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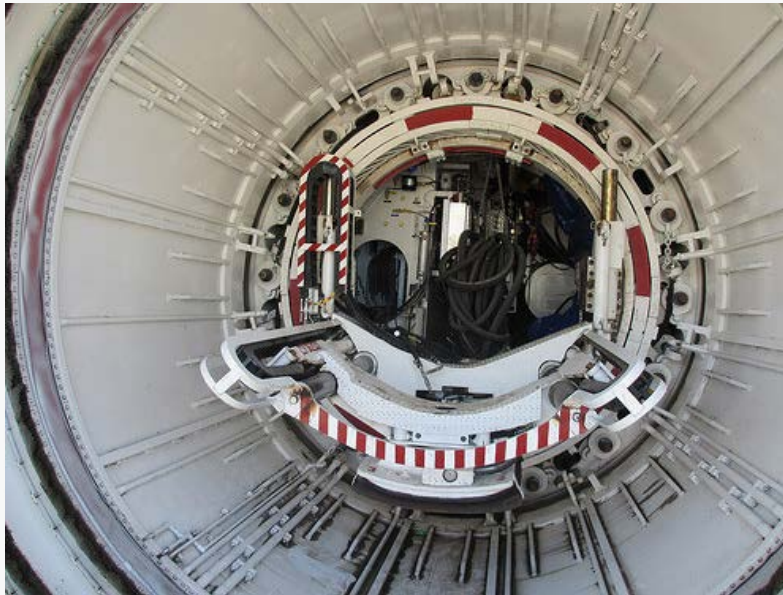
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Tunnel Boring Machine Completes Excavation of \$250 Million Water Tunnel Connecting Brooklyn and Staten Island

New, Deeper Water Tunnel Will Allow for the Final Stages of Dredging of New York Harbor to Accommodate Larger, More Environmentally Friendly Ships

Photos of the Tunnel Boring Machine Being Lifted out of the Tunnel Can be Viewed on DEP's [DEP's Flickr Page](#)

In Addition, a Video from Inside the Tunnel Is Available [Here](#)

The New York City Department of Environmental Protection (DEP) and New York City Economic Development Corporation (EDC) today announced that a tunnel boring machine has completed the excavation of a new, \$250 million water tunnel connecting Brooklyn to Staten Island. The new, deeper tunnel—called a siphon—will convey drinking water under New York Harbor from Brooklyn to Staten Island. Once the new tunnel is activated, two existing, nearly century old water mains that are located at a much shallower depth will be removed and the work to dredge and deepen the Anchorage Channel can be completed. The harbor deepening initiative is critical to accommodating the new generation of larger, more environmentally friendly cargo vessels in New York Harbor and retaining the nearly 300,000 jobs and \$12 billion in annual wages the Port of New York and New Jersey provides to the region. The project is being funded jointly by DEP and the Port Authority of New York and New Jersey, and is being managed by EDC. The tunnel boring machine is currently being

More Information

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removed from the tunnel and it is expected that the tunnel will be activated by the end of the year.

“This new \$250 million tunnel will help to ensure that the residents of Staten Island continue to enjoy a reliable supply of high quality drinking water for decades to come,” said **DEP Commissioner Emily Lloyd**. “I thank our partners at EDC for managing this critical project that will also allow the Port Authority to complete the necessary deepening of New York Harbor.”

All of New York City’s high-quality drinking water is collected in protected reservoirs located up to 125 miles north of the city. From there it travels south through aqueducts to Hillview Reservoir in Yonkers where it enters City Water Tunnels Nos. 1, 2 and 3. These tunnels are located roughly 500 feet beneath street level and travel through the boroughs of the Bronx, Manhattan, Queens and Brooklyn. Two siphons were built approximately 50 feet beneath New York Harbor to connect Staten Island to Brooklyn, and the City’s upstate water supply, in 1917 and 1925 respectively. As Staten Island’s population, and its demand for water grew, in 1970 the 10-foot diameter Richmond Tunnel was built deep in the bedrock beneath New York harbor and became the primary water conduit to the Island. The original siphons have since been kept in service as a back-up connection to ensure a reliable supply of drinking water for the nearly 500,000 residents on Staten Island who consume approximately 50 million gallons of water each day.

The new, 72-inch siphon is being excavated at a depth of 100 feet and will replace the two, nearly century old, existing water connections that run from Bay Ridge in Brooklyn to Stapleton and Tompkinsville on Staten Island. These two connections will ultimately be removed when the harbor dredging continues. The new siphon, which will serve as the back-up water feed for Staten Island, will convey approximately 5 million gallons of water each day. If needed, it has the capacity to carry up to 150 million gallons per day.

Work on the project began in August 2011 and included the construction of access shafts in Brooklyn and Staten Island. A 300 foot-long, 110 ton Tunnel Boring Machine (TBM) was lowered into the Staten Island shaft in July 2012 and had progressed approximately 1,600 feet towards Brooklyn when operations were suspended on the evening of October 28, 2012 in advance of the approaching Hurricane Sandy. The historic storm surge associated with Sandy flooded the Staten Island shaft and the excavated tunnel with sea water and severely damaged the TBM. After the tunnel and shafts were dewatered and damage assessments were completed, months of repairs and testing of the TBM followed. On April 14, 2014, the TBM resumed work and excavation of the tunnel was completed in February 2015.

The tunnel and TBM are only susceptible to flooding from a storm surge during construction, while the shafts are open. During the 18 month shutdown, resiliency measures were put into place that allowed crews to cover the shaft sites and close a flood gate to protect them from a potential storm surge during the final stages of construction. In addition, plans have been redrawn to raise the permanent infrastructure that will remain on the Staten Island side of the project above the new 100-year flood plain.

The Earth Pressure Balance TBM, being used for the first time in New York City as it is made specifically for use in soft ground as opposed to bedrock, excavates and simultaneously installs four foot-wide concrete pre-cast segment rings to line the tunnel wall. Prior to Hurricane Sandy, 389 segment rings had been put in place, and in total the TBM installed 2349 rings. While the TBM was building the tunnel, work crews were constantly building tracks that allow trains to transport workers, equipment, and the excavated material to and from the shaft sites.

In addition to building the tunnel, the project includes the installation of water control equipment and other related infrastructure improvements to connect the new tunnel to the existing water distribution networks in both boroughs, including

6,545 feet of new water mains in Staten Island and 1,710 feet of new water mains in Brooklyn. In Staten Island, the new water mains will run along Van Duzer Street, Victory Boulevard, Front Street and Murray Hulbert Avenue. In Brooklyn, the improvement to the existing water mains will occur near 79th Street and Shore Road and along Shore Road between 83rd and 86th Streets. The project will also include the restoration of street landscaping, tree protection and a new pavement walkway around Shore Road Park.

The Port of New York and New Jersey is the largest on the East Coast, handling nearly 33 percent of the East Coast shipping trade, and is the third-largest port in the country. Recent years have seen record cargo volumes at port facilities and, with future cargo volumes expected to double over the next decade, the Anchorage Channel must be deepened in order to accommodate the new generation of larger cargo vessels and better position the region to benefit from growth in global trade. These larger, next-generation 'post-Panamax' vessels also bring environmental benefits by carrying more cargo in fewer ships with cleaner fuel technology. The New York and New Jersey Harbor Deepening Project is being managed by the U.S. Army Corps of Engineers with the Port Authority acting as the local sponsor and providing half of the funding for the \$2 billion program. The project is expected to be completed in 2015.

As part of the ongoing New York and New Jersey Harbor Deepening Project, the channel is being dredged to approximately 50 feet deep in the seabed to accommodate ships with drafts that exceed 45 feet, the present depth of the Anchorage Channel. Ocean shipping of goods remains the most economical and environmentally friendly way to move cargo around the globe, and the Anchorage Channel is one of the most heavily-used shipping channels in the world with over five thousand ships passing through it every year. With the arrival of larger ships calling on New York area ports in recent years, the Harbor Deepening Project and the Port Authority's raising of the Bayonne Bridge will facilitate the arrival of the new generation of container ships and keep the region's marine terminals competitive.

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