

# Newburgh, New York

Wastewater Treatment Plant Update, 2011



## Table of Contents

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<b>Introduction</b>	<b>1</b>
<b>Operations</b>	<b>2</b>
Sludge Disposal	2
Chemical Usage	2
Process Control	3
Compliance	4
Laboratory	5
<b>Maintenance</b>	<b>6</b>
<b>Emergency Response</b>	<b>7</b>
<b>Safety &amp; Training</b>	<b>8</b>
<b>Community Involvement</b>	<b>9</b>
<b>Looking Ahead</b>	<b>10</b>
<b>Appendix</b>	<b>11</b>





## Introduction

Severn Trent Services is pleased to present the 2011 Wastewater Treatment Plant Update to our client and partner, the City of Newburgh. We have provided reliable, cost effective wastewater operations to the City since 2003. Far more than being simply a contractor, we partner with the City in providing vital services to the community's residents and businesses.

Throughout the past two years of our public-private partnership with the City of Newburgh, we have provided our professional expertise to assist the Borough during a number of events and challenges including a facility upgrade, tropical storm events and sludge disposal issues. In the face of these challenges and transitions, as always, Severn Trent's prime directive is to:

- Provide safe operation
- Maintain regulatory compliance
- Operate efficiently
- Preserve the City's investment in its facilities through optimized maintenance

Severn Trent's work with the City of Newburgh represents our commitment to environmental excellence as well as our dedication to serving the needs of the community.





## Operations

Under an intermunicipal agreement between the City of Newburgh and the Town of Newburgh, the 13.5 million gallon per day (MGD) wastewater treatment plant (WWTP) utilizes the activated sludge system and produces an average daily flow of 6.3 MGD. We are responsible for operations and maintenance of the plant as well as its combined sewer overflow (CSO) system. The CSO system is monitored continuously and weekly site visits are made to the regulators for inspection and maintenance. In addition, Severn Trent monitors and tabulates the Town of Newburgh's flow to the WWTP. Flow data is provided to the City Comptroller and City Engineer for billing purposes.

We regularly respond to inquires from residents in the Newburgh community. Questions are answered via phone where possible and if necessary, operators are dispatched to the customer's site to speak with them personally.

### Sludge Disposal

In the spirit of partnership with the City, Severn Trent readily processes and dewateres the water treatment plant's alum sludge approximately every six weeks.



During processing, alum sludge displaces our normal sludge, which backs up in the plant until the alum sludge is completely removed. Our staff works diligently to remove alum sludge from the unit process to prevent it from mixing with the existing plant sludge. After disposing alum sludge, we expend – on average – five days and 70 man hours dewatering and removing the WWTP's normal sludge until we reach normal operating conditions. Additional man hours are required to process the sludge as the water is more difficult to extract, resulting in longer dewatering times.

Because the plant's third-party sludge hauling facility will not accept alum sludge due to its adverse effects on equipment, Severn Trent hired a separate waste disposal hauler to remove the dewatered sludge containing alum.

### Chemical Usage

Within the past two years, Severn Trent operators have evaluated annual costs and associated hazards of chemical usage and have researched more cost conscious, less hazardous alternatives. As a result of our findings, potassium permanganate, an oxidant used to remove iron and hydrogen sulfide from water, has been replaced by Endimal. Potassium permanganate is hazardous if



swallowed, inhaled or if contact is made with the skin. Though Endimal oxidizes hydrogen sulfide in the same manner as potassium permanganate, it has been found to be safer to handle and generates an annual reduction in chemical costs.

## Process Control

Severn Trent's performance plan emphasizes process control procedures consisting of the following five key elements:

- Centralized control of facility processes and process changes
- Analysis, ongoing review and fine tuning of all facility operational parameters
- Implementation of a facility performance measurement system
- Regular meetings with City staff
- Periodic spot checks of facilities
- Weekly operations management meetings to review, strategize and prioritize facility issues

To further improve process control, Newburgh's WWTP underwent a major upgrade from a surface aeration system to a fine bubble diffuser aeration system



in 2009. The upgrade was planned and initiated during Severn Trent's contract with the City as an energy saving mechanism and a more efficient means of oxygen transfer in the activated sludge process. Severn Trent personnel commissioned, tested and commenced operation of the new system in 2010.

Upgrades to the activated sludge process have allowed plant operators to modify process control by utilizing half of the previous tankage, thereby reducing overall aeration basin in-service volume from 3 million gallons to 1.5 million gallons. This has resulted in a more efficient operating process, reduction in biosolids and cleaner effluent. Other benefits of the activated sludge process include:

- A reduction in biosolids, which in turn has reduced the amount of sludge produced and wet tons of dewatered sludge transported to the disposal facility
- A decrease in electrical use 14% over the past 3 years
- Minimizing carbon footprint by decreasing energy consumption and sludge hauling

Hydraulic loading and dilution factors of rainwater on the existing biological mass typically result in an increased daily flow from 6.3 MGD to 13.5 MGD



during rain events. This additional flow can cause operational and process control challenges. The CSO system is designed to allow a certain amount of rainwater runoff to enter the WWTP via the sewer collection system and flow regulators. Once the flow set point of the regulator is reached, the flow above and beyond the set point is diverted automatically, via a float and valve system, to the CSO outfalls that discharge into the river. A Wet Weather Program is in place to provide guidance to meet these weather events. The Program provides steps to be taken before, during and after rain events and include:

- Avoiding bar screen failures
- Visually observing and monitoring flow patterns
- Monitoring sludge blanket levels
- Maintaining secondary system solids inventory

## Compliance

The facility operates in accordance with the National Pollution Discharge Elimination System under SPDES permit number NY0026310. Sampling for SPDES permit takes place at the chlorine contact tank (CCT) discharge weir in accordance with the Site Sample Plan. The Newburgh facility has been in compliance with all monitoring parameters and has experienced no excursions to date.

Monitoring Parameter	Permit Level
BOD5	30 mg/L month, 45 mg/L 7 day average
Suspended Solids	30 mg/L month, 45 mg/L 7 day average
Settleable Solids	0.3 mg/L
pH	6.0 to 9.0 SU
Chlorine Residual (seasonal)	2.0 mg/L (May 1 to October 31)
Coliform, Fecal – 30 day geometric mean	200 colonies per 100 milliliters
Coliform, Fecal – 7 day geometric mean	400 colonies per 100 milliliters

The Plant Manager submits monthly corporate responsibility reports to Severn Trent's Compliance Division for review and evaluation. We also submit the following annual reports to the appropriate regulatory agencies:

- CSO BMP Best Management Practices – NYS DEC
- DMR QA – EPA
- IPP – EPA
- Sludge Report (503) – EPA

To further comply with all federal, state, and local requirements, we administered the City's existing industrial pretreatment program (IPP). In addition, we monitor local businesses that may fall under IPP regulations. For instance, after researching and identifying Unitex Laundry as a source of high volume water usage, we issued an IPP Significant Industrial User permit, which allows Unitex to be a part of the IPP.



## Laboratory

Our in-house lab performs daily testing on influent and effluent settleability, sludge volume Index, TSS, pH, dissolved oxygen and temperature. We monitor daily flows to evaluate and observe all treatment processes at the plant.

Severn Trent participates in the annual EPA DMR QA Study which evaluates the quality of data used to ensure the safety of the nation's waters. Severn Trent's lab personnel participate in proficiency testing, which is graded by an independent laboratory. The Newburgh WWTP has received annual Certificates of Recognition for successful evaluations.

The WWTP completes a five year cycle of whole effluent toxicity (WET) testing which determines the cumulative toxic effect to aquatic organisms from all pollutants contained in the facility's wastewater effluent. The WWTP achieved the highest rating possible in the 2011 testing year.



## Maintenance

Severn Trent's approach to maintenance involves executing effective preventive and corrective measures to increase the lifespan of the WWTP's assets. In every project we undertake, Severn Trent implements maintenance protocols and procedures that reflect manufacturers' warranties for existing and newly bought equipment. As part of our maintenance approach, equipment maintenance and repair history is tracked and available, enabling an educated decision making process when it comes to repairing or replacing a particular component. Severn Trent's approach to inspection, repair, and maintenance of equipment has kept much of the plant equipment operating up to and past its anticipated service life.

An asset management plan was developed by our Technical Services Group and presented to the Mayor and City Council in 2010 as a guideline for capital improvement projects over the next 10 years. This plan, which is updated annually, identifies each piece of equipment at the WWTP and specifies the following:

- Year Purchased
- Condition
- Criticality to Operations
- Performance
- At Risk Rating

To increase efficiency and productivity with the use of technology, Severn Trent implemented the HACH Job Cal maintenance program in September 2011. A computerized maintenance management system (CMMS), Job Cal assists with maintenance tracking and scheduling for wastewater plants maintenance activities, record keeping and manufacturer's information.



In addition, Severn Trent provides an annually updated tool and equipment inventory spreadsheet to the City Comptroller which identifies each item purchased, current inventory and deleted items.



## Emergency Response

Mother Nature can significantly challenge our efforts to provide uninterrupted, compliant services. In each situation, Severn Trent staff takes steps in advance to reduce the potential impact as much as possible and then marshals the necessary resources – staff from other locations, vendors and subcontractors – to ensure the people we serve continue to receive vital services.

When tropical storms Irene and Lee made landfall in August 2011, local Severn Trent employees actively participated in the City's Emergency Management Team. To ensure prompt, effective operations during these severe weather events, plant staff did the following:



- Kept City officials informed of plant status, including meeting on-site with the City Engineer during peak surge and tide conditions
- Manned the facility around-the-clock and executed the Emergency Management and Wet Weather Operating plans
- Secured all outdoor items that had the potential to become missile hazards
- Brought in off line tanks to service high flows
- Designated priority on-call staff to respond to any emergencies

The measures taken by our staff ensured that the WWTP sustained no damage and operations were not affected with the exception of high flow rates.



## Safety & Training

Promoting the safety of our employees is our highest priority. In keeping with this goal, the entire staff participates in monthly safety meetings and weekly tailgate sessions that address topics related to safety in the plant and in the home. Seasonal training sessions are conducted during the winter and summer months. In addition to meetings and training sessions, we have implemented the following safety improvements to benefit our employees, the City and the surrounding community:

- Visitor guidelines
- Lock out/tag out procedures
- Emergency response and operations
- Risk management plan
- Inclement weather plan
- Fire extinguisher use

Severn Trent purchases and provides staff with personal protective equipment such as safety life rings, steel-toed shoes and safety glasses as well as critical tools such as gas monitors, and confined space entry equipment.



## Community Involvement

We believe in being an integral part of the community in which we live and work. Therefore, Severn Trent works closely with the City of Newburgh to develop and participate in community activities and programs. Our participation in community activities is typically guided by the plant's Project Manager, which allows for considerable flexibility and customization. We have been a proud and continual sponsor of the annual Newburgh International Waterfront Festival as well as the City's annual Fourth of July Fireworks on the Waterfront event.



## Looking Ahead

Severn Trent understands that maximizing efficiency is an on-going process. In our continual effort to strive toward operational excellence, we have recommended the following suggestions for future implementation:

**Alternative Dewatering Method** – At no cost to the City, our Technical Services Group conducted a preliminary process evaluation to seek an alternative means of sludge disposal. In April 2011, we performed a pilot project to dewater alum sludge by pumping 18 liquid tanker loads of sludge directly from the tanks at the water plant. This method proved ineffective as there is no capability to thicken the sludge on site.



Our staff also evaluated and researched the potential use of Geo Tubes Dewatering Filter Bags to capture, dewater and dispose of the sludge in a contained area. This was not feasible due to the large carbon footprint for the number of containers needed.

Finally, Severn Trent researched the possibility of renting a trailer mounted dewatering unit to use on site to eliminate the impact of excessive sludge on the WWTP. This approach proved to be costly and the logistics would potentially interfere with water plant operations.

We suggest the City consider an alternate means of dewatering or sludge removal directly from the City's water plant or transporting the sludge to an associated holding facility to eliminate discharge to the WWTP.

**Adherence to the Asset Management Plan** – Adherence to the asset management plan is vital for the planning and budgeting process as well as for reducing the cost of repairs and maintenance caused by extended service life. Due to the age of the plant, its infrastructure, utilities and equipment, Severn Trent recommends that the guidelines set forth in the asset management plan be strongly considered and acted upon to prevent failure of critical equipment at the WWTP. The Plant Manager and Technical Services Group are available to answer any questions regarding the plan.

As a result of Severn Trent's recommendations concerning the asset management plan, the City Council approved an amended to resolution number 264-2010, which allows for the transfer of \$550,000 from the Sewer Department Fund balance to the Sewer Department Fund designated for other equipment. These funds are earmarked to provide funding for replacement or repair of critical equipment at the WWTP. The Plant Manager and staff are working diligently with the City to move forward with each recommendation.



## Appendix



