

Chesterfield County Environmental Stewardship 2019

Industrial Pretreatment Program

PROGRAM OVERVIEW

Chesterfield County's Industrial Pretreatment program is designed to prevent the introduction of pollutants into its sewer system. As a result of the implementation of this program, the wastewater treatment plant's operation is protected from pollutant interferences, the aquatic life within receiving waters is preserved from contamination and the quality of biosolids is maintained, such that it can be land applied for beneficial use, rather than being land filled or incinerated. The program further provides opportunities to reclaim and recycle wastewater and prevents adverse health and safety effects for the workers at the treatment plant, as well as, at the collection system.

FATS, OIL & GREASE CONTROL PROGRAM

Fats, Oils, and Grease (FOG) are prohibited to be discharged into the sewer system. FOG accumulates in sewer pipes, and overtime, can build up and restrict the flow in the pipe, causing untreated wastewater to back up into businesses and homes, or the blockage could cause manholes to overflow in the street, which is a public health hazard and/or contaminate waterways. To prevent this from occurring, Chesterfield County has implemented extensive educational plans for its customers and encourages all the food establishments to implement appropriate best management practices. Educational brochures and posters have been developed in several languages to achieve this goal. The food establishments are also required to have appropriately sized grease interceptor. Grease interceptors are required to be properly maintained and are subjected to inspection by a Chesterfield County's inspector. The inspector ensures that the equipment is functioning as designed and that it is being cleaned and serviced properly.

Mercury and Silver Pretreatment Control Program

Chesterfield County's Industrial Pretreatment section has developed an informational brochure on silver and mercury control. It is being used to educate the business communities that use silver and mercury in their processes. The Best Management Practices for dental offices to responsibly handle and recycle dental amalgam, lead foils and X-Ray fixers has been developed and utilized for education purposes. Mercury and Silver pose environmental hazards if discharged untreated. It evaporates slowly and does not degrade easily and accumulates in fish, resulting in human consumption advisories. Its consumption can result in fetal and child development issues and could lead to irreversible brain damage. Free ionic silver is very toxic and is considered hazardous waste. Silver is a nonrenewable resource used to manufacture a variety of products ranging from dental amalgam to x-ray film. Also, Silver reclaimed from photographic wastewater can be a source of revenue.

Spill Prevention, Control, and Countermeasure Plans

The purpose of the Spill Prevention, Control, and Countermeasure (SPCC) rule is to help facilities prevent the discharge of pollutants and oil into Chesterfield County's sewer system and/or navigable waters. Chesterfield County oversees the SPCC plans for all its permitted industries. The plan contains the operating procedures to prevent spills; Control measures to prevent a spill from reaching sewer system or navigable waters; and countermeasures to contain, clean up, and mitigate the effects of a spill that reaches sewer or navigable waters. Industries are required to have best management practices in place to ensure this goal.



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Wastewater Collections

PROGRAM OVERVIEW

Chesterfield County owns and operates 25 pump stations and over 2,000 miles of sewer lines. This collection system is dedicated solely to the transport of sewage from its source to the point of treatment. With over 90,000 customers, Chesterfield County sewage collection system serves approximately 250,000 people. Beyond traditional operations and maintenance of a sewage collection system, Chesterfield County Wastewater Collections team also pays attention to environmental stewardship. Some examples follow.

Inflow and Infiltration Reduction Program- The Inflow and Infiltration Reduction program developed a systematic approach to assisting in monitoring and reducing inflow and infiltration, thereby providing safe and cost-effective conveyance of wastewater.

Through routine closed-circuit television inspection areas in need of repair are identified and crews are dispatched to perform repairs. The Inflow and Infiltration Program utilizes flow monitoring equipment to identify areas of high flow during periods of heavy rain events to isolate the source of inflow.

Manholes were identified as a major source of inflow due to the nature of their design. Manhole inflow dishes, also known as manhole bowls are installed during routine maintenance and installed through Capital Projects.



In FY18, 865 manhole dishes were installed, 179,503 feet of sanitary sewer lines were televised, 541,062 feet of sanitary sewer lines were cleaned and .28 million gallons per day of inflow and infiltration was reduced.

Spoil Pile and Vehicle Wash-down Area Pollution Control Improvement Program - The Utilities Operations and Maintenance division identified the vehicle wash-down and spoil pile area as a source that could potentially discharge pollutants into an adjacent concrete BMP and then into a storm system. Excavated soil cannot be placed immediately back into excavated areas due to the moisture content of the soil. The soil is transported back to the operations center where it is unloaded and allowed to dry before disposal. Prior to leaving the site, vehicles must be washed to remove any mud or dirt left in the dump bed. Operations and Maintenance staff worked with the Technical Support and Environmental Engineering staff to develop and install improvements to the wash-down area thereby reducing the amount of sediment that would enter the stormwater system.

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Operations and Maintenance Parking Lot Oil/Water Separator Installation Project - Through a Stormwater site inspection, it was determined that the parking lot area between the main O&M building and the rear maintenance building could potentially discharge pollutants into an adjacent concrete BMP and then into a stormwater system.

Operations and Maintenance staff worked with Technical Support and Environmental Engineering staff to select the appropriate size Oil/Water Separator. Operations and Maintenance staff purchased and installed the Oil/Water Separator to minimize the potential for discharges into the stormwater system, this separator is routinely cleaned and maintained to ensure proper operations.

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Water Treatment

PROGRAM OVERVIEW

The Addison-Evans Water has a water treatment capacity of 12 MGD and was one of 18 utilities in the county, and the first in Virginia to meet the standards of the Partnership for Safe Drinking Water Program. Chesterfield is extremely proud of the quality water that we provide and our spotless record of never exceeding a Safe Drinking Water Act primary maximum contaminant level (MCL), an achievement held by only a handful of utilities across the nation.

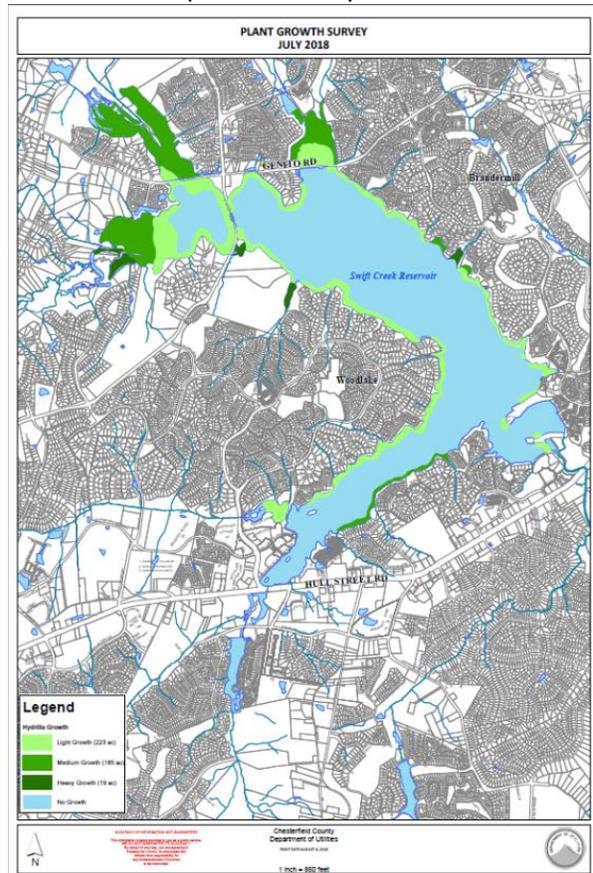
Addison-Evans Water Production & Laboratory Facility (AE):

AE continues to look towards environmentally friendly solutions to issues concerning the Swift Creek Reservoir (SCR) and the plant. Some examples include:

AE has worked with a renowned expert on the issue of the invasive aquatic weed hydrilla in the SCR.

Selected an environmentally friendly option of adding sterile grass carp (as opposed to herbicides, reservoir draining & scraping sediment, diesel-powered large equipment for plant removal, etc.). Over the years (since 2010) we have worked with the consultant and the surrounding communities to achieve a balance approach to control of invasive weed hydrilla. Monthly during the growth season our trained biologist and technicians monitor the plant growth using sophisticated cameras and vegetation calculations, providing constant updates to the community.

Control of algae in SCR is done through environmentally friendly methods. The county has staff experts in algal identification and a state-certified applications biologist trained in using low dose application in freshwater. In addition, our treatment plant uses state-of-the-art ultrasonic methods to control algae and monitor water quality in the reservoir intake bay. Low doses of a peroxide chemical and a copper compound are used only when needed to proactively prevent algal overpopulation, also known as algal blooms that would be harmful to the other natural biota in the reservoir as well as cause tastes/odors that would need removal at the treatment plant.



AE works on a regular basis with the VDGIF to have fish surveys and fishery assessments. This occurs as VDGIF is available but generally varies between annual to biennial. Tracking the fish population and health is a beneficial measure of the ecological balance in the reservoir.

AE is starting an Environmental Management System (EMS) to try to ensure best available environmental practices are occurring at the plant and to look forwards to continuous approval.

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Water Distribution

PROGRAM OVERVIEW -The water system is supplied from three sources: the Addison-Evans water treatment plant, the Appomattox River Water Authority, and the City of Richmond. The water distribution system supplies the finished water to residents throughout Chesterfield County and consists of just over 2,000 miles of pipeline ranging in diameter from two to 42 inches in diameter. To accommodate the water demands we have invested in 23 water storage tanks and 14 water pumping stations throughout the county.

Our water distribution team continues to look toward environmentally friendly solutions to all aspects of their operations. Some examples include:

The Water Distribution section implements a can puncturing procedure to properly dispose of residual aerosol can liquids and to recycle empty aerosol cans.

Periodically, the water lines need to be flushed with chlorinated water. Multiple tactics are used to remove chlorine from the water flushed from fire hydrants to eliminate adverse effects to the environment. One method is a dechlorinating agent in the form of tablets that are used in different ways to remove chlorine.



Can puncturing unit



Dechlorination tablets in a flushing diffuser



Dechlorination tablets in a flushing mat

Nonfunctioning water meters that are replaced through the meter replacement program are crated and recycled to minimize waste.



Scrap water meters crated and recycled.

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Wastewater Treatment

PROGRAM OVERVIEW - Chesterfield County owns and operates two wastewater treatment plants (WWTPs). The Falling Creek WWTP has a permitted capacity of 12 million gallons per day (MGD). The Proctors Creek WWTP has permitted capacity of 27 MGD. Performance of each facility is regulated by individual permits under the National Pollution Discharge Elimination System (NPDES). The NPDES permit for the Falling Creek WWTP is VA0024996, and the NPDES permit for the Proctors Creek WWTP is VA0060194. These permits ensure that the water discharged from these facilities maintain public health and environmental safety. The amount of nutrients discharged from both facilities, including nitrogen and phosphorus, is collectively regulated under a single General Permit, VAN040080. By addressing nutrient discharges, the General Permit supports restoration of the Chesapeake Bay.



These facilities also engage in environmental stewardship beyond to their permitted performance. Some example are as follows.

Stormwater Management at WWTP – Both wastewater treatment facilities have achieved a No Exposure Certificates (NECPRO0278 & NECPRO0279) from Department of Environmental Quality. All chemical storage and delivery systems have containment at both facilities. Operating procedures have been established to minimize the risk of spills and respond to spill events. In addition, storm water is collected to controlled discharge points such that wastewater does not contact stormwater at each facility. Falling Creek WWTP has one stormwater discharge point; whereas, Proctors Creek WWTP has two stormwater discharge points. Motorized gates have been placed at each stormwater discharge point at both facilities. In the event of a spill, these gates are close to prevent deleterious discharges into nearby water courses.



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Dominion Power Water Reuse – Dominion Energy’s Dutch Gap Power station uses approximately 0.5 to 1.5 million gallon per day of treated effluent from the Proctors Creek WWTP in their flue gas desulfurization system. As a result, Chesterfield County’s treated wastewater is employed to prevent acid rain, which would have otherwise resulted from the presence of sulfur in the flue gas. Furthermore, use of treated wastewater reduces overall water demand and treatment needs at the power station.



Digester Improvements - Both wastewater treatment facilities employ anaerobic digestion to stabilize biosolids, which result from the overall treatment process. The associated digesters need to be heated to roughly 100°F. Traditionally, commercial natural gas was employed to heat these digesters. Modification to process controls of the boilers have promoted efficient use commercial natural and allowed use of digester gas in lieu of commercial natural gas. As a result, the amount of commercial natural gas consumed has been reduced, and the amount of digester gas that is flared off has been minimized at both wastewater treatment facilities.

At the Proctors Creek WWT, further process modifications to the digestion system have reduced the amount of potable water consumed. The digestion process utilized gas compressors to mix the digesters. These compressors consume water to maintain seal pressure. The water source for these compressors was changed from potable water to non-potable water from the treated wastewater effluent.



Covered Biosolids Storage - Biosolids are a byproduct of wastewater treatment. The quality of these biosolids is governed under the EPA’s 501 and 503 regulations. Under these regulations, Chesterfield County proudly generates Class B solids, which can then be land-applied for beneficial agricultural purposes. Chesterfield County further advances their commitment to environmental stewardship by providing covered storage of these biosolids in a fully-contained setting. As a result, quality of the biosolids is maintained, and overall transport needs are reduced.