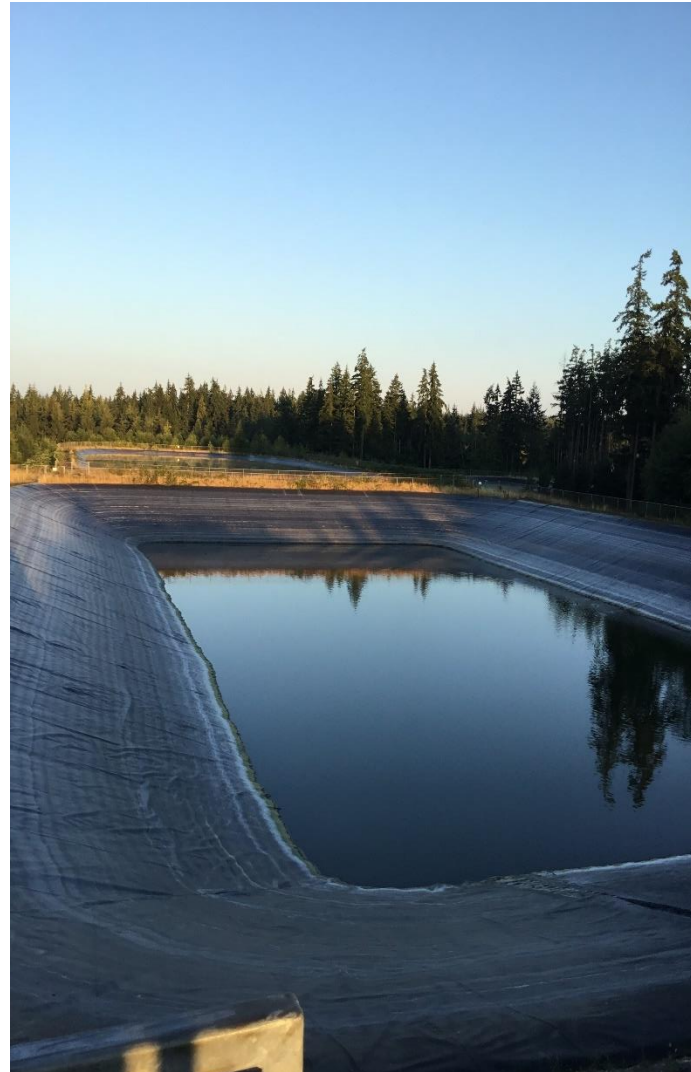




Cross Connection Control Evaluation 2023

MAY 9, 2023

Authored by: Chad Clay



Cross Connection Control Evaluation

HHSD 2023

As a condition of permit renewal, I am providing an evaluation for the Holmes Harbor Sewer District. Ultimately to develop a Cross Connection Control Program to be reviewed and approved by regulatory agencies with jurisdiction over the Holmes Harbor Sewer District.

I have been a certified professional in the clean water industries for 30 years. I am a Group IV Wastewater Treatment Plant Operator. I also possess a Wastewater Collections Specialist Group IV certification. I previously worked for King County WTD for nearly 20 years. I supervised the Brightwater reclaimed water system as the Supervisor for East Offsite. I was also the Supervisor for the MBR Carnation Treatment plant. I am certified as a WDM-1 and ***Cross Connection Control Specialist***. *I have been* the General Manager for Holmes Harbor since July 2020. My Waterworks Operator Certification Number is 15932. I do meet the qualifications per Washington State to evaluate this reclaimed water system.

Chad Clay - 30 years of clean water experience

In the Spring of 2023, I gathered all applicable District information available to me and evaluated the documentation; the evaluation included maps as well as field visits to inspect associated piping, plumbing and appurtenances associated with the Class A reclaimed water system of Holmes Harbor Sewer District. I also interviewed a legacy district employee.

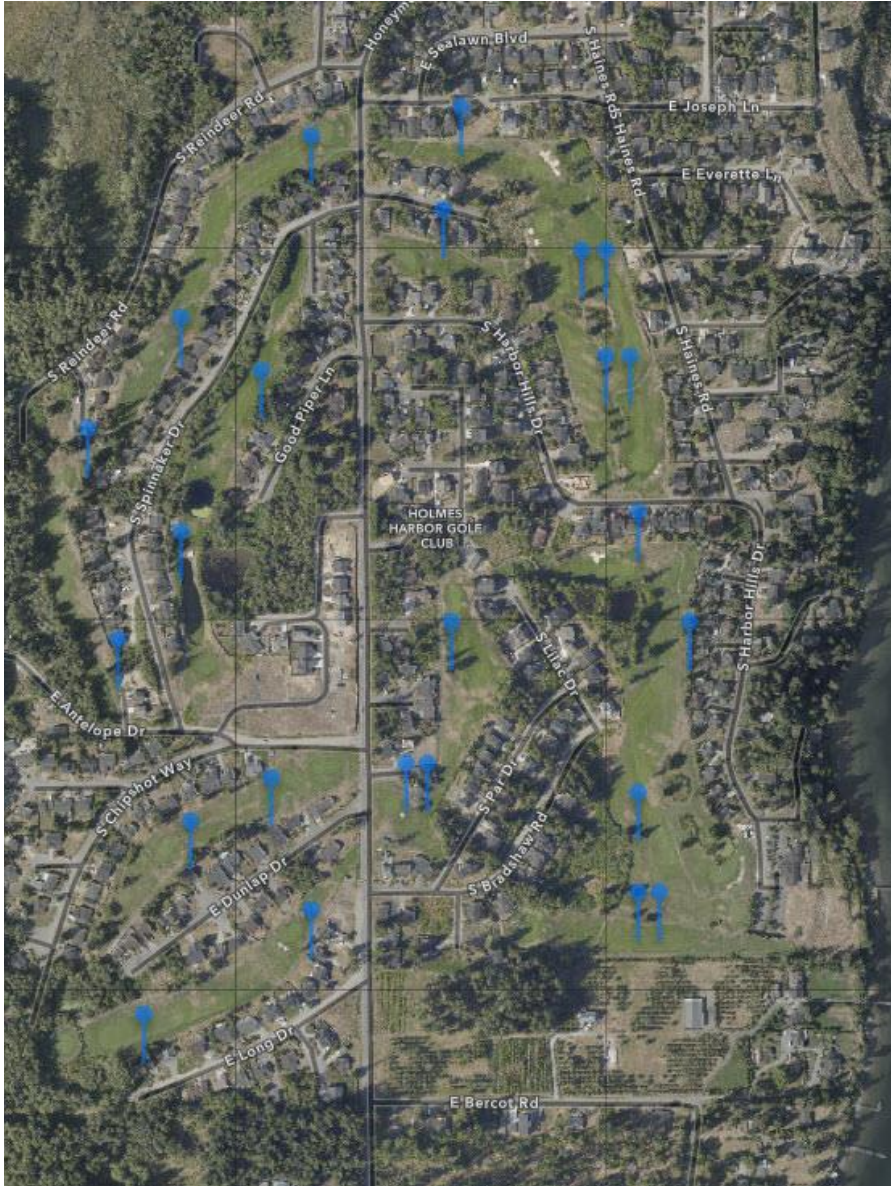
I have identified thirteen cross connection sites. One site separates the plant from the domestic water system, the other twelve are related to the reclaimed water system and four of those twelve provide protection against contamination of wastewater diverted from the facility during high flow events from storms or power outages. The district is attempting to correct as much of the I&I as possible by addressing as many of the individual tanks on customer parcels as time and budget will allow.

Wastewater from 455 customers enters the treatment facility at 1200 E Antelope Drive. HHSD utilizes an Aqua Aerobics SBR technology with a sand filter. HHSD uses a polymer to thicken particulates for filtration prior to the sand filter. After leaving the filtration process a 12.5% chlorine solution is injected into the effluent. Then the effluent flows via gravity into the chlorine contact channel for disinfection. The residual and turbidity of the Class A water is constantly sampled and monitored for water quality using in-line analyzers.

The sewer district generates class A reclaimed effluent 365 days a year. I have reviewed The DOE permit and the 2013 irrigation plan for HHSD and there is nothing specific for dates for allowable irrigation. The Agricultural industry recognizes an irrigation season as being March through September. The “purple book” also provides some guidance but is still not definitive on specific dates.

If weather and course conditions allow, during the months of April/May through September/October, HHSD is permitted to discharge reclaimed water as irrigation onto the HHSD property currently being utilized as a Golf Course. The golf course is operated by a private business and has a lease agreement. Outside the irrigation season, the district stores its effluent in storage ponds on district property that the State of Washington considers by definition, to be Dams. Space in the two storage ponds will hold about 10 MG each of Class A reclaimed water.

Annually, once agreement is reached with ecology the district will begin to transfer water from the plant storage ponds to the EDA irrigation ponds. Irrigation control stations for the course can be set to AUTO and the timers set and sprinklers adjusted as weather and course conditions allow. There begins the irrigation season.



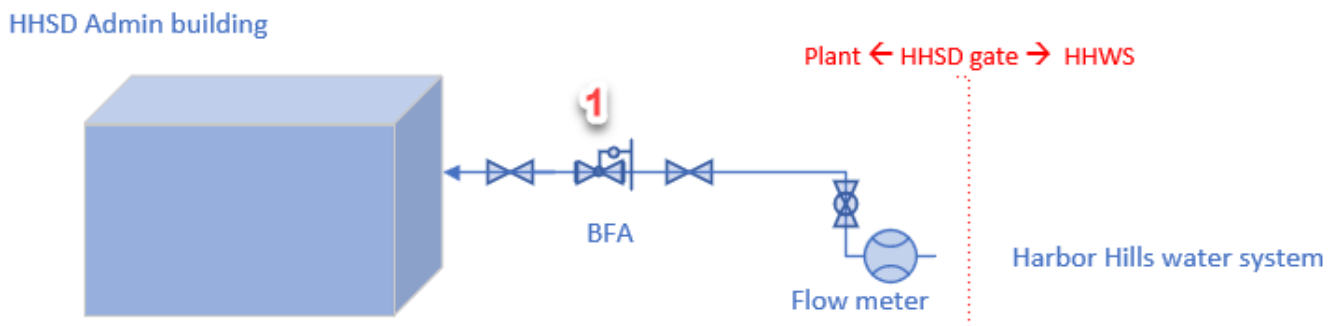
Irrigation clocks on the course

HHSD looks to a 2013 irrigation plan manual for guidance on application rates. The district has a rough goal of transferring 2.5 – 3 MG on a monthly basis to meet storage capacity needs for the following storage season.

The following are the individual evaluations for the thirteen sites:

Site 1 – Domestic water protection

Domestic water is provided by the Harbor Hills Water System. The system is managed by Freeland Water Services. The service line enters the plant and is metered outside the main administration building. The water then enters into the building and passes through a Reduced Pressure Zone assembly. That assembly is tested on an annual basis by Commercial Fire Protection out of Mount Vernon Washington. They would also provide any services necessary for repair or replacement of that assembly.



Domestic water connection

I suggest to continue with current O&M plan and maintenance schedule

Site 2 – Plant diversion protection

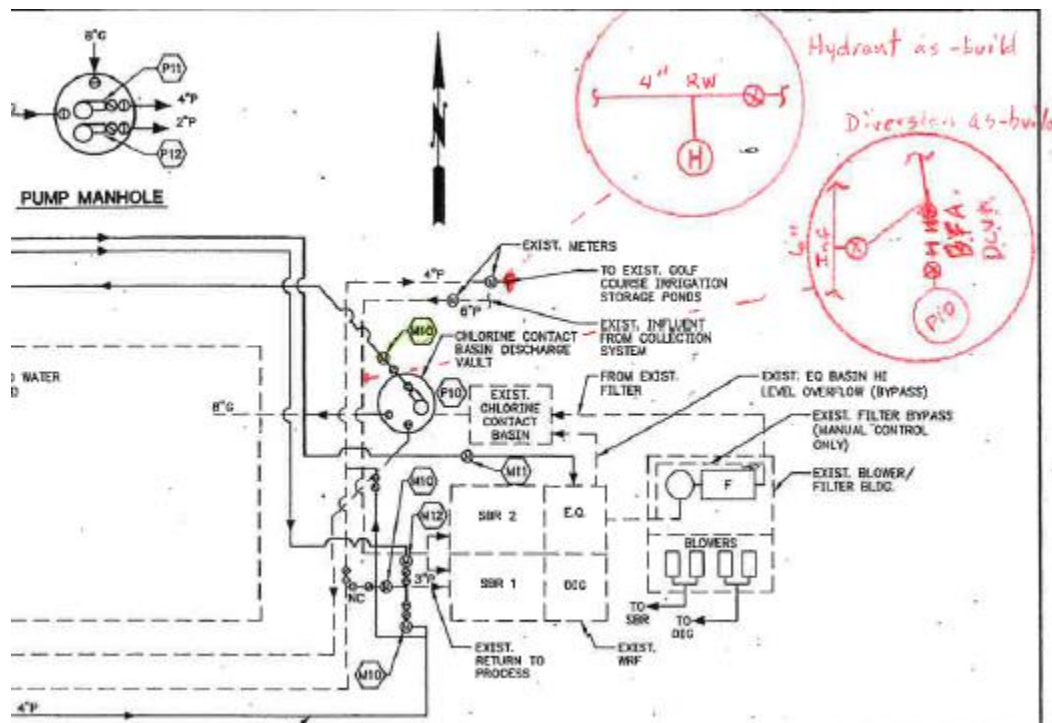
DOE and DOH recently approved a project to allow for the diversion of wastewater during high flow events to an existing off-spec pond. The effluent from the treatment facility passes through the P-10 structure before it goes to storage. Our wastewater is considered fully treated at this point. If it meets effluent parameters it goes to storage. If not, P-10 pumps it to the off-spec pond.

The P-10 structure facilitates distribution of our effluent to East, West or the off-spec ponds. Two manual valves in the P-10 structure can direct flow to East or West ponds. P-10 (pump) also in the P-10 structure is controlled by a control loop. Should the process experience low chlorine residual or high turbidity, P-10 will begin to pump

effluent to the off-spec pond. On and off for P-10 is float controlled. This is a layer of protection against storage ponds becoming contaminated. P-10 creates an air gap between water that is not to spec and the storage ponds.

The influent wastewater is diverted through the same line that P-10 diverts treated effluent when it isn't meeting effluent standards to the off-spec pond. A double check valve assembly is installed on the downstream side of P-10 and up stream of the diversion line of the influent. This back flow assembly is installed to protect the reclaimed water from contamination. When the diversion valve is open and the SBR feed valves are closed, 100% of the wastewater is diverted to the off-spec pond. This assembly is tested annually, the same as the RPZ for the domestic water.

There is an existing check valve on the discharge of P-10 that is part of the original plant design. There was agreement to leave that additional layer of protection in place. Upstream of the P-10 structure and downstream of the chlorine contact channel is another air gap that separates our effluent flow, aka effluent weir.



Diversion project as builds

I suggest to continue with current O&M plan and maintenance schedule

Site 3 – In plant RW – storage pond protection

Washdown water hydrants in plant are anti siphon hydrants. We have 5 spigots on this system and two of them are isolated, currently out of service awaiting repair.

I suggest to continue with current O&M plan for use

Site 4 – Plant irrigation – storage pond protection

I suggest an in-line check valve be installed to provide additional protection. The in-plant irrigation system is underground with two above ground spigots.

I suggest anti siphon adaptors for the spigots.

Site 5 – Plant hydrant – storage pond protection

Future external connections to the hydrant would be through an air gap
I suggest in-plant connections for O&M utilize an in-line check valve

Site 6, 7 & 8 – Irrigation storage protection – Plant storage

The chlorine contact channel has an elevated weir that provides an air gap between CCC and P-10 structure. Inside the P-10 structure to the storage ponds, there is an air gap created by P-10 if effluent standard is not met.

Ref narrative in Site 2 RE: plant diversion protection.

I suggest to continue with current O&M plan and maintenance schedule

Site 9, 10 & 11 – Irrigation storage protection – Natural Pond

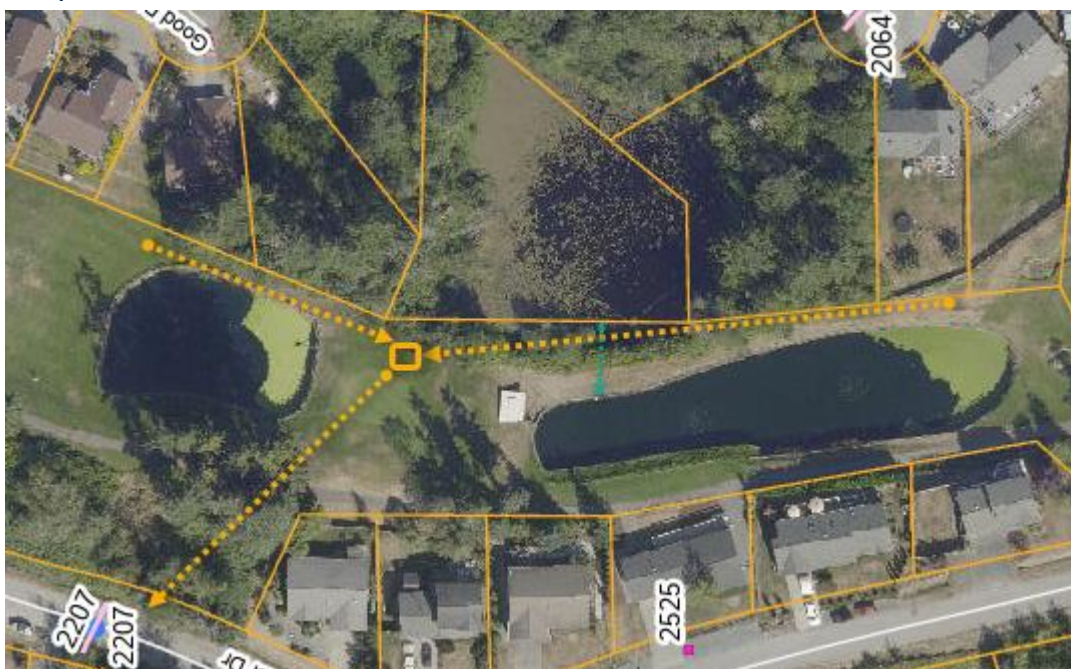
Existing line that connects through an underground pipe.

Air gap and isolation valve (gate) prevents cross contamination.

The natural pond is above the irrigation storage pond in elevation.



I suggest a total separation by eliminating the connecting piping (green line) and the installation of a drainage system to regulate the level in the natural pond and capture runoff from the local residential surface waters and discharge to Island County surface water drainage systems on Spinnaker. Prevent surface water from entering irrigation ponds.



Drainage proposal

Site 12 & 13 – Irrigation storage pond protection

Inside the pump house control building for the irrigation system. There are check valves installed on the discharge side of each of the four pumps that convey the water from the irrigation storage to the irrigation system on the course. Also, on the down stream side of the check valves, there is an 8" pressure regulating valve installed.



Pump house manifold

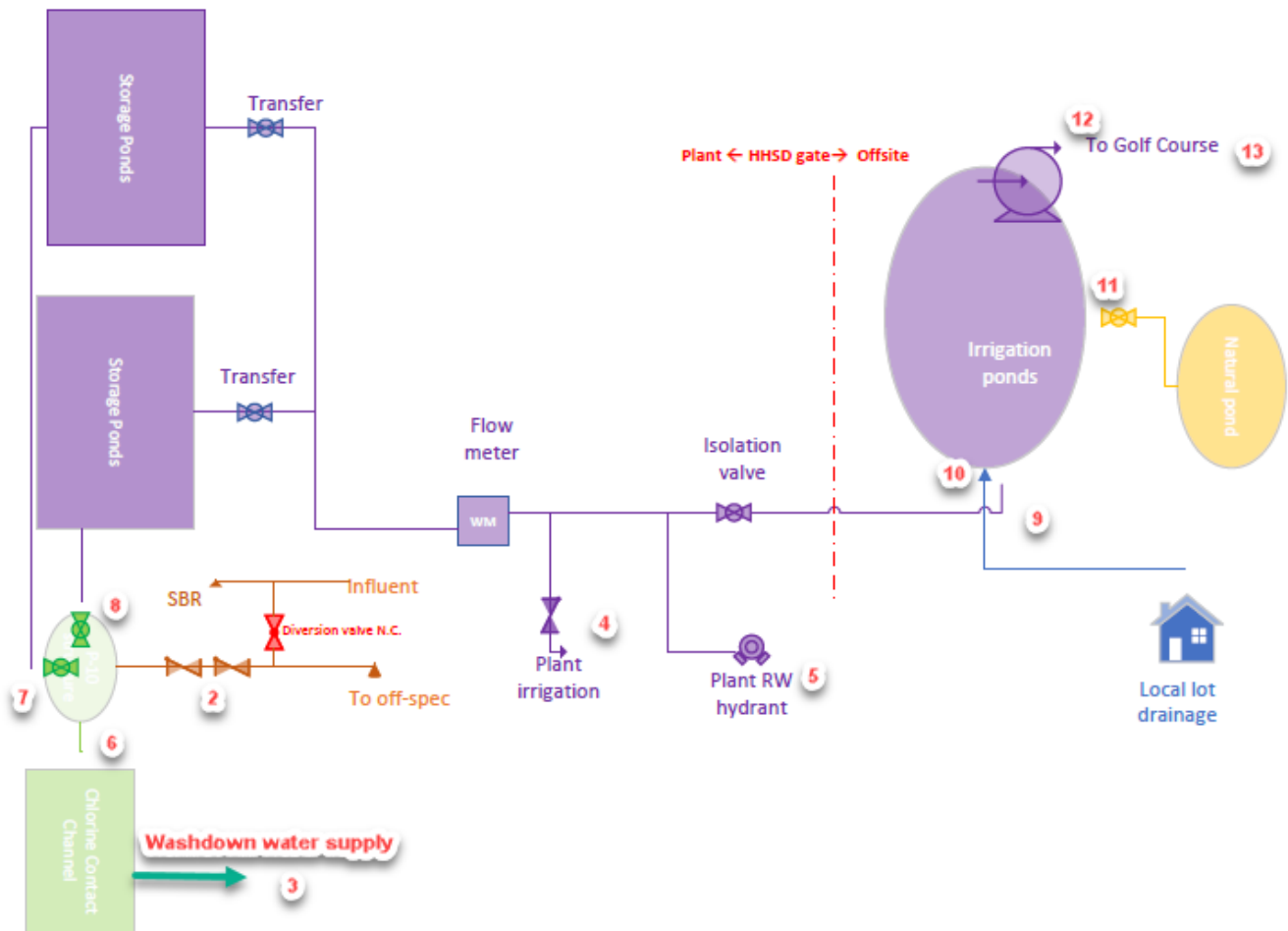
On the irrigation system there are 30 quick connect sites throughout the 60 acres of golf course for manual irrigation via 1" heavy duty hose. Some greens have 1 connection while others have two. There are two known quick connect adapters that are available for use by maintenance personnel to tap these connection points. These connections are binary and under constant pressure. The practice is to have the end of the hose opened while connecting or the back pressure at the connection will overspray and the person would get wet.



I suggest actions for twelve are to have the 8" regulating valve tested in 2023 and from that point forward, begin annual testing and maintenance for the 8" regulating valve in the pump house along with the schedule for site 1 and site 3.

Some of the quick connect sites on the golf course have been removed over time due to leaking. They were excavated and capped. The lines remain but in essence, are abandoned in place. I suggest HHSD continue to redline the irrigation system for accurate record keeping. I believe it is safe to continue use for manual irrigation by authorized personnel ONLY.

RW overview illustration



Cross connections overview for HHSD

In conclusion:

This concludes my evaluation of the class A reclaimed water system for Holmes Harbor Sewer District.

I evaluated sites within the facility at 1200 E Antelope Drive Freeland, WA 98249 and also the sites associated with the 60 acres golf course consisting waters related to the domestic water system and reclaimed waters. Along with the district's documents, I evaluated the considerations referenced in table 7-4 page 108 of the purple book. I have also considered all of the hazards associated with reclaimed and wastewater in tables 7-7 and 7-8 on pages 116 & 117 of the purple book.

This evaluation is respectfully submitted to Department of Ecology for their review via the Secure Access Washington web portal.

The overall expectation of this information is that a Cross Connection Control program be developed per WAC 173-219-310(5) and included in the facilities O&M manual for future use.

Purple book ref: *Revised February 2019 Publication no. 15-10-024*