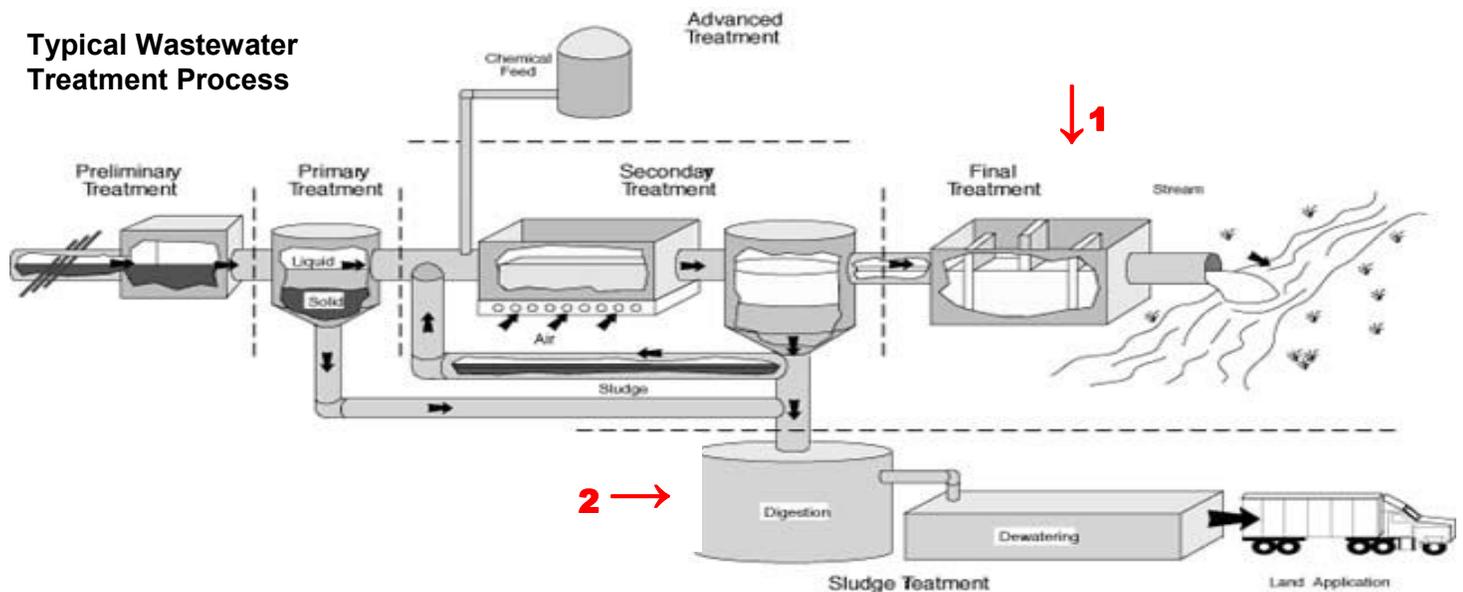


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Urban Wastewater Systems *(continued)*

Final and Sludge Treatment:



1 Final treatment. Final treatment focuses on removal of disease-causing organisms from wastewater. Treated wastewater can be disinfected by adding chlorine or by using ultraviolet light. High levels of chlorine may be harmful to aquatic life in receiving streams. Treatment systems often add a chlorine-neutralizing chemical to the treated wastewater before stream discharge.

2 Sludge treatment. Sludges are generated through the sewage treatment process. Primary sludges, material that settles out during primary treatment, often have a strong odor and require treatment prior to disposal. Secondary sludges are the extra microorganisms from the biological treatment processes. The goals of **sludge treatment** are to stabilize the sludge and reduce odors, remove some of the water and reduce volume, decompose some of the organic matter and reduce volume, kill disease causing organisms, and disinfect the sludge.

Untreated sludges are about 97 percent water. Settling the sludge and decanting off the separated liquid removes some of the water and reduces the sludge volume. Settling can result in a sludge with about 96 to 92 percent water. More water can be removed from sludge by using sand drying beds, vacuum filters, filter presses, and centrifuges resulting in sludges with between 80 to 50 percent water. This dried sludge is called a sludge cake. Aerobic and anaerobic digestion are used to decompose organic matter to reduce volume. Digestion also stabilizes the sludge to reduce odors. Caustic chemicals can be added to sludge, or it may be heat treated to kill disease-causing organisms. Following treatment, liquid and cake sludges are usually spread on fields, returning organic matter and nutrients to the soil.

Next week: Sludge Treatment Processes