Whitewater Wastewater Treatment Plant

City of Whitewater, Wisconsin

Treatment Begins at Your House!

- Where do you use water?
  - Sink
  - Bathtub and Shower
  - Dishwasher
  - Washing Machine
  - Toilet
- What happens next?
  - Water goes down the drain!

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Collection System

- The collection system is the largest and most important part of wastewater treatment.
- Its purpose is to ensure that wastewater reaches the wastewater plant for treatment.
- Whitewater has over 50 miles of sanitary sewer lines that brings the wastewater to the treatment plant.

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Collection System

- The sewage flows through sewer lines due to the force of gravity. However, at several locations throughout the city it is necessary to raise the water to keep it flowing towards the plant.
- Lift Stations utilize pumps to raise this water.
- Currently Whitewater has 9 Lift Stations located throughout the city.

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Collection System

- City lines are maintained regularly, however occasionally sewer lines do become clogged with debris.
- What Clogs Sewers?
  - Rags
  - Grease
  - Diapers
  - Roots
  - Feminine Hygiene Products

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How can you prevent a Back-Up?

- Don’t flush or put any of these items down the drain!
  - Feminine Hygiene Products
  - Condoms
  - Diapers
  - Wipes
  - Facial Tissue
  - Grease
  - Rice or any type of seed
  - Rags, Clothing, or Cloth Items

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How can you prevent a Back-Up?

- Human waste and water should be the only items going down your drain! Everything else belongs in the trash!
- This helps reduce the risk of sewer backups in your basement, your neighbor's basement and into the environment!

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Whitewater Treatment Plant

Whitewater Wastewater Plant

- The current wastewater treatment plant is designed to handle an average flow of 3.65 million gallons per day (MGD).
- In 2008 the average flow was 1.90 MGD

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Influent Waste

- A three foot sewer brings all of the city's waste out to the wastewater plant.
- The Whitewater Plant also accepts and treats hauled waste, including:
  - Holding Tank Waste
  - Septic Tank Waste
  - Pit Water Waste
  - RV Waste
  - Leachate and Specialty Waste

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Preliminary Treatment

- Bar Screen
- Grit Removal
- Screen

Bar Screen

- The first stop in the plant is a 2 inch bar screen that stops large objects from entering the waste stream.
- We have had the following stopped by the initial bar screen:
  - 2x4's
  - 5 Gallon Buckets
  - Large Rocks
  - Basketballs/Baseballs

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Wet Well

- The wet well is a collection basin where the influent wastewater makes its first stop.
- The water is then lifted by pumps high enough to allow the water to flow through the rest of the plant by gravity feed.

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Dry Well

- Next door in the dry well there are four raw sewage pumps. These pumps create the pressure to force the wastewater through the remainder of the plant.

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Bar Screen

- The water then goes through a second bar screen. This screen has openings of 3/8 inch. This removes the remainder of the large solids.
- This screen is cleaned automatically by a mechanical scraper arm.

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Screen Press

- Waste that is scraped off of the Bar Screen is processed through the screen press. This washes and then presses the water out of the waste.
- The ‘dried’ waste is placed in dumpsters and taken to a landfill.

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Grit Removal

- The Pista Grit System spins the water. This forces the heavier particles, such as sand, small rocks and other grit downward in the tank. The grit is then concentrated in a lower collection hopper.

Grit Removal

- The wet grit from the Pista Grit System is then dewatered in the Classifier.
- This dried grit is put into dumpsters that are taken to a landfill.

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Primary Treatment

- Primary Clarifiers

Primary Clarifiers

- Now that the larger solids have been removed from the incoming waste, the waste stream is split between two clarifiers.
- Primary clarification removes between 60-80% of solids.

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Primary Clarifiers

- The water in a clarifier is relatively stagnant. This allows dense solids to fall to the bottom and less dense solids (primarily grease) to rise to the top of the water.
- Skimmers are located on both the top and bottom of the clarifiers. The settled solids are removed and pumped to the digesters for digestion.

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Secondary Treatment

- RBC's
- Phosphorus Treatment
- Secondary Clarifiers

RBC's

- The water that flows out of the primary clarifiers is then split between three buildings. Inside these buildings are Rotating Biological Contactors (RBC's).

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RBC's

- The RBC's are comprised of hundreds of PVC plates known as media.
- Biofilm is a layer of biological growth, builds up on the media.
- The biological growth consumes the waste contained in the wastewater stream and cleans the water.

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Alum Addition

- After the RBC's remove the biological waste, phosphorus is removed using Alum or Aluminum Sulfate
- Alum is used to precipitate Phosphorus out of the wastewater.

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Secondary Clarifiers

- A second set of clarifiers is used after the RBC's to remove the solids produced by the Biofilm and the Alum precipitate.
- At this point in time approximately 90% of solid waste has been removed from the water.

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Tertiary Treatment

- Gravity Filter's
- UV Disinfection
- Aeration

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Gravity Filters

- Gravity filters with anthracite media are used to remove the smaller particles of waste.
- After these filters approximately 98% of the solid waste is removed from the wastewater.

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UV Disinfection

- UV Bulbs are used to kill potentially dangerous bacteria.
- UV is only turned on May through September; the warmer months that bacteria thrive in.
- Disinfection periods are determined by recreational use periods of state waterways.

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Post Aeration Tank

- In the Post Aeration Tank, air blowers are used to adjust the dissolved oxygen levels of the wastewater.
- If the dissolved oxygen level is too low, the natural aquatic life in Whitewater Creek could potentially be affected.

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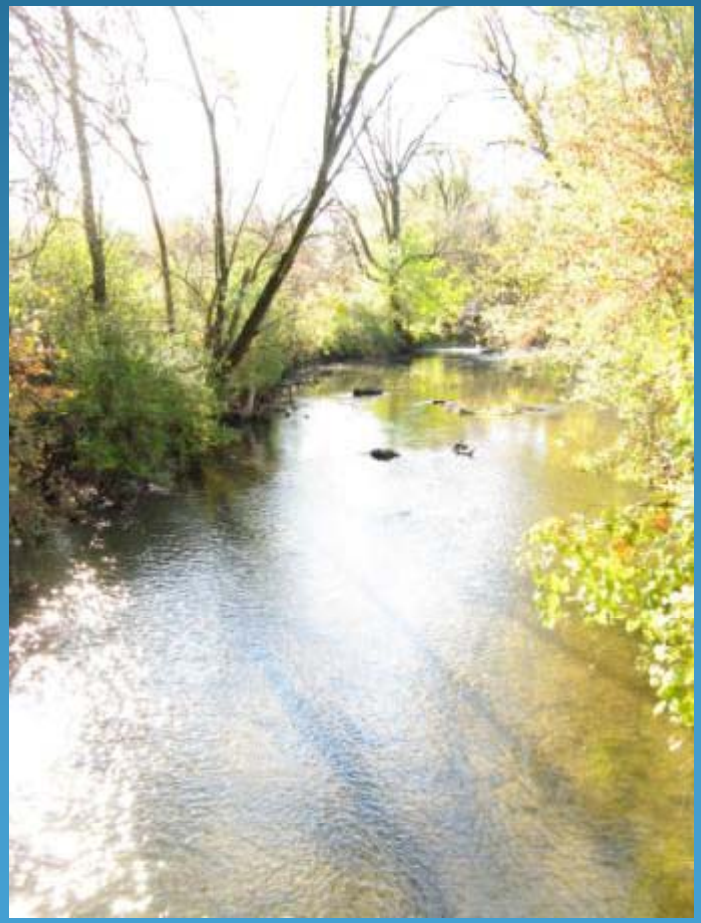
Whitewater Creek!



Biosolids Handling

- Biosolids Production
- Primary Digestion
- Biosolids Storage
- Land Application

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Biosolids Production

- Biosolids, or sludge, are the solids that have settled on the bottom of the primary clarifiers.
- This sludge is pumped to the primary digester.

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Primary Digesters

- The primary digesters breakdown the solids using a heated anaerobic digestion process.
- Anaerobic Digestion occurs when there is no oxygen present.
- The sludge is optimally kept at 98°F.

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Methane Production

- Primary Digestion produces methane as a byproduct.
- Currently this methane is burnt off using a methane burner.
- This flame burns constantly to make sure that explosive gas does not build up in or near the digester buildings.

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Biosolids Storage

- After being in the primary digesters for approximately 60 days, the biosolids are transferred to the Biosolids Storage Tank.
- The storage tank holds the biosolids until they can be properly recycled.

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Land Application

- Whitewater recycles their biosolids through Land Application.
- The DNR requires that we meet stringent analytical requirements before injecting or surface applying the biosolids on area fields.

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Land Application

- Land Application is a beneficial solution for both the wastewater treatment plant and the local farmers.
- We are able to dispose of our biosolids and the farmers are able to receive free fertilizer for their fields.

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What else do we do?

- Collections
- Trends – SCADA
- Laboratory
- Shop
- Mercury Green Tier
- Grease Trap Program

Collections

- The wastewater treatment plant staff maintains and cleans the city sewer system.
- There are over 50 miles of sewers in the City of Whitewater to be maintained by Wastewater Department Staff.

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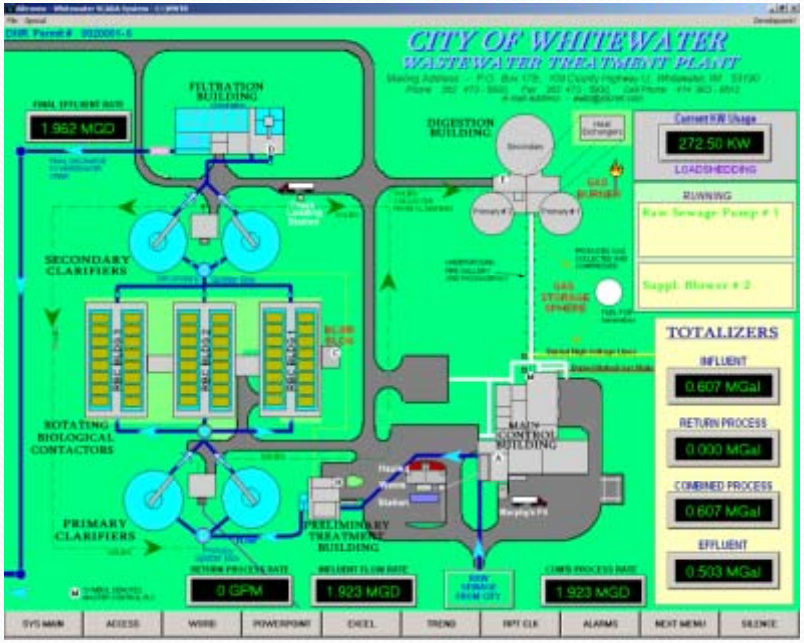
SCADA System

- The Wastewater Plant has a Supervisory Control and Data Acquisition (SCADA) System.
- This system sends data from locations all over the plant to a central computer.
- This allows Wastewater Operators to easily monitor plant operations.



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Laboratory

- The Wastewater Lab is an important element of treatment; it monitors water quality in the influent and effluent wastewater as well as Whitewater Creek.
- The quality of the water is highly regulated by the Wisconsin Department of Natural Resources and the data is sent to the DNR every month for approval.

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Work Shop

- The wastewater plant comes with a lot of upkeep.
- We have several operators whose primary job is to maintain the plant.
- There are dozens of pumps, motors and blowers that are maintained by staff.

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Mercury Green Tier Program

- Whitewater is a part of the Mercury Green Tier Program. This program focuses on removing toxic mercury from our waterways.
- Whitewater has adopted an ordinance that requires dental offices to collect and recycle mercury, rather than dispose of it down the drain.
- The wastewater plant staff perform yearly inspections of the equipment used to collect mercury.

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Grease Trap Program

- Whitewater has also instituted a grease trap program.
- The program monitors restaurants, companies, and any other businesses that use grease and oils. It helps make sure they are following good maintenance procedures.
- Grease traps reduce the amount of fats, oils and grease that end up in the sewers. Build up of these types of products often leads to sewer back ups and blockages.

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What about other plants?

Preliminary Treatment

- Preliminary Treatment is the initial removal of solids from wastewater. Another way to do this is through comminution and then remove the solids in primary clarification.
- Comminution requires equipment that grinds up solids to a manageable size for removal.

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Secondary Treatment

- Secondary Treatment is the Biological Treatment of Wastewater.
- There are many different approaches to Secondary Treatment including:
  - Trickling Filters
  - Activated Sludge
  - Oxidation Ditch

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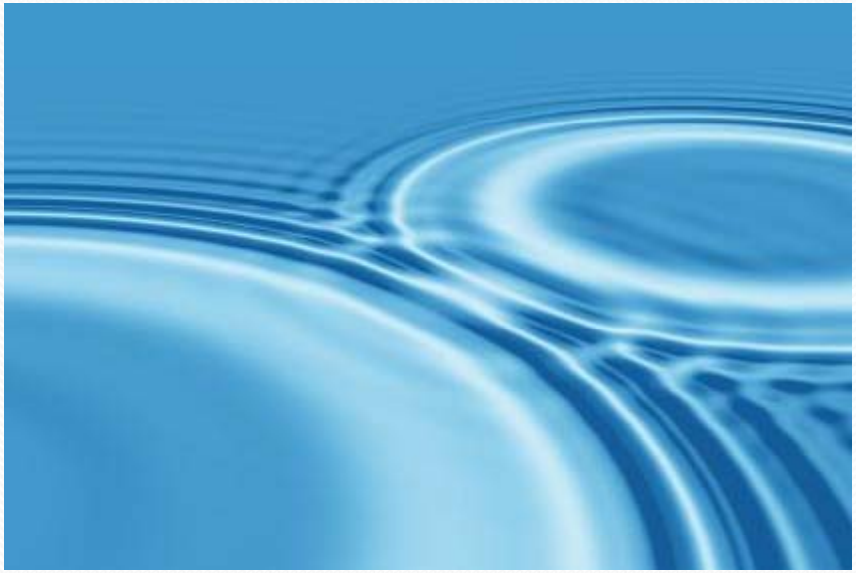
Tertiary Treatment

- Tertiary Treatment can include disinfection and final filtration.
- Other forms of disinfection include:
  - Ozone Treatment
  - Chlorine Disinfection



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The End!

For More Information or Tours,
Please contact the plant staff at:

262-473-5920
109 Hwy U
Whitewater, Wisconsin