

# The Passaic Valley Sewerage Commission: Business Update

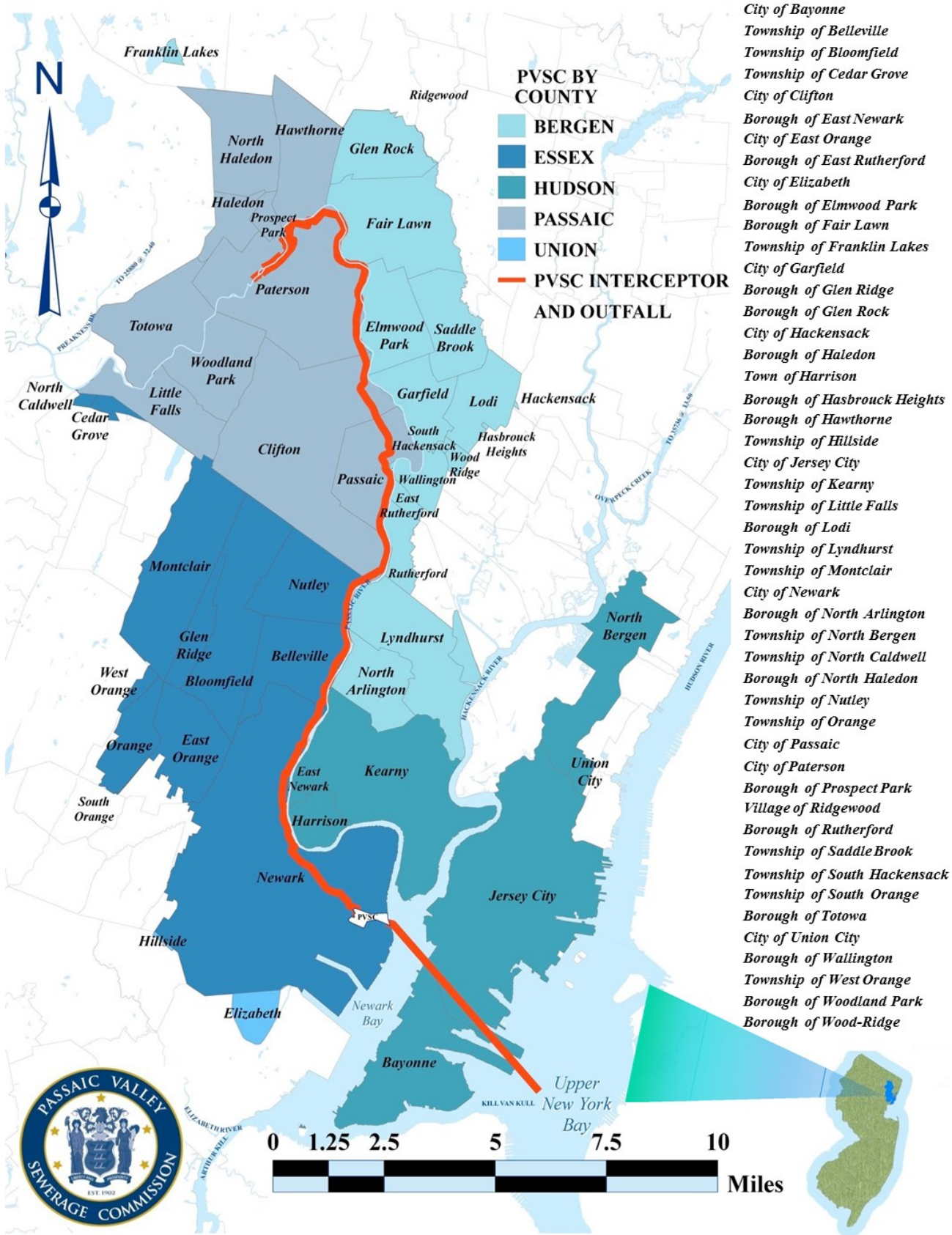


*“Protecting Public Health and the Environment”*

**January 2020**



# Passaic Valley Sewerage Commission Service Area



# Table of Contents



|                           |                |
|---------------------------|----------------|
| Leadership                | Pages 4 to 6   |
| Awards and Achievements   | Pages 7 to 10  |
| Protecting Our Assets     | Pages 11 to 14 |
| Safety and Security       | Pages 15 to 16 |
| Environmental Stewardship | Pages 17 to 19 |
| In the Community          | Pages 20 to 21 |
| Green Infrastructure      | Pages 22 to 24 |





### **Our Board of Commissioners and Executive Director**

(From Left To Right) Executive Director Gregory A. Tramontozzi, Commissioner John J. Cosgrove, Commissioner Elizabeth Calabrese, Commissioner Mildred C. Crump, Vice Chairman Luis A. Quintana, Chairman Thomas Tucci, Jr., Commissioner Hector C. Lora, Commissioner Brendan Murphy, Commissioner Joseph F. Isola and Commissioner James P. Doran.

### **Senior Management**

**Chief Operating Officer**  
Bridget McKenna

**Chief Engineer**  
John S. Rotolo, P.E.

**Chief Financial Officer**  
Joseph F. Kelly, C.P.A.

**Chief Administrative Officer**  
Matthew F. Murray

**General Counsel**  
Michael D. Witt, Esq.

### **Contact Information**

600 Wilson Avenue  
Newark, NJ 07105  
973-344-1800 (Phone)  
<https://www.com>

**Press Inquiries**  
Doug Scancarella  
[dscancarella@pvsc.com](mailto:dscancarella@pvsc.com)  
973-817-5735



## *Message from the Chairman*

**Thomas Tucci, Jr.**  
Chairman

Over the course of our 116-year history, PVSC’s Board of Commissioners and employees have worked hard to earn the agency a well-deserved reputation for excellence as the fifth largest wastewater treatment plant in the United States and one of the largest advanced wastewater treatment plants in the world.

Every day, we demonstrate a relentless commitment to operating our treatment plant as effectively and efficiently as possible. On an average day, our plant receives some 225 million gallons of wastewater. It arrives here through miles of underground tunnels. Treatment then takes place in two stages: primary and secondary. The primary stage includes removing grit and pollutants. Secondary treatment includes biological and gravity treatments. Next, the wastewater is disinfected and de-chlorinated and then discharged into Upper New York Harbor.

The innovative and thorough ways we collect and treat wastewater enable us to meet all discharge permits issued by the Environmental Protection Agency (“EPA”) and the New Jersey Department of Environmental Protection (“NJDEP”). By constantly meeting stringent water quality standards, we always make good on our mission to “protect public health and the environment.” All the while, we consistently maintain among the lowest user charges in the country.

Accomplishing the successes documented in this *Business Update* is a tribute to PVSC’s outstanding employees. In my opinion, we have the finest workforce in the State of New Jersey. Meanwhile, I am extremely fortunate to have the privilege of working alongside my dedicated and forward-thinking fellow Commissioners, Vice Chairman Luis Quintana and Commissioners Elizabeth Calabrese, John Cosgrove, Mildred Crump, James Doran, Joseph Isola, Hector Lora and Brendan Murphy. They have done an extraordinary job overseeing our efforts to continue meeting challenges and delivering reliable and vital services to our ratepayers.

Our successful operations are thoroughly elaborated upon in this *Business Update*. It highlights our agency’s accomplishments and demonstrates our commitment to our contributing municipalities, ratepayers and the environment we tirelessly seek to preserve and protect.

**Thomas Tucci, Jr.**  
Chairman

*Message from the Executive Director*



**Gregory Tramontozzi**  
Executive Director

PVSC is one of the premier sewer utilities in the United States. We treat wastewater here with the most cutting-edge technology in the industry and then discharge it into Upper New York Harbor after it meets stringent water quality standards.

In an effort to modernize and make our treatment process even more efficient, PVSC is working tirelessly on significant resiliency projects. These projects call for upgrades to our plant, our process equipment and our infrastructure. Many of these projects are well underway and already paying dividends.

PVSC is also the driving force behind the rejuvenation of local waterways, including Newark Bay, the Passaic River and its tributaries. The health of these waterways has improved dramatically in recent years thanks, in large part, to the cleanup efforts of our River Restoration Program.

We are justifiably very proud to provide vital high quality wastewater services to our customers, while also protecting and enchaining our environment. None of it would be possible without the efforts of our most valuable assets — our people. We repeatedly continue to accomplish so much through the invaluable leadership of our outstanding Board of Commissioners and through the hard work and diligence of our talented staff.

As we continue to successfully maintain and operate one of the oldest wastewater treatment plans in the United States, it is appropriate for us to periodically reflect on the impressive accomplishments that the agency regularly achieves. As you will read in the pages that follow, we go to great lengths in treating wastewater and returning it safely to the environment at a reasonable cost to the communities we serve. In fact, PVSC manages to conduct its critical operations while charging user fees that are well below the national average. I feel confident that the work accomplished over the last two years will yield great success in the years ahead.

**Gregory Tramontozzi**

**Executive Director**

## Awards and Achievements

### Association of Environmental Authorities of New Jersey Wave Award

**Wave Awards** are a recognition of excellence in the public water, wastewater, recycling and solid waste sector in New Jersey. PVSC has won 23 such awards since 2000. Most recently, PVSC received a **“Forward Thinking” Wave Award** for the successful efforts of its New Jersey Combined Sewer Overflow (“NJCSO”) Group. PVSC created the this group to work collaboratively with combined sewer system municipalities within its district to ensure that they all achieve New Jersey Pollution Discharge Elimination System (“NJPDES”) permit compliance.



**Photo:** (From Left to Right) Vice Chairman Luis A. Quintana, Commissioner Mildred C. Crump, Chief Operating Officer Bridget McKenna, Chairman Thomas Tucci, Jr., Executive Director Gregory A. Tramontozzi, Commissioner Joseph F. Isola and Commissioner James P. Doran display PVSC’s most recent **WAVE Award**.



### New Jersey Water Environment Association Award



Our agency also regularly earns (“NJWEA”) **Awards** for strategic excellence in wastewater management. Most recently, PVSC received the association’s prestigious **Thomas G. Meholic Public Education Award**. That award is given in recognition of significant accomplishments in promoting awareness and understanding of water environment issues, among the general public, through the development and implementation of public programs. Our agency was honored with this award for the following initiatives: River Restoration, Educational Outreach, Green Infrastructure Municipal Outreach, Lower Passaic and Saddle River Alliance, World Lab Day events, and CSO Long Term Control Planning.

**Photo:** NJWEA Public Education Committee Chair Thomas G. Meholic (right), presented PVSC with an NJWEA Award that is named after him. PVSC Lab Director Jennifer Marques (left) received the award on PVSC’s behalf.

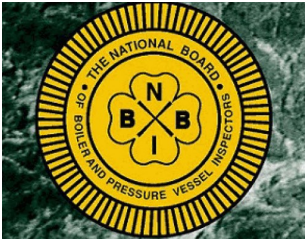


### Moody’s Upgrades PVSC Bond Rating



PVSC’s bond rating was recently upgraded by Moody’s Investors Service, signaling continued financial stability at the agency. Moody’s cited several strengths that warrant the upgrade, including PVSC’s “profitable and growing sludge operations,” a “long trend of healthy debt service coverage,” and a “debt service reserve fund funded at maximum annual debt service.”

In upgrading PVSC’s rating to A2, with a stable outlook, Moody’s indicated that “the Commission’s finances will remain strong and stable for the near to medium term as management continues to budget conservatively and actively manage rates.”



## ***Agency Receives Prestigious “R” STAMP Certification***

PVSC’s treatment process requires the efficient operation of numerous boilers and pressure vessels. History has shown that without proper operation and maintenance, utilizing such pressure equipment can be extremely hazardous.

The National Board of Boiler and Pressure Vessel Inspectors is an organization that develops standards, training programs and certifications for organizations and agencies that use pressure equipment. Their goal is to promote greater safety to life and property through uniformity in the construction, installation, repair maintenance and inspection of pressure equipment. PVSC has always strictly adhered to their rules, regulations and safety standards. Accordingly, in 2018 PVSC received the National Board “R” Stamp Certification Authorization to repair boilers and pressure vessels. An “R” Stamp signifies that an organization has met the National Board’s highest quality safety standards and requirements.

## ***New Jersey Alliance for Action Honors PVSC for Resiliency Program***

PVSC was recognized by the New Jersey Alliance for Action in 2018 for the development and implementation of a robust Resiliency Program that will help the agency battle large-scale weather-related events. The Alliance presented PVSC with its prestigious “*New Jersey’s Leading Infrastructure Projects Award*” in recognition of our innovative, pioneering and landmark construction efforts.



The need for a resiliency plan became obvious a little more than seven years ago when Superstorm Sandy slammed into New Jersey, inflicting catastrophic and unparalleled damage. The FEMA-funded (90% funded

by FEMA) resiliency/plant hardening project that was approved in 2015 includes:

- Construction of two permanent flood walls to protect the east and west sides of the plant
- Plant-wide replacement and relocation of switchgear and motor control centers
- Construction of a 34-megawatt on-site standby power plant
- Plant-wide replacement of electrical cables and utility tunnel bulkheads
- Construction of stormwater pumping stations
- Stormwater collection system improvements
- Construction of east/west electrical substations

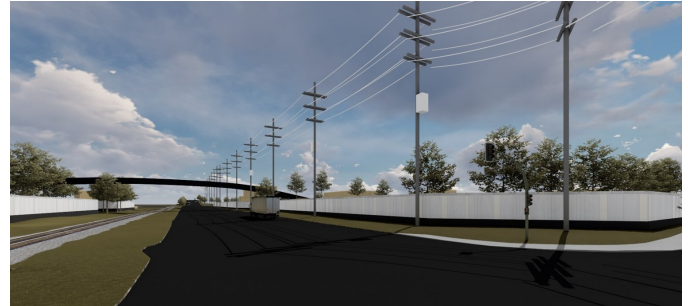


*An artist’s rendition of the flood wall that will be built around PVSC’s plant (left). PVSC Manager of Engineering John Bolcar, PVSC Chief Engineer John Rotolo and New Jersey Alliance for Action Executive Vice President Jerry Keenan at the award ceremony (right).*



The first of those projects took a major step forward last summer when the invitation to submit bids for the construction of the massive floodwall, stormwater collection system and stormwater pumping stations was advertised in four North Jersey newspapers and posted to the PVSC website.

Construction is expected to begin in early 2020. The floodwall will surround the perimeter of our 140-acre plant on both sides of Doremus Avenue. Three pumping stations and upgrades to our stormwater collection system will be located throughout the plant.

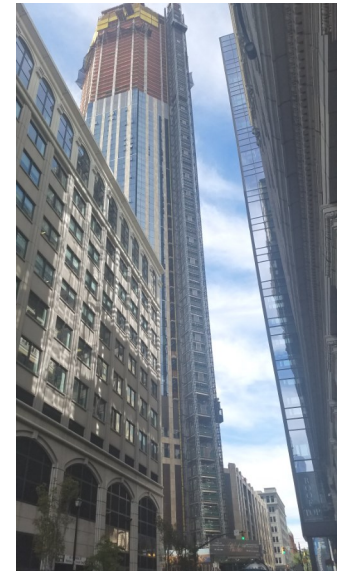


### ***PVSC Connections Unit Eclipses Milestone***

New York City may be known for its skyscrapers, but New Jersey has been keeping pace recently. The state boasts numerous large construction projects, including a 900-foot tower in Jersey City (99 Hudson Street). It will be the state's tallest building and the 15th tallest in the country.



Newark, meanwhile, is undergoing a massive mixed use development plan that has already seen billions of dollars in large-scale construction projects since 2011 and has billions more in the pipeline.



None of this could happen without the PVSC Connections Unit. All of these modern, beautiful structures need to provide the necessary wastewater infrastructure to accommodate thousands of people. Accordingly, the design and construction of these buildings are highly regulated by descriptive codes and standards that are comprised of specifications on materials, equipment, assembly, installation and operation. The codes and standards used are based on a building's occupancy classification breakdown.

While many of our commercial or residential applications are from large-scale construction projects, many more are from small-scale construction projects throughout the district. The team inspects roughly 2,200 properties a year. Most sites need to be inspected multiple times. Once PVSC endorses a project, a Certificate of Occupancy is granted. This past year, the Connections Unit eclipsed an impressive milestone. They have now reviewed 30,000 files in over 24,000 locations.

### ***Rebates Awarded to Municipalities***

In 2019, PVSC awarded rebates totaling \$609,750.77 to municipalities in its service area as part of our innovative Municipal Rebate Incentive Program. All construction projects within the PVSC service area are required to be assessed for connection fee applicability. First, a construction project application must be submitted to the PVSC Inspection and Compliance Bureau Connections Unit. PVSC Inspectors then review each application and



work closely with municipal Building Departments and Code Enforcement Offices in order to calculate the appropriate connection fee. In accordance with the Municipal Rebate Incentive Program, 15% of that fee (up to \$5,000.00 per file) is then refunded back to the municipalities in exchange for their cooperation. Our Inspectors reviewed 2,585 applications in 2018. This resulted in a daily discharge of an additional 3,379,353.23 gallons for the year into the PVSC system, which resulted in nearly just over \$9 million in connection fees and \$609,784.29 in rebates to PVSC's contributing municipalities.

## ***Recognizing Local Businesses with Perfect Environmental Compliance***

For the 25th consecutive year, PVSC has recognized companies that operated in the previous calendar year without having incurred a single effluent (wastewater discharge) or reporting violation.

PVSC service area companies who qualify as Significant Industrial Users are issued Sewer Use Permits that include limits for the quality of effluent the companies may discharge into the sewer system. These companies must also monitor and report on their discharges to PVSC on a monthly basis. Compliance violations occur when a company fails to file its monthly report on time or exceeds its permitted discharge limits. Each facility that goes a full calendar year without a single violation earns a PVSC Permit Compliance Award. There have been 100-plus such award winners in each of the last two years.



*Sika Corporation of Lyndhurst has earned the award 21 consecutive years.*

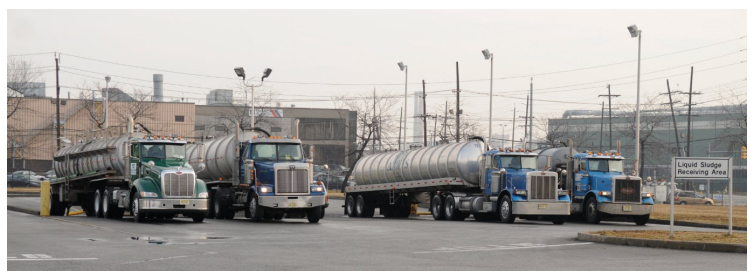
The agency began accepting non-hazardous liquid waste from outside of its service area in 1996. This includes

## ***Liquid Waste Acceptance Continues to Break Records***

liquid, non-hazardous industrial waste (including categorical wastes), wastewater sludges and digester cleanout, potable water sludges, commercial wastes, landfill leachate, grease trap cleanout (with restrictions), sanitary waste, septage and groundwater.

PVSC's Liquid Waste Acceptance ("LWA") has since become one of PVSC's largest revenue-producing units. In fact, the program generated a record \$34.8 million in revenue last year. LWA clients come from 11 different states, from Maine to Virginia.

Approximately 300 trucks per day, as well as two barges and ten ships per week, are served by the agency. Many of the deliveries by boat come from New York City. The revenues collected through the LWA Program significantly offset user charges that would otherwise be borne by PVSC's ratepayers.



## Underground Infrastructure

All day, every day, millions of gallons of human and industrial waste are sent through PVSC's complex underground sewer system. The polluted water is conveyed to the plant through our 21-mile Main Interceptor, the Hudson County Force Main, the Newark Southside Interceptor, and 20 miles of branch interceptor sewers and lateral local sewer connections. Once treated, the effluent travels through our 5.5-mile Outfall Pressure Tunnel, which runs approximately 250 feet beneath Newark Bay. It is then discharged into New York Harbor, in the vicinity of Robbins Reef Lighthouse, through our dispersion field made up of 150 diffuser nozzles.

One of the challenges in maintaining our system is that so much of the process takes place underground, out of view. Given the age of our sewer system (much of it built between 1902 and 1923), assessing the condition of the underground pipes and associated infrastructure is absolutely critical.

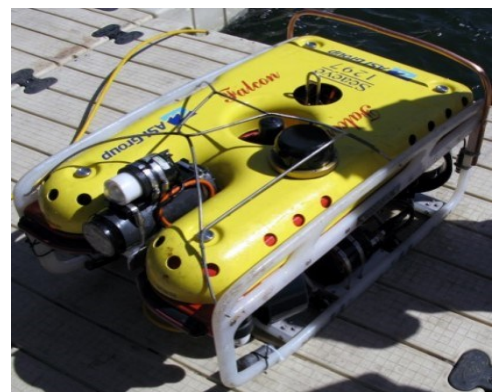
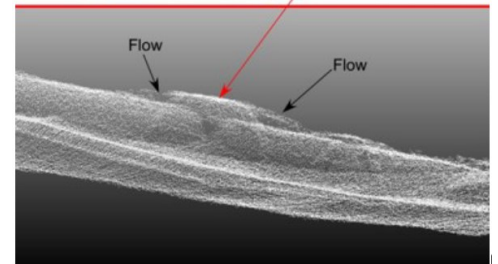
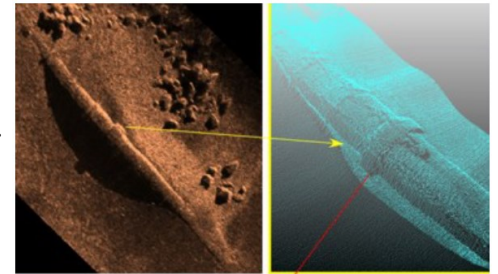
PVSC is set to embark on a design and rehabilitation project to repair sections of our twin outfall tunnel pipes and diffuser nozzles within our New York Harbor effluent dispersion field. CDM Smith, a full-service engineering firm, will be performing the design work associated with the repair and rehabilitation project.

CDM Smith's inspection of the Main Interceptor and Branch Interceptors was completed in 2017 and the inspection of the Outfall was completed early in 2018. An underwater remotely operated vehicle was used by one of CDM Smith's subcontractors for inspecting the interior of our outfall tunnel pipes. Between a combination of several other CDM Smith subcontractors, they performed seismic (high-frequency sub-bottom), side-scan orthosonograph, 3D echoscope, and multibeam bathymetry to examine, investigate, and assess the geophysical features of the underwater surface associated with, and in the vicinity of, the outfall tunnel pipes and diffuser nozzles.

With the inspections complete, CDM Smith provided PVSC with a comprehensive engineering report on the condition of these assets. The report concluded that a number of diffuser nozzles required remediation.

The report also noted that while the plant effluent should be discharging through the diffuser nozzles, there is evidence of flow at the exposed sections of the twin outfall tunnel pipes that were damaged when the SS Leviathan, a luxury transatlantic ocean liner, crashed into the outfall tunnel in 1923. When the repair and rehabilitation project is completed,

the outfall tunnel pipes and dispersion field diffuser nozzles will restore the discharge of the plant effluent through the outfall to its original operational state, thereby preserving and enhancing our underground infrastructure reliability.



## *Archimedes Screw Pumps*

Our Return and Waste Sludge Pumping Station is a critical facility that is responsible for returning activated sludge to the treatment process. To do so, the facility relies on three Archimedes screw pumps. Each screw weighs approximately 39,000 pounds, is 53.62 feet long and has a spiral diameter of 10 feet.

In the spring of 2019, the station suffered a catastrophic equipment failure when one of the three screw pumps cracked, rendering it inoperable. Although the facility can normally function with two operable screw pumps, the lack of the third meant PVSC had no backup in the event that one of the remaining two screw pumps failed. With only one operable screw pump, PVSC's biological treatment process would have been impaired.

It was initially thought that the damaged screw was not repairable and that a temporary bypass piping system would have to be constructed. The budgetary estimate to implement this solution was in excess of \$800,000. Instead of proceeding with that costly solution, PVSC reached out to G.J. Oliver, Inc., from Phillipsburg, an existing PVSC contract holder for pump repair services, to discuss the possibility of repairing the damaged screw.

IEW Construction from Trenton, another PVSC contract holder, was brought in to work alongside the PVSC Maintenance team to remove the screw and then have it shipped to G.J. Oliver's facility. After a quick inspection, G.J. Oliver confirmed that they could repair the damaged screw to like-new condition.

They made the repair by welding the two pieces back together. During the five weeks that the repair required, members of the PVSC Operations, Maintenance and Engineering Departments conducted frequent site visits to monitor the ongoing work. Once the repairs were completed, IEW Construction transported the screw back to PVSC's plant, where it was re-installed a few months later.

Through the utilization of existing PVSC contract holders, the overall time required to remove, repair and reinstall the repaired screw was significantly reduced. Furthermore, the total cost to repair the damaged screw was \$109,000, resulting in a cost avoidance to PVSC of \$700,000 had it needed to install a temporary bypass piping system.

## *Interceptor*

With our 21-mile Main Interceptor traversing Paterson, Clifton, Passaic, Nutley, Belleville and Newark, and with our 20-miles of branch interceptor sewers and lateral local sewer connections, PVSC sends its line operations staff out daily to conduct routine inspections and perform regular preventative maintenance. Constantly maintaining the sewer line goes a long way in preventing blockages, clogs or any other issue that can lead to potential sewage backups, possible overflows and significant damage to the line. Making sure these



sewers are debris-free is one of our top objectives. Early last summer, the Line Operations crew discovered a very large debris mass within the South Bay Avenue (Newark) combined sewer overflow (“CSO”) regulator chamber. While this large debris mass was contained within the (“CSO”) chamber, it could have caused a significant blockage within the 4-foot-9-inch diameter cast-in-place concrete Jabez Street Branch Interceptor Sewer, which dates back to the 1920’s.

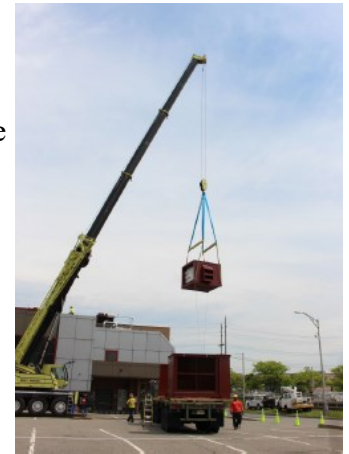
Initially, the PVSC Engineering Department consulted with outside contractors about removing the mass. After two bids came in at \$50,000, it was decided that PVSC’s Line Operations Department would attempt to handle the removal of this mass. Various Line Operations team members safely took turns descending into the CSO regulator chamber via a man-basket. The mass was secured, strapped and pulled from the narrow manhole opening. It took less than two days (10 hours in total at a PVSC labor cost of just over \$4,000) to perform the task, saving PVSC about \$46,000.



### ***Lab/Inspection and Compliance Building***

Commercial air conditioning systems and heaters, of course, are much larger than the conventional residential AC units many of us have at home. Commonly, commercial units come in the form of a large unit that sits on the rooftop of a building. These units condition a small percentage of outdoor air and a majority of recirculated air either by heating or cooling it. The air is transmitted throughout the building via a ductwork system and vents. Several of the buildings in the plant have such units.

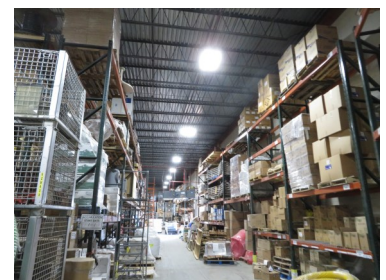
In May, we utilized a 120-ton crane to hoist a new, 8,200 pound, Daikin Rooftop Unit onto the top of the Lab/Inspection and Compliance Building. It replaces a similar unit that was installed when the building was built in 1996. The unit was delivered to PVSC in four, large parts. Piece by piece, they were hoisted onto the roof and then assembled and secured.



### ***The Warehouse***

Our warehouse is essentially considered a nerve center. It houses virtually every piece of equipment, part, instrument and machine that is utilized at the plant. It also houses various hazardous chemicals that are utilized in the wastewater treatment process.

One of PVSC’s goals is constantly coming up with updated measures to keep the warehouse efficient and safe. Rite-Hite industrial fans were installed this past year. These fixtures span up to 16 feet in diameter. They keep the warehouse cool in the summer and warm in the winter by mixing warm air from the ceiling with cooler air at the floor. They circulate air up and over obstructions such as stacked products. They also have reduced the warehouse’s energy consumption by 30 percent. Also installed this past year were energy efficient Rab-Rail lights, which feature high-transmittance lenses that emit maximum light. They are also equipped with low-glare semi-diffusers and feature various sensor options for multilevel lighting control. They have reduced energy consumption by up to 80 percent, compared with traditional warehouse lighting.



## *Sludge Facilities*

Large wastewater treatment plants, such as PVSC, are exposed to potentially hazardous substances on a near-constant basis. That is because oils, chemicals, greases, fumes, water, high humidity, and varying atmospheric conditions are either necessary to or a result of properly executed sewage treatment. Unfortunately, they are all highly corrosive to PVSC's many steel and concrete surfaces and various types of equipment.

Comprehensive maintenance is required in order to protect our infrastructure. Painting our facilities and equipment is one of the best ways to protect our assets from aggressive chemicals and adverse conditions. The Return and Waste Activated Sludge Facility (10,000 square feet), the Sludge Thickener Facility (37,500 square feet) and the Primary Clarifier Facility (96,500 square feet) were all painted in 2017.

The painting of the Final Clarifier Facility (191,000 square feet) was completed in 2018. The Wet Weather Pump Station and our underground tunnels are being painted this year. The work was 90%-funded through FEMA.



## *Electricity Grids*

Temperatures last summer were once again as hot as expected. That drove the demand for electricity to peak, as air conditioning usage was significant and widespread.

PJM Interconnection is the operator of the country's largest electric grid. It serves 65 million customers in 13 northeast states, including New Jersey. PJM coordinates the movement of wholesale electricity and manages the high-voltage electricity grid to ensure reliability.

Under their "Demand Response" program, commercial and industrial electricity customers can voluntarily curtail a portion of their electricity consumption when the grid is under stress.

By voluntarily curtailing consumption when requested by the grid operator, end users can help to ensure grid reliability, reduce price spikes, and reduce carbon emissions.

As an incentive for electricity customers to take part in the curtailment program, PJM offers substantial revenue payments per megawatt of capacity pledged. Over the past eight years, PVSC has realized more than \$3.7 million in revenue through the program.

Some of the systems temporarily curtailed during a grid emergency event include the Sludge Heat Treatment Reactors, Thickening Centrifuges, Filter Presses, Oxygenation Tanks and other equipment we determine is available to meet the pledged load reduction.



## Safety and Security

More than 3 million workers are seriously injured at work each year in the United States and, on average, 12 are killed daily, according to the Bureau of Labor Statistics. Many also die from workplace-related diseases each year. None of this is lost on PVSC management. Our employees are exposed to a variety of hazardous chemicals and liquids. Slip and falls can also occur in or around the clarifiers or vats. Working in confined spaces also carries risks. Other common hazards include electric shock, explosions, and entanglement in moving machinery. Reducing the incidence of workplace accidents is one of our top priorities.

### Heavy Rescue Emergencies

One of our chief concerns is that so many of our personnel are constantly surrounded by massive equipment, machinery, pipes, concrete, bricks, steel and iron. Any type of entrapment involving those items could be catastrophic. Preparing and drilling for such an emergency, therefore, plays a vital role in ensuring that our employees are kept safe.

Two structural collapse drills take place during every year. In one such drill, we simulate an emergency where a dummy is trapped underneath a 4,000 pound piece of concrete. In another such drill, our rescue teams conduct Z-Rig rope drills. A Z-Rig is an arrangement of lines and pulleys that utilizes tension and theoretical mechanical advantage to increase an individual's lifting capacity by 3-times. Essentially, this means a rescue crew could use 100 pounds of force to move 300 pounds.



### Spill Drills

Many chemicals used here are inherently hazardous, or even deadly, when they are not used in a properly controlled manner or when accidents occur. Fortunately, those occurrences are extremely rare at PVSC. Still, it is absolutely essential that our Operations and Safety Departments, as well as our Emergency Services Unit (“ESU”), know exactly what to do in the unlikely event that a spill occurs.

Spills can come in different shapes and forms. They could be big or small and can occur indoors or outdoors. Most create medical or contamination emergencies. Three spill drills are conducted every year. The drills are simulations of accidents that occur during the delivery and/or containment of these hazardous chemicals.



### Confined Spaces

A smooth and steady flow through utility tunnels, sewers, storm drains and process pipes ensures that the wastewater is treated properly and then drained into the New York Harbor consistent with PVSC's permit obligations. To ensure that the infrastructure is properly maintained, PVSC employees descend into many confined spaces to inspect, repair and perform upkeep. That is



a challenge, since wastewater confined spaces are generally narrow, poorly lit and often contain hazardous liquid, toxic fumes or vapor. Other dangers include lack of oxygen; solids that suddenly fill the confined space; fire or explosions; extreme heat; falling objects; moving parts of equipment and/or machinery; and electrical shocks from electrical hazards.

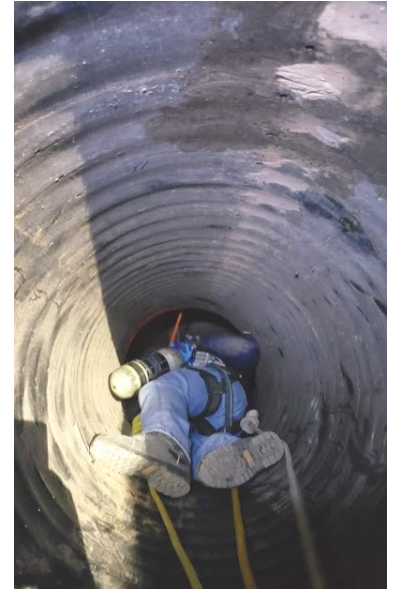
Confined spaces vary in size, shape and characteristics and challenges. The urgent need to rescue someone from a confined space can occur at any time. Accordingly, our ESU and our Safety Department come together several times annually to hold confined space rescue drills. The objective is for both teams to sharpen their expertise, knowledge, and skills so that they are not just prepared to avoid emergencies, but also to perform a rescue if an emergency still occurs.

Three such drills are conducted annually. In all drills, a dummy is used as the victim. Each time, the teams spring into action, assessing the configuration, size, potential hazards, and entry point of the confined space. A number of types of equipment can be used. These particular exercises call for ropes, harnesses, a 12-foot tripod, a ventilation system, winches, and self-contained breathing apparatus.

### ***Chainsaw and Wood Chipper Course***

You won't find a tool with more power per inch than a high-speed, fast-cutting chainsaw. According to OSHA, there are more than 40,000 people injured by chainsaws each year in the United States. Likewise, wood chippers are also dangerous. They generally consist of a powered feed mechanism, blades mounted on a rotating disc, and an internal combustion engine. There are safety features built into every chainsaw and wood chipper owned by PVSC. Still, training, the utilization of proper techniques, caution and common sense are still required to operate both. Accordingly, our employees who handle such equipment attend a Chainsaw, Tree Trimming and Wood Chipper Safety seminar at the Training Center every summer. The instructor emphasizes the common

and unique hazards associated with both devices; the proper techniques of cutting, limbing, bucking and felling (chainsaw); the proper techniques of loading trees, branches and limbs and selecting the safest work area (wood chipper); safe work practices; the importance of following the manufacturer's instructions for operating, inspecting and maintaining; common causes of accidents; tips for escaping danger; and personal protective equipment ("PPE") that should be used when operating both devices.





### Skimmer Vessel

It's no secret that the Passaic River has been the subject of massive pollution for many years. Two centuries of industrial dumping is buried in layers of silt and muck at the bottom of the river. Shortly after America's founding, the mighty Passaic River became a cradle of the nation's fledgling manufacturing industry.

While the river faces one of the most challenging and expensive environmental cleanups in United States history to remove chemicals, pesticides and heavy metals from the sediment, PVSC is making a significant difference at the top.

PVSC pioneered its River Restoration Program back in 1998, when it commissioned a 50-foot TrashCat Skimmer Vessel, the *SV Newark Bay*. We have removed more than 14,000 tons of debris from more than 100 miles of area waterways, which include the Passaic River, its tributaries and Newark Bay.

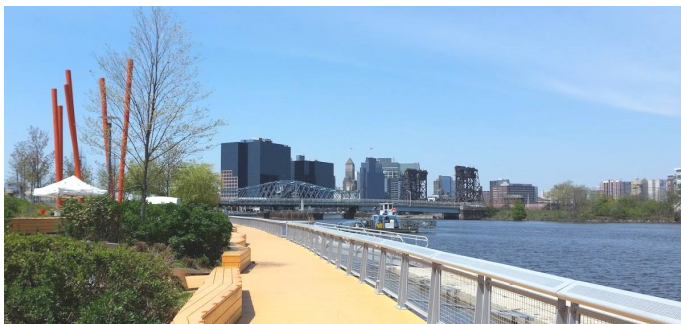
Help for the *SV Newark Bay* arrived in 2018. A new, state-of-the-art, Aquarius System Trash Hunter-34 Skimmer Vessel was launched into Newark Bay in the spring. The 50-foot long, 13-foot wide, 27,500 pound vessel was built by Aquarius Systems in Wisconsin. This innovative vessel features twin catamaran hulls, a water jet propulsion system, and an aluminum cab with tinted windows and seating for a captain and member of the crew or a passenger.

In tandem with the *SV Newark Bay*, it travels up and down the lower Passaic, its tributaries and Newark Bay, collecting debris and trash on its conveyor belts. The materials are stored onboard and then offloaded at our dock in North Arlington or at our plant in Newark.

### Great Falls Cleanups

There are parts of the Passaic River that are inaccessible by the Skimmer Vessel. The most notable and obvious part is the Great Falls in Paterson. PVSC conducts a few cleanups a year of the national landmark. This requires dewatering (turning off) the Great Falls — diverting the flow of the Passaic River through an adjacent hydroelectric plant owned by Paterson and operated by Eagle Creek Renewable Energy.

PVSC River Restoration Program team members then remove fallen trees, litter and other debris that accumulates along the shores and in the rocks above the falls. By keeping the falls clear of such potential blockages, PVSC is helping to ensure that the water continues to beautifully cascade over the falls and





mitigating threats of flooding. PVSC has now dewatered the Great Falls 20 times since 1998 for cleanup purposes.

One cleanup is conducted each year at the end of April in preparation for National Park Week and Earth Day. Attending on behalf of PVSC last April was Olivia Le Warn, our Watershed Ambassador. Olivia (right) is part of the New Jersey Watershed Ambassadors Program, a community-oriented AmeriCorps program designed to raise awareness about water issues in New Jersey.



The program works with all sectors of society to improve the quality of waterways, nurturing environmental activities and empowering residents to make responsible and informed decisions regarding their watershed.



New Jersey Water Environment Association (“NJWEA”) members also volunteered for last year’s cleanup (right). NJWEA is a nonprofit organization dedicated to preserving water quality and protecting the public health through education and training.

With a membership of approximately 2,800 operators, scientists, engineers, students and other professionals, NJWEA is an environmental leader in the State.



## *Tree and Debris Removal*

The heavy rains and high winds that swept across New Jersey the last couple years caused damage and inconvenienced many throughout our district. The conditions caused many trees to blow over. Quite a few, unfortunately, ended up in local waterways. In many instances, woody debris such as trees, branches, limbs and stumps can impact the flow of a river. This can increase flood risks and cause damage to bridges, docks, the riverbank and nearby homes.

In 2018, a fallen tree (40-foot long and 2-foot wide), with numerous branches and limbs, crashed into a dock at the Nereid Boat Club in Rutherford near Riverside Park. It dislodged and damaged the dock and several boats. After assessing the situation, members of our River Restoration crew descended into the river to cut the tree into several smaller pieces. The tree was then harnessed with cables from our crane and hoisted away.



## *Kearny Boathouse Cleanup Conducted*

PVSC annually conducts a cleanup in March of the grounds surrounding the Kearny High School Boathouse, which is situated on the Passaic River. The school's crew team uses the boathouse extensively for their races and practices. More than 100 students, teachers, and parents turned out for the event this past year.



On both sides of the Passaic, members of the PVSC River Restoration Program and volunteers (right) walked the banks of the river, collecting various forms of debris. Bags, rakes and work gloves were distributed to volunteers by PVSC.



## *Passaic River Tributaries*

The 90-mile Passaic River, which starts in Mendham and ends up in Newark Bay, has many beautiful parks and access points along its shores and provides habitat for wildlife. Cleaning up the Passaic River's tributaries such as the Peckman River is also a major priority for PVSC. The agency, for example, frequently de-snags the Peckman in Cedar Grove, Little Falls and Woodland Park.

The Peckman originates in West Orange and flows northeasterly until its confluence with the Passaic River in Woodland Park. PVSC River Restoration employees frequently remove fallen trees, litter and other debris that typically obstruct the flow of the river. PVSC clears Passaic River tributaries such as the Peckman River as a courtesy to the communities at no cost.

## *In the Community*

Wastewater may not be a glamorous subject, but it is still a very important one. At an early age, most of us come to realize that waste from our showers, sinks, dishwashers, laundry machines and toilets does not simply disappear into the ground. That tends to pique people's curiosity enough to ask: "Where does it go?"

### *Educational Outreach*

PVSC has offered a top-notch educational outreach program for K-through-12 students across its treatment district since 2003. The program seeks to educate young people about the steps that PVSC takes to keep local waterways healthy. The program also teaches young people about the effects of pollution on these waterways and the various things they can do to help mitigate pollution. It consists of a 50-minute presentation on stormwater pollution prevention and proper disposal of household wastes.

PVSC has now educated well more than 300,000 students on visits to more than 1,300 district schools. Most presentations take place in the classroom, in assembly halls or in an outdoor setting along one of the shorelines of a local waterway. The curriculum is customized for each grade level. The lesson plan for younger groups includes a tutorial from Messy Marvin, a cartoon character who has learned about litter through his experiences near the water. Older groups learn through interactive, multimedia presentations, and activity books.

A Bird House Program is part of Educational Outreach. Each year, we visit local schools to help students construct and hang bird houses. Attracting birds can improve the ambiance of any outdoor environment. While bird watching can be enjoyable and relaxing, birds actually serve a more practical purpose. They also provide people with an all-natural and organic means for weed and pest control.

### *Plant Tours*

PVSC also conducts approximately 15 tours per year for foreign dignitaries, college and school aged students, and various environmental groups.



Guests learn how our complex infrastructure captures wastewater from more than 1.5 million residents and then assiduously treats it so it can be safely released into Upper New York Harbor. Many of these guests are interested in pursuing careers as STEM (Science, Technology, Engineering and Mathematics) professionals.

Some of our recent tour groups included a delegation from the United States Department of Commerce and the Korean Local Government Officials Development Institute, Tianjin Municipal Engineering Design and Research Institute in China.

## *Lab Day*

Every year, PVSC hosts students from a local high school for Lab Day. Our two most recent visitors were the St. Dominic Academy and Ferris High School.

The primary objective of the event is to showcase various careers within the sciences, raise awareness of the important role labs play in society, and to specifically educate the students regarding lab procedures and responsibilities.



Students are exposed to what transpires in the lab on a daily basis by observing several wastewater analyses and having the hands-on opportunity to perform the analyses themselves.

They also learn about safety procedures in the laboratory and about the State and federal regulations PVSC observes. In addition to visiting the lab, students are taken on an extensive, plant-wide tour.

## *STEM Expo and Science Day*

Employees from Engineering, the Lab and Educational Outreach have participated in STEM Expos and Science Days at local schools. For instance, they have served as judges at Queen of Peace Elementary School STEM Expo in North Arlington, where they also shared their knowledge of wastewater treatment and management with the students.

The STEM Expo is designed to give students the opportunity to design STEM projects, while working individually or within groups. The students then showcased their projects to their peers, teachers, parents, and other local STEM Professionals.

Since 2018, they have also served as panelists at Science Day at Hillside Elementary School in Montclair.

Throughout the day, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> grade students listen to panelists as they discuss what shaped their early interest in science, challenges to overcome, what their job entails, contributions they make to society through their career, and words of advice for students thinking about that career.



# Green Infrastructure

## Green Infrastructure Partnerships

The Green Infrastructure Municipal Outreach and Technical Assistance Program Partnership between PVSC and the Rutgers Cooperative Extension (“RCE”) Water Resources Program moves into its seventh year of service in 2020. The goal of the program is to provide guidance and direction to the 48 municipalities in the PVSC service area regarding the benefits of and opportunities for implementing green infrastructure.

Green Infrastructure is an approach to stormwater management that is cost-effective, sustainable and environmentally friendly. PVSC is committed to promoting green stormwater infrastructure to protect public health and the environment. To date, we have completed 39 municipal-wide green infrastructure feasibility studies. A list of these studies can be found here: <http://water.rutgers.edu/PVSC/PVSC.html>

PVSC has also partnered with a Rutgers Landscape Architecture Class to have the students develop stormwater overflow solutions along the Passaic River. We also partnered with two Civil/Environmental Engineering Senior Design Teams from Stevens Institute of Technology to develop shallow, less expensive sewer separation designs that incorporate green infrastructure in East Newark.



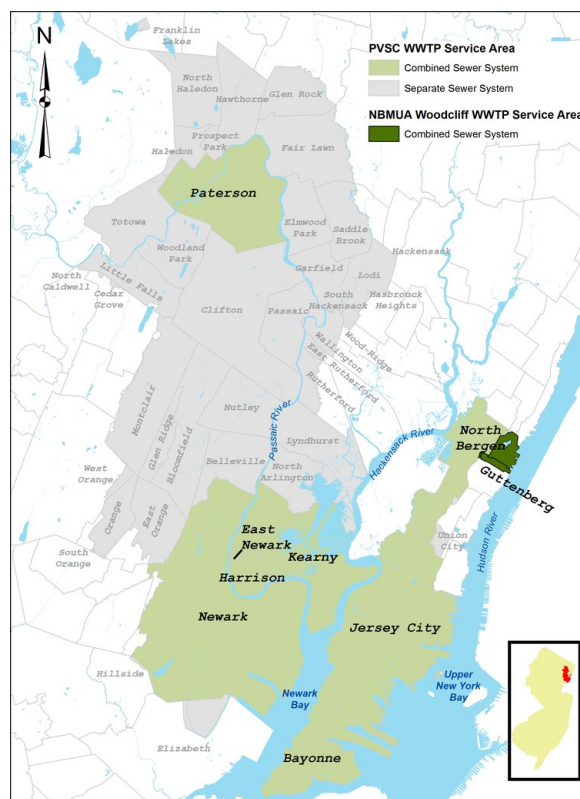
## Clean Waterways and Healthy Neighborhoods

The New Jersey Department of Environmental Protection (“NJDEP”) issued PVSC and its eight Combined Sewer Systems (“CSS”) municipalities with New Jersey Pollutant Discharge Elimination System (“NJPDES”) permits requiring the development of CSO Long Term Control Plans (“LTCP”). The CSO LTCP will identify cost effective infrastructure improvements to reduce pollution from the CSO discharges.

The permit also requires extensive community outreach and public participation during the development of the CSO LTCP including the creation of a Supplemental CSO Team.

PVSC, in conjunction with its Supplemental CSO Team, developed the brand, Clean Waterways Healthy Neighborhoods. The initiative is a collaborative initiative of the entities who own and operate combined sewer systems within the Passaic Valley Sewerage Commission and North Bergen Municipal Utilities Authority (“NBMUA”) service areas.

The initiative aims to keep the public informed of efforts being taken to reduce the water quality impacts of combined sewer overflows area receiving waters.



As part of its community outreach, Supplemental CSO Team meetings occur quarterly at various locations around the PVSC and NBMUA service areas. Consultants, permittees, regulators, and guest speakers present on relevant topics. Members of the Supplemental CSO Team and the wider public are invited to provide input and comment on the LTCP development process.

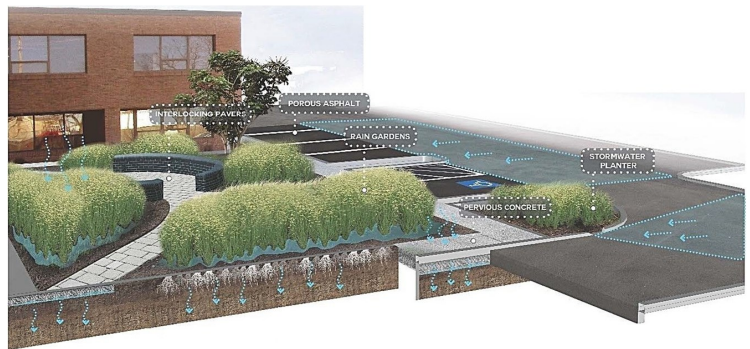
Green Infrastructure Fact Sheets and Quarterly Meeting Presentations can be accessed here: <https://www.njcleanwaterways.com/>



## ***Administration Building Rain Garden***

In 2018, PVSC and RCE proudly demonstrated a green infrastructure project by constructing a rain garden and bio-retention system at the PVSC Administration Building Plaza. The project consisted of a stormwater planter, permeable pavers and porous concrete, all of which decreases non-point source pollution.

Stormwater is a major cause of water pollution. When rain falls on grass or other vegetation, the water is absorbed and filtered by soil and plants. However, when rain falls on paved streets and surfaces, the rainwater cannot soak into the ground. In those cases, the rainwater must be properly managed to prevent flooding and remove pollution that the rainwater/stormwater may have picked up from streets, driveways, or other paved surfaces.



The new landscape outside our Administration Building can capture and store up to 18,000 gallons of rainwater. At first glance, this landscape looks like an ordinary garden, but it was built to manage rainwater draining from the building's rooftop and parking area.

The garden captures, filters and absorbs stormwater to help restore the natural water cycle. It reduces non-point source pollution at the source. This results in significantly cleaner, healthier waterways.

## ***Rain Collection System Installations***

Another one of our ongoing green infrastructure efforts is the installation of rain collection systems. At many local schools, rain drains from rooftops only to settle on the asphalt or cement playgrounds and driveways next to the schools.

PVSC and RCE recently addressed this concern at Abraham Lincoln School No. 6 in Garfield and Langston Hughes Elementary School in East Orange. PVSC's River Restoration Program, Line Operations Department and Pipe Shop teamed to install rain gardens at both of these schools.



Both rain gardens collect stormwater from the rooftops that would otherwise puddle on playgrounds and eventually make it to the nearby sewers, collecting trash and other forms of debris along the way.

Rain gardens also provide meaningful learning opportunities for students outside the classroom as they plan, plant, manage, monitor and study their plantings.

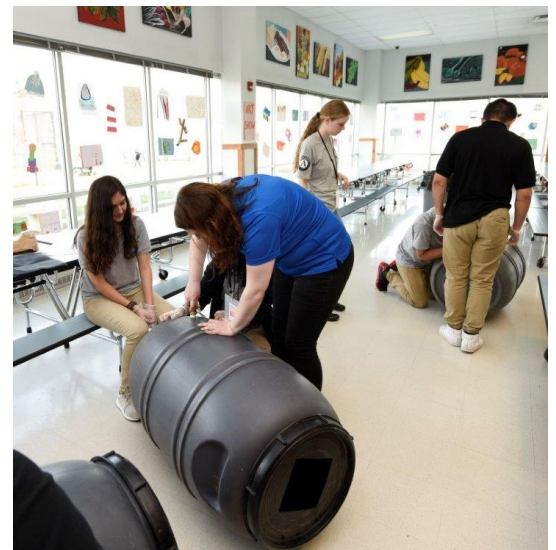
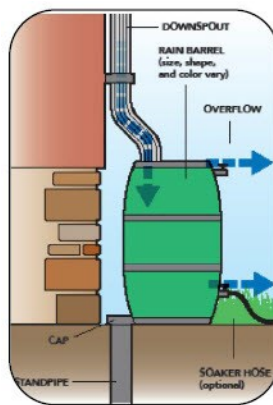
## *Harrison Tide*

The Town of Harrison entered into the Green Infrastructure Municipal Outreach and Technical Assistance Program four years ago and immediately developed the Harrison TIDE “Transforming Infrastructure and Defending our Environment Program.”

Their objective is to improve Harrison’s water quality by addressing combined sewer and stormwater pollution and flooding. They accomplish that by collaborating with PVSC and Rutgers to identify and implement green infrastructure solutions and by engaging the community through environmental educational outreach.

Every year, Harrison TIDE holds a Rain Barrel Workshop at Harrison High School.

Connecting downspouts from a building to a rain barrel enables people to collect, store and use storm water for purposes such as landscaping or washing exterior surfaces around the house. Attendees learn the process of constructing, installing and maintaining rain barrels.







*“Protecting Public Health and the Environment”*

PASSAIC VALLEY SEWERAGE COMMISSION  
600 WILSON AVENUE  
NEWARK, NJ 07105

(973) 817-5735

<http://www.nj.gov/pvsc/>