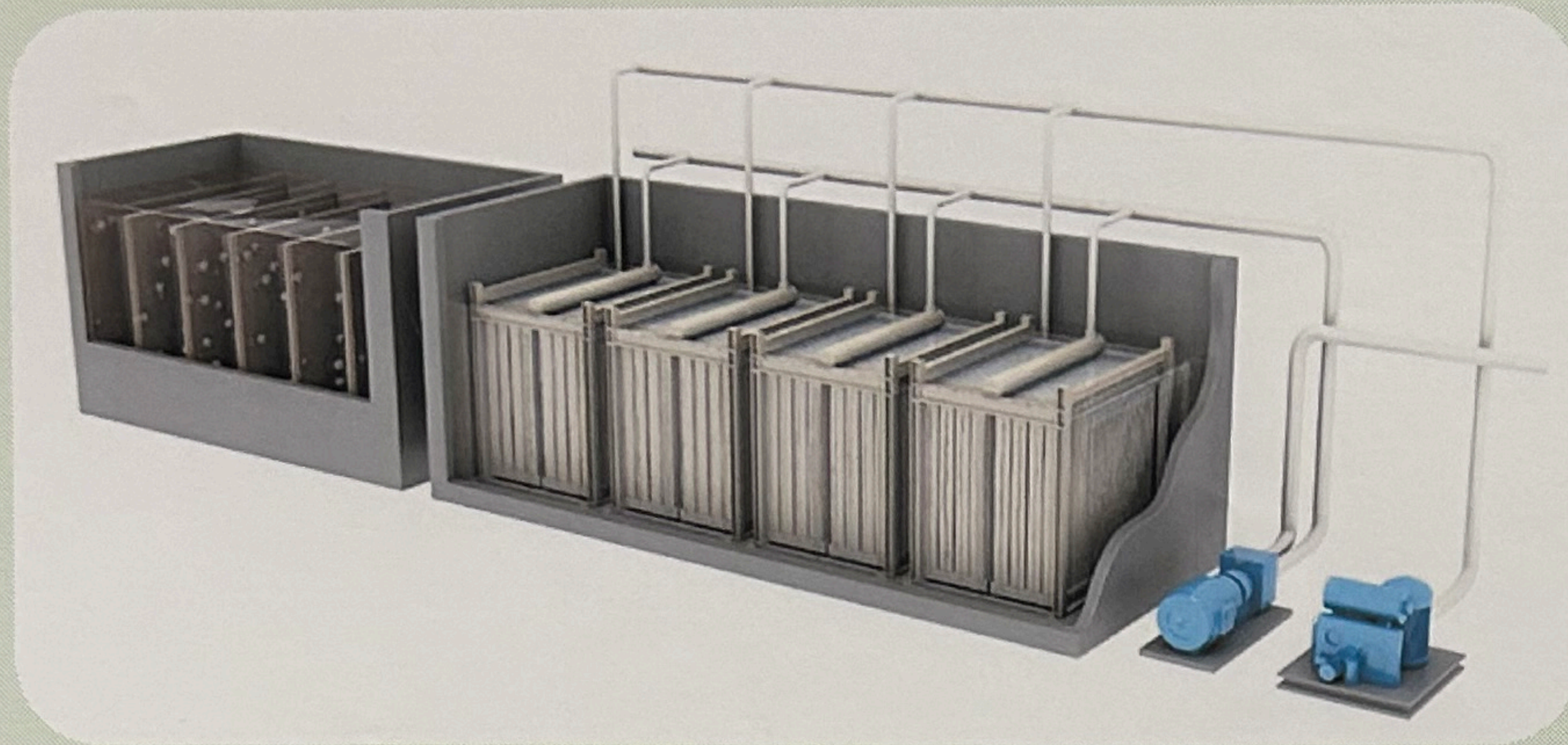


WWTP Upgrades

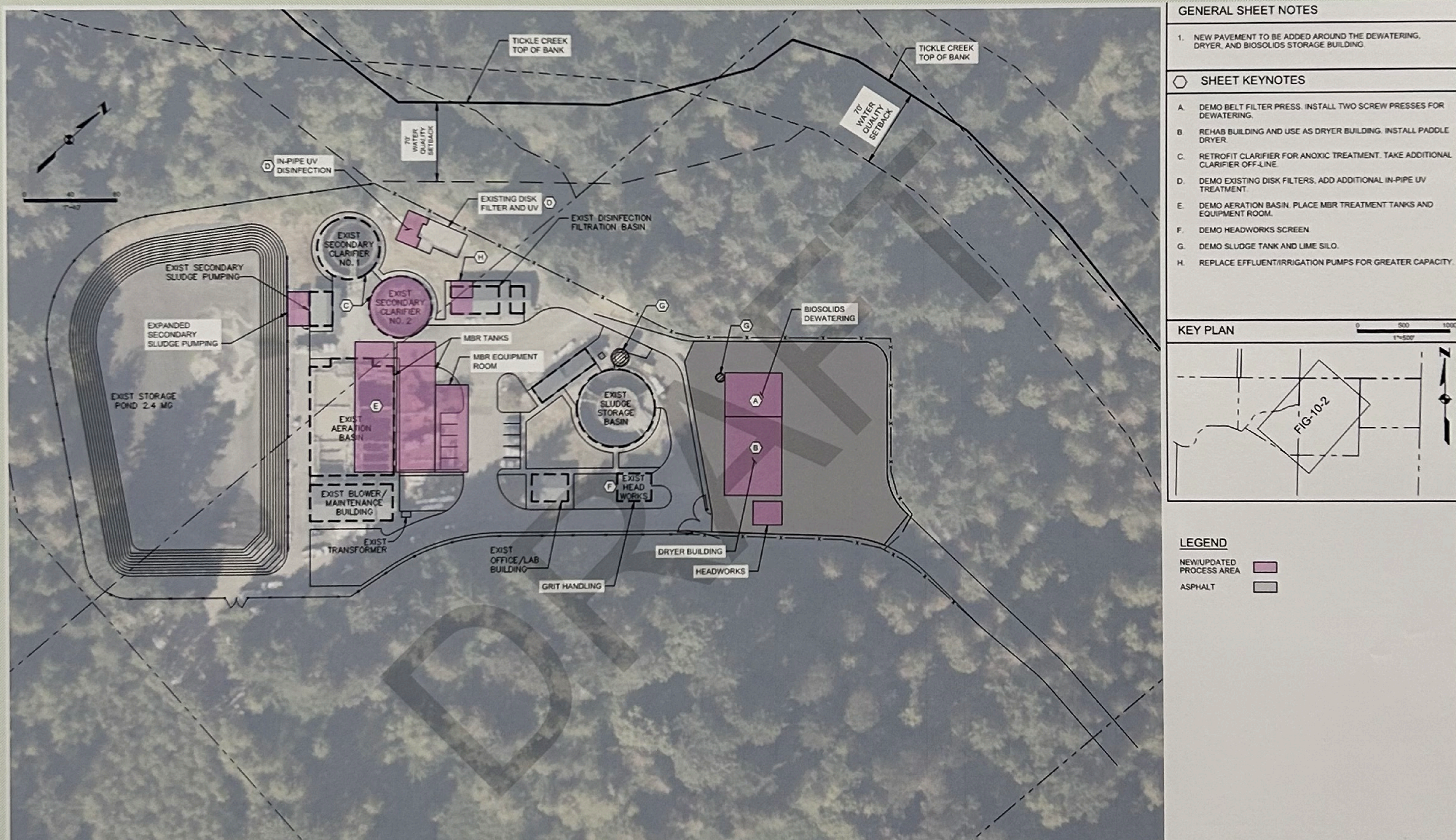
Membrane BioReactor (MBR)



Sandy's Facility Plan Amendment recommends converting the existing plant from Conventional Activated Sludge treatment to a Membrane BioReactor (MBR) plant. MBR treatment will improve Sandy's ability to provide high quality treated effluent. This improvement will allow the City to meet permit requirements through the planning horizon outside of three basin rule requirements.

MBR treatment will perform a portion of PFAS removal for Sandy's effluent.

What An MBR Plant Will Look Like

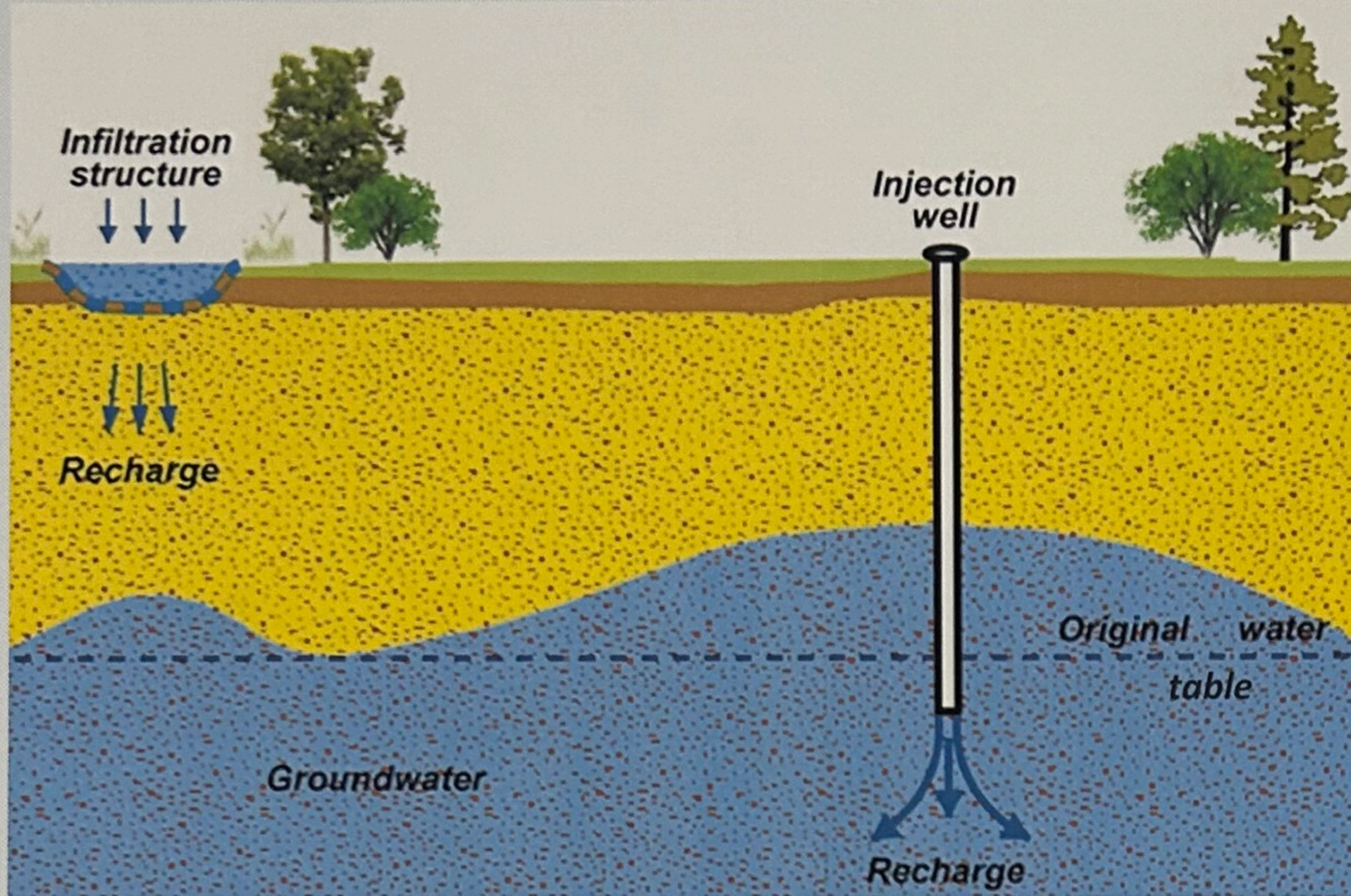


Upgrading from Conventional Activated Sludge to an MBR plant requires improvement throughout the existing plant. Some of the required upgrades include:

- **Headworks Upgrade:** Improving the headworks for capacity and redundancy. Headworks removes items that can upset or damage treatment processes. This upgrade is crucial for protecting an MBR from damage
- **Solids Handling and Storage:** Solid byproducts to be hauled off site are treated, dewatered and stored on site. Improvements to this process are necessary and can help Sandy to produce useable product in the future
- **Disinfection Improvements:** UV disinfection will be expanded for future capacity.
- **Electrical and Controls:** With major changes at the wastewater treatment plant site, major changes in site electrical and system controls will be required.

Groundwater Recharge

What is Groundwater Recharge?



Groundwater Recharge is the process of discharging highly treated effluent with the intent of replenishing groundwater aquifers.

This can be performed in two ways:

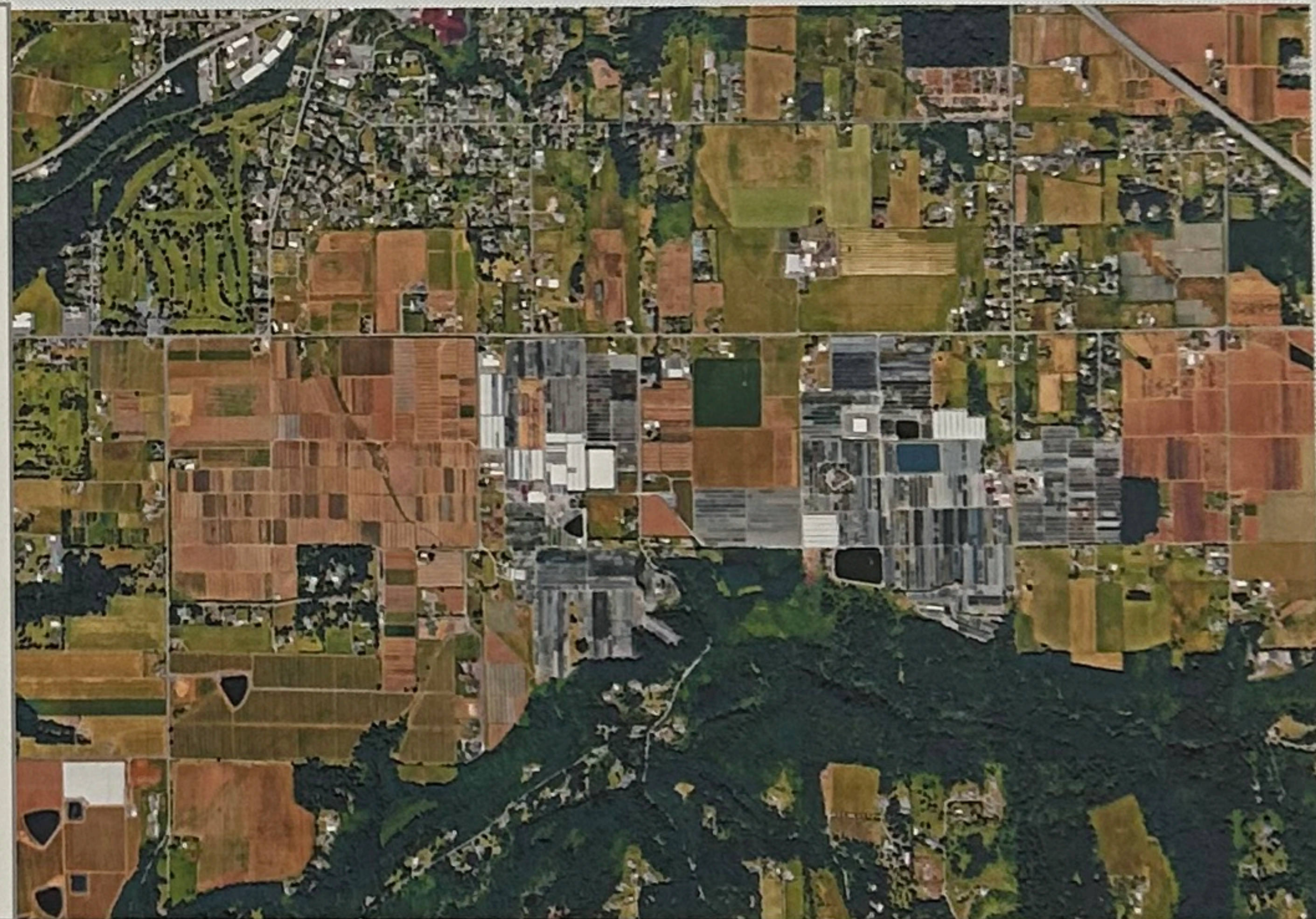
Infiltration: Surface or shallow infrastructure adds water to the soil. This water filters through soil layers as it travels downward to the aquifer

Injection: Highly treated water is injected through a well-like structure deep into the aquifer, directly recharging the water.

Why Should We Do This?

This solution combined with our existing wastewater reuse program is beneficial to an aquifer that serves a region that is heavily populated by nurseries. This water intensive use of the land has taxed the groundwater over the decades. Adding water back to this aquifer, combined with offsetting water drawn from wells will benefit the area for years to come.

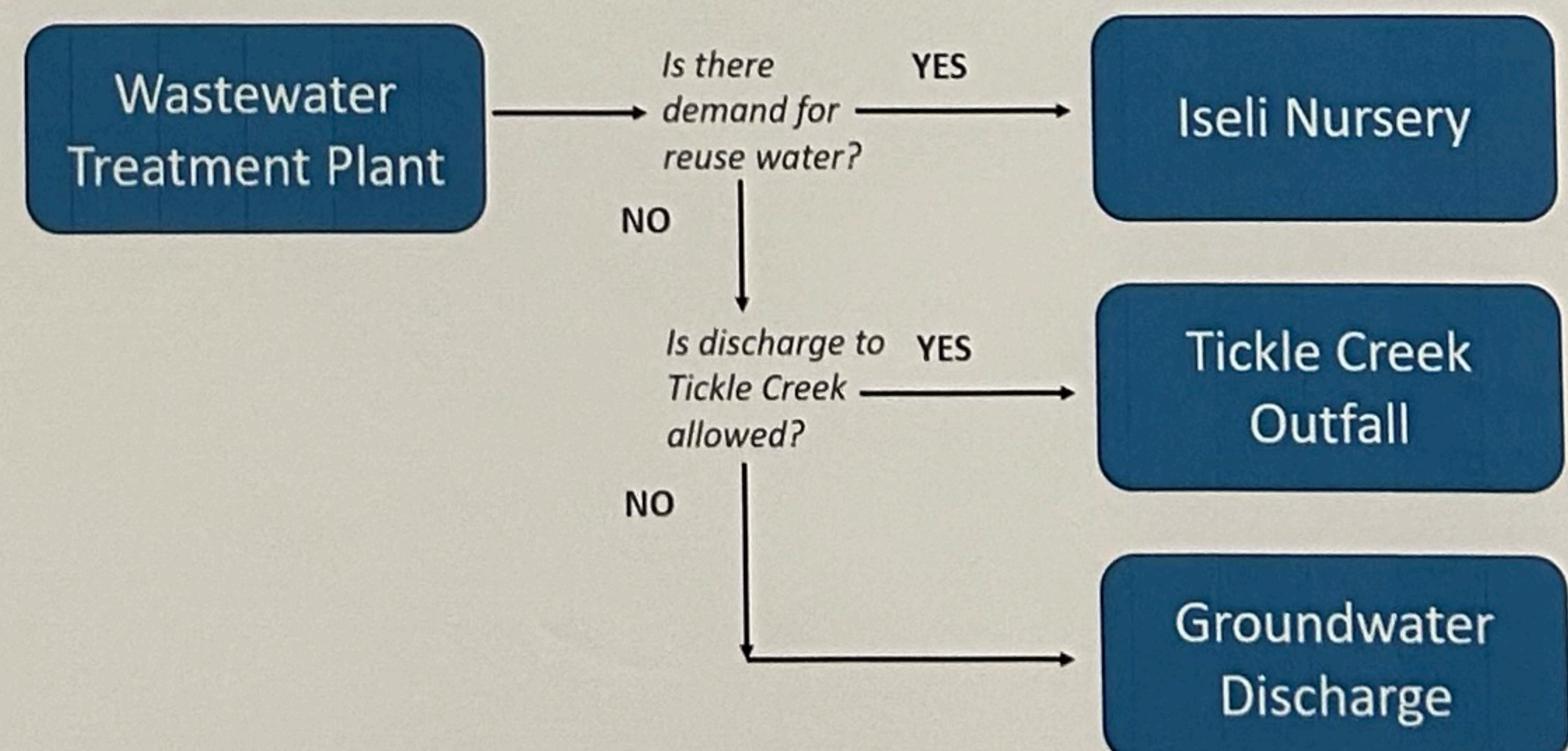
To Sandy, this approach offers an Attainable, Feasible, Viable solution for long term discharge. This method of discharge alleviates the permitting issues facing Sandy's future. Adopting this solution will allow Sandy to end its current Consent Decree with State and Federal government and return to business as usual.



How Would We Do This?



Water Polishing is a fourth level of treatment which will be used during groundwater discharge, bringing water to safe levels to be introduced to the aquifer. This will remove contaminants, like PFAS, to a level beyond the high standard to which Sandy already treats its wastewater. This could be done using **Granular Activated Carbon Filtration** (Left) or **Reverse Osmosis** (Right.) See MBR board for further information on treatment improvements



Unlike other available options, Groundwater Recharge gives Sandy a three-pronged approach to discharge. Nursery partner reuse and gravity discharge to Tickle Creek will be maximized when practical and permissible. Groundwater Recharge will initially be used when other discharge options are not available, solving Sandy's current discharge bottleneck imposed by the Three Basin Ruler and changing weather patterns.