even studied the impact of LID in conjunction with increased tunneling (the model which we propose for the District). It found that while tunneling

[38] DC WASA LTCP, *supra* note 1 at 2-11, tbl. 2-5.
[39] REDUCING STORMWATER COSTS, *supra* note 32, at 7.
[40] STRATUS CONSULTING, A TRIPLE BOTTOM LINE ASSESSMENT OF TRADITIONAL AND GREEN INFRASTRUCTURE OPTIONS FOR CONTROLLING CSO EVENTS IN PHILADELPHIA'S WATERSHEDS (2009) [hereinafter PHILADELPHIA REPORT].

can be effective at controlling CSOs, it provides no other benefits. LID methods, on the other hand, help control CSO events while also providing social and environmental benefits: a total value which the Philadelphia study estimates could be a net benefit over costs of $4.5 billion to the citizens of Philadelphia over a forty year period.[41]

The study incorporated factors like the cooling effect of additional trees, the air quality improvements from increased tree cover, the decreased impacts of construction under a green infrastructure model, and the increases in property value created by LID.[42] Energy cost savings alone, when avoided costs and cost savings are combined, reached an astonishing $5.5 million per year, city-wide.[43] These cost savings would likely be replicated in the District, and research to quantify the amounts should be conducted. The Philadelphia study also identified other benefits of LID such as the creation of green jobs and urban temperature reduction.

The Philadelphia study anticipates that increasing vegetated and "treed" acreage to handle CSOs will have the additional benefit of improving air quality. Two air pollutants that significantly harm human health are ozone (the main ingredient of smog) and fine particulate matter.[44] Particulate matter (PM) is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. "Fine" particles, those measuring less than 2.5 micrometers in diameter (PM2.5), pose the greatest health risks.[45] Trees and shrubs remove a significant amount of ozone and particulate matter from the

[41] Id. at 5-3.
[42] Id. at 4-1 through 4-8.
[43] *See* id.
[44] Id. at H-1.
[45] US EPA, Fine Particle Designations, http://www.epa.gov/pmdesignations/faq.htm#0 (last accessed Aug 10, 2010).

ambient air.[46] Improved air quality helps the city in meeting EPA-mandated air quality standards and reduces the incidence of air quality related illness like asthma, bronchitis, and other respiratory ailments. The Philadelphia study estimates that an increase in the number of trees in Philadelphia County by 30% would result in avoiding 1 to 2.4 premature deaths per year from ozone and PM2.5 pollution. It would also prevent 0.4 new cases of chronic bronchitis per year, 1.2 heart attacks, 23 asthma attacks, 708 days of respiratory illness, and 250 days of work and school absence per year.[47] Philadelphia's analysis demonstrates that a city-wide greening approach can provide multiple benefits not achievable through the use of hard infrastructure alone.

C. Low Impact Development Should Be A Cooperative Effort

DC Water is not capable of fully implementing an LID strategy for CSOs without the help of other agencies, but there are many opportunities for partnering. The DC government and the EPA have both made greening Washington, DC, a top priority. The Mayor has expressed his commitment to green solutions, stating, "[m]y Administration is committed to enhancing green programs and services—and to account for our performance."[48]

On October 2, 2009, DC and EPA signed a Performance Partnership Agreement designed to "focus their resources and environmental protection efforts in five key areas for improving quality of life in the District." Among the priorities were "Restoring the District's watersheds including the Anacostia, Potomac, and Rock Creek by developing

[46] David J. Nowak, et al., U.S.D.A. Forest Service, *Air Pollution Removal by Urban Trees and Shrubs in the United States*, 4 URBAN FORESTRY AND URBAN GREENING 115–23 (2006).
[47] PHILADELPHIA REPORT, *supra* note 40, at H-5, tbl. H-1.
[48] District of Columbia, Green DC Agenda: Welcome From Mayor Adrian M. Fenty, http://green.dc.gov/green/cwp/view,a,1248,q,462423.asp (last accessed Aug. 9, 2010).

an approach that considers all sources of pollution" as well as "Implementing the Green DC Agenda and showcasing the District for its green programs."[49]

The Green DC Agenda, to which DC and EPA have committed, anticipates significant green infrastructure implementation. DC Water should work with leaders from the District and federal governments to target the use of LID technologies and leverage available resources to ensure their implementation. Indeed, many green infrastructure initiatives are already under way. For example, the DC Housing Authority is currently installing rain barrels on Public Housing Developments at two locations.[50] The District Department of Transportation (DDOT) and District Department of the Environment (DDOE) are working together to implement tree planting standards for trees on public lands, to provide larger tree boxes, and to improve maintenance. They plan to plant a minimum of 4,150 trees annually (13,500 additional trees over the next 3 years). DDOE and the Office of Personnel Management (OPM) are working to complete a structural assessment of all District properties maintained by OPM to determine feasibility for green roof installations, based on which DDOE will develop an implementation schedule for retrofitting District properties.[51] If DC Water were to work cooperatively with these agencies, a comprehensive and successful LID solution to CSO pollution would be achievable.

In addition to the city funding available for green projects, there are federal funds available as well. The EPA's Green Infrastructure website provides information on many

[49] DDOE Press Release, "EPA, District Sign Agreement to Focus Efforts on City's Top Environmental Matters" (Oct. 5, 2009), *available at* http://newsroom.dc.gov/show.aspx/agency/ddoe/section/2/release/18273/year/2009.
[50] District of Columbia, Green DC Agenda: Agenda Items, http://green.dc.gov/green/cwp/view,a,1248,q,462150,show,%7B'48'.CT.'Water'%7D.asp (last accessed Aug. 9, 2010).
[51] Id.

funding opportunities available to local governments for implementing LID. [52] There are funds available to support community-based partnerships to reduce pollution at the local level under the Community Action for a Renewed Environment (CARE) Grant program; funds to pay for education, training, technology transfer, and demonstration projects under the Clean Water Act Nonpoint Source Grant (Section 319 Grant); funds specifically geared toward stormwater treatment like the Clean Water State Revolving Fund (CWSRF); or flexible sources of funding like the Department of Housing and Urban Development's Community Development Block Grant Program (CDBG), as well as many other funding opportunities.[53]

We ask that DC Water take advantage of these partnership and funding opportunities to incorporate LID into the Long Term Control Plan.

IV. Combined Sewer Overflows and the Impacts of Climate Change

The Intergovernmental Panel on Climate Change found in 2007 that both precipitation and storm intensity will increase due to climate change throughout the northern and eastern United States, including the District of Columbia and surrounding region.[54] In September 2008, the EPA reported that climate change related increases in both rainfall levels and storm intensity will make CSOs more frequent and impact the effectiveness of Combined Sewer Overflow Plans.[55] EPA also cited increasing runoff

[52] US EPA, "Green Infrastructure Funding Opportunities," http://cfpub.epa.gov/npdes/greeninfrastructure/fundingopportunities.cfm (last accessed Aug. 10, 2010). EPA also offers a webcast on Funding Green Stormwater Infrastructure Projects which is available at http://216.75.69.10/downloads/stimuluswebcast/GreenProjectWebcasts.htm.
[53] Id.
[54] Aristita Busuioc et. al, *Chapter 11: Regional Climate Projection, in* IPCC, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS 847–940 (2007).
[55] *See* US EPA, NATIONAL WATER PROGRAM STRATEGY: RESPONSE TO CLIMATE CHANGE 12 (2008), *available at* http://www.epa.gov/water/climatechange/docs/TO5_DRAFT_CCR_Revised_10-16.pdf [hereinafter RESPONSE TO CLIMATE CHANGE].

and urban flooding as creating additional design challenges, overloading, and costs for stormwater management programs, including combined sewer systems.[56]

In addition, the EPA developed a report specifically addressing the impacts of climate change on CSO events.[57] The report focuses on whether a CSO control program that meets the goals of the CSO policy based on historical precipitation levels will actually be successful in the face of climate change and what incremental changes in the design capacity might help.[58] The report indicates that Long Term Control Plans with calculations based on current hydrology may not meet future objectives due to the impacts of climate change on hydrology.[59] Though the study does not focus on Washington, DC, specifically, it includes areas in New England and the Great Lakes region that, like DC, will likely experience increased precipitation because of climate change. The analysis also demonstrates that research can be done to estimate the impacts of climate change on combined sewer systems and help inform recommendations for better LTCPs.[60]

On the regional level, the Pew Center on Global Climate Change has mapped the anticipated changes in average monthly precipitation for the Chesapeake Bay region by the end of the century. Four models were created encompassing two different climate models and two different greenhouse gas emissions scenarios. Each model predicted a

[56] Id. at 10–15.
[57] *See* U.S. EPA, A SCREENING ASSESSMENT OF THE POTENTIAL IMPACTS OF CLIMATE CHANGE ON COMBINED SEWER OVERFLOW (CSO) MITIGATION IN THE GREAT LAKES AND NEW ENGLAND REGIONS, EPA/600/R-07/033F (2008), *available at* http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=188306.
[58] *See* id. at 1–2.
[59] Id. at 36.
[60] *See generally* id.

25% increase in rainfall for at least one month of the year. Two models predicted increases as high as 40–50% in certain months. [61]

The Maryland Climate Commission's Comprehensive Assessment of Climate Change Impacts in Maryland predicts, "[u]rban flooding will likely worsen because of intensification of rainfall events. More intense rainfall resulting from large scale and localized (urban canopy) climate effects are likely to increase peak flooding in urban environments." According to a key author of the study, given the nature of the grids from which the projections are derived, the Maryland projections are equally applicable to Washington, DC.[62]

The Metropolitan Washington Council of Governments ("COG") released a National Capital Region Climate Change Report in 2008.[63] The report states that "[b]y the second half of the 21st century, precipitation in the Mid-Atlantic region is expected to increase overall" and when this increase occurs "the stormwater management controls currently in place throughout the region may also be operating at the maximum or exceeding their design capabilities."[64] This more localized report builds on the national level data, demonstrating that stormwater runoff levels will increase in the future, perhaps to a critical degree.

The District's LTCP is not designed to compensate for what we now know about climate change impacts and combined sewer overflows, the science of which has

[61] *See* PEW CENTER ON NATIONAL CLIMATE CHANGE, COASTAL DEAD ZONES & GLOBAL CLIMATE CHANGE: RAMIFICATIONS OF CLIMATE CHANGE FOR CHESAPEAKE BAY HYPOXIA 7 (2007), *available at* http://www.pewclimate.org/docUploads/Regional-Impacts-Chesapeake.pdf.
[62] Email from Donald F. Boesch, Chair, University of Maryland Center for Environmental Science (Oct. 15, 2009).
[63] METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS [COG], NATIONAL CAPITAL REGION CLIMATE CHANGE REPORT (2008), *available at* http://www.mwcog.org/uploads/pub-documents/zldXXg20081203113034.pdf.
[64] Id. at 30.

substantially advanced since the LTCP was submitted in 2002.[65] The COG report urges more research and planning to determine the full scope of the impacts of climate change on the Washington region and swift effective response to it as is needed.[66] EPA urges the consideration of redesign "because an increase in storm event frequency and intensity can result in more combined sewer overflows causing increased pollutant and pathogen loading."[67] These recommendations should be incorporated into long term CSO prevention planning in the District.

V. Conclusion

As a result of research efforts by the EPA, Casey Trees, Stratus Consulting, and others, there is now ample evidence that environmental and economic benefits can be achieved using Low Impact Development throughout the District. When considered together with new information on climate change and increasing storms, this research provides both the rationale for and the means to reexamine the Long Term Control Plan and revise it to incorporate LID to the full extent required by law and to improve the effectiveness of the plan at reaching its ultimate goals: the reduction of Combined Sewer Overflows in the District of Columbia and compliance with water quality standards so that DC residents and visitors alike can use and enjoy its waterways.

The Long Term Control Plan is an invaluable tool to protect the District's waters. Our hope is to ensure the plan is as strong as it can be as DC Water proceeds into the next stages of planning and project development for CSO control and prevention.

[65] *See* DC WASA LTCP, *supra* note 1, at 2-2–2-4 (basing findings on historical rainfall levels from 1988–90).
[66] COG, *supra* note 63, at 68.
[67] RESPONSE TO CLIMATE CHANGE, *supra* note 55, at 14.