



Develop critical backup systems for our aging water network to ensure long-term reliability

The long-term vision of the New Yorkers who built our water supply system—starting in the 1840s—has given us a network of reservoirs, aqueducts, and water mains sufficient to meet the needs of our growing population well into the future. Our Catskill and Delaware Watersheds provide some of the nation’s purest water. However, our supply system faces challenges that we must address over the next 25 years. Critical elements such as aqueducts and water tunnels currently cannot be taken out of service for long-term repair and maintenance—the kind of work that only needs to be done once a generation or more. In addition, as development continues to encroach on the city’s upstate watersheds, we will have to continue vigilant monitoring and protection of our reservoirs.

Our plan for the future of our water network includes the following initiatives:

Ensure the quality of our drinking water

- 1 Continue the Watershed Protection Program
- 2 Construct an Ultraviolet Disinfection Facility for the Catskill and Delaware systems
- 3 Build the Croton Filtration Plant

Create redundancy for aqueducts to New York City

- 4 Launch a major new water conservation effort
- 5 Maximize existing facilities
- 6 Evaluate new water sources

Modernize in-city distribution

- 7 Complete Water Tunnel No. 3
- 8 Complete a backup tunnel to Staten Island
- 9 Accelerate upgrades to water main infrastructure

Water Network

OUR PROGRESS

Received new Filtration Avoidance Determination from EPA, purchased more than 5,000 acres to protect the watersheds, and began construction on Croton Filtration Plant

Over the last year, the City has taken significant steps on the water network initiatives in PlaNYC. We received a Filtration Avoidance Determination from the federal government. The City’s watershed land acquisition program reached a new milestone, exceeding 130,000 total acres for the first time. We have met significant milestones on the planned completion of City Water Tunnel No. 3. And construction of the Croton Filtration Plant began last year.

Our water system includes some of the City’s most expensive infrastructure. As a result, we paid significant attention this year to securing the financial resources sufficient to meet our needed budget commitments. We achieved

three major steps. First, we began modernizing the Department of Environmental Protection’s (DEP) billing and receiving system, which will improve the accuracy of water bills in part by connecting water meters to the new citywide wireless communication network. Second, a landmark law passed by the City Council will allow the City to punish those who do not pay their water bills—thus ending the practice of forcing honest New Yorkers to subsidize deadbeats. Finally, the Water Board approved an increase in water rates. While we seek to avoid increases in water rates as much as possible, we also recognize that our water supply depends on sufficient funding for the investments we need.



Rendering of the new Catskill-Delaware Ultraviolet Disinfection Facility

Credit: Department of Environmental Protection

Ensure the quality of our drinking water

The drinking water from the watersheds west of the Hudson River—the Catskill and Delaware systems—has continued to be pure. This is due to the natural buffers that prevent land near our reservoirs from becoming highly developed. In July, the United States Environmental Protection Agency (EPA) recognized the integrity and effectiveness of our approach by granting the City an historic 10-year renewal of its Filtration Avoidance Determination (FAD), which allows the City to use Catskill and Delaware water without building expensive water filtering plants. Under the FAD, we will continue to protect reservoirs by upgrading wastewater treatment facilities in towns near the reservoirs, replacing failing septic systems, preserving wetlands, working with private land owners to improve land management practices, constructing stormwater best management practices, and purchasing land in the watershed.

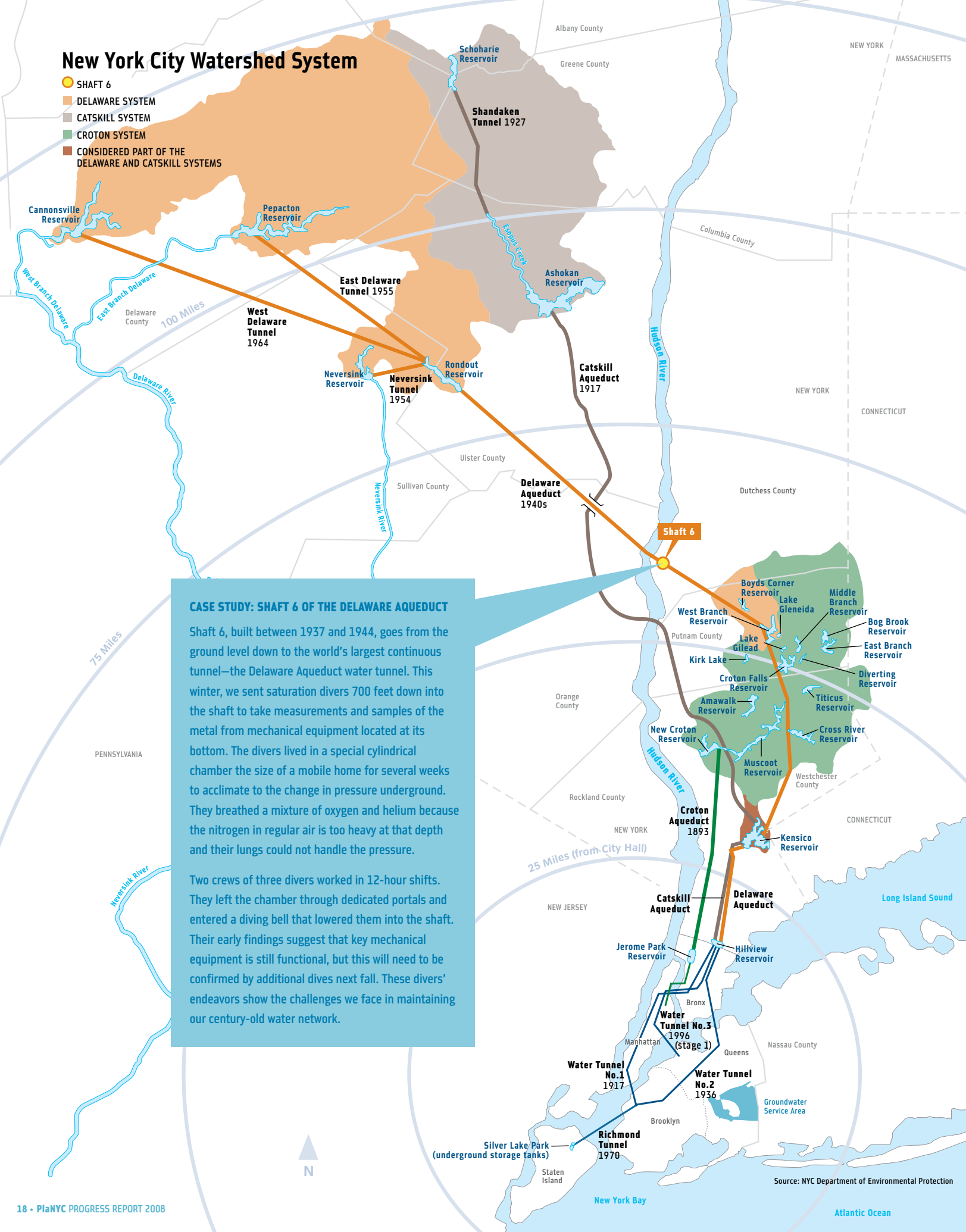
Since receiving the renewal of the FAD last summer, we have extended contracts to the Watershed Agricultural Council and Catskill Watershed Corporation to continue to expand these kinds of efforts. We have also submitted a strategy to leverage land trusts as part of the land acquisition program. The City continues to work with the Environmental Facilities Corporation for the upgrade of wastewater treatment plants in the watersheds.

To ensure the continued diversity of the city’s drinking water resources, we are constructing the Croton Filtration Plant in Van Cortlandt Park to allow for much heavier reliance on water from east of the Hudson River—the Croton Watershed. Work began on the facility in August. And, to meet new EPA regulations for all of our drinking water, in February we began construction of a 2 billion-gallon-per-day capacity Ultraviolet Disinfection Facility in Eastview, New York. Although these projects have seen construction costs rise, an independent review determined that external factors—such as the global increase in steel and concrete prices—were mainly to blame.

“All New Yorkers who care about the future of the city—economically, socially and health-wise—would do well to get firmly behind Mr. Bloomberg.” *The New York Observer*, May 22, 2007

New York City Watershed System

- SHAFT 6
- DELAWARE SYSTEM
- CATSKILL SYSTEM
- CROTON SYSTEM
- CONSIDERED PART OF THE DELAWARE AND CATSKILL SYSTEMS



CASE STUDY: SHAFT 6 OF THE DELAWARE AQUEDUCT

Shaft 6, built between 1937 and 1944, goes from the ground level down to the world's largest continuous tunnel—the Delaware Aqueduct water tunnel. This winter, we sent saturation divers 700 feet down into the shaft to take measurements and samples of the metal from mechanical equipment located at its bottom. The divers lived in a special cylindrical chamber the size of a mobile home for several weeks to acclimate to the change in pressure underground. They breathed a mixture of oxygen and helium because the nitrogen in regular air is too heavy at that depth and their lungs could not handle the pressure.

Two crews of three divers worked in 12-hour shifts. They left the chamber through dedicated portals and entered a diving bell that lowered them into the shaft. Their early findings suggest that key mechanical equipment is still functional, but this will need to be confirmed by additional dives next fall. These divers' endeavors show the challenges we face in maintaining our century-old water network.

Create redundancy for aqueducts to New York City

We face significant challenges in moving water from the watersheds to the city. Many of the tunnels and aqueducts we rely on are more than 50 years old, and we lack the excess capacity to allow us to close down portions of the system to undertake their long-term maintenance and repair. The Delaware Aqueduct, which carries 50 percent of the city's water, has leaks; while it is not in imminent danger, it must at some point be turned off and fixed. (See case study: *Shaft 6 of the Delaware Aqueduct*.) After careful study, DEP identified several strategies for providing alternative water sources while the aqueduct is repaired. In the fall of 2007, we began the preliminary design phase on the three most favorable infrastructure alternatives: increasing the capacity of the Catskill Aqueduct; sinking more drinking water wells in Southeast Queens; and constructing a new aqueduct between the Rondout and West Branch Reservoirs. To mitigate the impact of an emergency, DEP is also recon-

structing and upgrading the Cross River and Croton Falls Pump Stations to transfer water from the Croton Watershed to the Delaware Aqueduct.

We are phasing in our water conservation effort to reduce consumption by 5 percent. We are building capacity and designing programs for a multi-year water conservation effort; but, because of current budget conditions, we have made the choice to prioritize capital construction projects related to the Delaware Aqueduct—in part because water conservation programs can be activated fairly quickly. We will continue to develop these programs for broader launch as soon as resources allow.

Modernize in-city distribution

Our construction of City Water Tunnel No. 3—already nearly a 40-year project—will allow City Water Tunnel No. 1, completed in 1917, to be inspected and repaired for the first time in its history. Over the last year, we began construction of the shafts to connect the tunnel to water mains in the street and began lining

the tunnel with concrete. The main phase of the new tunnel is on schedule to enter operation in 2013.

In order to accelerate upgrades to our infrastructure, we are aiming to increase the rate at which we replace water mains from 60 miles to over 80 miles annually. DEP has launched a planning process to meet this accelerated schedule, and has initiated projects to expand the rate of water main replacement.

Next Steps

Our water network is a priceless, critical asset, supplying one of our most basic needs. However, water network projects are large, expensive, and take years—sometimes decades—to complete. That is why we have made an historic commitment of \$23 billion to improve our water and wastewater infrastructure over the next 10 years. Through investment in our critical backup systems, and more efficient use of existing resources, we will ensure that New Yorkers enjoy a reliable water supply into the next century.



Water Network Progress

INITIATIVE	LAUNCHED*	PROGRESS SINCE APRIL 22, 2007	IMPLEMENTATION MILESTONE FOR DECEMBER 2009
1 CONTINUE THE WATERSHED PROTECTION PROGRAM			
Aggressively protect our watersheds as we seek to maintain a Filtration Avoidance Determination (FAD) for the Catskill and Delaware Water Supplies	✓	On July 30, EPA issued a new 10-year FAD. In November, the City submitted a strategy to work with land trusts to augment the Land Acquisition Program. In December, the City submitted an evaluation of potential engineering alternatives to address turbidity at the Ashokan Reservoir	Renew the City's Filtration Avoidance Determination and fulfill its commitments
2 CONSTRUCT AN ULTRAVIOLET DISINFECTION PLANT FOR THE CATSKILL/DELAWARE SYSTEMS			
Construct an Ultraviolet Disinfection Facility to destroy disease-causing organisms in our upstate watershed	✓	DEP began construction on the Ultraviolet Disinfection Facility and anticipates completion in 2012	Begin construction of Ultraviolet Disinfection Facility
3 BUILD THE CROTON FILTRATION PLANT			
Construct a water filtration plant to protect the Croton supply	✓	In August, DEP began construction of the Croton Water Filtration Plant and has met all construction milestones to date	Continue to construct Croton Filtration Plant
4 LAUNCH A MAJOR NEW WATER CONSERVATION EFFORT			
Implement a water conservation program to reduce citywide consumption by 60 million gallons a day (mgd)		On June 16, 2007, released a Request for Expression of Interest to participate in a Performance-Based Model to achieve water use savings. Hired Director of Marketing in fall 2007 to launch expanded conservation program. Due to budget constraints, program is currently deferred, except for initial \$6 million required for programming of the collection and billing system	Launch water conservation program
5 MAXIMIZE EXISTING FACILITIES			
Add 245 mgd to our supply potential through increased efficiency	✓	Completed the environmental review of the Cross River Pump Station, allowing the transfer of 60 mgd from the Croton Watershed to the Delaware Aqueduct. Bid released to obtain construction contracts. Design progressing for the Croton Falls Pump Station, allowing the transfer of 180 mgd from the Croton Watershed to the Delaware Aqueduct	Begin installation of new hydraulic pumps; begin designing enhanced filtration plant for greater use of Jamaica groundwater
6 EVALUATE NEW WATER SOURCES			
Evaluate 39 projects to meet the shortfall needs of the city during a prolonged shutdown of the Delaware Aqueduct	✓	DEP started facility planning for 3 infrastructure projects expected to be most effective, including the use of in-city groundwater (up to 55 mgd), optimization of the Catskill Aqueduct (up to 60 mgd), and construction of a parallel tunnel (minimum of 440 mgd)	Finalize a short list of projects for piloting and design
7 COMPLETE WATER TUNNEL NO. 3			
Complete construction of Stage 2 of Water Tunnel No. 3, and begin repairing Water Tunnel No. 1	✓	The City completed the tunneling of the Brooklyn/Queens leg in 2001 and the construction of shafts on this leg is significantly complete. DEP completed the mining of the Manhattan leg of Water Tunnel No. 3 in 2006. Construction of the shafts and the lining of the Manhattan leg continues. Activation is scheduled for 2013	Open Brooklyn/Queens leg
Complete Stages 3 and 4 of Water Tunnel No. 3	✓	Preliminary design (10%) for the construction of Stage 3, also known as the Kensico City Tunnel, is nearly complete. Given the long-term nature of Stage 4, design has not yet started	Complete design of Stage 3 ¹
8 COMPLETE A BACKUP TUNNEL TO STATEN ISLAND			
Replace pipelines connecting Staten Island to Tunnel No. 2	✓	DEP has nearly completed design of the new tunnel to Staten Island	Begin replacing pipelines
9 ACCELERATE UPGRADES TO WATER MAIN INFRASTRUCTURE			
Increase replacement rate to over 80 miles annually	✓	DEP launched a planning process to increase the rate of water main construction, pending funding	Continue to replace water mains

* Initiative begun by the City, including planning or advocacy stages

¹ 2015 milestone set—no 2009 milestone