FACT SHEET

HRSD's Highly Treated Water

The wastewater treatment process

Highly Treated Water cleaned at HRSD's James River Treatment Plant

HRSD's Nansemond Treatment Plant in Suffolk, Virginia

Bar screens at HRSD's James River Treatment Plant in Newport News, Virginia

Primary clarifiers at HRSD's Williamsburg Treatment Plant in Williamsburg, Virginia

Why does HRSD clean wastewater?

Clean water is one of our most valuable resources. To protect public health and area waterways, the water used by homes, industries and businesses must be collected and treated before it can safely be released back into the environment. HRSD's extensive wastewater treatment process helps protect:

- Public health - by eliminating many disease-causing pathogens such as bacteria and viruses
- Local waterways - by reducing the nutrients nitrogen and phosphorus, which contribute to harmful and unsightly algal blooms
- The economy - by ensuring that we can enjoy clean oceans, lakes, streams and rivers and that the businesses relying on them can thrive.

How does HRSD clean wastewater?

HRSD's extensive wastewater treatment process can be broken down into three main processes: **Primary Treatment**, **Secondary Treatment** and **Tertiary Treatment**. These processes ensure that the final water meets stringent state-regulated environmental standards and supports the intended use of the receiving waterbody.

Primary treatment

When wastewater enters an HRSD treatment plant, it first flows through a bar screen that removes large floating objects such as trash, sticks and rags. The captured material is properly disposed of in a landfill and the wastewater flows to a grit chamber and a sedimentation tank. These devices slow the flow of the water and allow sand, grit, human waste solids and other small particles to settle to the bottom. These solids are then removed along with any scum or grease floating on top.

swift Sustainable Water Initiative for Tomorrow

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An aeration tank at HRSD's York River Treatment Plant in Seaford, Virginia

Secondary treatment

Next, the wastewater travels to secondary treatment facilities that speed up the processes of nature, allowing microorganisms (bacteria and other organisms) to consume 80-90 percent of the "organic matter" – or human, animal and plant waste. The most commonly used secondary treatment technique in HRSD plants is the *activated sludge process*. An activated sludge process speeds up the work of the microorganisms by pumping oxygen-rich air and sludge into close contact with the wastewater in an aeration tank. Over several hours, the organic matter is broken down into harmless by-products.

Final clarifiers at HRSD's Virginia Initiative Plant in Norfolk, Virginia

The wastewater is then sent to a final clarifier. In the final clarifier, the microorganisms that grow during the activated sludge process sink to the bottom and are recycled back to the aeration tanks, and the remaining water moves on to the final treatment process.

Tertiary treatment and disinfection

Advanced treatment systems remove additional pollutants such as nutrients, heavy metals and chemical compounds. These systems may use microorganisms that differ from those in secondary treatment, additional chemicals or an effluent filtration system. This significantly increases plant construction and operation costs but improves the final quality of HRSD's highly treated water.

Chlorine disinfection at HRSD's Nansemond Treatment Plant in Suffolk, Virginia

Finally, the water is disinfected. Some wastewater treatment plants use chlorine, while others expose the water to high levels of ultraviolet light. HRSD facilities remove excess chlorine before discharging the cleaned water to local rivers. These processes kill 99 percent of disease-causing pathogens such as bacteria and viruses. The water quality now supports the intended use of the area waterway- meeting the needs of the aquatic life within- and can be released back into the environment.

Highly treated water exiting HRSD's James River Treatment Plant in Newport News, Virginia

How else can HRSD's highly treated water help the environment?

As our groundwater source becomes increasingly stressed, HRSD is looking for a more beneficial use for the highly treated water it currently releases into our local rivers. By adding proven drinking water treatment processes like those being tested at the **Sustainable Water Initiative for Tomorrow (SWIFT) Pilot Project**, we can create a valuable, renewable resource that can be used to help replenish groundwater and improve our region's environmental resiliency. Advanced water treatment processes involve additional extensive and systematic steps used to meet drinking water standards to ensure that the finished water is reliable and safe!