

How the WaterHub Works

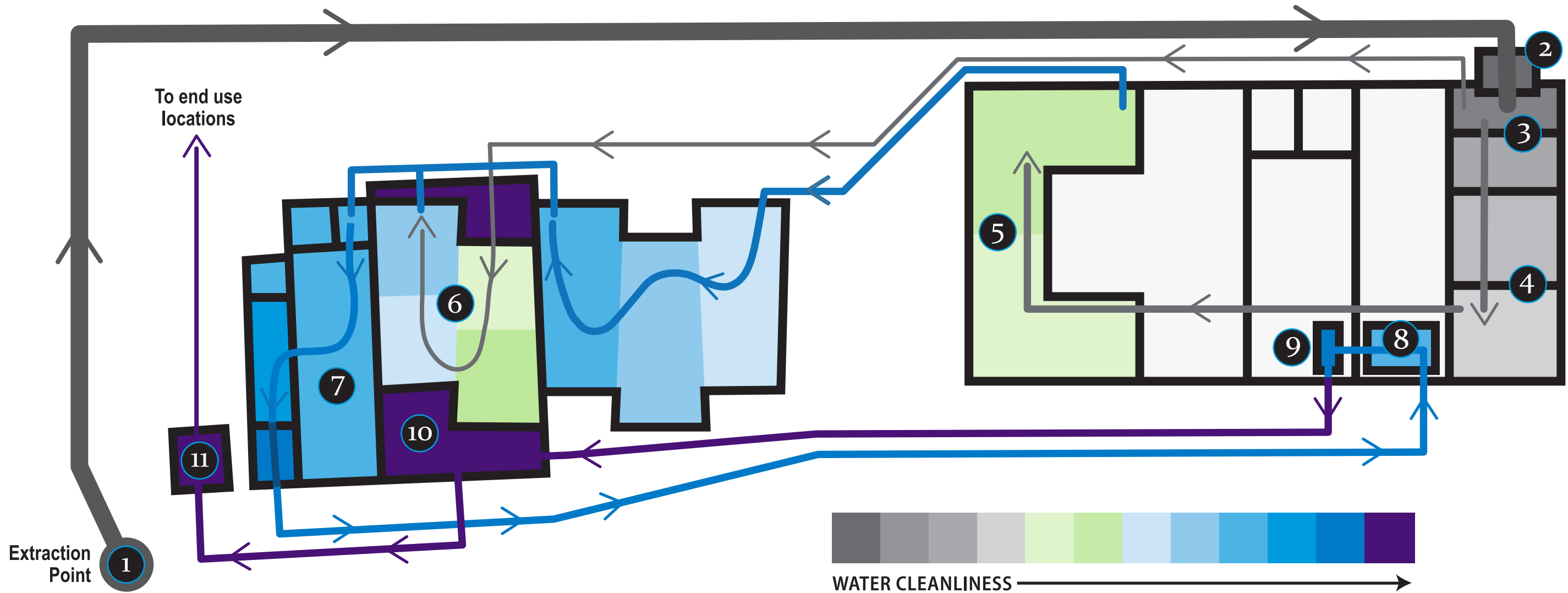
1 2 Extraction and Rotary Screen. Wastewater is extracted from the south site and pumped to the rotary screen at the north site (on roof) which removes non-bio-degradables.

3 Anoxic Moving Bed Bioreactors (MBBR). In an oxygen depleted environment, carbon containing material is removed by clustering microorganisms that colonize on freely-moving "BioPortz" (honeycombed plastic pellets which maximize habitat). Wastewater circulates between MBBRs to optimize nitrogen removal and minimize creation of odorous gases.

4 Aerobic Moving Bed Bioreactors. Wastewater is aerated with coarse bubble diffusers. This removes much of the carbonaceous material and further removes odorous gases from the water.

5 Hydroponic Reactors. Within the greenhouse, dense tropical plant root systems and BioWeb provide a healthy habitat for large microbial populations. This results in stable biofilm growth and efficient, stable wastewater treatment. Outdoor Hydroponic Reactors utilize native and naturalized plant species and allow greater volumes of wastewater to be treated. Fine bubble aeration diffusers add oxygen to enhance reduction of carbonaceous material and nitrification. Beneficial organisms graze on microbial biomass and reduce solids/sludge.

6 Demonstration Reciprocating Wetlands (DRW). Created to demonstrate alternate waste treatment systems, the DRW receives screened influent from the MBBR. The fill-and-drain wetland cells use various sizes of gravel which provide microorganism habitat. Fill-and-drain cycling occurs 8 to 18 times a day and provides alternating anoxic and aerobic treatment. Requiring little mechanical energy, yet large land mass, a Reciprocating Wetland is a treatment system appropriate to rural areas and developing countries.



7 Clarifier Tank. Removal of dissolved phosphorus by use of coagulating elements and gravity. A portion of the solids are sent to the greenhouse to provide ample bacterial communities to begin the treatment process.

8 Disk Filter. Very clean water is sent to the greenhouse and through a disc filter which removes solids using a felt filter membrane. At this point, the water contains very small amounts of microorganisms.

9 Ultraviolet Disinfection. Water is subjected to high-quality ultraviolet (UV) light, an energy-efficient, chemical-free method of removing any remaining microorganisms.

10 50,000 Gallon Storage Tank. Fully treated water is stored underground. This reserve allows for variability in demand or planned outage work at the WaterHub.

11 Campus Distribution. Water is distributed to the steam and chiller plants for use as process make-up water and to residence halls for toilet flushing.