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NYC: Combined Sewer Overflows

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Raw sewage and polluted stormwater impacting Newtown Creek. Credit: (c) Giles Ashford 2005.

**Riverkeeper Report:  
"SUSTAINABLE  
RAINDROPS: Cleaning New  
York Harbor by Greening the  
Urban Landscape"**

*by Mike Plumb, Columbia Law  
Clinic intern and former  
Riverkeeper intern.*



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### EXECUTIVE SUMMARY

More than 27 billion gallons of raw sewage and polluted stormwater discharge out of 460 combined sewage overflows ("CSOs") into New York Harbor each year. Although water quality in the Harbor has improved significantly over the last few decades, most parts of the waterfront and its beaches are still unsafe for recreation after it rains. As little as one-twentieth of an inch of rain can overload the system. The main culprit is New York City's outmoded sewer system, which combines sewage from buildings with dirty stormwater from streets.

This extraordinary degree of pollution imposes steep environmental, human health, and economic costs on the City and its residents. CSO discharges, in addition to preventing safe recreation, impair navigation and damage fish habitat. Sadly, the New York City Department of Environmental Protection ("DEP") may be understating the severity of the CSO pollution in the Harbor due to sampling inadequacies.

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Federal and state law requires New York City to bring its CSO discharges into compliance with water quality standards. The DEP must submit the initial outline for its long-term CSO control plan to the New York State Department of Environmental Conservation (“DEC”) in June 2007.

### **The DEP is Investing in Obsolete Infrastructure.**

The DEP’s June 2007 plan will likely favor a \$2.1 billion investment in end-of-pipe tanks and in-line storage for CSO pollution. This approach ignores meaningful and economical alternatives that reduce the volume of stormwater entering the system. Furthermore, these end-of-pipe investments will fail to bring the City into compliance with water quality standards. After the proposed end-of-pipe projects are completed in the next two decades, the City will continue to discharge 22 billion gallons or more of CSOs each year. Acknowledging that its plan is likely to fail, the DEP has already applied for variances in anticipation of its inability to meet water quality standards.

The burden of fixing the CSO problem falls on all the agencies that manage the urban environment, including the Departments of Buildings, Transportation, and Parks. The state DEC recognized as much, naming the “City of New York” and the DEP as parties to a recent CSO enforcement action. Yet, the DEP is going it alone, driven by a mindset that regards stormwater as a waste that must be disposed of rather than a resource to be utilized at the source, where the rains hit the ground. This mindset ignores the state-of-the-art source control technologies and practices described in this report.

### **Source Control is the Economical and Sustainable Alternative.**

New York City needs to adopt a sustainable approach to CSOs that gives appropriate consideration to stormwater source controls that keep stormwater from ever entering the sewage system in the first place. Source controls include street trees, “Greenstreets” parks (smaller vegetated areas on streets), green roofs, rain barrels, and direct injection into groundwater. Any excess stormwater that is not captured by source controls would then enter the sewage system for eventual treatment. Source controls must be viewed as a long-term, economically viable alternative to be used in concert with end-of-pipe controls, not just as convenient gap-fillers.

This report demonstrates that source controls may be significantly more cost effective than end-of-pipe controls. The gallon-removal benefits of source controls can be measured. For \$1,000 invested in the DEP’s end-of-pipe projects, CSOs might decrease by 2,400 gallons. By comparison, the same \$1,000 investment in:

- Greenstreets could decrease CSOs by 14,800 gallons;
- Street trees could decrease CSOs by 13,170 gallons;
- New green roofs could decrease CSOs by 810 gallons; retrofitted green roofs could decrease CSOs by 865 gallons; and incentivized green roofs could decrease CSOs by 12,000 gallons; and
- Rain barrels could decrease CSOs by 9,000 gallons.

### **The EPA Endorses Source Control.**

Source control systems work. The EPA recognizes the effectiveness of source control, as noted in guidance by the Assistant Administrator on March 5, 2007 (attached as an appendix). Cities across the country, including Chicago, Milwaukee, Pittsburgh, Portland, Seattle, and Washington D.C. have recognized the effectiveness of source control and have implemented programs in an effort to control CSOs. And while source control is only done in New York City on a haphazard basis, the City Office of Environmental Coordination has itself recognized its effectiveness. The DEP remains alone in its reluctance to embrace the obvious benefits of keeping stormwater out of the sewer system.

The DEP has no basis to ignore source control as a viable CSO control alternative. The DEP cancelled the only two source control studies that might have informed the CSO long-term planning process in time for the June 2007 submission deadline to the state DEC. Further, a draft of a DEP-commissioned source control study by the company Biohabitats, slated to be released in October 2006, has been inexplicably delayed until after the June 2007 deadline.

### **Stormwater Can Make the City More Sustainable.**

Source control regards stormwater as a resource to be utilized for much broader sustainability purposes, rather than a waste that must be disposed. By giving life to vegetation, stormwater can help prepare the City for the effects of climate change, decrease summer temperatures, promote energy efficiency, improve air quality, and make communities more livable. A major commitment to source control would help advance a number of ambitious and laudable goals that Mayor Michael Bloomberg wants the City to attain by the year 2030. The following findings illustrate the wisdom of an ambitious source control commitment, over and above its effectiveness in reducing CSO discharges:

- In twenty years, additional unsustainable growth could add to the urban heat island beyond the 2 to 3°F temperature increase that will accompany global warming. Surface temperatures in the City could be reduced by 1.4°F if 50 percent of the flat roofs in the City were converted to green roofs. This decrease in temperatures correlates to energy savings of \$70 million dollars per year;
- By adding another 300,000 street trees to the 500,000 existing street trees, over 60 tons of air pollution can be removed from the

City's air every year;

- Rain barrels and stormwater capture would conserve residential and commercial water usage, putting stormwater to use for irrigation, sidewalk cleaning, cooling, industrial use, and sanitary needs.

End-of-pipe controls confer none of these benefits.

The City has demonstrated the capacity to manage distributed systems. Programs at such as the DEP's catchment basin cleaning and at the Department of Parks and Recreation's street trees and Greenstreets programs suggest the City already has the competence to manage a distributed stormwater source control system.

### **Visionary Leadership is Needed.**

The Mayor's Office of Long Term Planning and Sustainability is set to release its sustainability plan at the end of March 2007. The sustainability plan will hopefully include, among many things, the specific ways in which stormwater can be controlled at the source. Yet in December, the Mayor was unwilling to commit the New York City to a goal of making the Harbor safe for swimming by 2030. This reluctance stems from DEP's reluctance to fully address CSOs. Based on DEP's most recent statements, few meaningful source control initiatives will be incorporated into the June 2007 DEP plan, which will chart the City's approach to CSOs for the next generation.

The DEP's long term CSO planning is part of a binding, legal construct, driven by a matrix and federal and state laws, enforcement actions, and legally required citizen participation. To implement a sustainable and effective CSO solution, the Mayor's likely initiatives must be merged into the binding long-term planning process.

Mayor Bloomberg has consistently demonstrated that the impossible is within reach. Despite the great challenges ahead, the creation of the new Office of Long Term Planning and Sustainability and the level of public involvement to date present reasons for optimism.

Eliminating the combined sewage overflow problem—and greening the City—will require the vision, toughness and endurance necessary to topple an entrenched bureaucracy. The Mayor should set a goal of a swimmable and fishable Harbor. While this would mean taking on the DEP, the Mayor can take inspiration from precedent. In 1997, the historic Watershed Agreement ensured for the protection of the City's upstate reservoir system at the source rather than building a multi-billion dollar filtration plant at the end-of pipe. The Agreement was hailed as an international model for drinking watershed management. Mayor Bloomberg could implement a similarly

groundbreaking plan for stormwater source control within the five boroughs, and use it to advance a more sustainable urban environment.

This report does not purport to be the final answer on the benefits and costs of stormwater source control in New York City. Rather, the preliminary findings in this report demand the need for a robust discussion and further in-depth technical analysis of source control.

**Section I** of this report discusses the environmental and economic costs of combined sewage overflows on the City and demonstrates how the DEP's likely plan will fail to achieve water quality standards.

**Section II** reveals that source control technologies can be more cost effective than end-of-pipe controls at reducing CSOs.

**Section III** describes the substantial sustainability benefits of source controls.

**Section IV** provides three examples of CSO control scenarios, spreading \$2.1 billion across source control and end-of-pipe alternatives.

**Section V** concludes the report with a series of recommendations.

#### **More About NYC: Combined Sewer Overflows:**

- ▶ **[Introduction](#)**
- ▶ **[Why Do CSOs Occur in NYC?](#)**
- ▶ **[What's In NYC's CSOs?](#)**
- ▶ **[How Often do CSOs Occur in NYC?](#)**
- ▶ **[Proposed CSO Plan Issued for Public Comment](#)**
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