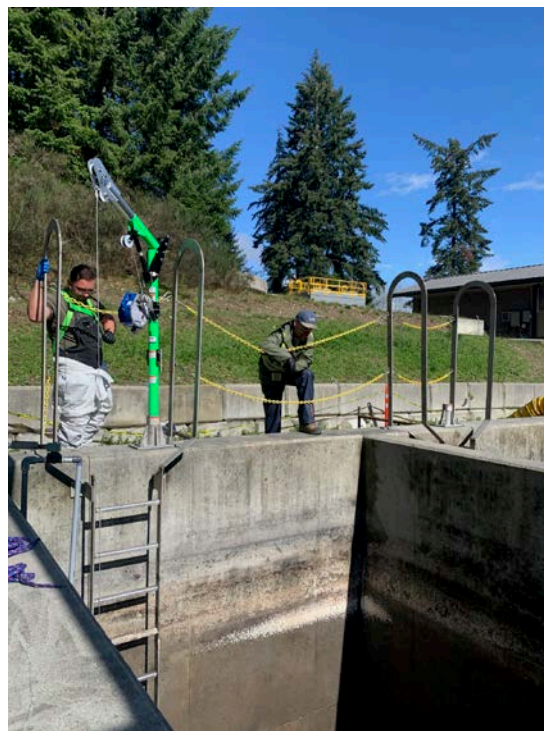


The SBRs were an upgraded wastewater treatment process for the Town of Gibsons, which came online in 2006. The treatment process has been operating extremely well, but like all equipment requires regular maintenance and replacement. Wastewater is hard on equipment! To continue to provide treatment, the membrane diffusers in the SBRs needed to be replaced recently, as they were over double their lifespan.

In August 2019, SBR #2 was taken out of service to clean and inspect the tank, as well as repair and replace any broken or worn parts. During this work, the operator crew came across many unforeseen problems, which posed real challenges! Many deficiencies were noted and worked on for the remainder of 2019 to better prepare for future work. The Town of Gibsons also had to endure terrible odour, which was extremely offensive during peak tourist season!

In 2020, the same work was done on SBR #1. With careful planning, the work was done in a safer fashion than in the past, and with minimal odour upset to Town of Gibsons' residents!

- We ordered all the replacement parts in advance, knowing from the previous year the potential problems and weak parts.
- We hired a safety consultant to help us assess all of the confined spaces that Town of Gibsons operators needed to access. This included providing hazard assessments for the spaces and issuing confined space entry permits.
- We applied in advance to WorksafeBC, knowing that we needed a special variance permit for the isolation of our SBR tank for the confined space entry.



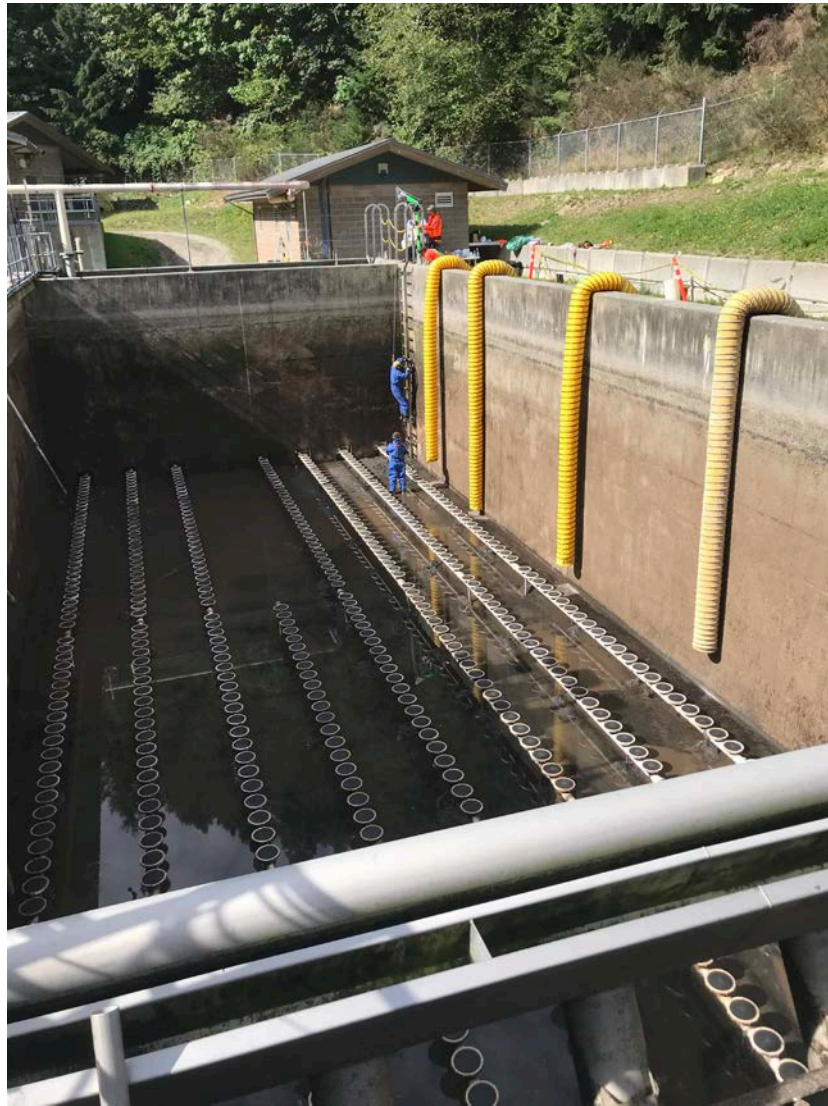
***Davit Arm with Self Retracting Lanyard and Rescue Line***

- The Town of Gibsons operators took numerous days of safety training in lockout safety, confined space entry, and confined space rescue.
- The Town of Gibsons purchased new safety equipment to be compliant with WorksafeBC regulations including a davit arm, tripod, self-retracting lifeline, and a rescue winch. In addition, mounts for these devices had to be secured and engineer approved for safety.
- We planned the work for late September, considering the height of tourist season would be over and the weather/wind inversions would not hold and trap the smell.
- The operating staff committed to be available to work daily for the two-week period because we still had water and wastewater systems to operate and maintain while we did this entry.
- We handed out and advanced notice to neighboring houses to the treatment plant at 389 Stewart Road. We also put notices on our social media pages, directing those inquiring to the Town of Gibsons webpage, where we provided updates every few days.
- We brought in a specialist to change some logic set points on the computer logic program that operates our water and wastewater operations, so that we could efficiently run the treatment process on one SBR tank.



- We rented extra pumps to pump down SBR #1 as fast as SBR #2 treatment could handle the flow, this was to reduce odour for residents.

- After we pumped down SBR #1 as low as possible, we hired septic trucks to remove fourteen years of accumulated grit from the bottom of the tank, as this grit can interfere with our downstream solids handling equipment. There were also a lot of tree branches wrapped up in the piping, which we were able to remove from the top of the tank before entering.
- We hired a safety consultant to operate our confined space, this included a practice rescue before we could safely enter the space. For confined space entry we require a rescue team of minimum two people.

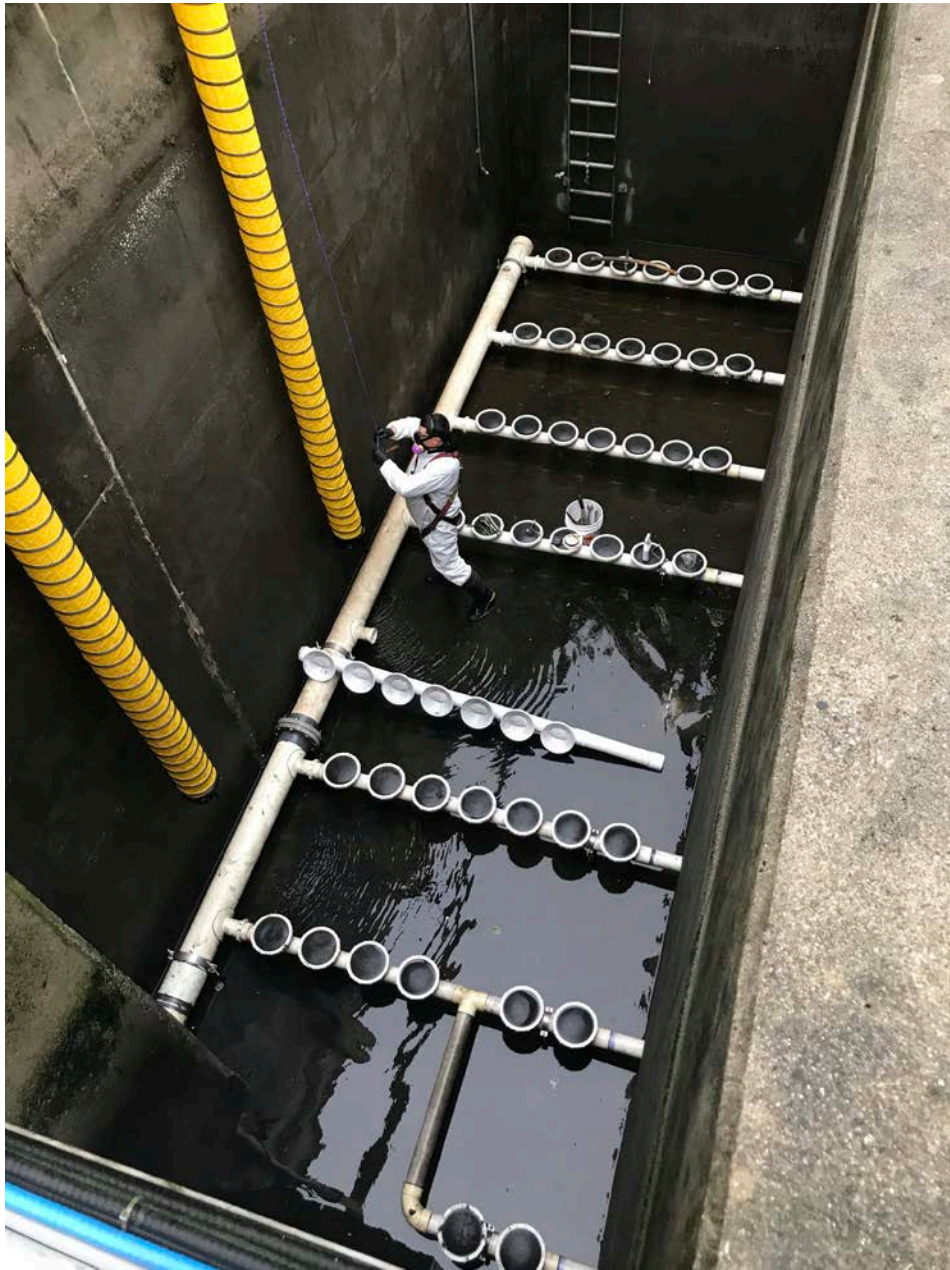


***Initial practice rescue test prior to any work being conducted in the SBR – required by WorksafeBC***

- The SBRs actually have two sections (an inlet chamber and the main tank), so we had two confined space entries operating at once. We coordinated moving the davit arm back and forth for the entries and exits.

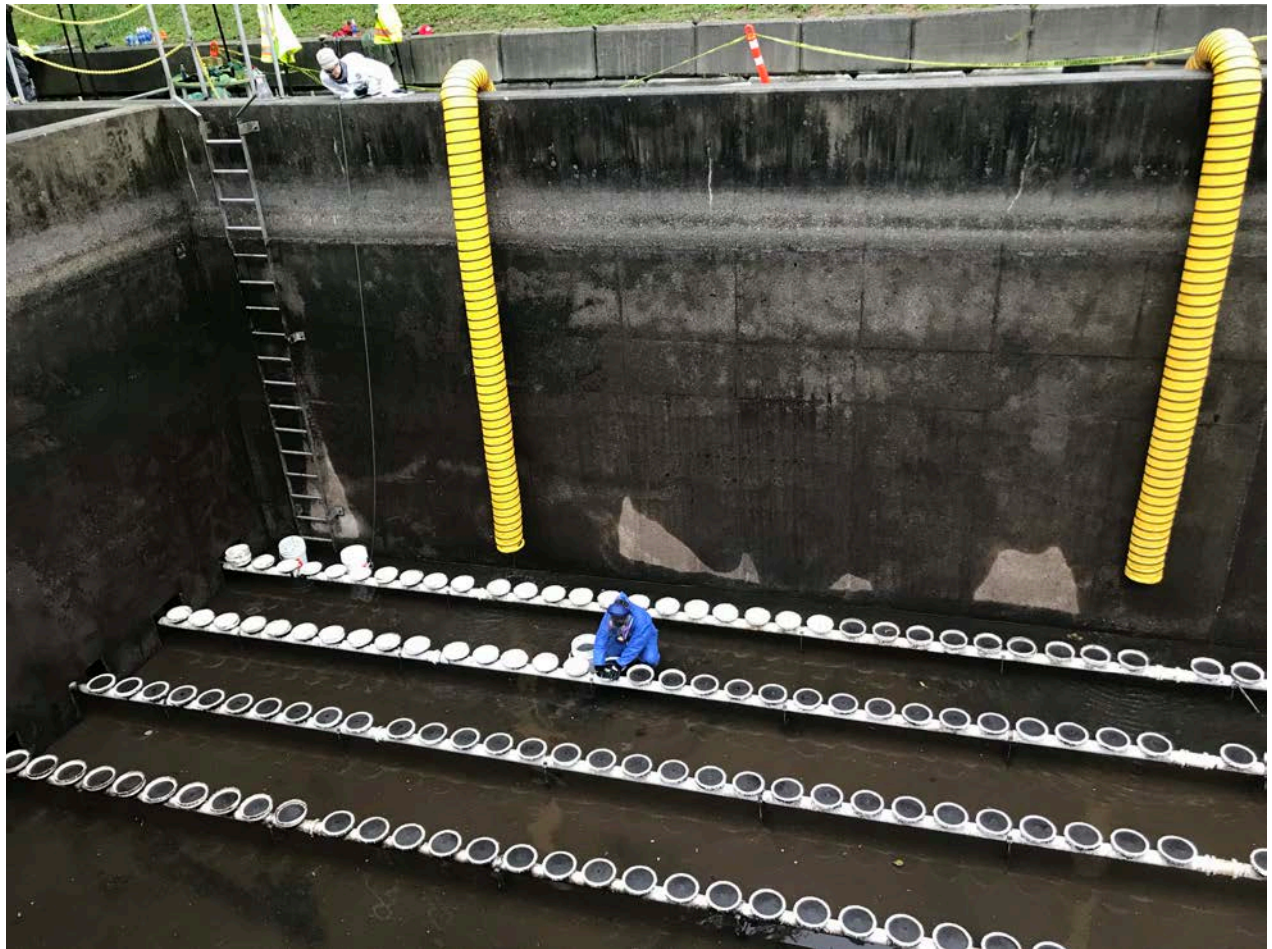


- The first day of entry was spent removing debris from the brackets of the network and diffuser piping. Even though we try remove all the rags and grit, some does get through to the SBRs—in this case there was fourteen years of accumulation! We used tongs and scissors to safely remove the rags and to keep us safe. There were a lot of needles wrapped up in the rags, therefore we were extremely careful to protect ourselves from infection. We used a bucket and rope system to haul up the debris for disposal.
- We had two sections of broken piping to replace, and the brackets that secure piping were loose and needed to be repaired and tightened. We also needed to replace a coupling in the aeration inlet heading in the inlet section of the tank.



***Replacing broken diffuser piping***

- On day two and three we removed ALL 660 diffuser ring assemblies, cleaned and washed them, and replaced every membrane! We used a bucket/rope system to haul and transfer the parts.
- We also installed new caps at the ends of the air laterals in the diffuser piping to facilitate easier cleaning in the future.



***Operator replacing the membranes on the diffusers***

- Once the work was completed, we filled up the SBR with clean water above the diffuser piping and air header coupling to ensure the workmanship was properly done and there were no apparent leaks.  
When we were satisfied with the work, we unlocked SBR #1 tank and started filling it with wastewater once again! We transferred some microorganisms from SBR #2 to SBR #1 to accelerate the biological treatment in SBR #1. Ultimately, the goal of the work was not only to repair and replace broken parts, but also to improve treatment quality by replacing the diffusers.





***Inspecting the diffuser operation with clean water***

For future planning we will be inspecting and repairing our SBR's on a regular basis. We plan to isolate, clean, and inspect them every five years! We welcome any questions and look forward to providing tours once it is safe to do so with Covid-19 restrictions.