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Department of Environmental Protection Completes Rehabilitation of 123 Year-old New Croton Aqueduct

**\$177 Million Project Marks Key Milestone Towards
Reactivation of the Croton Water Supply System, Which
Can Provide Between 10 and 30 Percent of the City's Daily
Water Needs**

Photos of Work on the Historic Tunnel can be Viewed on DEP's Flickr Page

The New York City Department of Environmental Protection (DEP) today announced the completion of a multi-year, \$177 million comprehensive inspection and rehabilitation of the New Croton Aqueduct. The Aqueduct was originally placed into service in 1890 and is a 33-mile-long, 13-foot-diameter, brick-lined tunnel that was engineered to convey by gravity up to 290 million gallons of drinking water each day from the New Croton Reservoir in Westchester County to Jerome Park Reservoir in the Bronx. The Aqueduct begins just below ground level and reaches a depth of roughly 400 feet. Rehabilitation work included re-grouting the brick lining of the tunnel, upgrading 34 shaft site connections that allow crews to access the tunnel from ground level, and repairing valves and pumps that allow certain Westchester communities to pull water from the Aqueduct. In addition, a 58-foot-long and 12-foot-wide concrete plug was built inside the Aqueduct beneath Jerome Park Reservoir in order to divert water to the Croton Filtration Plant. Five historic gatehouses located at ground level along the route of the Aqueduct were also restored.

The New Croton Aqueduct conveys water from the City's oldest collection of upstate reservoirs in Westchester and Putnam Counties, the Croton watershed,

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to the in-city drinking water distribution network. For more than 150 years the system provided unfiltered drinking water to the city, first through the Old Croton Aqueduct, which was built in 1842, and then the New Croton Aqueduct. However, as population density increased around the Croton reservoirs, water quality in the system diminished and, in the late 1990s, DEP stopped using Croton Water for in-city distribution and began planning the construction of a filtration plant. With the system taken off-line and the Aqueduct drained of water, DEP conducted an extensive inspection of the tunnel and began plans for repairs.

Due to a limited number of access points, and restrictions on the size of the equipment that would fit through them, much of the machinery was taken apart and lowered by crane through the shafts hundreds of feet down to the Aqueduct, where it was reassembled. The inspection of the Aqueduct began in 1996 and included the use of ultrasonic stress waves, ground penetrating radar, and diamond core test drilling to determine the permeability and strength of the tunnel lining and surrounding bedrock. A remotely operated vehicle inspected the portion of the tunnel that runs under the Harlem River, which was not dewatered. Overall, the Aqueduct was found to be in good condition, with some areas requiring sediment removal, the repair of cracks in the tunnel lining, and brick and mortar repointing and replacement.

Rehabilitation work commenced in 2004 and was completed in 2013. The interior of the Aqueduct was power washed and where investigations showed that a void may be present behind the tunnel lining, a series of grouting injections was made to ensure the stability of the tunnel. The lining of the tunnel is made up of more than 163 million bricks and portions were repointed and secured with new grouting to reduce friction in the tunnel and keep groundwater from seeping in. Additionally, a new 10-foot diameter shaft cap was installed at the Aqueduct's terminus in upper Manhattan. Work also included the upgrade of existing connections to the Aqueduct, including shafts and pumps, for the Villages of Briarcliff Manor, Tarrytown, and Sleepy Hollow. The New Croton Aqueduct serves as a backup water supply for these villages, which primarily rely on the Catskill Aqueduct. In addition, the towns of New Castle, Ossining, and Pelham, the villages of Pleasantville, Ossining, Irvington, Ardsley, Bronxville, Dobbs Ferry, Hastings-on-Hudson, Pelham Manor, Pelham, Tuckahoe, and the City of New Rochelle also have connections that allow them to use water provided through the New Croton Aqueduct.

A major component of the project was the connection of the Aqueduct to the Croton Water Filtration Plant in the Bronx. A large concrete plug, 58 feet long and 12 feet wide, was built within the Aqueduct to direct the water through a new tunnel to the filtration plant. Once the water has gone through the filtration process, it travels through a separate tunnel back to the Aqueduct, downstream of the concrete plug, and towards the distribution network. The filtration and mechanical systems within the Croton Plant are currently being tested with water provided through the New Croton Aqueduct.

The completion of the Croton Filtration Plant and the reactivation of the Croton drinking water supply system will play important roles in the future as DEP repairs leaks in the Delaware Aqueduct, which currently supplies more than 50 percent of the city's daily water needs. Last year DEP began building two vertical shafts on opposite sides of the Hudson River in Orange and Ulster Counties. The shafts will be used by workers to build a bypass tunnel around a leaking portion of the Delaware Aqueduct, roughly 600 feet below ground level. Once that bypass tunnel has been built, DEP will temporarily shut down the Delaware Aqueduct in 2021 to make the necessary connections. The Croton system will be critical in ensuring that DEP can continue to meet the city's drinking water needs during the shutdown of the Delaware Aqueduct. It will also help to supplement the city's water supply during future drought conditions.

DEP manages New York City's water supply, providing more than one billion gallons of water each day to more than 9 million residents, including 8.3 million

in New York City, and residents of Ulster, Orange, Putnam, and Westchester counties. This water comes from the Catskill, Delaware, and Croton watersheds that extend more than 125 miles from the City, and the system comprises 19 reservoirs, three controlled lakes, and numerous tunnels and aqueducts. DEP employs nearly 6,000 employees, including almost 1,000 scientists, engineers, surveyors, watershed maintainers and others professionals in the upstate watershed. In addition to its \$68 million payroll and \$157 million in annual taxes paid in upstate counties, DEP has invested more than \$1.5 billion in watershed protection programs—including partnership organizations such as the Catskill Watershed Corporation and the Watershed Agricultural Council—that support sustainable farming practices, environmentally sensitive economic development, and local economic opportunity. In addition, DEP has a robust capital program with over \$14 billion in investments planned over the next 10 years that will create up to 3,000 construction-related jobs per year. For more information, visit www.nyc.gov/dep, like us on Facebook at www.facebook.com/nycwater, or follow us on Twitter at www.twitter.com/nycwater.

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