



## CASE STUDY:

The advantages of Hallett® 1000  
over open-channel UV systems

UV  
PURE

### System Design Specifications:

<b>Application:</b>	Municipal wastewater treatment
<b>Location:</b>	Catlett and Calverton, Fauquier County, VA, USA
<b>Commissioned:</b>	June 2022
<b>System:</b>	4 x UV Pure Hallett® 1000
<b>Capacity:</b>	80 US gpm (303 L/min) per train
<b>Minimum UV dose:</b>	50 mJ/cm <sup>2</sup>
<b>Minimum UVT:</b>	65%
<b>Fecal coliform limit:</b>	< 200 CFU/100 mL
<b>Treatment process:</b>	AquaPoint AquaFAS
<b>Plant capacity (ADF):</b>	80,000 US gpd (303 m <sup>3</sup> /day)

Cost was a serious concern for the towns of Catlett and Calverton, Virginia as they began planning for a major project to replace aging residential and commercial septic systems with a central sewer and wastewater treatment plant (WWTP).

However, UV Pure Hallett® 1000 systems showed how a thoughtfully designed disinfection system provided multiple savings in capital and operating costs and helped improve the overall affordability of the project.

### Selecting the ideal UV system

Initially, chlorine was specified to provide final disinfection of treated effluent, but the Virginia Department of Health recommended that UV light be used instead to avoid releasing chemicals to the environment and to improve operator safety.

AquaPoint, which supplied the AquaFAS moving bed biofilm reactor (MBBR) for the project, is highly experienced with open-channel and closed-vessel UV systems and evaluated both for the project.

“We’ve installed UV Pure Hallett systems at several of our AquaFAS and Bioclere sites and thought that they would be ideal for Catlett and Calverton to help us trim costs and simplify the design and operation of the plant,” said Josh Lindell, President of AquaPoint.

Four UV Pure Hallett 1000W systems are installed at the plant, with two systems operating continually and two as redundant standby systems that can be used during maintenance or repair of the others.

Unlike conventional open-channel UV systems, which are installed on the floor, Hallett 1000 closed-vessel systems are mounted on a wall. This simple change eliminates concrete pads or below-grade vaults and reduces the amount of floor space needed for process equipment. As a result, the size of a treatment plant can be reduced accordingly to minimize material and construction costs.

## High reliability and low maintenance

UV Pure Crossfire™ Technology is another innovative feature that improves system reliability and reduces maintenance. The Hallett UV lamps are mounted vertically in air, rather than inside the quartz sleeve. As UV light passes through the water column, elliptical reflectors redirect the light back through, effectively reusing the energy to eliminate shadowing and targeting pathogens from all angles.

“Positioning the UV lamp outside of the water channel is a big advantage for the Halletts, since water can’t come into contact with the lamp,” Lindell said. “In an open-channel system, the UV lamps are immersed in the water. We have occasionally experienced problems with those systems when water gets by the seals, enters the light chamber and short circuits the system.”



*UV Pure Hallett systems are installed on the wall, eliminating the need for concrete pads or below-grade vaults and reducing space requirements within the WWTP.*

The Hallett in-air lamp design also enables an automatic cleaning system to remove biofouling inside the quartz sleeve and extend the intervals between manual cleanings. Many UV Pure Hallett systems operate for months, or even years, without manual cleaning, so plant operators can focus their time and attention on other more demanding responsibilities.

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*Josh Lindell, President, AquaPoint*

## Eliminating costly components

Each Hallett 1000 is equipped with four integrated sensors that continually monitor UV transmittance, and UV intensity, eliminating the need for external UV sensors that can cost \$10,000 or more. Data from the sensors is transmitted to the plant SCADA and the system will trigger an alarm if any parameters are not within set limits.

This feature provides confidence that the system can reliably achieve its disinfection target and reduce e-coli from an incoming level of 10,000 – 20,000 CFU/100 mL to below 200 CFU/100 mL. Once the effluent has passed through the Hallett systems it is then pumped to a drip irrigation system.

“We often use the Hallett systems when we have a pressurized discharge system,” said Lindell. “The closed-vessel design means we can pump the effluent from the clarifier to the UV and maintain the pressure to transport the water to the irrigation field. That’s another advantage over an open-channel system because we can avoid the capital cost and energy usage of another pump.”



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