

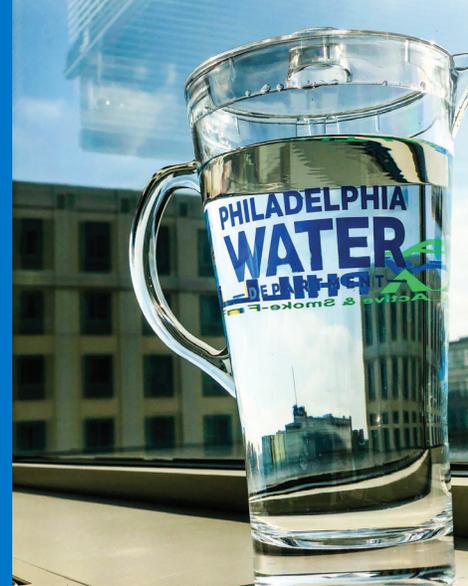
Drinking Water

Master Plan Overview

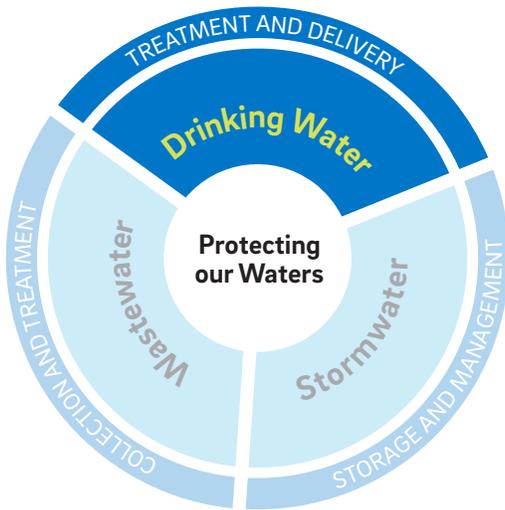
March 2019

Building reliable infrastructure for today.
Investing for a resilient tomorrow.

PHILADELPHIA
WATER
DEPARTMENT



This plan addresses the drinking water component of our core services



The Drinking Water Master Plan is a comprehensive 25-year strategy for upgrading key facilities. It ensures **resilient, robust and dependable** infrastructure and continues our long tradition of future planning.



Increases Service Level



Decreases Risks



Focuses PWD drinking water facility capital spending

Philadelphia's History of Delivering Safe Drinking Water to Residents: the First in the Nation

<p>1682</p>  <p>Philadelphia founded</p>	<p>1793-98</p> <p>Yellow fever kills residents</p>	<p>1799-1822</p>  <p>Watering committee formed and Waterworks opened and expanded</p>	<p>1840s</p> <p>City buys land upstream along Schuylkill River to protect water source</p>
<p>1860-1909</p> <p>Population doubles; Typhoid kills 27,000</p>	<p>1900-12</p>  <p>Philadelphia builds five slow sand filtration plants</p>	<p>1914</p>  <p>Chlorination of water supply: Typhoid / Cholera eradicated</p>	<p>1957</p>  <p>New rapid sand filters and pump stations constructed</p>
<p>1996</p> <p>Joined Partnership for Safe Water demonstrating optimized treatment process</p>	<p>2018</p> <p>PWD develops a forward looking, 25-year Drinking Water Master Plan that provides a clear path to deliver safe, clean, affordable drinking water into the future.</p>		

Starting at the turn of the 19th century, Philadelphia was the first city in the country to make delivery of water a municipal responsibility. Since then, the City has focused on delivering safe, reliable, high-quality drinking water to its residents in the most affordable manner possible.

In the 1950s and 1960s, the City invested significantly in its drinking water system. The City has maintained these facilities over the last 70 years, but some of the facilities are reaching the end of their useful life.

The time is now to invest in upgrading these facilities.

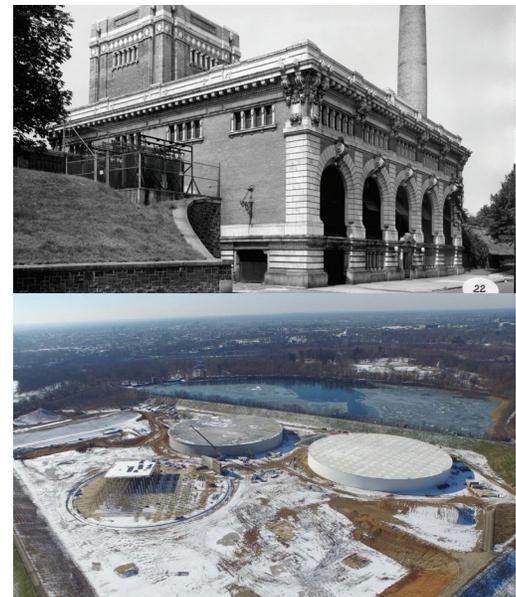
Upgrades Needed to Continue Providing Clean Water Into the Future

The City is facing a challenge similar to other large cities across the country: the need to update its aging infrastructure.

Our facilities are showing their age and require significant investments to maintain a sufficient, safe supply of water to Philadelphia. These investments will come with an ever-increasing price tag. Without spending in the near term, PWD will likely experience more on the spot repairs, which can be costly and have a negative impact on city residents.

The City is taking proactive steps to meet federal water quality regulations now and in the future. We also need to improve our drinking water system's resiliency to provide a reliable supply to city residents for any range of possible events, such as contamination or natural disasters.

By strategically aligning several projects, on a 25-year timeline, we extend capital spending over decades, and will keep water rates affordable for our residents.



An original Pumping Station (top) highlights our history of providing clean drinking water to the City of Philadelphia. It will be preserved as part of larger work planned at the nearby Water Treatment Plant. Current construction projects (lower) focus on replacing aging facilities to better serve our customers.

PWD's drinking water quality consistently performs better than the drinking water standards developed by the EPA to maintain public health. Our commitment is to maintain the same level of quality in the future while also keeping rates affordable.

Master Planning Guidance

Six goals and criteria were established by a steering committee, comprised of members from across PWD.

Service Goals

Water quality

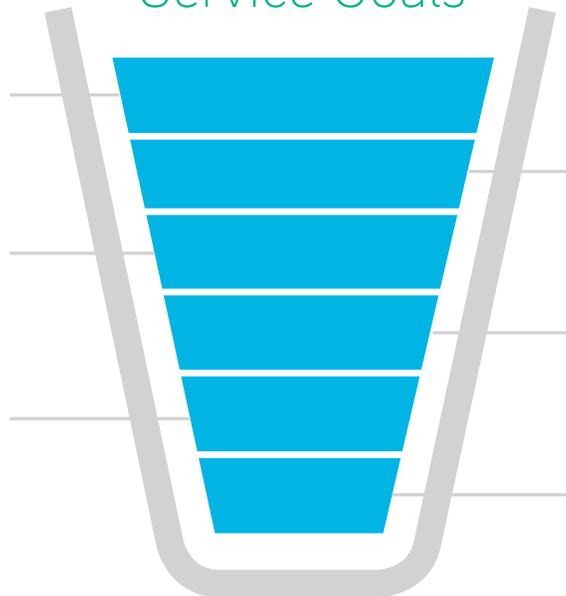
Achieve present and future regulatory requirements

Operability

Provide the appropriate system redundancy for a wide range of emergency conditions

Capital availability

Manage financial resources to make necessary investments in the water system while keeping rates affordable



Water quantity

Provide long-term water supply to the service area

Service pressure

Provide adequate water pressure for system operation

Public perception

Seek public engagement to meet service goals

These criteria were used to evaluate each solution and helped us identify potential risks.

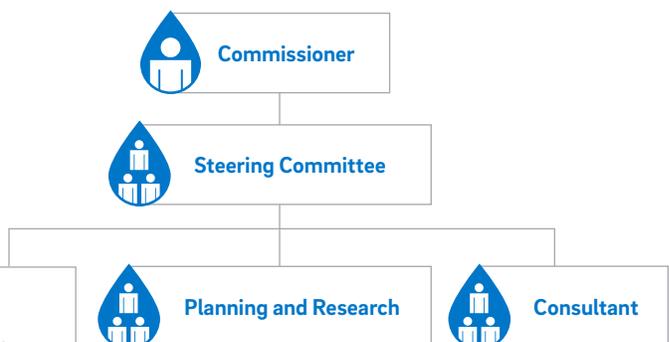
The collaborative committee brought together hands-on experience operating PWD facilities and lessons learned working with similar utilities across the nation.

Project Team Engagement



Core Review Committee

Source Water Protection Bureau of Laboratory Services
 Water Treatment Engineering Design
 Water Conveyance Construction
 Engineering Planning



Our Planning Process

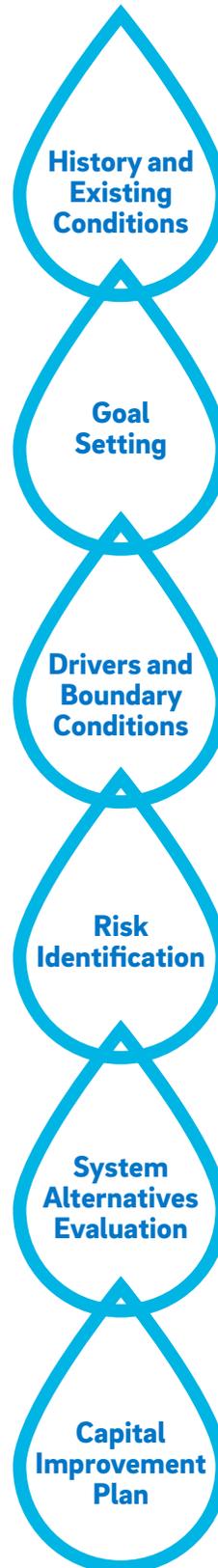
The project team followed a comprehensive planning process to develop the final recommendations in the Drinking Water Master Plan.

The first step in the planning process was establishing the historical context of the water system and existing system characteristics. At the same time, the Steering Committee established the service goals for the 25-year planning horizon. This was followed by a detailed condition assessment of the existing water supply facilities to document the current condition of these assets and identify repair, replacement, or improvement needs.

The planning team also studied other planning drivers including water demand projections, regulatory requirements, and environmental factors. Based on the service goals, the team developed a detailed risk assessment for each of the service goals, determining the likelihood and consequence of each risk occurring. This analysis guided the identification of the highest risks for the Drinking Water Master Plan.

The team developed and evaluated a wide range of alternatives to determine their effectiveness in addressing the identified risks. These alternatives addressed risks at water treatment plants, water pumping stations, water storage facilities, and large water transmission mains. Each alternative was evaluated based on performance and estimated construction costs. This enabled the Steering Committee to review the alternatives and select the alternative that reduced the risks to the service goals in the most cost-effective manner.

The selected alternative was a group of projects that collectively reduced or removed the identified risks. The Steering Committee recommended these projects for financial and constructibility analysis. These recommended projects were assembled into a feasible construction schedule based on the projects' dependencies and sequencing. This schedule determined the capital requirements for each year of the 25-year planning horizon, which were balanced with the need to keep rates affordable. The plan is a living document that will continue to be updated throughout the 25-year implementation period to address any changes that arise.



- Reviewed relevant department history
- Established existing system characteristics

- Set service goals through series of workshops
- Confirmed service goals with Steering Committee

- Conducted asset condition evaluations
- Projected current and future water demands
- Reviewed current and future water quality regulations
- Identified source water availability and quality
- Considered extreme weather and climate change impacts

- Identified risks to meet service goals
- Quantified severity of these risks

- Developed numerous water system improvement alternatives for the water treatment plants, pump stations, storage facilities, and large transmission mains
- Evaluated alternatives to determine best solutions

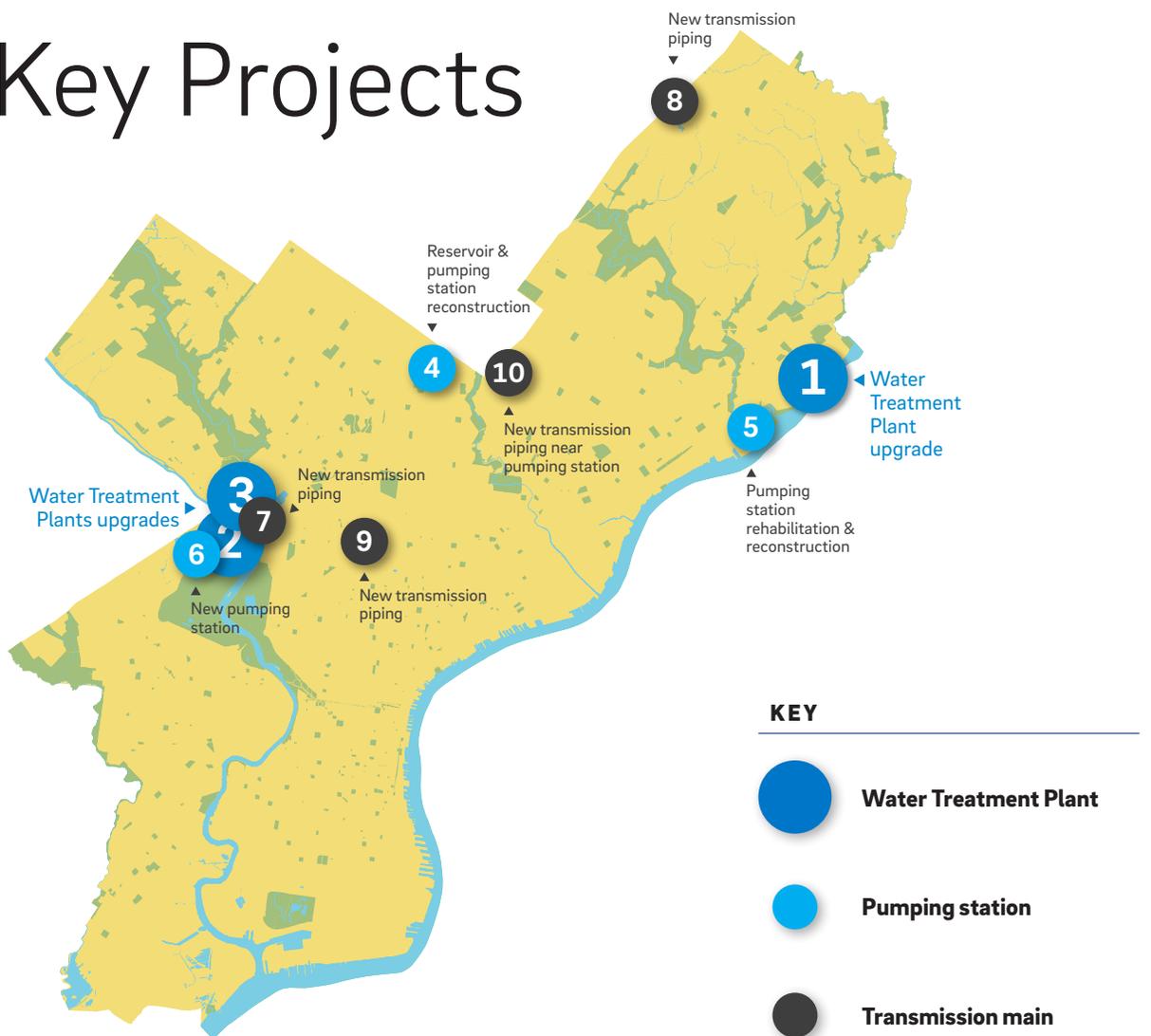
- Conducted financial evaluation of improvement projects, and their sequencing
- Incorporated projects into the capital improvement plan

The Drinking Water Master Plan identified approximately 400 projects focused on the rehabilitation of some existing facilities and construction of several new facilities.

The combined estimate of these projects, to be completed over the next 25 years, is \$2.5 billion, half of which is already currently budgeted. The 10 key projects are highlighted in the graphic below and to the right.

400 individual projects **\$2.5B** combined estimate **10** key projects

10 Key Projects



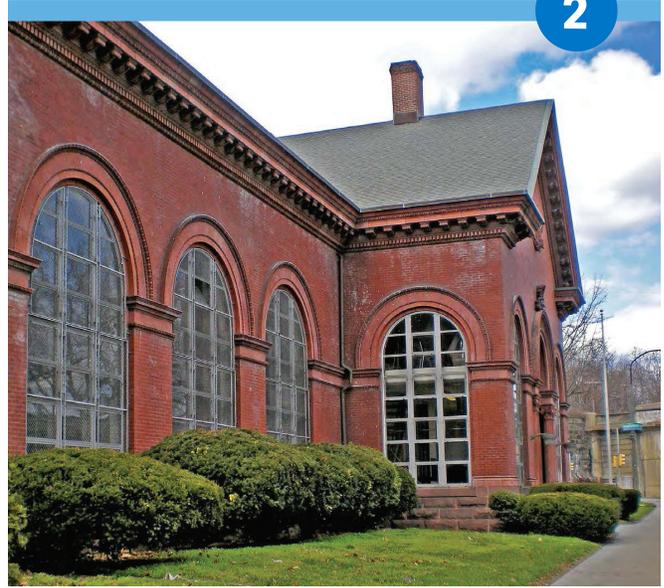
1



Water Treatment Plant

- Key component: ultraviolet (UV) treatment addition
- Benefit: long-term regulatory compliance and drinking water quality

2



Water Treatment Plant

- Key component: additional treatment capacity and UV treatment addition
- Benefit: long-term regulatory compliance, drinking water quality, and supply redundancy

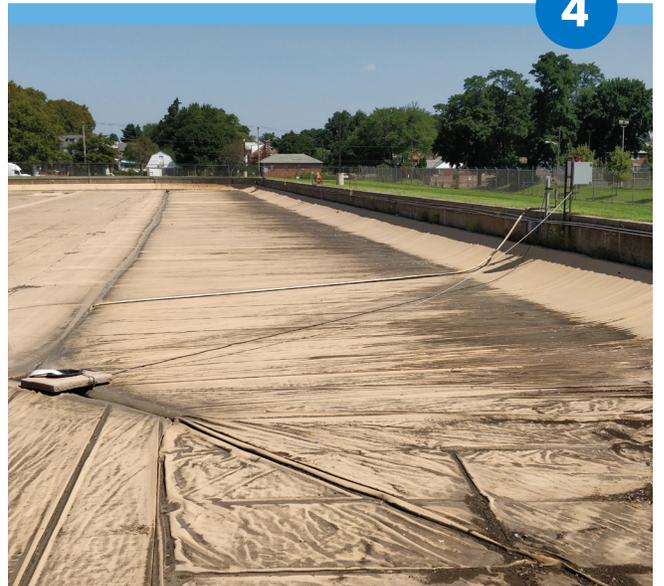
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Water Treatment Plant

- Key component: reconstruction of entire plant with additional treatment capacity and UV treatment
- Benefit: increased reliability and modularity and supply redundancy

4



Reservoir & Pumping Station

- Key component: reservoir & pumping station reconstruction, transmission piping and automated valve
- Benefit: drinking water quality and increased reliability

The 25-year implementation schedule was developed to consistently provide quality drinking water to residents throughout program implementation.

The sequencing is critical because the projects work together to maintain this reliable service. This implementation timeline also provides a clear road map of the timing of the projects for stakeholders across the city. These projects will provide comprehensive water supply benefits to the city.

Funding the Program

The implementation of the Drinking Water Master Plan has been scheduled to maintain the affordability of safe, clean drinking water for all Philadelphia residents—now and into the future.

This implementation plan was carefully developed based on the capital requirements for each large project and the impact on customer rates.

To maintain affordability for all residents of Philadelphia, PWD's Tiered Assistance Program (TAP) will continue along with affordable rate increases. The rate increases will be consistent with water rates in Philadelphia's peer cities and will reduce the likelihood of sudden rate increases that could arise from future emergency infrastructure repairs.

The funding for the Drinking Water Master Plan implementation has also been coordinated with PWD's other infrastructure requirements for wastewater and stormwater improvements to avoid significant capital needs from occurring at the same time.



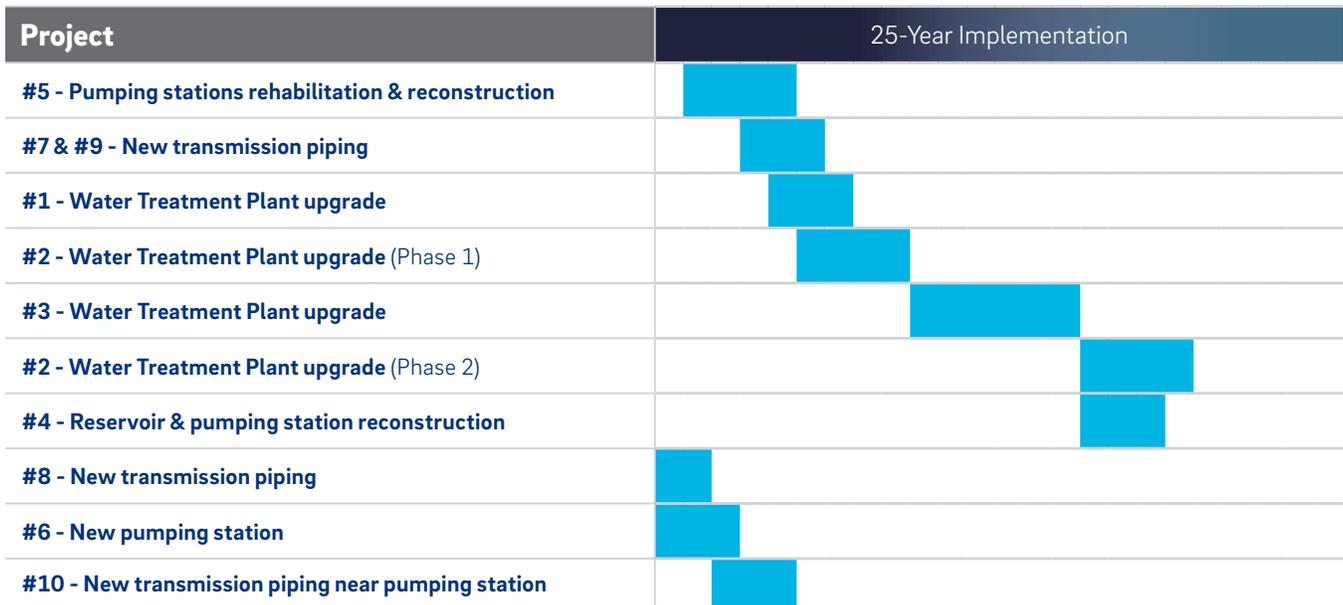
Similar to the current East Park Reservoir tank construction project, the Drinking Water Master Plan will provide construction jobs in the City over the next 25 years.



“The Drinking Water Master Plan has been developed with the full engagement of the Philadelphia Water Department and provides a comprehensive roadmap to continuing our service of safe, clean, drinking water for all residents of Philadelphia now and for future generations. I endorse this plan and look forward to the implementation of infrastructure that enables our city to continue to grow and prosper.”

—**Debra A. McCarty**, Commissioner

Sequencing Schedule (refers to map on page 5)



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Plus, on-going facility rehabilitation projects at
 Water Treatment Plants, Pumping Stations, and Storage Facilities

Benefits to City Residents

The Drinking Water Master Plan is a long-term plan with the goal of updating the City's aging water treatment system infrastructure in the most efficient and affordable manner possible.

This plan required a comprehensive understanding of the needs of the City's drinking water infrastructure today and in the future. It includes a series of projects that have been carefully planned and sequenced to minimize impacts on the communities around the water treatment plants during construction and to result in no disruptions to service or water quality.

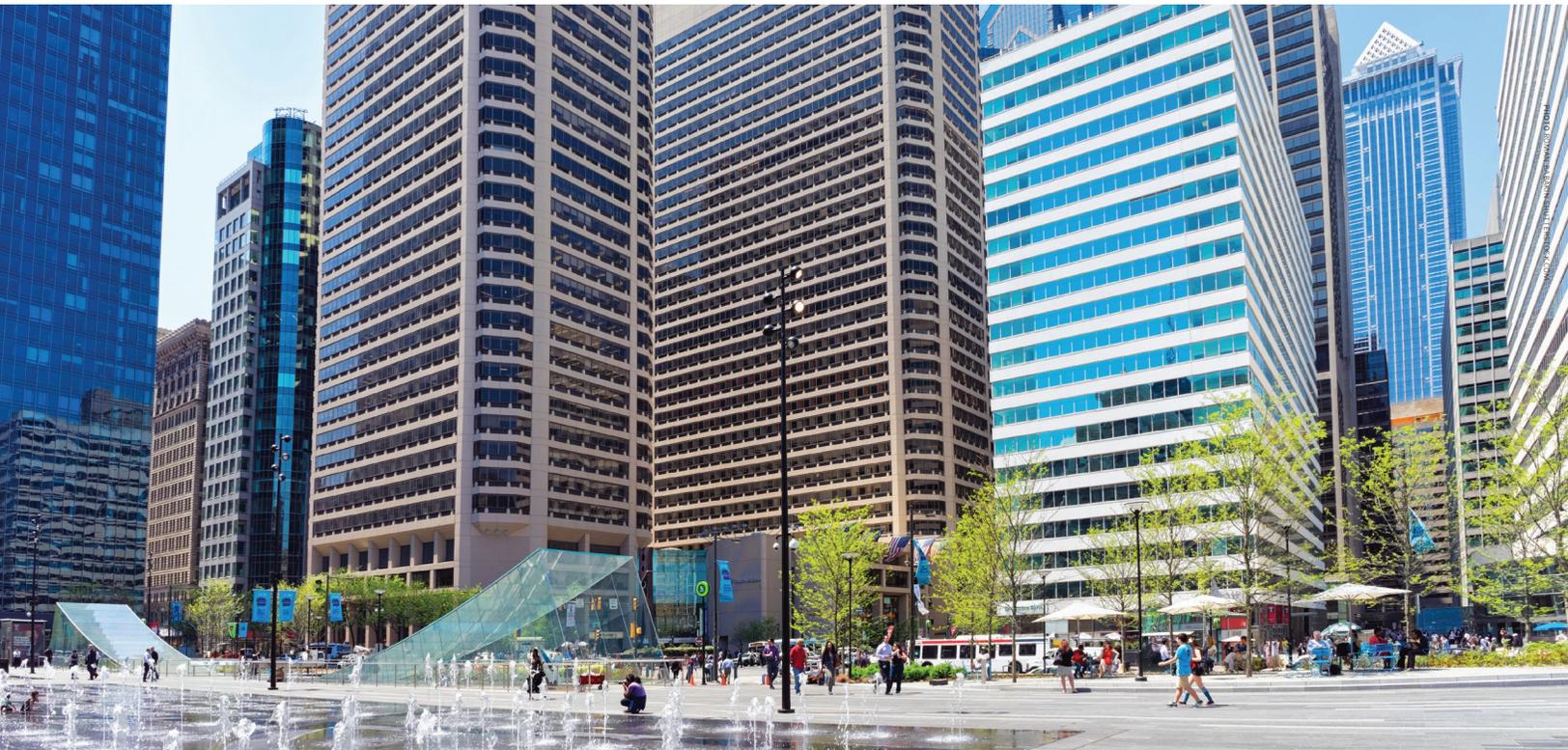
The City has a proud history of delivering high-quality water with some of the most affordable rates in the country. This plan provides a clear path to continue to deliver safe, reliable drinking water for our community into the future.

As the Drinking Water Master Plan is implemented, it will provide numerous benefits to the city for years to come:

- Upgraded facilities to deliver safe, reliable drinking water supply for the next 50 years and beyond
- Nationally recognized leadership due to proactively addressing aging infrastructure issues
- Construction jobs in the City over the next 25 years
- Improved water service due to resiliency and reliability of the system
- Updated water treatment plants to meet modern code compliance requirements
- Fiscally responsible investment in the system by balancing spending to match customer rates at the right time
- Continued partnership with regulators to maintain, or exceed compliance requirements
- Clear understanding for the Water Rate Board and bond rating agencies of PWD's capital needs for the long term

New ways to mitigate impacts for neighborhoods

New rules for construction sites ensure safe and clean worksites and set hours to minimize disturbances. Residents will have clear channels to report and resolve quality of life impacts.



The Dilworth Plaza water feature points to the history of public water supply in Philadelphia and the future of safe, clean, affordable water for the whole city.

Upgraded facilities to deliver a safe, reliable drinking water supply for the next 50 years and beyond.

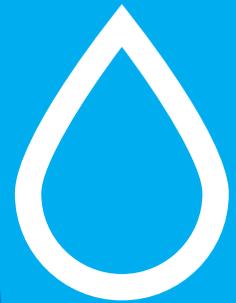


Some of the nation's most affordable rates and robust assistance for seniors and others in need.

Improved water service due to resiliency and reliability of the system.



Nationally recognized leadership due to proactively addressing aging infrastructure issues



Fiscally responsible investment in the system by balancing spending to match customer rates at the right time



Construction jobs in the City over the next 25 years





Debra McCarty
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Melissa LaBuda
Deputy Commissioner of Finance

Donna Schwartz
Deputy Commissioner and Director of Operations

Marc Cammarata
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General Manager of Engineering and Construction

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