

Cortland Wastewater Treatment Facility

- ✓ Originally built in the late 1930's with various upgrades over the last 70 years
- ✓ The facility operates on 8.5 acres
- ✓ Serves wastewater for Cortland, Homer, McGraw, & Cortlandville
- ✓ Flow is around 7.2-7.5 million gallons / day
- ✓ Facility treats "water" and "sludge" using physical and biological processes
- ✓ Biological (aerobic and anaerobic microorganisms)

One of the main goals of the plant is to reduce the BOD (Biological Oxygen Demand)

- BOD is a measure of the organic pollution present
- amount of oxygen needed by bacteria to break down organic matter in wastewater
- Influent has high BOD and we hope the Effluent has low BOD

Blue tanks were attempt to use carbon filtration to process wastewater

- no longer in use

1. Wastewater entering the facility via a 48" pipe

- 80% domestic wastewater and 20% industrial wastewater
- rainwater and other fluids that percolate through the garbage at the landfill (leachate) also enter the facility
- shed is for testing of influent
- usually less than 1% of the influent is organic and inorganic matter (99% water)

2. The flow then goes through the screening, which is basically iron bars that catch large objects

3. Flow then travels through a pipe towards to the raw sewage pumps where it is pumped to the top of the building where the primary clarifiers are located

4. Before getting to the clarifiers, goes through the grit removal chamber

- flow is subjected to a centripetal effect where heavy solids are at the center and it can settle out to the bottom and can be removed

5. The water goes to the Primary Clarifier where water circulates and allows for sludge to sink to the bottom and floatables come to the surface

- 80' wide by about 12' deep
- floatables are skimmed by boom and removed
- sludge settles to the bottom (primary sludge) and is sent to the sludge digesters
- This is where the 2 types of treatments split

6. Flow then goes to the Aeration Basins where microorganisms use aerobic processes to help break down the organic matter

- aeration (bubbling) provides maximum amount of oxygen for the microbes
- brown color is the microbes, not what you think
- if you fell in here you could not swim or float
- bubbling changes your density and you would sink to the bottom

How much do you think the facility spends on electricity per month? \$30, 000-35, 000

7. Gravity allows for flow to travel to the Secondary Clarifiers where organic material and live microorganisms (activated sludge) settle out at the bottom and is pumped back to the aeration tanks or to the primary clarifiers to eventually be pumped to the sludge digesters

- pumping active sludge back to clarifiers helps maintain the proper population of microbes
- dead organisms and other material skimmed off the top
- organic removal completed at this point

8. The water then travels to the chlorine tanks and then leaves the facility as Effluent into the Tioughnioga River

- Chlorine is only added during May 15th-Oct 15th
- also, Sulfur Dioxide is added to counteract the chlorine
- final aeration increases the Dissolved Oxygen levels before being dumped into the river

Water enters the river about 12 hours after it enters the plant!

Sludge Processing

1. Sludge is transferred from the bottom of the Primary Clarifiers and from the Secondary Clarifiers to the Sludge Digesters

- Anaerobic (without oxygen) conditions
 - sludge is mixed and warmed to about 100-105 F
 - can not have more than 1 degree swing in temp or altered pH levels
 - 2 types of bacteria exist (acid loving and methane fermenters) in the tanks
 - Acid loving bacteria break down matter into sulfide gas and other volatile acids
 - Methane fermenting bacteria break down matter into volatile acids, methane,

carbon dioxide, and fully digested sludge

2. Sludge clarification occurs as a digested sludge is pumped to a new tank where it is settled by gravity and can be removed for dewatering

- floating gas holder in this tank allows for storage of gases that were produced
- Some of the methane gas produced can be used to run their boilers

Anaerobic digestion takes about 15 days

3. Sludge dewatering takes place in a belt press which prepares the sludge for removal and being shipped to the landfill

- the final sludge is still about 85% water

Stream Ecology

- Must be careful of what we “dump” into any bodies of water
- Adding excessive nutrients (N & P) into a system (Eutrophication)
- If we put raw sewage into a stream/lake that has high nutrients, algae will thrive and then they die off and sink to the bottom
- Bacteria will begin decomposing the algae and that requires LOTS of oxygen!
- Which means less oxygen for other organisms (fish and plants) and possibly causing a die off