

NOTICE FROM DEPARTMENT OF UTILITIES

CITY OF NEWPORT

AUGUST 18, 2014

INFORMATION EASTON BEACH UV STORMWATER DISINFECTION SYSTEM OPERATION

The purpose of this notice is to provide an overview of the standard operation procedures and design criteria for the Easton Beach UV Stormwater Disinfection System (UV System). We have also included a summary of the UV System operation during the recent beach closures.

Design Criteria & System Operation

The Moat, which is shallow and nearly flat, encircles the South Easton Pond embankment beginning at the Station 1 water treatment plant and discharges onto Easton Beach. The Moat was originally constructed as part of the Easton Pond reservoir system and designed to carry runoff from an area north west of the pond and flow from the emergency spillway of North Easton Pond. Over the years with the development in the City, the Moat has also become a discharge channel for numerous storm drains. The watershed that now contributes storm water runoff to the Moat is approximately 600 acres of land that is mostly developed.

It was determined as part of the 2007 Easton Pond Dam & Moat Study that the stormwater discharged from the Moat onto the beach was a significant contributor to water quality impairments at the beach. The discharges from the Moat onto Easton Beach during rain events observed as part of the 2007 Study had bacteria levels at times greater than 20,000 *Enterococci colonies*/ 100ml. As a result a single control that could substantially reduce bacteria loadings in the Moat discharge was required to significantly improve beach water quality. The Beach Standard is to be at or below 104 *Enterococci colonies*/100ml.

The UV System was designed to treat 100% of the Water Quality Volume from the watershed that contributes stormwater runoff to the moat. The watershed also included the area that contributed to the RIDOT 24" storm drain outfall that discharges into the Moat. The Water Quality Volume is determined as the first inch of runoff from the watershed. With the size of the watershed this equates to 43,000 GPM (gallons per minute) or 63 MGD (million gallons per day) of stormwater to be treated. For perspective, the wastewater plant is designed to treat 10.7 MGD on an average day. The Water Quality Storm of 1.2" of rain over a 24 hour period produces 1" of runoff and was used as the design storm for the facility. A 1.2" rain event over 24 hours represents approximately 90% of the storms in Newport/Middletown.

The UV System consists of a diversion gate that automatically closes when the rain gauge measures $\frac{1}{4}$ " of rain over a 24 hour period. The diversion gate is raised during dry weather and is lowered to divert flow when $\frac{1}{4}$ " of rain is measured. Once the diversion gate is closed, flow is conveyed through a screen and to a pump station. As part of

the construction project for the UV system, the RIDOT storm drain was relocated to upstream of the diversion gate. There are two (2) pumps to lift the stormwater into the UV treatment channel. The two pumps are required to handle the variable flows of the Water Quality Design Storm through and up to peak design ranging from 7,000 gpm to 43,000 gpm. Two pumps were selected because a single 43,000 gpm pump could not be operated at speeds low enough to pump the lower flows. The smaller pump operates first until flows require the larger pump to start. The combined pumping capacity of the two pumps is 43,500 gpm.

The pumps lift the stormwater into the UV channel. The water flows through the system which consists of 336 UV lamps. The number of lamps is required to treat the water down to 104 *enterococci colonies/100ml* at the design flow of 43,000 gpm. The disinfected stormwater is then discharged back into the Moat downstream of the diversion gate.

The diversion gate is programmed to remain lowered for a period of 24 hours after a rain event ends or when there is insufficient water levels in the Moat for the small pump to operate. Operating the UV system at very low water levels is avoided as it will result in pumping silt and “muck” from the Moat into the UV channel damaging the UV lamps.

As designed the UV system will treat 100% of the watershed stormwater runoff for a 1.2” storm. Stormwater flows in excess of the 43,500 gpm will flow over the diversion gate through the existing Moat channel and mix with the flow that is treated by the UV System downstream of the diversion gate. The only outfall pipe downstream of the UV system is the emergency overflow pipe from Middletown’s Wave Avenue sewage pumping station.

SUMMARY OF UV SYSTEM DURING RECENT BEACH CLOSURES

Beach water sampling throughout the State is conducted by the Rhode Island Department of Health under their Beach Monitoring Program.

Easton Beach Closure July 29

It is our understanding that the closure on Tuesday, July 29th was based on samples taken by the Rhode Island Department of Health Monday, July 28th. We are unsure if the Monday samples were part of a regular sampling schedule or if the samples were taken due to the rain event on Sunday, July 27th. The rain on Sunday July 27th was localized and sporadic. There was no rain on Saturday, July 26th and the total rainfall measured at the UV system for Sunday, July 27th through Monday July 28th was 0.09”. The UV System was not activated due to the rain gauge not measuring ¼” of rain in a 24 hour period.

Easton Beach Closure August 14

It is our understanding that the closure on Thursday, August 14th was based on samples taken by the Rhode Island Department of Health at 9:15/10:00 am on Wednesday, August 13th. The rain event on August 13th was extremely localized.

Amounts of rainfall varied greatly throughout the State from 3+ inches to less than an inch. At the UV System, rainfall began at 4:00am on August 13th. The rain gauge at the UV system measured ¼" at 11:55 am which activated the UV System by lowering the diversion gate. The total rainfall on Wednesday Aug 30th measured 0.28" at the rain gauge at the UV system and 0.38" at the rain gauge at the wastewater treatment plant on Connell Hwy. The UV system operated as designed for 24 hours until the diversion gate rose at 11:55am on Thursday August 14th. All the flow from Moat was treated during the time the system operated and the diversion gate was lowered. Four sets of UV influent and effluent samples were taken on August 13th and analyzed for *enterococci* the results were as follows:

SAMPLE	TIME	<i>Enterococci</i>, CFU/100ml
UV Influent	1:02pm	8164
UV Effluent	1:12pm	<10
UV Influent	1:30pm	6488
UV Effluent	1:44pm	<10
UV Influent	2:00pm	9804
UV Effluent	2:28pm	<10
UV Influent	2:30pm	3873
UV Effluent	2:40pm	<10

Moat Watershed for UV System

