



planNYC

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**A GREENER,
GREATER
NEW YORK**



The City of New York
Mayor Michael R. Bloomberg



Paerdegat Basin CSO Facility

Credit: NYC Department of Environmental Protection

nitrogen control upgrades in Jamaica Bay, will significantly improve the health of one of New York City's most valuable ecological areas.

INITIATIVE 3 Complete cost-effective grey infrastructure projects to reduce CSOs and improve water quality

Over the next 20 years, we will invest \$2.9 billion to construct cost-effective grey infrastructure projects that reduce the amount of untreated water discharged into our waterways. We will implement two categories of grey investments—infrastructure that reduces the volume of CSOs and other projects that improve the water quality in waterways impacted by CSOs.

In some areas where it is cost-effective, we will reduce CSO volumes by building large detention facilities that capture and hold CSOs and pump back wastewater to a treatment plant when storms pass. We recently completed a rehabilitation of the 20-million gallon CSO detention facility at Spring Creek and a new 43-million gallon facility at Flushing Bay. In 2011, we will complete a 50-million gallon facility at Paerdegat Basin that will capture 1.7 billion gallons of CSOs per year. This will enable Paerdegat Basin to achieve a greater than 90% attainment of existing dissolved oxygen standards and 100% attainment of existing pathogen standards.

Also in 2011, we will complete a 5-million gallon CSO facility at Alley Creek in Queens. We will increase the capacity of the Avenue V Pumping Station in Brooklyn from 20 mgd to 30 mgd. This will help reduce CSOs and increase oxygen levels in Coney Island Creek. We will increase the capacity of the existing Gowanus Canal Pumping Station from 20 mgd to 30 mgd. Together, these grey infrastructure projects will reduce CSOs by more than 8.2 billion gallons a year.

We will implement other CSO-related grey infrastructure projects to improve water quality. We will invest \$50 million to reactivate the Gowanus Canal Flushing Tunnel. The tunnel was opened nearly 100 years ago, but has not operated at its full capacity since it fell into disrepair in the 1960s. It brings oxygen-rich water from the Buttermilk Channel, which is fed by the East River, into the canal to improve overall water quality and mitigate the effects of CSOs. The existing single pump will be replaced with three pumps, increasing the daily flow of water into the canal by 40%. We will also complete an in-water aeration system in Newtown Creek and a destratification facility at Shellbank Creek.

INITIATIVE 4 Expand the sewer network

To support current residents and future growth, we will prioritize the extension of sanitary and storm sewers to neighborhoods throughout the five boroughs that need additional capacity.

On the Rockaway Peninsula, we have spent almost \$55 million to construct separate storm sewers since 2002. This investment has improved water quality and reduced flooding and sewer backups. We will target Southeast Queens for separate sewer projects to increase capacity and reduce street flooding. We will also finish key projects on the South Shore and Mid-Island of Staten Island, in Hunts Point in the Bronx, and in the Springfield Gardens, Maspeth-Middle Village, and Hunters Point neighborhoods in Queens.

We will also invest in High Level Storm Sewers (HLSS) to keep water out of our combined sewer system. HLSS partially separate the flow in combined sewer areas by capturing 50% of rainfall and diverting it into our waterways through permitted outlets. We will build HLSS in the Throgs Neck area of the Bronx, the Gowanus neighborhood of Brooklyn, and in the Laurelton neighborhood of Queens.

CASE STUDY Nitrogen

The quality of some of our waterways can be affected by nitrogen that enters our waterways through discharges from wastewater treatment plants and other sources such as stormwater runoff. Although it poses no threat to human health, high levels of nitrogen can deplete dissolved oxygen in the water, inhibiting fish habitation. Other chemicals such as de-icing fluids can have the same effect.

This effect is a problem in those waterways where tidal or other natural flushing actions have been compromised; nitrogen has been identified as one contributor to the recurring water quality problems in Jamaica Bay, the East River, and Long Island Sound. As part of our efforts to improve water quality, we have committed to reduce nitrogen discharges into Jamaica Bay and the East River by 50%.

Traditional nitrogen removal processes require large, capital upgrades that are energy intensive and have high operating costs. But there are new technologies available that can cost-effectively remove nitrogen by supplementing existing infrastructure. We will introduce two of these technologies, SHARON and ARP, to begin removing nitrogen from wastewater treatment plant discharges.

The SHARON, or Single Reactor System for High Ammonia Removal Over Nitrate, process uses heat to raise bacterial activity to a level where nitrogen-rich wastewater can be treated more efficiently in a single reactor. Within the reactor, ammonia oxidizing microorganisms transform nitrogen by-products into a gas, which is then trapped and removed from the facility. We have been operating one of the two vessels for about a year at the Wards Island Wastewater Treatment Plant. Once SHARON is fully operational it is expected to reduce the nitrogen discharge load by 10,000 pounds per day.

We will install the Ammonia Removal Process (ARP) at the 26th Ward Wastewater Treatment Plant in Jamaica Bay. ARP combines flash vacuum distillation with ion exchange to remove an estimated 90% of nitrogen from filtrate streams. When the installation is completed by 2014, the ARP technology should reduce the plant's nitrogen load by an additional 3,000 pounds per day.

SHARON and ARP are good examples of how new technologies are making it possible to remove nitrogen using less energy and fewer chemicals. These technologies will lessen the tradeoff that has existed between improving the quality of our waterways and reducing greenhouse gas emissions.