

A Bug's Life

The bugs spend their whole lives eating the stuff in wastewater, getting fat, and multiplying. To avoid having too many bugs, which could clog the membrane filters, some of the bugs are regularly removed, or "wasted". The mass of wasted bugs is called **sludge**.

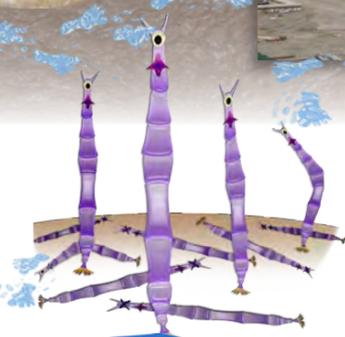


The sludge is regularly collected, and sent to the **Digesters**.



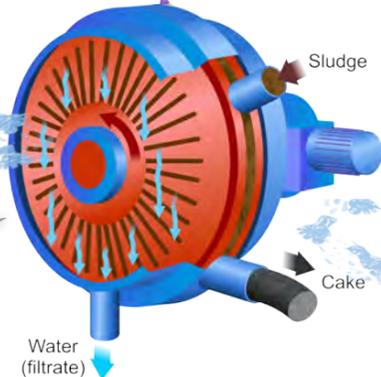
The Digesters

After digestion, the sludge is ready for the next step in the process. The digested sludge is sent to the **Dewatering Building**.



In the **Digesters**, there is nothing for them to eat. They begin to consume their own bodies to live – they starve. The crash diet kills many of the bugs, reducing the mass of the sludge. And, the remaining bugs are not eating, which means they don't produce the **gases** that cause unpleasant odors. What's left is called **digested sludge**.

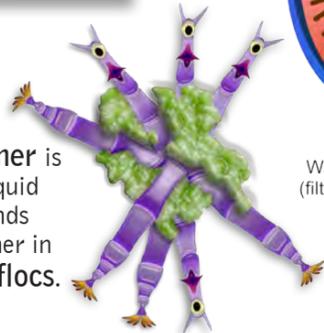
The sludge is run through a **rotary fan press**, which forces the sludge against a screen. The flocs of bugs are too large to pass through the screen, but water passes through, easily. The water is sent back through the treatment process.



The dewatered sludge, called **cake**, is sent by truck to another City facility, where it's mixed with wood waste to make a useful **compost**.



There, a **polymer** is added to the liquid sludge. This binds the bugs together in groups, called **flocs**.

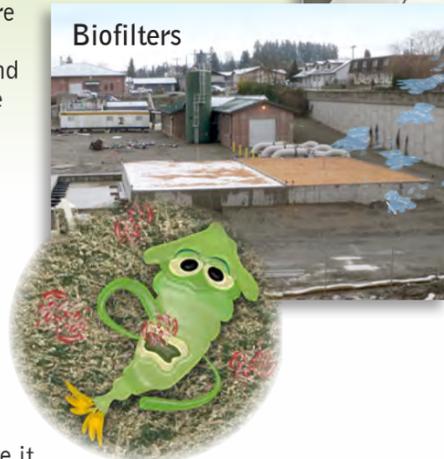


O, Say Can You Smell?

The Treatment Plant would not be a good neighbor, if the folks there didn't do anything to **control** the **odors** created by the treatment process. But they do! The parts of the plant that are likely to smell the worst (the **Headworks**, the **Digesters**, and the **Dewatering Building**) are **enclosed** and **ventilated**.

In the **Biofilters**, the smelly air is forced through a thick layer of **filter media** that captures and treats the odorous stuff. The media is also home to still more bugs that like to eat nasty stuff. Both the media and the bugs help to **clean the air**, before it is released into the atmosphere.

Biofilters



Headworks



Digesters



Dewatering



There, the offending gases are collected and sent to the **Biofilters**.

That's it! That's how the folks at the AWRF handle the job of wastewater treatment, and help me to continue my career of useful service to the people of Arlington.



For more information please call 360.403.3526

An Insider's Tour of the Arlington Water Reclamation Facility



Hi! I'm **Mr. Waters**. I'm sure you know me, and I'll bet you can think of many ways that I serve the people of **Arlington**.



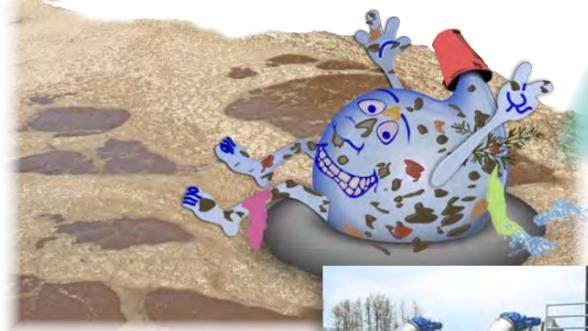
But, I have one important job that most people don't like to think about at all. It's the job of carrying **wastewater** from the places where people live and work, so it can be disposed of in a **healthy** and **useful** way.

I take the wastewater to a **treatment plant**, where the nasty stuff is removed, and I get cleaned up and sent out to do even more for Arlington. Follow my footsteps and I'll show you how that transformation takes place. It all happens at a place called the **Arlington Water Reclamation Facility**, or **AWRF**.



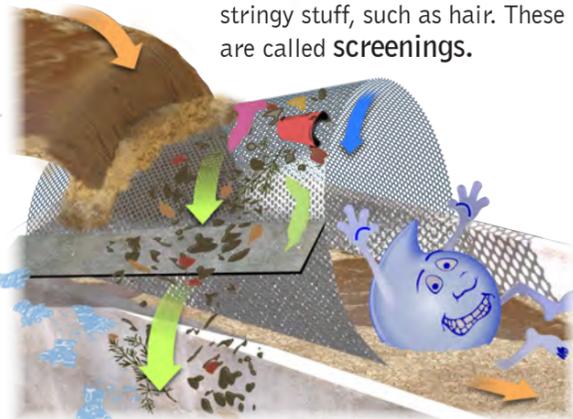
My Visit to the AWRF

When I arrive at the AWRF, I'm a mess. I'm carrying everything that's been dumped into the sewers. That means everything that's been washed down a drain, or flushed down a toilet.

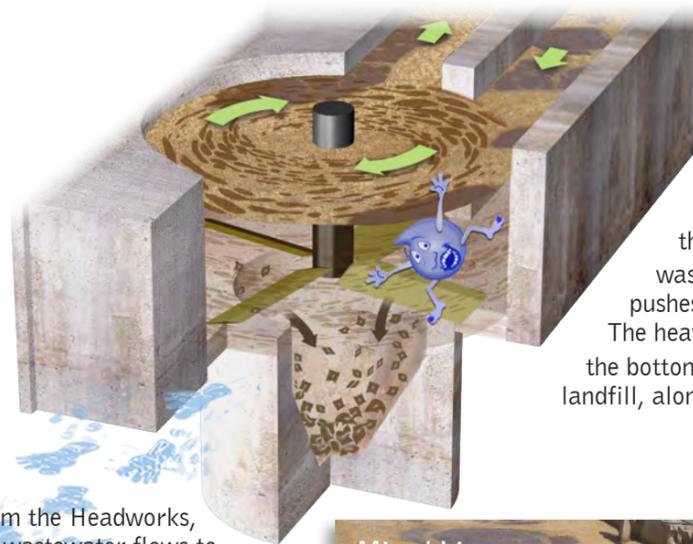


Wastewater is mostly **organic material** dissolved in water, but there's also a lot of **solid stuff**. It all ends up at the AWRF, and it all needs to be removed.

They start with the big stuff. The **Rotary Drum Screens** separate the bigger chunks, and stringy stuff, such as hair. These are called **screenings**.



The **Headworks** is where they screen out the solid material.



The **Grit Vortex** separates the smaller chunks of solid material, such as sand, coffee grounds, and egg shells, from the lighter dissolved materials. They spin the wastewater around, and **centrifugal force** pushes the lighter stuff up the sides of the vortex. The heavier solids drop out, and are collected at the bottom. That's called **grit**, and it's sent to a landfill, along with the screenings.

From the Headworks, the wastewater flows to the **Aeration Basins**.



Mixed Liquor

The **Aeration Basins** are filled with mixed liquor. It's not what it sounds like, though. This is a cocktail of **wastewater** and **microorganisms**, or **bugs** as they're known around the AWRF. The job of these little bugs is to eat the organic material in the wastewater, and **remove nitrogen** and **phosphorus**.



If the wastewater went untreated, these contaminants would threaten the health of naturally occurring waters, such as the **Stillaguamish River**.

The **Aeration Basins** are divided into three zones. Each zone has a **different environment** that lets it perform a different role in treatment.



The **anaerobic zone** gets no oxygen or nitrate. This makes it ideal for growing bugs that **remove phosphorus**.

The **anoxic zone** gets no oxygen, but does get nitrate from the aerobic zone. The bugs in this zone convert the nitrate to **nitrogen gas**. This harmless gas is removed from the wastewater, and released into the atmosphere.



The **aerobic zone** has air pumped into it, to provide oxygen. It grows bugs that **convert ammonia to nitrate**, which is recycled to the anoxic zone to be converted to nitrogen gas. This is also where the organic material gets eaten by the bugs that live there.



The MBRs tanks are covered



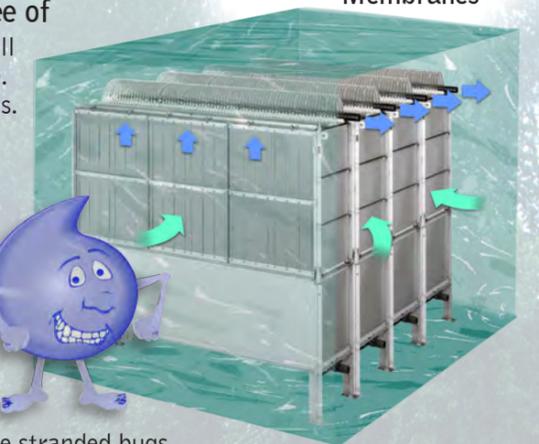
UV Elements

The MBRs are amazingly efficient at filtering out bugs. Still, a few of the smaller ones, including some viruses, manage to squeeze through. So, after passing through the membrane filters, the effluent is treated with intense **Ultra-Violet (UV) light**. This kills any bugs that might still be hitching a ride.



All of the bugs just love eating the stuff that's in wastewater. They eat so much, that when it leaves the aeration basins, the effluent is **free of organic waste**. However, it's still full of the bugs that ate the organic waste. So, the next step is to remove the bugs. That happens in the **Membrane Bioreactors, or MBRs**.

The MBRs are **filters**. The membrane filters have holes no larger than **0.4 microns**. That's 250 times smaller than the thickness of a human hair! Water passes through them easily, but the big fat bugs get left behind. They haven't finished their job, anyway. The stranded bugs are collected, and sent back to the Aeration Basin, where they'll feast on a new batch of wastewater.



MBR Filter Membranes

After UV treatment, I'm my old self again. Clean and germ-free, I go back into the river, or to a newly **constructed wetland** across the highway from the treatment plant. There, I can provide a **healthy habitat** for plants and **wildlife**, and continue helping the people of Arlington.



Artist's Rendering