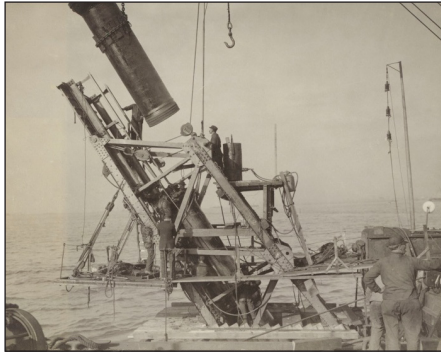


## City Siphoned All its Engineering Talent to Get Water to Staten Island

**W**hen Board of Water Supply engineers began planning how to bring Catskill water into Staten Island for the first time in 1913, they found themselves faced with a unique challenge—how would the water be carried across the Narrows—the entry to New York Harbor—into Staten Island? The biggest problem was that in the early 20th century, this harbor was one of the busiest ports in the world and the Narrows was the primary waiting point for merchant vessels awaiting Coast Guard clearance to dock at the city. As a result of all the ship traffic, there were strict shipping regulations that required any obstructions, like a water tunnel, to be 45-60 feet below low tide. One of the options the Board



considered was a deep-pressure tunnel like the one used to cross the Hudson River. But the complexity and cost involved in building a deep-rock tunnel made this solution unrealistic and engineers would have to come up with an entirely new method for dealing with this design challenge.

(Continued on reverse side)

## Spotlight on Safety

### Heads Up: It's Your Hard Hat, So Check It

Did you know that your hard hat has an expiration date?

Hard hat expiration is based on the American National Standards Institute (ANSI) guidelines for personal protection equipment. ANSI advises referring to the manufacturer's instructions regarding service life guidelines for your particular hard hat.

Manufacturers indicate that replacement of a hard hat is recommended after four to five years of use regardless of its physical appearance. Information on your hard hat's manufacture and expiration date are usually printed inside each hard hat or you can check with your bureau's safety staff.

Employees should use a permanent marker to record the date (inside the hat) they begin to use their head

protection. This date will vary from the date of manufacture but will provide a reminder for replacement.

Be sure to do a regular inspection of your hard hat. Look for damage such as dents, gouges, scrapes, holes or cracks. The suspension inside the shell also needs to be checked for wear, defects and to ensure it is properly seated in the shell. When replacing the suspension, use a product from the same company that manufactured your hard hat. Do not cover your hard hat with stickers as they can obscure a crack or other defect.

Hard hat use and care is covered under Personal Protective Equipment (PPE) training that everyone in DEP who is required to wear a hard hat needs to take.

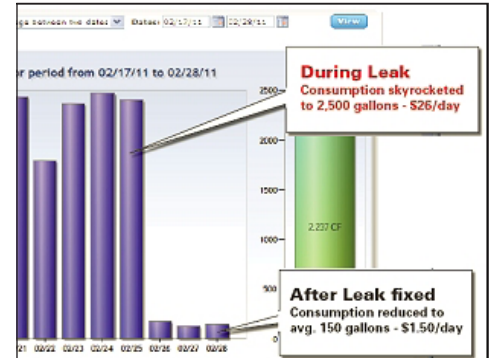
For more information visit [b](#).

## Commissioner's Corner

DEP's customer service has reached a new level of excellence over the last several years due to the remarkable work of the entire Bureau of Customer Services. A lot of this credit is due to our customer service representatives. For example, the time it takes our Call Center, the first point of contact for our 836,000 customers, to answer a customer's call has dropped to 19 seconds so far this calendar year—down from nearly four and a half minutes in 2006. In other areas, our investment in new technology has paved the way for enhanced services. This has mostly been made possible by our \$252 million program to install wireless water meter readers, or AMR, at all of our customers' homes—a project that is more than 94% complete.

Wireless meter readers transmit accurate data to our databases from the existing water meters so that it can be viewed online by DEP and the customer instead of workers having to get access to a meter for a visual reading. This gives customers near real-time information on water usage, which can help them make smart decisions about their water use and detect leaks more quickly. In addition to providing more current and accurate information, the AMR system allowed DEP to create a unique Leak Detection Program that gives us the ability to proactively alert customers when we notice their consumption deviate significantly from their normal use. That gives single-, two- and three-family homeowners an opportunity to quickly address an issue before it becomes a real and costly headache.

Since **Mayor Bloomberg** unveiled the program in February 2011, DEP has sent alert to more than 12,000 customers, and we project that has saved them approximately \$10 million, equating to more than \$800 saved per customer! Now, we are expanding the program to include large residential buildings, meaning that even owners and managers of large rental, co-op and condo properties will have the ability to set a threshold for when they would like



to be alerted to increased water use. But the only way to take advantage of these is to sign up for a My DEP account at [www.nyc.gov/dep](http://www.nyc.gov/dep). More than 152,000 of our customers already have and we are working to get the rest to follow.

We have outlined in great detail the two leaks in the Delaware Aqueduct, and our plans to fix them, in the Weekly Pipeline over the past several months. Our Water for the Future program, our top, new capital priority will repair those leaks by bypassing a leaking section near Roseton and pressure grouting smaller leaks in Wawarsing. Most recently, we discussed our initial analysis of the U.S. Geological Survey's preliminary report on the impact of the tunnel leak on Wawarsing. You can read our statement [here](#).

Earlier today we reached a major milestone in our effort to provide financial assistance to Wawarsing homeowners with water problems—a major step forward for those homeowners who are looking for an immediate solution. This week, we sent a contract to Ulster County for approval by the local legislature. The contract includes \$3.7 million in DEP funding to match State funds that were allocated in 2011 to buy out eligible homeowners. In addition to doubling the funding available, DEP's assistance includes an incentive payment of 10% of the purchase price in return for a release of city liability. Responsibility for administering the program, including the state and the city funding, rests with Ulster County. Resolving this issue has been a major priority for the past two years, and we hope that this puts us one step closer to fully addressing local community concerns about the operation of our water supply infrastructure.

At DEP, everyone is responsible for safety. If you or anyone on your team is concerned about your working conditions, it's okay to ask your supervisor or your bureau's EHS liaison how they can help. If you've still got questions, you can call the EHS Employee Concerns Hotline. It's DEP's responsibility to acknowledge and fix unsafe situations, procedures, and practices. With your help, we'll not only get the job done, we'll make it safer for ourselves, our coworkers, our families, and our city. CALL (800) 897-9677 OR SEND A MESSAGE THROUGH PIPELINE. HELP IS ON THE WAY. [b](#)



a shore gatehouse located beneath Victory Boulevard to Silver Lake, a former resort area that was being transformed into a 56-acre storage reservoir called Silver Lake Reservoir. By 1917 the reservoir was filled with fresh Catskill water that was delivered to Staten Island by the Narrows Siphon.

After conducting various feasibility studies the Board decided on a novel approach—they would use a 36-inch, cast iron submarine pipeline with flexible joints capable of extending all the way from Brooklyn, across the Narrows, to Staten Island. Of the 10,620 total feet of piping that would be necessary—9,709 feet would need to be submerged in water. The first stage of the project was for workers to dig and smooth out 10- to 35-foot deep trenches where the pipe would be laid. This involved using 13-ton dredge buckets to dig the trenches and 20-ton I-beams to smooth out the bottom of the trenches.

With the method for laying the pipe resolved, the next major challenge was deciding what type of piping would be used. It was clear to engineers that all pipe joints would have to be flexible to facilitate installation. After coming up with precise standards for the amount of flexibility the pipe joints required, the Board brought in highly skilled pipe installers capable of adhering to those standards when joining the pipes. As sections of pipe were joined, workers would begin the process of placing the pipes into the excavated trenches. To do this, workers used special cradles and a floating scow that allowed the pipe to be gently lowered into the water and placed into the trenches. At intervals along the pipeline, pressure tests, which involved applying 80 pounds of air pressure to joints, were conducted to make sure there were no leaks caused by faulty joints. Despite the complexity involved in using this unprecedented piping technique, work was completed quickly and by 1915, the majority of the pipeline was laid, and the submarine pipe was connected to the land conduit, and the Narrows Siphon was put into service.

At the same time that the Narrows Siphon was being constructed, work had also started on the construction of the Richmond Conduit, a 48-inch cast iron conduit that would carry the Catskill water from

However, despite the successful installation of the first Narrows Siphon and the Silver Lake Reservoir, water consumption on Staten Island was increasing beyond the available supply. By 1923 the Board decided it would be necessary to expand the delivery system and install a second submarine pipeline known as Narrows Siphon 2. The design of the pipeline would be similar to that used for the first Narrows Siphon, except that this time they would be laying flexible jointed, cast-iron submarine pipes. Using the same method that was perfected during the installation of the first Narrows Siphon, trenches were dug and pipe was laid, this time with the help of two floating scows that were named “Collegian” and “Champion.” At least twice a day during the installation process, a diver was sent down to examine the pipes and to caulk any leaks that were found with air-pressure tests. By 1925, the submarine pipeline and the shore connections were completed, and Siphon 2 was put into service. Together with the first Narrows Siphon, Silver Lake Reservoir was now receiving about 32 million gallons of Catskill water a day.

Additional challenges would be presented to engineers whenever repairs to the Siphons would be needed over the 40 plus years that they were in service. For example, in 1922 emergency repairs were needed to fix an 18-inch wide hole that was discovered in a section of submerged pipe located at the foot of Arrietta Street in Staten Island. In a letter to Mayor John Hylan describing the break and the subsequent repairs, Commissioner Nicholas Hayes from the Department of Water Supply, Gas and Electricity, explains that in order to remove the damaged pipe—a diver working underwater had to operate an electric torch to burn the metal away “without any hood or other protecting device to keep the water away from the torch.” Although the repair was successful, Commissioner Hayes goes on to say that the break was “the most difficult



Small equipment used in the field in all five boroughs gets quite a workout—often in use for the better part of 24 hours at a time—as BWSO repairs main breaks, service line leaks and countless other pieces of critical NYC infrastructure. And when the tools of the trade, such as jackhammers, air saws and pumps, tire out for one reason or another, they get a makeover at the Pike Street Repair Facility in Manhattan.

With such use and the demands of the day, ensuring that employees in the field who perform our critical, core functions have reliable tools available at the ready is just one step in helping DEP continue providing high levels of service in an efficient manner.

Ideas generated through the OpX program to maximize our use of equipment, directly from DEP’s senior team at BWSO and employees in the field like **Joe Ciancotta** and **Edwin Tardy** will help to make us more efficient.

That was the goal of a recent OpX field visit; to dig more deeply into understanding why equipment comes in for repair, examine the frequency and recurrence of problems, and look for solutions to keeping these important tools in service longer.

Identified solutions range from simple to complex, including the fostering of a greater sense of accountability for the equipment, more closely examining equipment in the field before sending it in for what may turn out to be a simple fix or routine maintenance, and boosting training on equipment to ensure crews in the field are using items in the manner intended.

It is no more than common sense that keeping tools in service longer will result in decreased maintenance costs, increased productivity, and ultimately improved service for our customers. The next step for these ideas is to develop the right structure to ensure breakdowns are kept to a minimum. This may include Standard Operating Procedures, training, and management protocols that track and report on equipment failures.

repair job that the Department had ever undertaken.”

Later, in 1938, when a section of Narrows Siphon 2 would sustain similar damage, engineers were able to make the actual repairs without having to work underwater. Because there were now two siphons, it was possible to shut down the damaged one while the first siphon continued to supply water to the borough. As a result, workers were able to excavate the damaged section of pipe, remove it by burning it off with an oxy-hydrogen torch, and then replace it with a brand new section of pipe. The entire repair process was so extraordinary that it was featured in a February 15, 1939 issue of Water Works Engineering.

By 1968, the completion of the Richmond Tunnel, a five-mile long pressure tunnel that connected Staten Island to City Water Tunnel No. 2 in Brooklyn, increased delivery capacity to 300 million gallons of water

a day and rendered both Narrows Siphons obsolete. However, both siphons are currently active in a stand-by mode and serve as a backup to the Richmond Tunnel. Today, however, plans are underway to replace the two siphons as the backup water supply for Staten Island, as DEP works with the Port Authority, the Army Corps of Engineers and the Economic Development Corporation to dredge that area of the harbor. Meanwhile the Silver Lake Reservoir would continue to serve Staten Island until 1970 when it too was replaced because of the ongoing water loss caused by ground seepage in the reservoir. The reservoir replacement came in the form of two of the world’s largest, underground water-storage tanks, capable of holding 100 million gallons of water. Subsequently, the Silver Lake Reservoir, although not used as a potable water supply source, is still an active part of the water distribution system and remains a DEP asset.

**DEP Blood Drive:** Lefrak, 3rd Floor Cafeteria; high-rise building: 3/13-3/15, 7:45 am to 1:30 pm; Sutton Park, 2nd Floor: 3/1, 8:30 am to 2:15 pm; Downsville Fire Dept.: 3/7, 9:00 am to 2:00 pm; Kingston, 51 Albany Avenue: 3/5 and 3/12, 1:00 pm to 5:30 pm; Grahamsville Parking Lot: 3/14-3/15, 10:00 am to 3:00 pm. Please click here [to see the email from the Commissioner](#), and here [to see the list of blood captains](#).

**We welcome your feedback! To submit an announcement or suggestion, please email us at: [newsletter@dep.nyc.gov](mailto:newsletter@dep.nyc.gov)**