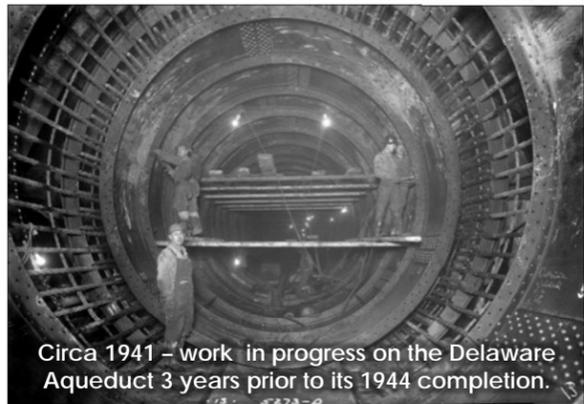




# The Mulvaney Pipeline

**\$1.5 BILLION TO FIX A PIPE LEAK? YOU BET!**



Circa 1941 – work in progress on the Delaware Aqueduct 3 years prior to its 1944 completion.

**The Delaware water supply system** originates more than 120 miles north of New York City and comprises four reservoirs: Cannonsville, Neversink, Pepacton and Rondout. The 85-mile long Delaware Aqueduct conveys drinking water from these reservoirs to the City's distribution system, which originates at Hillview Reservoir in Yonkers. On average, the Delaware Aqueduct provides more than half of the approximately 1 billion gallons of clean drinking water required to meet the City's demands every day. The aqueduct, the world's longest continuous tunnel, was constructed between 1939 and 1944 and crosses Ulster, Orange, Dutchess, Putnam and Westchester counties. The aqueduct runs as deep as 1,500 feet below ground, varies in diameter from 13.5 to 19.5 feet, and was constructed by drilling and blasting.

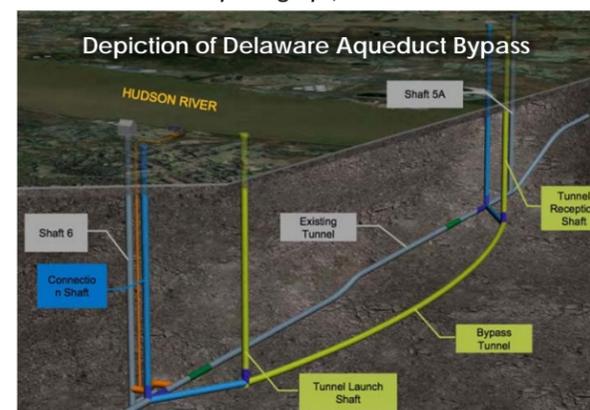
In most areas, the Delaware Aqueduct is lined only with reinforced concrete. However, two sections of the tunnel that run through limestone formations were lined with steel because limestone is more likely to cause wear and tear on the lining of the aqueduct. The ongoing investigation of the structural integrity of the aqueduct has found that small cracks formed where this steel lining ended.

DEP has monitored the two portions of the aqueduct with leaks – one in the Orange County town of Newburgh, and the other in the Ulster County town of Wawarsing – since the 1990s. The leaks release 15 to 35 million gallons of water a day, depending on the amount of water the aqueduct is carrying. DEP has continuously tested and monitored the leaks by using dye, backflow and

hydrostatic tests, and hourly flow monitors provide near real-time data on the location and volume of the leaks. In 2003 and 2009, DEP used an Autonomous Underwater Vehicle (AUV) – a cutting-edge, self-propelled submarine-shaped vehicle built in partnership with engineers at Woods Hole Oceanographic Institution in Massachusetts – to conduct a detailed survey of the entire 45-mile length of tunnel between Rondout Reservoir and West Branch Reservoir. The AUV took 360-degree photographs while gathering sonar, velocity, and pressure data to assist in determining the location, size and characteristics of the leaks. The AUV is scheduled to launch again this year to update that data. All the data gathered thus far clearly show that the rate of water leaking from the tunnel has remained constant and the cracks have not worsened since DEP began monitoring them in 1992.

The New York City Department of Environmental Protection is collaborating with Syracuse University and environmental engineers to search for innovative ways to fix leaks in its aqueduct system. This collaboration came up with many ways to fix these massive leaks but none were fast, easy or cheap. In 2010, the City announced a plan to address the leaks by building a bypass tunnel around the portion of the aqueduct in Newburgh with significant leaks, and also grouting closed the smaller leaks in Wawarsing. Site work for this complex project began in January 2013 and construction is expected to continue through the year 2021.

The project will begin with the excavation of two vertical shafts that will provide access for construction workers to dig the bypass tunnel. The shafts in Newburgh, on the west side of the Hudson River, and the Dutchess County town of Wappinger, on the east side



of the river, will be 900 and 700 feet deep respectively and will measure roughly 30 feet in diameter. Blasting for the shaft in Newburgh began in October, and work on the Wappinger shaft is expected to start by the end of November. Both shafts are expected to be complete by 2016. An underground chamber at the bottom of the Newburgh shaft will serve as the staging area for a tunnel boring machine, which will drill the 22-foot-diameter bypass tunnel, progressing at roughly 50 feet a day. The tunnel will be roughly 14.5 feet in diameter once it is lined with concrete and steel and will stretch 2.5 miles – including beneath the entire width of the Hudson River. The existing Delaware Aqueduct will stay in service while the bypass tunnel is under construction. Once the bypass tunnel is nearly complete and water supply augmentation and conservation measures are in place, the existing tunnel will be taken out of service and excavation will begin to connect the bypass tunnel to structurally sound portions of the existing aqueduct. This work is anticipated to happen late in the year 2021. Engineers expect it will take roughly eight to 10 months to connect the bypass tunnel. While the Delaware Aqueduct is shut down, work crews will also fix cracks at three segments in Wawarsing, roughly 35 miles northwest of the bypass tunnel. These segments, totaling roughly 500 feet, will be sealed by injecting grout into them. This project when completed, will be an engineering wonder that preserves our precious water supplies for generations to come.



Work begins a 30FT Diameter Access Shaft

## Sustainable Infrastructure: A National Priority

Defining sustainability is becoming an expected exercise at sustainability conferences. Every conference on infrastructure, engineering, planning, construction, and public administration is a conference about sustainability. This is not just because technocrats have dreamed up a "concept of the day," but because our society is challenged, if not threatened, by human and natural forces that have dire consequences if left unaddressed.

Population growth, scarce or diminishing resources, uneven population and resource distribution, global warming, and climate change are all a part of the conversation. Despite the debate about the causation and impact of each of these externalities on the way we live, there are some certainties upon which we can agree. The fragility of our natural world, our dependence on it for our quality of life, the inexorable fact that, until the industrial revolution, the presence of our species on this planet did not matter much, all come into play.

That humankind now matters and matters a lot is a given. Less well understood is that the more we have mattered over time, the greater the threat we have posed on that natural world upon which we are so dependent. That is why sustainability is a topic of public policy debate today. In a world of plenty, where resources are unlimited and there is capacity to absorb and support unlimited growth and development, there is little need and less incentive to preserve and to plan for a lesser day. We do not live in such a world. Sustainability today is not only a desirable outcome, but also essential to everything that matters.

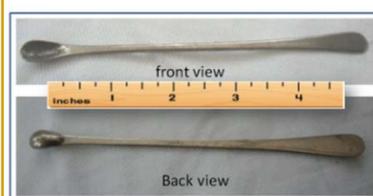
Our civil infrastructure, in particular, is a lynchpin of our communities — both local and national. It provides for almost everything that matters, including our personal security, public health, and quality of life as reflected in all of those measures of well-being that create dignity in human existence. However, that same infrastructure increasingly is resource-intensive and intrusive on the environment.

This conflict between what we need and what we want is best reflected in the concept of the triple bottom line, with its emphasis on balancing the social, economic, and environmental concerns associated with infrastructure development in a way that provides balance and perspective.

The Brundtland Commission got it right in 1987: Sustainability is not just about the longevity of our infrastructure; it is about the wisdom of our thinking when we make decisions about that infrastructure as we plan, design, construct, operate, and maintain it. Sustainability is about holding open options, or not precluding them, for generations that will fill our shoes 50 years from now. In this sense, assessments about the success of our sustainability efforts will be a judgment of history — and the jury will be our children.

### Little Known facts and Trivia

- The ancient Egyptians kept excellent records of Nile River floods. Scientists still use their data.
- Buick introduced the first electric turn signals in 1938.
- Since the beginning of recorded history, about 550 different volcanoes have erupted on the surface of the Earth--but a lot more than that have erupted on the ocean floor.
- Women under 30 are 33% less likely to get a traffic ticket than men under 30.
- In 1899, inventor Nicola Tesla made an artificial lightning bolt 130 ft. long, still a world record.
- The average American will drink 9,000 cups of coffee in a lifetime.
- Americans consume more than 140 pounds of cane sugar, corn syrup, and other natural sugars per year--50% more than the Germans and French, and 9 times more than the Chinese.
- Under San Francisco's fast-food laws, meals with a free toy cannot contain over 600 calories.
- By the early 1990s the fatality rate for passengers of U.S. airlines was less than one third the rate suffered in the 1950s and 1960s.
- At 15, McDonald's tycoon Ray Kroc lied about his age to become an ambulance driver in WWI.
- About 26,000 meteorites strike earth every year, but only 7 people are known to been hit by one.



**WHAT THE HECK IS IT?**  
If you can name the item pictured, you may  
**WIN A MULVANEY MECHANICAL LEATHER JACKET**

If you e-mail your entry, you must write "NEWSLETTER CONTEST" in the subject line to avoid our SPAM filter. Please mail to [janette@mulvaneyinc.com](mailto:janette@mulvaneyinc.com)

If multiple correct answers are received, a winner will be selected at random.

**\*JUST LIKE THIS ONE!**



This item is an early type of a lightning rod terminal fitting. It was designed to attract lightning and discharge it safely to the ground through a network of heavy copper conductors.

- We received 8 correct answers
- Jeff Farnham, CBR Consulting
  - Michael Conklin, City of Stamford
  - Erik Zimmitti, Southport Engineering Assoc.
  - Joseph Carroll, DTZ, a UGL Company
  - L. Tyler Long, Long Consulting
  - M. Jeffers Ryer, Ryer Associates
  - Mark Lawrence, Town of Wilton
  - Tim Long, Long Consulting

A final winner will be selected at random from the above submissions.

## WHAT'S GOIN' ON?

Jun 22 <sup>nd</sup> -24 <sup>th</sup>	BOMA Building Conference & Expo	Orlando, FL
Jun 26 - 28 <sup>th</sup>	AIA conference	Chicago, IL
Jun 28 <sup>th</sup> -Jul 2 <sup>nd</sup>	ASHRAE Annual Conference & EXPO	Seattle, WA
Jul 15 - 19 <sup>th</sup>	Fire House Expo	Baltimore, MD
Aug 14 <sup>th</sup> - 16 <sup>th</sup>	Nursery and Landscape Conf.	San Antonio, TX
Sep 8 <sup>th</sup> - 11 <sup>th</sup>	Nat Assoc. of Elevator Contractors	San Antonio, TX
Sep 17 <sup>th</sup> -19 <sup>th</sup>	IFMA Annual Conference and Expo	New Orleans, LA

"If the facts don't fit the theory, change the facts". Albert Einstein

"People who think they know everything are a great annoyance to those of us who do". Isaac Asimov



**MECHANICAL CONTRACTORS**

4 Christopher Columbus Avenue  
Danbury, Connecticut 06810  
203-797-8005 – 845-278-8813  
FAX 203-794-1786

E-mail [mulvaney@mulvaneyinc.com](mailto:mulvaney@mulvaneyinc.com)