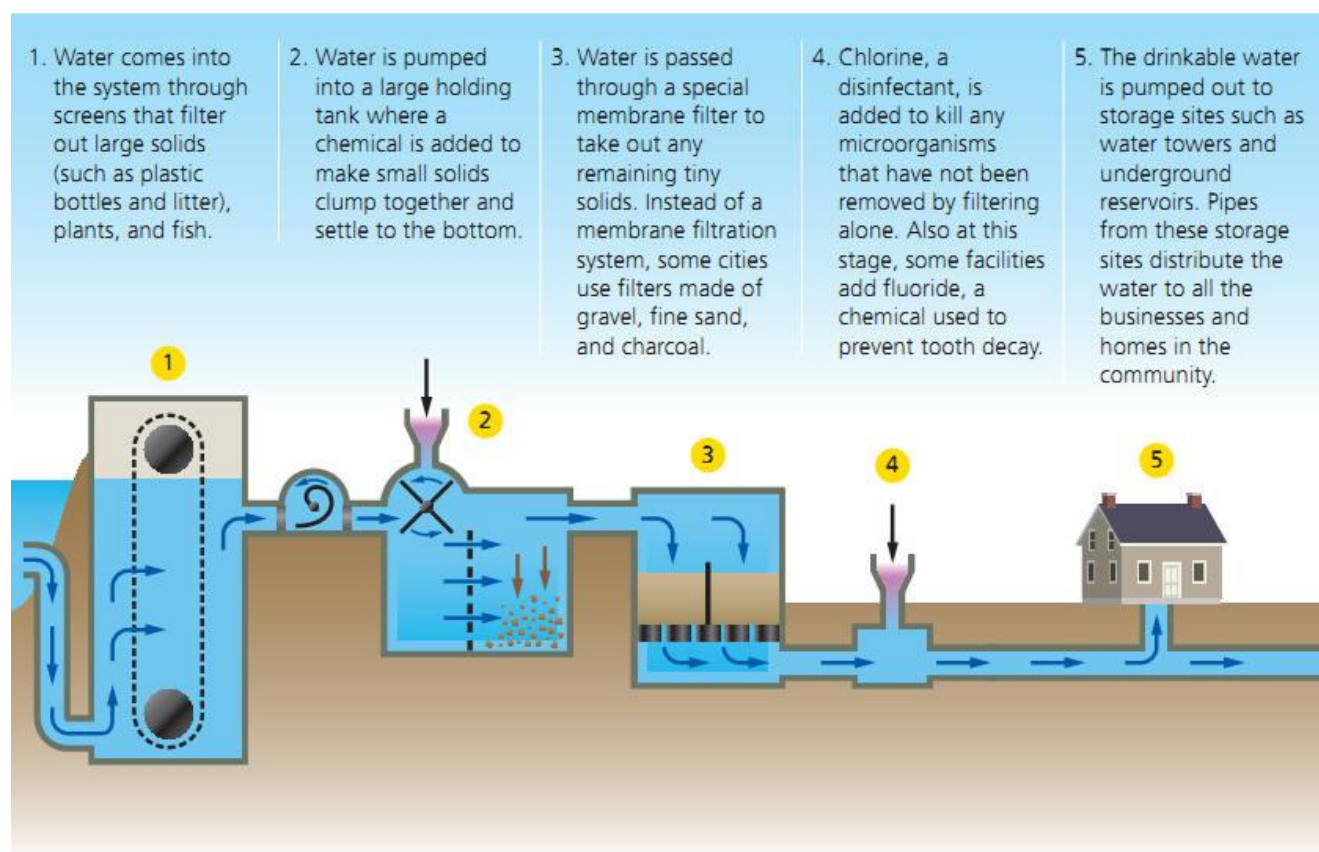


In developed countries, we use a lot of water. We have the resources and technology to provide a safe supply of water. In rural areas, groundwater wells are used. In urban and suburban areas, a municipal or city system is used that draws water in from a larger source (lake or river).

In both cases, water is regularly checked to ensure that it is safe to drink.

Below is a diagram of a typical water intake treatment plant.

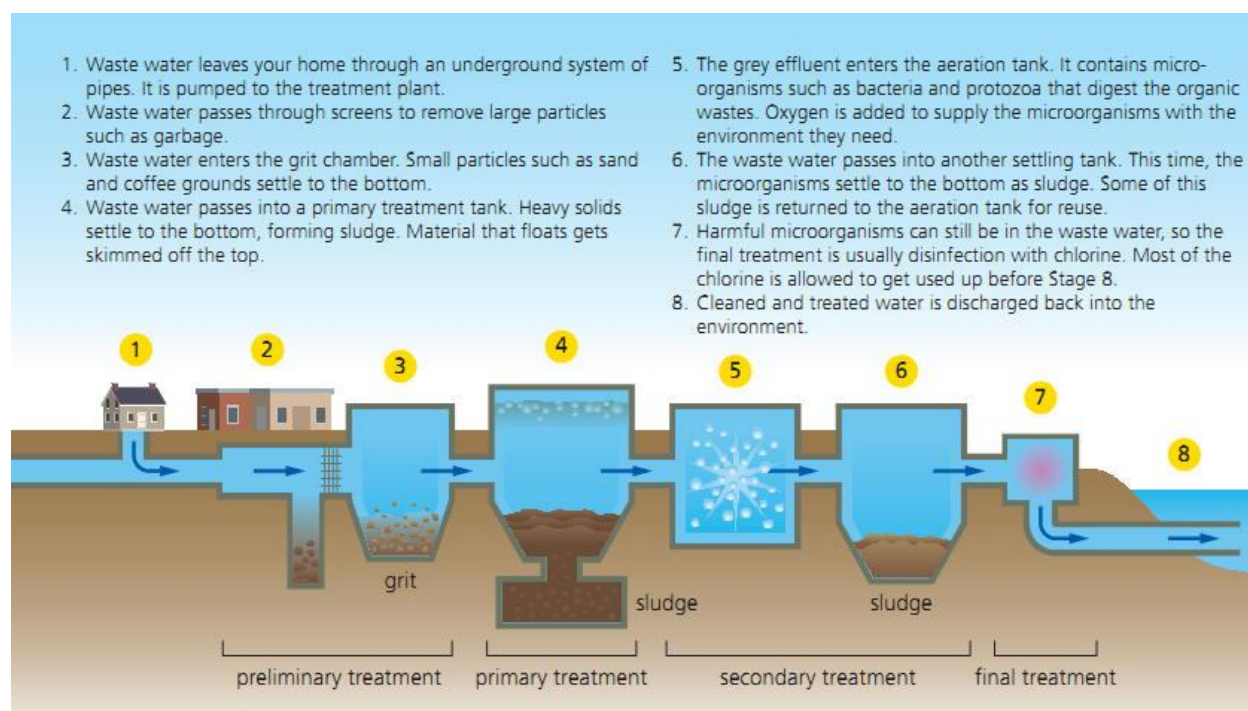


When we are done with the water, the grey water, brown water and surface runoff from precipitation is collected and treated so that it does the least harm to the natural environment. In the event of a storm, however, sometimes the system goes beyond capacity and some water goes untreated into the environment and that is why some beaches are closed after storms.

Cities and municipalities are careful with their wastewater treatment since they want to protect their natural environment. Developing countries do not always have the wealth or ability to create these systems and as a result, they end up contaminating their local water supply and sicknesses and parasites become a serious problem.

Contaminated water is one on the greatest preventable killers of humans across the globe. It is estimated that a child dies every 20 seconds from bad water somewhere in the world. During this period, 150 children will have died due to an illness contracted from their only water source.

Below is a schematic of a typical wastewater treatment process.



Our water, in Ancaster, costs about 1 cent per litre. It is one of the lowest costs in Ontario for municipal or city water. It is still expensive since water use is metered and used to calculate waste-water or sewage billing too. The reason that it is expensive is that it costs a lot to build and maintain the system on a large scale. Hamilton's water/wastewater/stormwater infrastructure has a replacement value of over \$10 billion! (<https://www.horizonutilities.com/myHome/watersewer-billing/Pages/FAQ.aspx#Q1>)

*Look over the schematics and answer the following questions:*

1. What are the contaminants that we avoid both on the intake and treatment of wastewater?

Water Intake System –

*Large solids such as plastics. Plants and fish*

*Smaller solids*

*Microorganisms*

Wastewater Treatment System –

*Large solids such as plastics. Plastics and other garbage (Bars and screens)*

*Smaller solids (Screens and grit tanks and aeration tanks)*

*Microorganisms (Aeration and sludge tanks – finally Chlorine is added))*

Do a bit of research on the different sources of contamination. There are three categories - give examples of each.

Physical:

*Litter or wind-borne trash, illegal dumping, transportation vehicles (rust, hydrocarbons coolant)*

*Suspended sediment from improper construction sites or bad landscaping*

*Invasive species and bioturbation*

Chemical:

*Improper disposal of household chemicals (hydrocarbons, pesticides, herbicides and medication)*

*Industrial chemicals (leaks, spills and illegal dumping); Road salt; Acid Rain*

Biological:

*Invasive species and bioturbation*

*Algae Bloom*

*Leaking or overloaded Sewage systems; Pet waste; livestock waste*

