

## Special Guest *Commissioner's Corner*



**Paul Rush**  
Deputy Commissioner  
Water Supply

Many of my colleagues across DEP feel a deep sense of pride in our mission to operate, maintain and protect a water supply system that is considered a marvel of modern engineering.

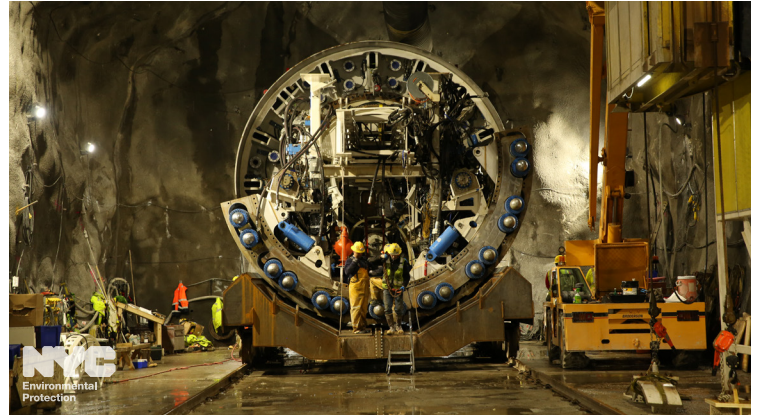
Since this is National Engineers Week, it seemed appropriate to reflect on some of the engineering that makes our system special and some of the engineers who conjured up the aqueducts, dams and other infrastructure that allow us to capture and convey water over such great distances.

During the 177-year history of our water supply, New York City has openly celebrated the landmark feats of engineering that went

into the design and construction of the system. You might even say that we have bragged about it from time to time. Some of my favorite quotes come from the “sod-turning” ceremony in 1907 to mark the start of construction on the Catskill Aqueduct. At the ceremony near Peekskill, N.Y., City officials said they hired the greatest engineers that money could buy, and they predicted the great Ashokan Reservoir and Catskill Aqueduct would allow “American engineers to laugh to scorn” at the great works of Rome, Egypt and Babylon.

Boasts aside, our system was overseen by some of the greatest engineers in American history.

**John B. Jervis**—celebrated for his engineering of railroads and canals—oversaw the design and construction of the original Croton



Water Supply in the 1800s, at a time when many thought the City’s grand water project was foolhardy. In the end, Jervis’ skill as an engineer helped save the City and turned New York into the Empire State.

**J. Waldo Smith** was the supervising engineer on New Croton Dam, which was the largest dam in the world when it was completed in 1905. He then oversaw construction of the entire Catskill Water Supply System. As the City’s first reservoirs and aqueducts were built in the Catskills, Smith wrote detailed maintenance instructions that many of our engineers continue to follow today.

We cannot forget about **Nora Stanton Blatch Deforest Barney**, the first woman in American history to graduate with a college degree in civil engineering. Her second job out of college was drafting the dams and intake structures at Ashokan Reservoir. The tunnel boring machine we are using today to fix leaks in the Delaware Aqueduct is named in her honor.

The accomplishments of these engineers and others yielded what many believe to be the greatest water system in the world. But why is it a marvel? Even now, it is hard for almost anyone to imagine building dams large enough to gather huge

quantities of water, and aqueducts big enough to convey that water over 120 miles from mountains to the largest metropolitan area in the United States.

Perhaps the hallmark of the system is that it does this all by gravity alone. That was the marvelous part. And it’s also the part that took a lot of engineering.

When Jervis oversaw construction of the original Croton Aqueduct, he needed to be sure it dropped a steady 13.25 inches per mile to maintain flow by gravity alone. The City also built a huge arch bridge over the Sing Sing Kill in Westchester County and the celebrated High Bridge over the Harlem River to maintain the hydraulic grade line.

For the Catskill System, workers gathered more than 3,000 miles of linear surveys to ensure infrastructure was built properly and that gravity could push water through the new 92-mile aqueduct.

The last chapter of engineering on our water supply system it not yet written. It probably never will be. Aging infrastructure must be updated to modern standards. Climate change will challenge us to engineer for stronger storms and deeper droughts.

Engineers will contribute to all this work now and in the future. Our hope is that we can have the skill and forethought of those who came before us.

## Spotlight on Safety

### Respiratory Protection—What Employees Should Know

Depending on their job, certain DEP employees can be exposed to the risk of adverse health effects caused by breathing in contaminants in the air. Wearing appropriate respirators, along with an effective respiratory protection program, can prevent such exposures. Respirators must be approved by the National Institute of Occupational Safety and Health (NIOSH) and depending on the type of respirator, employees must be medically evaluated. Commonly used respirators are:

- Particulate Respirators: protect against particulate such as dust, fumes and mists.

- Chemical Cartridge/Gas Mask Respirators: filter chemical gases out of the air.
- Powered Air-Purifying Respirators (PAPRs): use a fan to draw air through the filter to the user.
- Self-Contained Breathing Apparatus (SCBA): use their own air tank to supply clean air and protect against higher concentrations of dangerous chemicals.

For more information, check out [OSHA’s respiratory protection FAQs](#) and [DEP’s Respiratory Protection Policy](#).

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. HELP IS ON THE WAY.

## Focus on the Field



**Natalia Perez** is a member of DEP's talented engineering staff and currently serves as a project manager for the Bureau of Engineering Design and Construction's Capital Program. For Perez, engineering runs in the family. Her father is a systems engineer and instilled in her a love of problem solving. A native of Colombia, Perez received an undergraduate degree in Civil Engineering from the University of Florida and a graduate degree in Civil and Environmental Engineering from the University of California at Berkeley. As she continued on with her studies, she grew very interested in the inner workings of cities, particularly those related with water infrastructure, because, as she says, these mostly underground engineering feats often go unnoticed.

"I started to become very aware of all the components of a city, like its roadways, catch basins and sewers," she said. "It's the stuff people usually take for granted."

Perez joined DEP in 2012 following an internship with the New York State Department of Environmental Conservation where she worked on a wastewater treatment plant in NYC's watershed and gained invaluable insight into a regulating agency. As a former in-house designer for BEDC and now as a

project manager, she is putting that experience to use, as she regularly interacts with regulatory agencies, attends countless public meetings, coordinates with DEP's legal department, and works closely with the communities her projects will impact.

Currently, Perez is working on delivering the design for two large combined sewer overflow (CSO) storage tanks along the banks of the Gowanus Canal, aimed at capturing millions of gallons of CSOs that would otherwise enter the canal. The project is an enormous undertaking, one where drainage plans, community concerns, public open space, ULURP requirements, and project alternatives all must be carefully taken into consideration. Throughout the project, her work has led her to coordination efforts with a number of stakeholders including, DEP's Bureau of Wastewater Treatment, National Grid, NYC Department of Transportation, Department of City Planning, and NYC Parks.

"This project has really given me a better sense of the program, of BEDC as a whole. I've learned about all the different groups within BEDC like the scheduling group, the cost estimating group and the Sustainability group, who all have to come together to see a project through to completion," she said.

## Q&A with Commissioner Sapienza



### What drew you to begin your engineering career at DEP?

Within weeks of joining the department, I recognized that DEP offered its engineers a broad opportunity to work on extraordinary infrastructure that provided a critical public service. And given DEP's immense portfolio, I could potentially get assigned a wide variety of different work, including planning, operations, design, regulatory compliance, and construction management. I also found the engineers at DEP to be very collegial and willing to share their lessons learned. So I've truly enjoyed almost 36 years here.

### How has the industry changed since you joined DEP in 1983?

When I started, there were no desktop computers, paper spreadsheets were tabulated on adding machines, drafting tables were used for hand design, and we had large rooms full of file cabinets to store and retrieve documents. Today's technology certainly makes us much more efficient. But we also have to contend with many more regulations, and our customers are much more engaged and have higher expectations for service. Designing for safety and serviceability is now standard practice. In 1983, few people had heard of global warming, but obviously today we make significant efforts to minimize carbon emissions.

### How has New York City shaped the engineering of wastewater treatment facilities?

New York City engineers have always been leaders in wastewater treatment technology—even dating back to the 1930s. Many of the biological treatment innovations used today were invented by city engineers. In recent years, because of our high density and limited physical space, we've had to get creative about solutions, like with the nitrogen reduction initiatives.

[Click here](#) to read more on Medium.

## Out of the Archives



This photo was taken on March 7, 1931 and shows Board of Water Supply engineers and a geologist on the upper landing over a shaft of City Water Tunnel No. 2 near Hillview Reservoir, now under the purview of the Bureau of Water and Sewer Operations. It is believed the engineers were inspecting construction progress and rock conditions at the point of contact between Yonkers gneiss and Fordham gneiss in the tunnel, 800 feet below. Left to right: Engineering inspectors **John C. Beam** and **George J. Gerrety**, engineering assistant **Philip Austin**, contractor's timekeeper **J.R. Crowley**, and assistant geologist **Horace R. Blank**.



This month, DEP is celebrating our value of service. If you know someone who embodies this value, please send an email by February 19<sup>th</sup> to [values@dep.nyc.gov](mailto:values@dep.nyc.gov), and include the name of who you are nominating, their bureau, and a brief description of how they embody this value.

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