

R-1 Greywater Brochure



WATER CONSERVATION

Hawaii's primary source of drinking water is groundwater that exists within the islands' porous volcanic rock reservoirs known as aquifers. Fresh water is an especially finite resource in Hawaii due to the limited rain catchment area, increasing population/tourism, and decreasing rainfall rates. This is the reason that water conservation is one of the main pillars of sustainability for our islands.

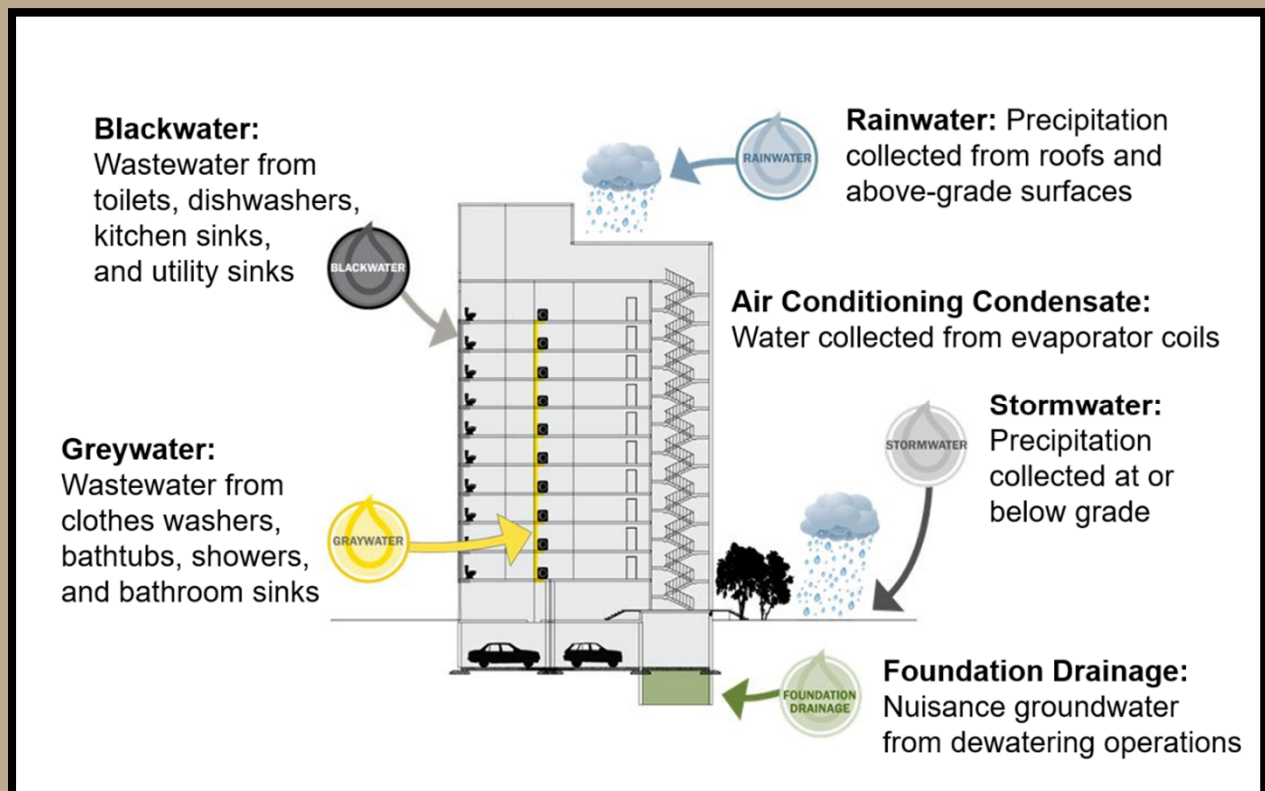
Water reuse (also commonly known as water recycling or water reclamation) reclaims water from a variety of sources then treats and reuses it to reduce our overall consumption and conserve our precious resource.



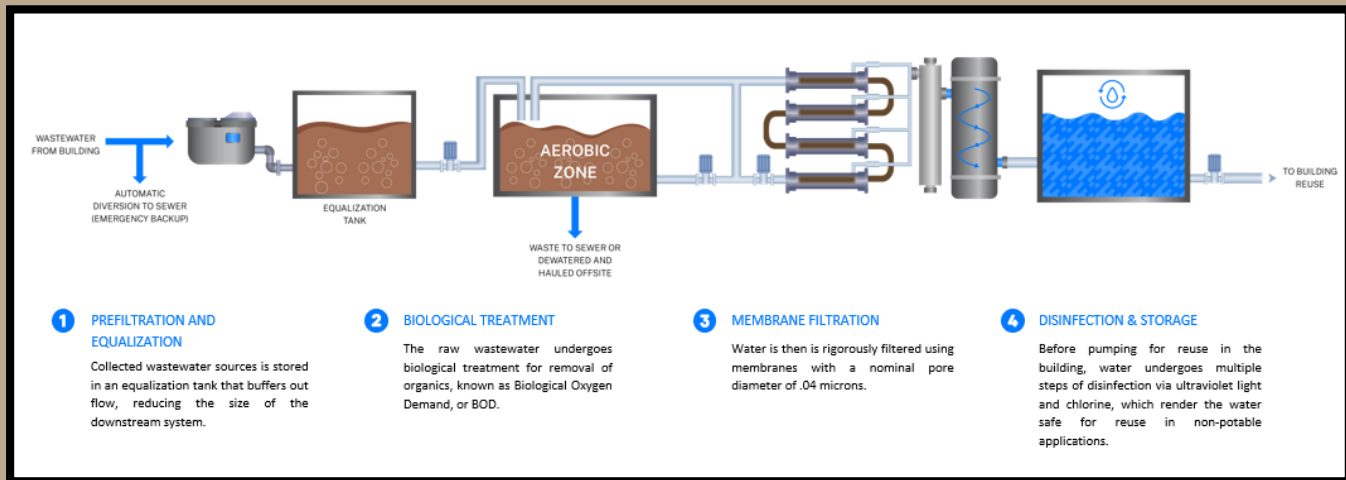
GREYWATER VS BLACKWATER

Sewage can be classified into two categories:

- Greywater is collected from washing machines, lavatories, and showers
- Blackwater, which is collected from kitchen sinks, dishwashers, and water closets and go directly into the sewer. Blackwater is distinct from Greywater in the sense that there are higher levels of organic “solids” in the waste stream that would require additional treatment processes.



GREYWATER RECYCLING



STEP 1 – The treatment train starts with collected greywater flowing into the Collection Tank with an overflow connection to sewer. A diverter valve is installed upstream to divert the incoming greywater to sewer when tank is full or when the system is shut down for maintenance.



STEP 2 – The collection tank flows into the Aerobic Tank where Micro-organisms break down organic waste material. Fresh air is constantly introduced to the tank to fuel their metabolic processes. Any Settled solids in the tank will be discharged to sewer periodically.

STEP 3 – The partially treated water flows into the filtration portion of the system and acts as a prefilter reducing contaminants down to 15-20 microns. This will help mitigate wear and tear on the downstream membranes. Next, the water flows into the ultra-filtration membrane which filters out any remaining contaminants down to 0.04 microns. Membranes will be backwashed regularly with R-1 water and will be cleaned regularly with a chemical solution.



STEP 4 – After filtration, the water flows through UV and Chlorine Disinfection. This stage intended to eliminate the remaining micro-organisms, viruses and bacteria that may have escaped filtration. A free chlorine residual of 0.2 ppm will be maintained in the treated water tank and monitored by a chlorine residual analyzer. During the UV and chlorine stages if the R-1 water tank falls below a set level, it will be made up with city domestic water through a motor-actuated valve and air gap.

WATER QUALITY MONITORING & REPORTING

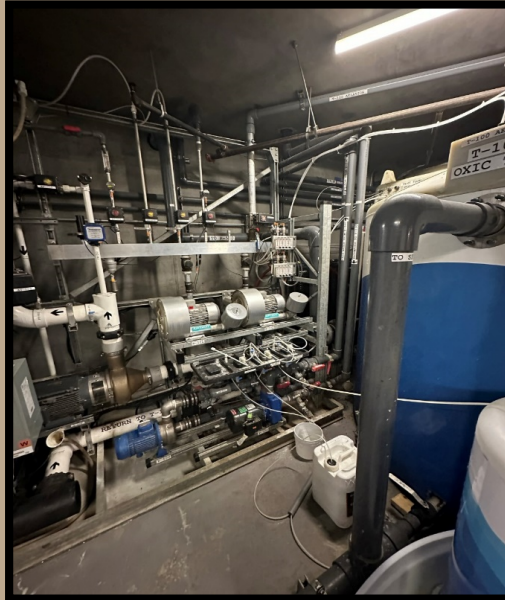
- Water quality monitoring, sampling, and reporting will be required by the DOH
- This includes flow rates, chlorine residual, UV intensity, turbidity, and pH
- If water quality parameters fall out of tolerance, the system will shut down, alarm, and divert the greywater to the sewer system
- The dedicated operator will conduct regular sampling and keep a log of all readings. These logs will be compiled into a report that will be submitted periodically to DOH.



- The system dashboard can be accessed through the cloud and is regularly monitored by the manufacturer, operators, and building maintenance



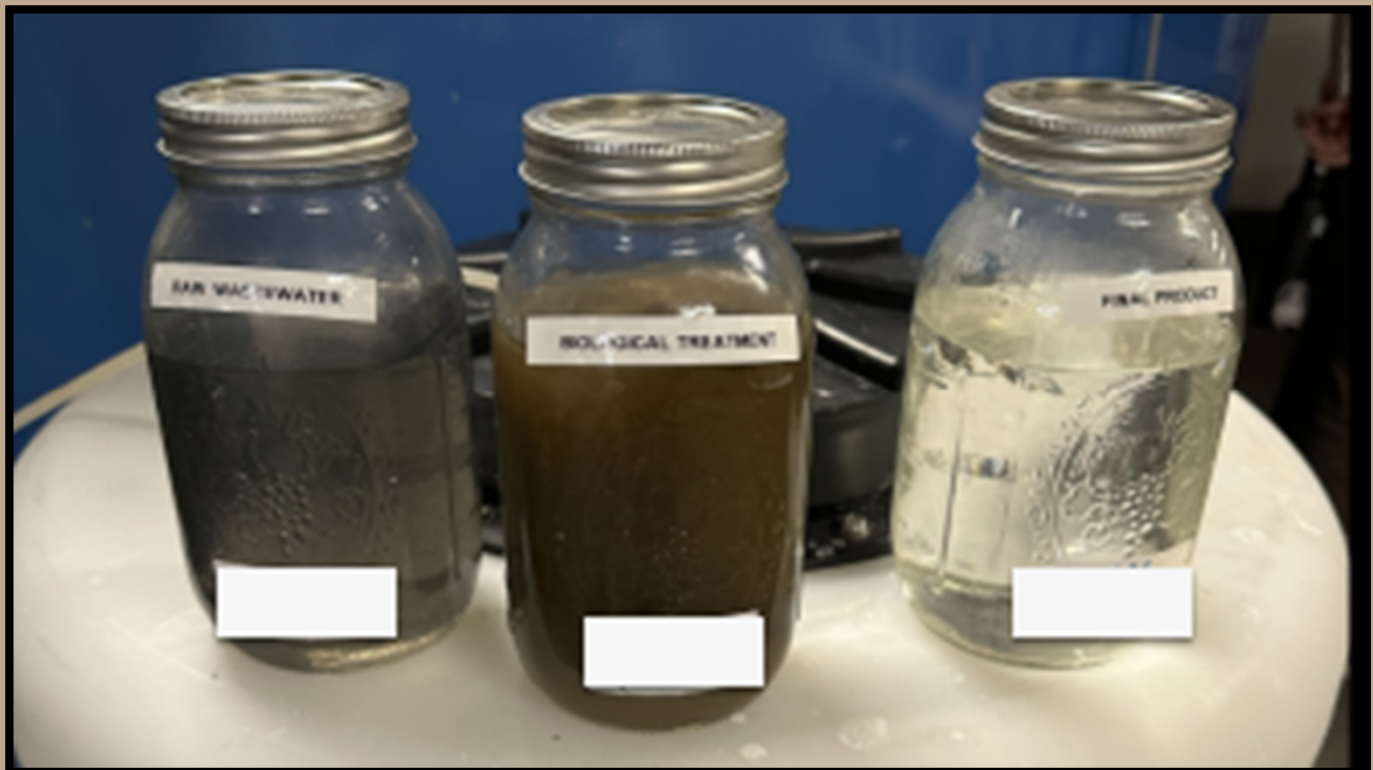
Membrane Filtration Skid



Aerobic Tank and Filtration



R-1 Booster Pump



Samples taken during the site visit showing the raw greywater on the left (you can see that it is a grey color), a sample taken during the biological treatment and the final R-1 product on the right after UV disinfection and filtration.