

The Passaic Valley Sewerage Commission: A New Paradigm

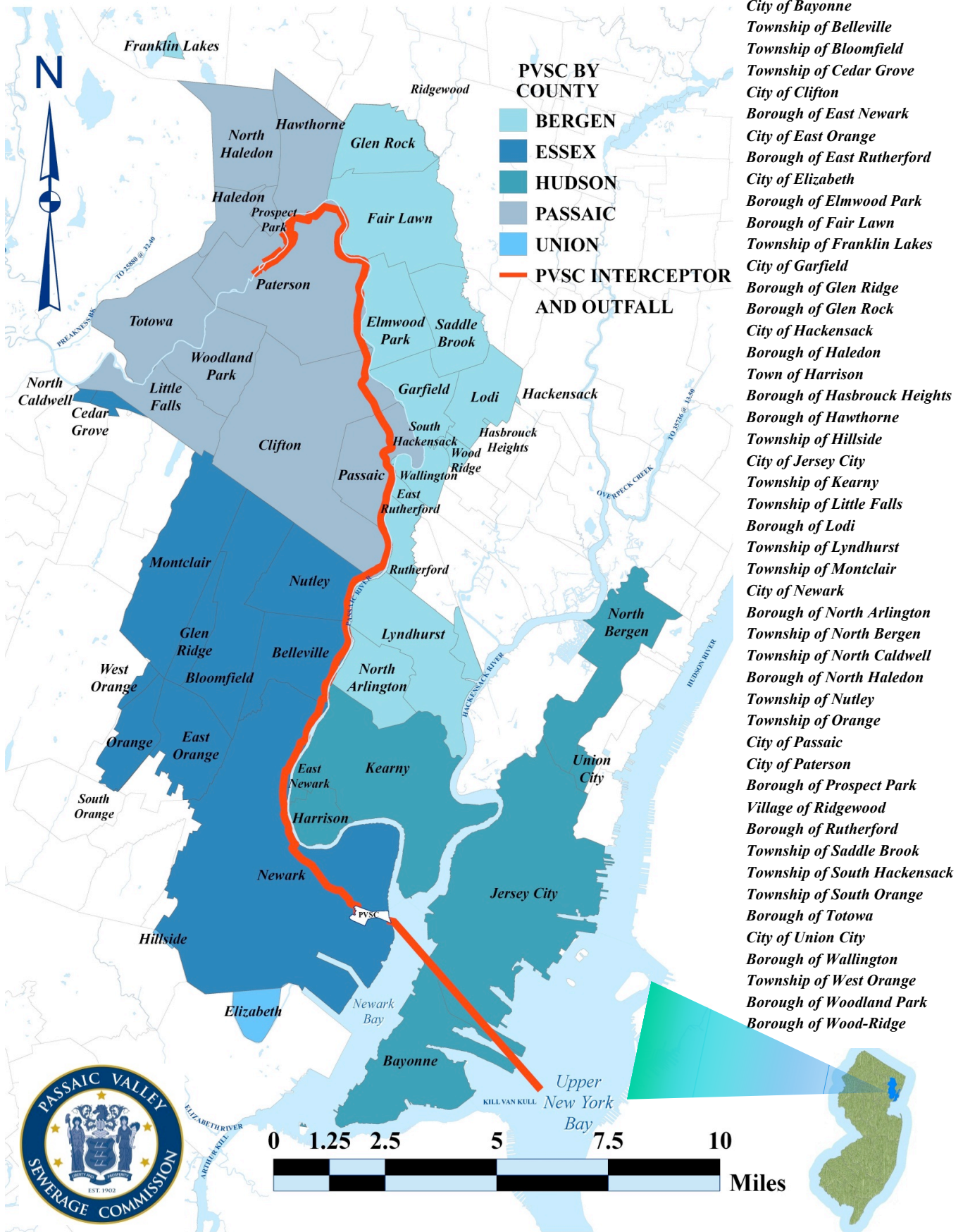


“Protecting Public Health and the Environment”

December 30, 2017



PVSC Service Area





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LEADERSHIP



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GREGORY A. TRAMONTOZZI
Executive Director

MESSAGE FROM THE CHAIRMAN



Thomas Tucci, Jr.
Chairman

It has been five years since Superstorm Sandy slammed into New Jersey, inflicting catastrophic and unparalleled damages which in turn necessitated billions of dollars in repairs. Since the storm, New Jerseyans have seen overwhelming evidence that our state truly was and is “stronger than the storm,” a slogan that became post-storm New Jersey’s rallying cry and a statement of courage and resolve.

In the immediate aftermath of the storm, the Passaic Valley Sewerage Commission was much like the rest of the state – devastated. Our 140-acre plant, situated near the confluence of the Passaic River and Newark Bay, was entirely engulfed by flood waters during the course of the storm. This resulted in the inundation of PVSC’s 5,000-foot underground utility tunnels with more than 200 million gallons of combined bay, rain and wastewater, which destroyed much of PVSC’s critical process equipment.

Five years after the storm, PVSC is the model of recovery and resiliency. Indeed, through hard work, unwavering determination, and collaborative vision, PVSC has come back stronger and more unified than ever before. This is a tribute to PVSC’s excellent employees, who have met significant challenges head-on and persevered. Meanwhile, our outstanding Board of Commissioners – including Vice Chairman Kenneth Lucianin and Commissioners Elizabeth Calabrese, David Catuogno, Mildred Crump, James Doran, Scott Heck, Joseph Isola and Luis Quintana – has provided invaluable leadership as the agency continues to rebuild and modernize, while remaining extremely responsive to its contributing municipalities and ratepayers.

The agency has finalized plans for the construction of two permanent flood walls to protect the east and west sides of the plant as part of a \$500 million

FEMA-funded (90% funded by FEMA) resiliency/ plant hardening program that was approved in 2015. In addition to the walls, the plans include:

- Construction of a 34-megawatt on-site standby power plant
- The plant-wide replacement and relocation of switchgear and motor control centers
- The plant-wide replacement of electrical cables and utility tunnel bulkheads
- The construction of storm water pumping stations
- Construction of and upgrades to PVSC’s storm water collection system
- The construction of east/west electrical substations

The need for such a robust resiliency plan is obvious. Severe storms are a growing threat and the incidence of weather-related, large-scale disasters around the country has climbed steadily and drastically in the last decade, with the greatest spikes coming since Superstorm Sandy.

However, combatting such severe storms is hardly PVSC’s only responsibility. While addressing storm-related concerns, PVSC continues to effectively and efficiently operate the fifth largest wastewater treatment facility in the United States. PVSC also continues to fulfill its role as good environmental stewards by consistently removing debris and other polluting matter from Newark Bay, the Passaic River and its tributaries. All the while, PVSC has continued to conduct its critical operations while charging user charges to its ratepayers that are well below the national average and, indeed, among the lowest in the United States.

Thomas Tucci, Jr.
Chairman

MESSAGE FROM THE EXECUTIVE DIRECTOR



Gregory Tramontozzi
Executive Director

As PVSC continues to rebuild following the devastating effects of Superstorm Sandy, and as another year comes to an end, it is appropriate for us to reflect on the impressive accomplishments and milestones that the agency has achieved over the last several years. As our Chairman often says, an organization is only as good as its employees, and PVSC is blessed to have many talented, hardworking and dedicated employees working in the various units within our Operations, Engineering and Maintenance, and Administrative Departments. The agency is also extremely fortunate to have dedicated and forward-minded Commissioners who have done an exceptional job overseeing and leading our efforts to improve our critical infrastructure and prepare for the future. The recent successes that this proud agency has achieved through the diligence and tireless commitment of its Board of Commissioners and staff are thoroughly elaborated upon in this report.

Achieving the successes highlighted in this report is no easy task when one considers that PVSC serves – on a 24/7/365 basis – more than 1.5 million residents in its 48 contributing municipalities, located in portions of Bergen, Essex, Hudson, Passaic and Union Counties. Formed in 1902, PVSC is the fifth largest and one of the oldest wastewater treatment plants in the United States. On an average day, PVSC receives some 225 million gallons of wastewater which is then assiduously treated before being discharged into Upper New York Harbor after meeting stringent water quality standards. PVSC takes tremendous pride in the critical service it provides and some of the recent awards the agency has received are a testament to that fact.

The successes detailed in this report will serve as the foundation for our continuing and relentless commitment to our mission of operating and maintaining our treatment plant as effectively and efficiently as possible and fulfilling our role as good environmental stewards. We are positioned for growth and ready to embrace the challenges that will confront us as we continue to rebuild. Ours is a great success story and we can look forward to the future with great optimism.

That foundation will be further strengthened by our newly adopted By-Laws. Throughout PVSC's history, the agency has operated without By-Laws. After careful consideration, our Commissioners recently adopted our first-ever By-Laws. They will provide a modern, strategic and streamlined framework for PVSC's governance and organization.

This publication contains a non-exhaustive list of highlights that demonstrate PVSC's commitment to its most important stakeholders – its contributing municipalities and ratepayers and the environment we tirelessly seek to preserve and protect every day.

Gregory Tramontozzi
Executive Director

Awards

PVSC is proud to have received the following recent awards/recognition:



National Association of Clean Water Agencies (“NACWA”) Peak Performance Gold Award:

This honor recognized PVSC for its outstanding compliance record. During 2015 and 2016, the facility repeatedly met daily, weekly, and monthly Clean Water Act compliance standards and, consequently, operated its plant without a single violation of its New Jersey Department of Environmental Protection-issued effluent permit.

- Public Education for our Green Infrastructure Municipal Outreach and Technical Assistance Program and for our Passaic River Blueway Canoe and Kayak Trail.
- Best Management Practices for our Newark Energy Center Reclaimed Water for Beneficial Reuse Project and for our River Restoration program.
- Forward Thinking for our Hudson River Environmental Conditions Observing System Station.



New Jersey Clean Communities Council (“NJCCC”): The NJCCC recognized PVSC for “Preserving and Protecting Over 100 Miles of Waterways.”



New Jersey Department of Environmental Protection (“NJDEP”) Stewardship Award: This honor recognized PVSC for Public Outreach, Water Use Reduction, Process/Operations Energy Use Reduction, Renewable Energy Use, Environmental Enhancement Projects, and Innovative Programs.



Association of Environmental Authorities of New Jersey (“AEANJ”) Wave Awards: These awards recognize excellence in the public water, wastewater, recycling, and solid waste sector in New Jersey. Over the last couple years, PVSC earned the following WAVE Awards:





Liquid Waste Acceptance Program

PVSC’s Liquid Waste Acceptance (“LWA”) Program accepts non-hazardous liquid waste from more than five hundred customers – via truck, barge, ship, and rail – 24 hours a day, 7 days a week, 365 days a year. The LWA Program, PVSC’s largest revenue-producing unit, has been transformed over the last several years such that program revenues have increased from \$18.6 million in 2010 to \$31.7 million in 2016. Revenues collected through the LWA Program offset user charges that would otherwise be collected from PVSC’s ratepayers. Accordingly, PVSC constantly looks for new sources of LWA Program revenue.

Newark Energy Center

In its ongoing effort to maximize its ability to provide wastewater treatment services at the lowest cost to its ratepayers, PVSC began supplying the Newark Energy Center (“NEC”) with treated effluent for use as non-contact cooling water in 2015. NEC is a 655-megawatt combined cycle generating station located to the south of PVSC’s Newark premises. The state-of-the-art

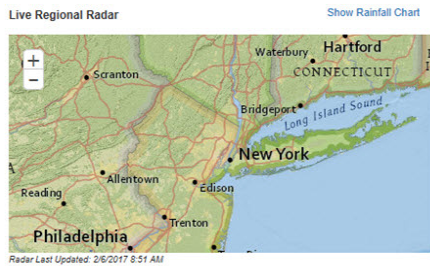
power generating station requires non-contact cooling water for its plant process operations. NEC identified PVSC as a viable provider of non-contact cooling water due to PVSC’s existing NJPDES permit, which allows PVSC to provide reclaimed water for beneficial reuse. PVSC provides NEC with treated effluent at a rate less than the cost of city water, providing NEC with the benefit of reduced operating costs.

The estimated daily water supply from PVSC to NEC is 3 million gallons, which results in an estimated annual revenue to PVSC of \$800,000. In addition to the revenue PVSC receives relative to the supply of non-potable water, PVSC will ultimately receive \$1.7 million in connection fees and annual user charges based upon NEC’s discharge of process water to the local sanitary sewer.

The reuse of treated effluent provides the environment with the benefit of water conservation. Utilizing treated effluent for non-contact cooling water at the NEC



facility will conserve an estimated three million gallons per day of the Newark's drinking water.



- Legend
- Permitted CSO outfall location
 - Municipality shoreline where CSOs may be occurring
 - Municipality/Permittee where CSOs unlikely to be occurring due to rainfall
 - Municipality/Permittee where CSOs may be occurring due to rainfall

CSO Notification System

Eight municipalities within the PVSC district have combined sewer overflow (“CSO”) discharge points. PVSC has created a CSO notification system website to inform the public when local waters may be impacted by CSO discharge. The website utilizes information from sewer system models and real time radar to predict the likelihood of an overflow within a particular community. The application also maintains a record of each predicted event for the participating permittees to utilize in their monthly Discharge Monitoring Reports (“DMRs”) to the NJDEP.

Laboratory Compliance

PVSC operates an advanced wastewater quality laboratory at its plant. The laboratory is staffed with degreed and trained professionals, and is certified by the NJDEP to conduct a wide variety of analytical chemical and biological testing. The laboratory performs numerous

analyses for PVSC’s NJPDES permit compliance, for Industrial permits, LWA customers and for treatment plant process evaluations. The mission of the laboratory is to help ensure that the wastewater conveyed to the PVSC plant is properly treated so that it can be cleanly and safely released back into the environment.

Each year, more than 115,000 analytical tests are conducted in the laboratory, for an average of 315 tests a day. PVSC’s laboratory successfully complies with 100% of its regulatory performance tests each year.

Operations Staff Compliance

PVSC continues to be vigilant in its commitment to effectively and efficiently operating the fifth-largest wastewater treatment plant in the United States. To that end, PVSC ensures that its Operations staff continue to upgrade their licenses and skills through various wastewater classes. In fact, 75 Operations Department staff members now hold wastewater, collections system, and/or boiler licenses.

Green Infrastructure Municipal Outreach

PVSC has partnered with the Rutgers Cooperative Extension (“RCE”) Water Resources Program



to pilot a Green Infrastructure Municipal Outreach and Technical Assistance Program. The program is designed to provide guidance and direction to PVSC’s 48 contributing municipalities regarding the opportunities and benefits associated with implementing green infrastructure practices. Here are some of the ways PVSC has educated the public on the benefits of Green Infrastructure.

- Last year, more than 120 municipal officials within the PVSC treatment district attended an Assessing Stormwater Infrastructure Workshop.



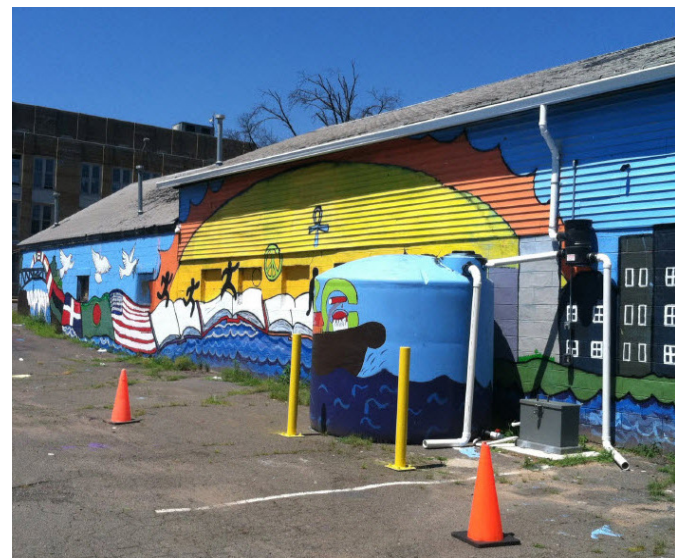
- PVSC and RCE have worked with various municipalities to develop Green Infrastructure Feasibility Studies, which identify potential Green Infrastructure projects that can be implemented. To date, studies have been developed in Bayonne, Bloomfield, Clifton, East Newark, Fair Lawn, Garfield, Harrison, Hawthorne, Jersey City, Kearny, Little Falls, Lyndhurst, Montclair, Newark, North Arlington, North Bergen, Paterson, Saddle Brook, Union City, Wallington, and West Orange.

- PVSC funded Green Infrastructure Feasibility Studies for several of its municipalities in exchange for those municipalities implementing



two Green Infrastructure projects within two years. To date, the following projects have been implemented by PVSC and/or PVSC contributing municipalities as demonstration projects:

- a rain barrel distribution program in Montclair; and
 - a Build-A-Rain Barrel workshop at the Montclair Community Farm which allowed residents to build rain barrels using recycled pickle barrels.
- Additionally, PVSC has funded the following Green Infrastructure projects within its district:
- cisterns were installed at the Newark Greater Conservancy and at the Elysian Fields Community Garden in Paterson;
 - cisterns and rain gardens were installed at Horace Mann School in Bayonne and Lincoln Middle School in Kearny; and
 - cisterns are currently being installed at Hawkins Street School in Newark and Watsessing Elementary School in Bloomfield.



ENGINEERING AND MAINTENANCE HIGHLIGHTS

Post-Superstorm Sandy Resiliency/Plant Hardening Program

In the wake of the unprecedented damage PVSC sustained as a result of Superstorm Sandy, the agency developed a recovery and resiliency plan to protect the plant against future significant weather events. A \$500 million FEMA-funded (90% funded by FEMA) resiliency/plant hardening program was approved in 2015. It includes:

- Construction of a 34-Megawatt



On-Site Standby Power Plant (\$118 million)

- Plant-Wide Replacement and Relocation of Switchgear and Motor Control Centers (\$84 million)
- Construction of Two Flood Walls (\$75 million)
- Plant-Wide Replacement of Electrical Cables and Utility Tunnel Bulkheads (\$71 million)
- Construction of Storm Water Pumping Stations (\$39.5 million)
- Construction of and Upgrades to Storm Water Collection System (\$19.4 million)
- Construction of East/West Electrical Substations (\$10 million)
- Witco Property Contractor Staging area (\$3.3M)
- Plant Sump Pump Relocation & generator provisions (\$3.2M)

Implementation of Phase V Rehabilitation of Main and Branch Interceptor Sewers

PVSC is not just one of the largest sewerage treatment facilities in the United States, it is also one of the oldest. Since the completion of the original interceptor sewer in 1924, numerous expansions, capital improvements and assessments have taken place. The most recent rehabilitation efforts relative to the Main Interceptor began in 2013 and was completed this year. The Phase V Facilities Inventory and Conditions Assessment Program relative to PVSC's collection system and other assets outside of the PVSC plant began this year and will continue for the next seven years.



The Phase V Program is being managed by CDM Smith, an engineering and construction consultant. Due to the immensity of this program, there will be significant coordination between CDM Smith, PVSC's contributing municipalities, the New Jersey Department of Transportation, etc. The Phase V Program began with an evaluation and condition assessment of:

- Main and Branch Interceptor Sewers
- Laterals and Local Sewer Connections
- Flow Meters
- Combined Sewer Overflow Regulator Chambers
- Outfalls
- The Hudson County Force Main

The evaluation and condition assessment is anticipated to conclude in the first quarter of 2018. Although dependent on the outcome of the evaluation and conditions assessment, the Phase V Program is anticipated to include the preparation of design documents for three cleaning and re-inspection contracts, four rehabilitation contracts, and two emergency (as needed) rehabilitation contracts. The design phase is anticipated to begin in the

first quarter of 2018 and will be completed in the third quarter of 2018. Implementation and/or construction of the nine contracts identified from the design phase is anticipated to begin in early-2019 and conclude in late-2022.

Implementation of Quality-Based Preventative Maintenance Program

This program involves the planned and systematic inspection, servicing, testing, cleaning and adjusting of approximately 47,000 plant assets. The objectives are to prevent assets from breaking down and to make sure that the assets remain in optimal operating condition for as long as possible. This has resulted in increased productivity, equipment reliability, and, ultimately, plant performance.

Maintenance Apprenticeship Program

Apprenticeship, learning a skilled trade through on-the-job training, has long been an integral part of employee development at PVSC. To stay abreast of technological advancements and process improvements, the Maintenance and Human Resources and Organizational Development Departments are collaborating to establish a state-of-the-art Apprenticeship Program, approved by the United States Department of Labor's Office of Apprenticeship. The program will include several trades (e.g., mechanics, instrumentation technicians, and HVAC technicians), but is initially targeting aspiring electricians. Trainees complete 144 hours of classroom instruction using specialized labo-



ratory equipment at Bergen County Technical School. The Maintenance Department's licensed and seasoned electricians supplement the theoretical and technical course content with 8,000 hours of hands-on training and practical experience. PVSC provides additional support through tuition reimbursement to cover the cost of school fees. Upon graduation, successful participants will be eligible to take the electrical license examination. Each Apprenticeship Program includes a four-year commitment.



ADMINISTRATION HIGHLIGHTS

\$14 Million in Savings Through Refinancing

In step with its efforts to effectively manage its outstanding debt, PVSC closed on a substantial refinancing transaction last summer. The agency refinanced more than \$86 million of its existing debt, which had been subject to interest rates of greater than 5%. The new, refinanced debt, with an average yield of only 1.52%, will save PVSC and its ratepayers more than \$14 million in debt service payments over the next four years.

The refinancing will result in greater budgetary flexibility, allowing for the overlay of new debt associated with a variety of future capital projects without creating additional debt service requirements. The new debt will finance significant repair work related to damage caused by Superstorm Sandy.

The refinancing will also allow PVSC to maintain what are among the lowest user charges in the nation. In fact, PVSC's average per household user charges of \$142.52

per year are significantly lower than the national average of \$435. This will directly benefit PVSC's 1.5 million ratepayers, who reside in 48 municipalities in parts of Bergen, Essex, Hudson, Passaic, and Union Counties.

River Restoration Program

PVSC's statutory mission is to protect the environment by "relieving the streams and rivers [within the Passaic Valley River Basin] from pollution...." In furtherance of that mission, PVSC operates its award-winning River Restoration Program, which is comprised of three elements –skimmer vessel floatables removal, volunteer shoreline clean-ups, and community-requested clean-ups. Since 1998, PVSC has removed more than 12,000 tons of debris from more than 100 miles of area waterways. In the last year alone, PVSC removed 12,960 tons of debris from those waterways. PVSC has sponsored nearly 1,250 individual cleanups along area shorelines.

The River Restoration Program's signature effort consists of at least

two cleanups per year of the Great Falls in Paterson. This requires diverting the flow of the Passaic River through an adjacent hydroelectric plant. River Restoration team members then remove debris that has accumulated in the rocks above the falls.



In 2016, the River Restoration team constructed an outdoor classroom and amphitheater in Essex County Yanticaw Park. The unique learning facility is located on the bank of the Third River and can be used by all grades K-12. It consists of four tiers of seating, approximately 30 feet in width, built into the natural slope of the park. There is enough seating to accommodate about 75 students. Reclaimed wood was used to create a podium in front of the stadium seating.



Legal

The agency created an in-house Legal Department and streamlined the process by which it responds to its legal needs in 2011. This has resulted in a significant reduction in total legal spending from \$2.4 million in 2010 to \$817,000 in 2015.

Succession Planning

PVSC has made succession planning a focus of its Human Resources and Organizational Development Department. The goals of PVSC's succession planning process are to:

- (1) ensure operational continuity in leadership and other key positions, particularly as baby boomers retire;
- (2) retain and develop the knowledge and skills needed now and in the future to continue to operate the plant with a high level of professionalism; and
- (3) encourage individual growth and professional advancement.

Safety and Security

PVSC continues to be committed to providing a safe, secure, and healthy environment for all PVSC employees and visitors to the treatment plant. New safety measures and workplace procedures revolving around training, education and enforcement were put into place in 2013 to reduce the incidents of workplace



accidents and also reduce the number of worker's compensation claims. Additionally, a robust investigative component was introduced for all incidents and near misses to identify root causes of accidents on site. PVSC achieved its goal of a 5 percent reduction in recordable incidents every year since 2013. This has resulted in, among other benefits, a substantial savings in worker's compensation claims. PVSC's total claims payouts decreased from an average of more than \$600,000 per year between 2001 and 2010 to less than \$125,000 per year between 2013 and 2016.



PVSC's Emergency Services Unit ("ESU") was reconstituted in March of 2012 after a review of PVSC operational needs revealed a concern involving adequate response and rescue relative to the large number of confined space entries and possible hazardous material events at PVSC. The ESU consists of one part-time Coordinator assigned eight hours weekly and 20 PVSC personnel assigned to various departments throughout PVSC. ESU, after completing training evolutions, is certified by the state in "Confined Space Rescue" and "Hazardous Material Response." Additionally, ESU members are encouraged to maintain certifications in Technical Rescue, Swift Water Awareness, First Responder, and a variety of specific skills related to their mission.

Educational Outreach

PVSC offers an environmental educational outreach program to all elementary, middle and high schools within its treatment district. The program, which feature an indoor and/or outdoor component, is ideal for students of all grade levels. Students learn by doing, combining a multimedia presentation with hands-on participation to see how small steps can make a big impact in keeping the Passaic River Watershed healthy.

The program has educated more than 216,000 K-12 students since 2003. Last year, PVSC visited nearly 80 elementary, middle and high schools throughout the PVSC service area, earning excellent reviews from faculty and administrators.





“Protecting Public Health and the Environment”

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