

WALLINGFORD FIRE DISTRICT #1
WASTEWATER
POST JULY 2023 FLOOD
TREATMENT PLANT ASSESSMENT
RUTLAND COUNTY, VERMONT

NPDES PERMIT NUMBER VT0100552
STATE OF VERMONT PERMIT NUMBER 3-0365

September 27, 2023

This report was prepared based on observations made during July 19, 2023, site visit by Heather Collins, VT DEC, WSMD, WWMP in conjunction with Army Corps of Engineers and US EPA Region 1 representatives.

REPORT LIMITATIONS

This report was prepared from visual observations and operator conversations during site visits. No testing of equipment or measuring of components was performed.

MAIN PLANT

FACILITY DESCRIPTION

The plant is a 120,000 GPD extended aeration treatment system. Average daily flows are approximately 40,000 GPD. Wastewater is pumped from an influent well to the headworks channel and gravity fed to an oxidation ditch and a clarifier. Aeration is achieved through a horizontal paddle rotor. Sodium hypochlorite (chlorination) and is added upstream of two chlorine contact chambers (one of the two clarifiers has been converted to a chlorine contact chamber to allow for sufficient contact time) and de-chlorination is achieved through injection of sodium bisulfite. Treated effluent is discharged to the adjacent Otter Creek. Solids are digested and decanted on site prior to removal off site.

OBSERVATIONS

At the time of the assessment, the plant appeared to be fully operational. During the heavy flow event, the Otter Creek overflowed its banks and inundated the plant, fully submerging the aeration chamber. River water backed up into the outfall chamber and back into the dichlorination and chlorine contact chambers as well. Clarifier #2 took on a significant amount of water which could have been from both the river overflowing and high flows coming into the plant. Although the oxidation ditch was submerged and diluted by flood waters, it is still achieving sufficient BOD reduction and seed sludge was not needed to restore effective treatment. The operators reported that portable pumps were added to the second clarifier to maintain proper flow along with valving off and plugging pipes with test balls

Electrical systems were unaffected by flood waters. The control building is on higher ground and remained dry.

The primary concern during this and even less intense events is the tendency for the very short effluent run between the chlorine contact chamber and the outfall (approximately 15 feet) to back up into the treatment works. The operators must be diligent to valve off the effluent to prevent backflow into the chlorine contact chamber as

Otter Creek rises. Rainfall events as low as one-inch can cause enough creek rise to threaten backflow.

PUMP STATIONS

PUMP STATION

FACILITY DESCRIPTION

Two pump stations in the collection system remained fully operational.

Appreciable amounts of grit and sediment from the collection system were likely conveyed into the wet wells. Subsequently, pump performance should be checked for accelerated wear. Replace or recondition.

COLLECTION SYSTEM

FACILITY DESCRIPTION

The collection system consists of varying materials and diameters of piping with approximately 115 manholes. There are 4 water crossings.

OBSERVATIONS

Overall, the collection system received large amounts of grit/silt/debris.

RECOMMENDATIONS

SHORT TERM

- Relocate the outfall slightly downstream with the flow in line with the creek flow. Currently, the outfall is perpendicular to the stream, which encourages stream flow to back feed the effluent. This could be achieved by excavating the short effluent pipe, adding a 90-degree elbow, and relocating the outfall to the slightly lower velocity creek flow approximately 30 feet downstream in a small oxbow.
- An appreciable amount of grit and sediment from the upstream collection system and plant inundation was likely conveyed into the plant. Subsequently, pump performance should be checked for accelerated wear. Replace or recondition if

found. Similarly, pumps which show evidence of water intrusion in bearing grease or oil should be replaced or reconditioned.

- The aeration ditch grit level should be also checked and compared to pre-flood measurements. Excess buildup of solids should be removed.
- Jetting and camera inspection of low-lying collection system areas as the collection system received an appreciable amount of grit/silt/debris. Camera inspections should be explored to ascertain collection system damages.

LONG TERM

Long term recommendations to potentially mitigate future flooding impacts include:

- Consider raising effluent discharge in the effluent concrete well structure to provide for a longer and higher discharge to prevent influence and back flow from Otter Creek during high water events.
- The facility should install a back flow preventer or duckbill on the effluent pipe to the river to prevent the back up of river water from entering the facility.
- High flows may exceed the working capacity of chemical pumps. Additional pumps should be provided to deliver process and disinfection chemicals during high flows. Larger day tanks and supplies of chemicals on hand may be needed.
- Consider portable or fixed pumps to discharge effluent if gravity flow is no longer possible.

PHOTOS



1- Perimeter Fence Showing Debris From High Water and Influent Pump Station



2- Headworks Channel



3-Oxidation Ditch with Residual Debris



4- Clarifier



5-Clarifier Converted to Contact Chamber



6-Chlorine Contact Chamber



7- Effluent Weir



8- Aerated Sludge Holding Tank



9- Aerated Sludge Holding Tank with High Water Mark Line Approximately 2 feet