Septic Systems 101

for Waterfront Living in Vermont

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VERMONT

Winooski Conservation District

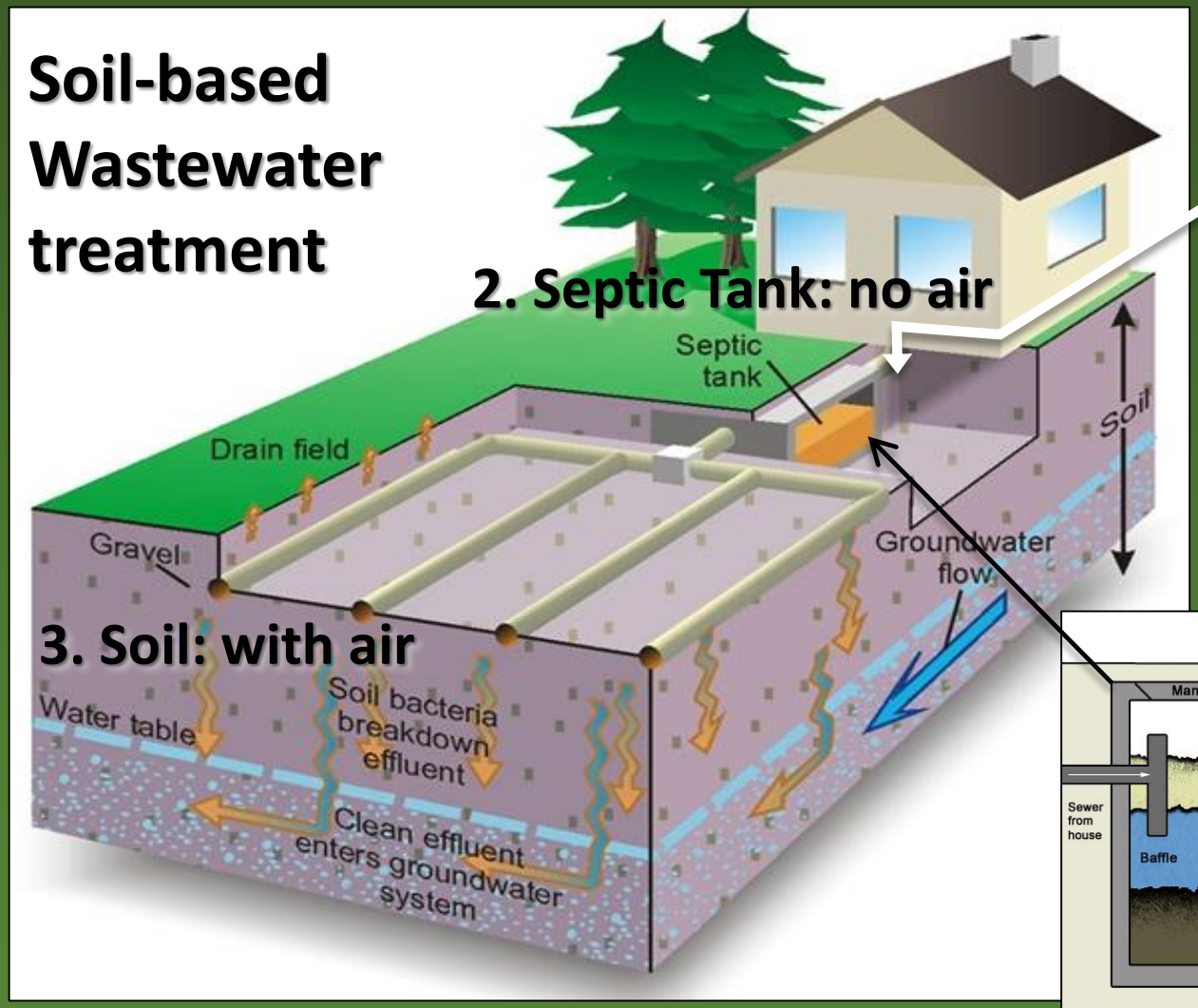
"Connecting people to a sustainable landscape"

Septic Systems 101

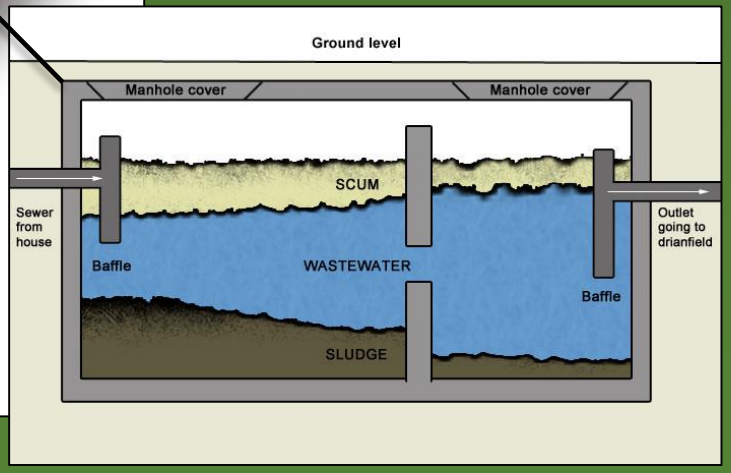
- What are the components of a septic system?
- Why care about wastewater treatment?
- How do onsite wastewater treatment systems work?
- What are the different types of wastewater systems?
- How do you know a wastewater system has failed?
- Who can design a wastewater treatment system?

What are the Components of a Septic System?

Soil-based Wastewater treatment

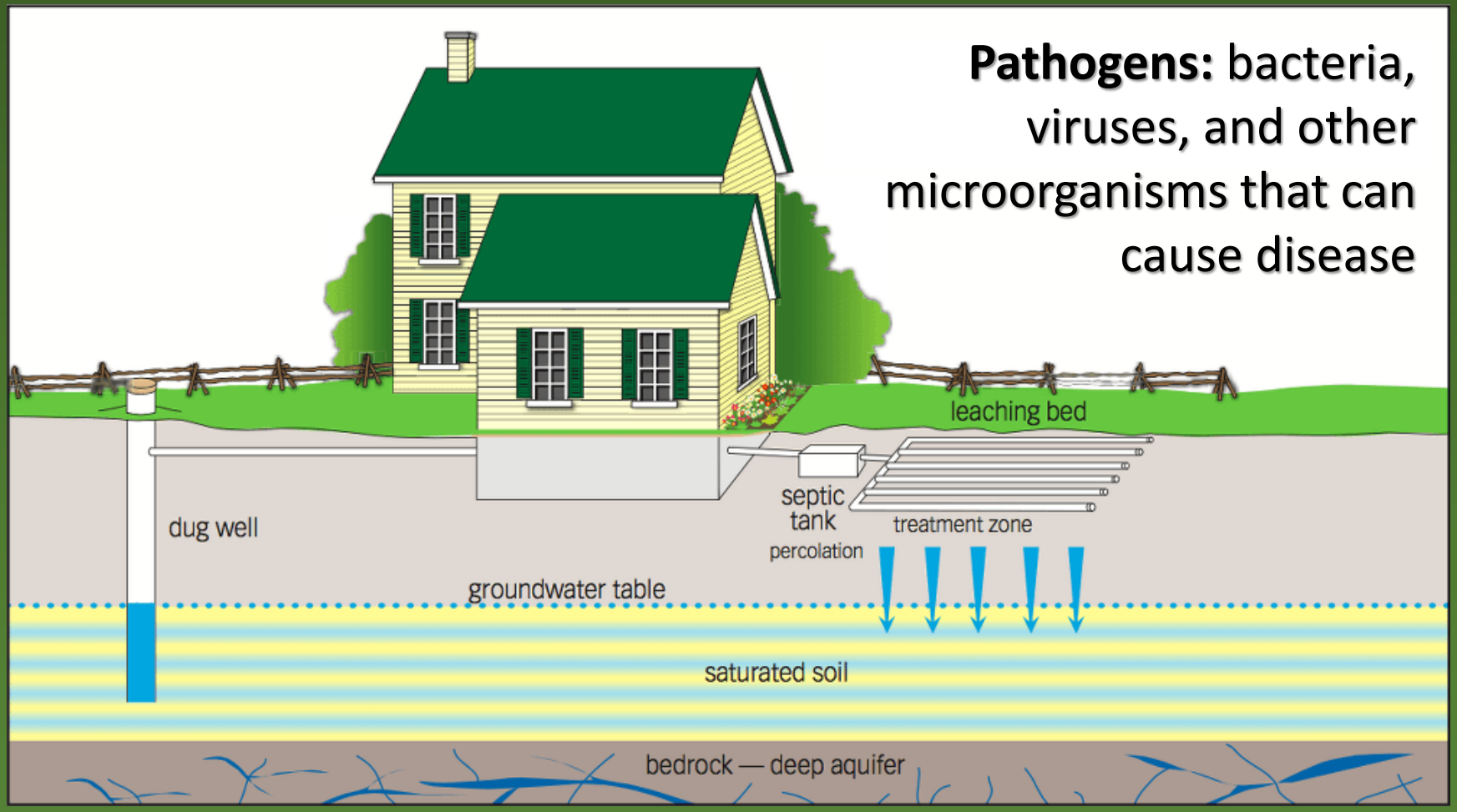


1. Digestion



Why care about wastewater treatment?

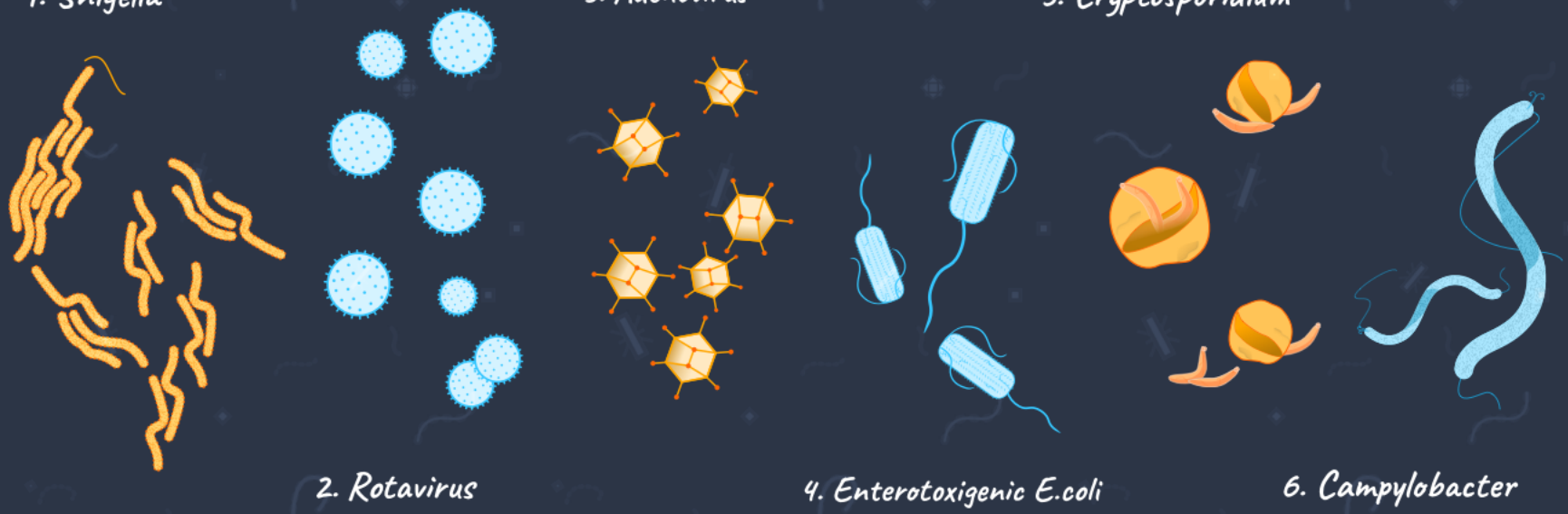
Human Health



Why care about wastewater treatment?

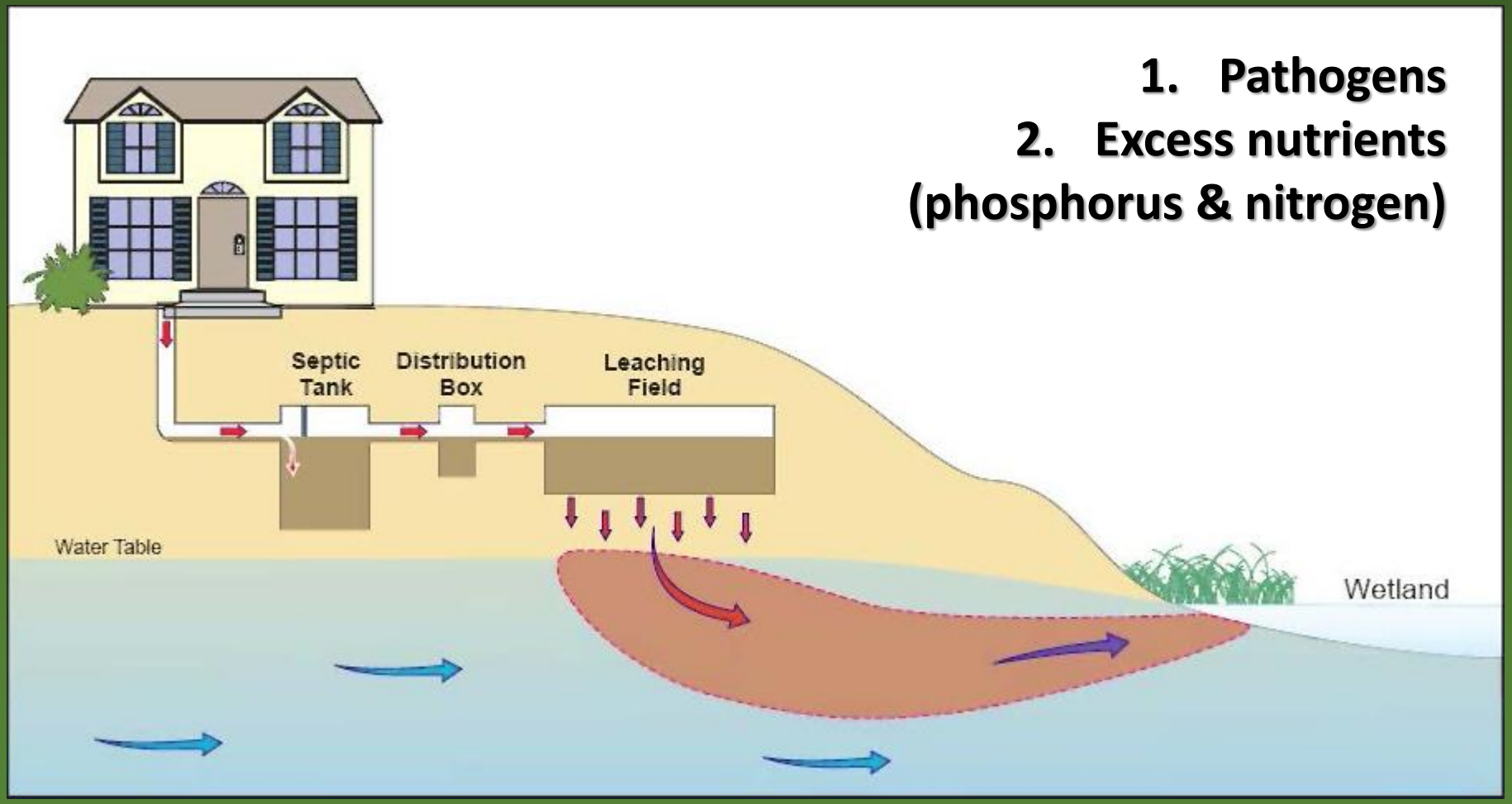
Human Health

Top six leading pathogens responsible for diarrhea are...



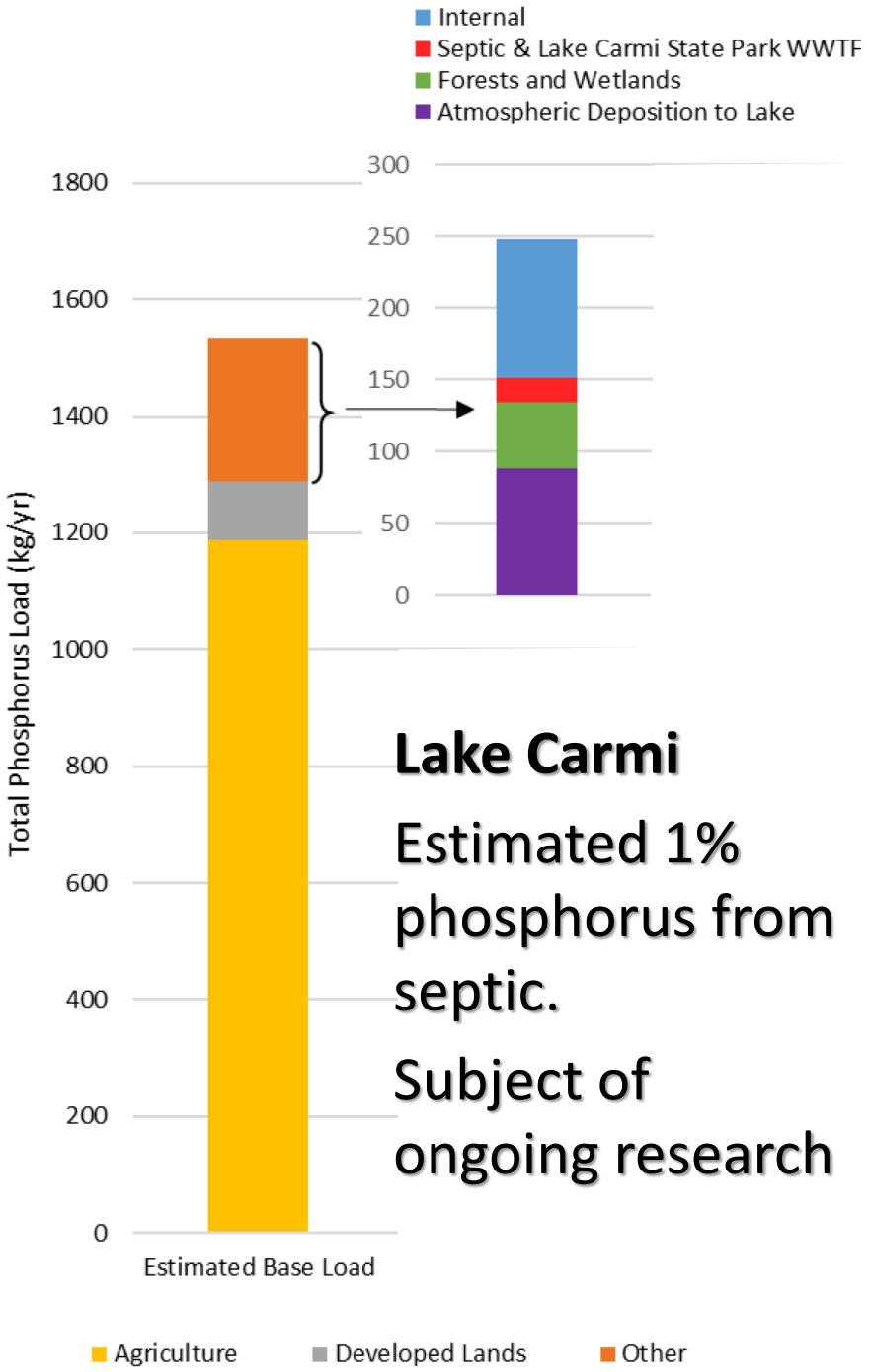
Why care about wastewater treatment?

Environment



Why care about wastewater treatment?

Environment

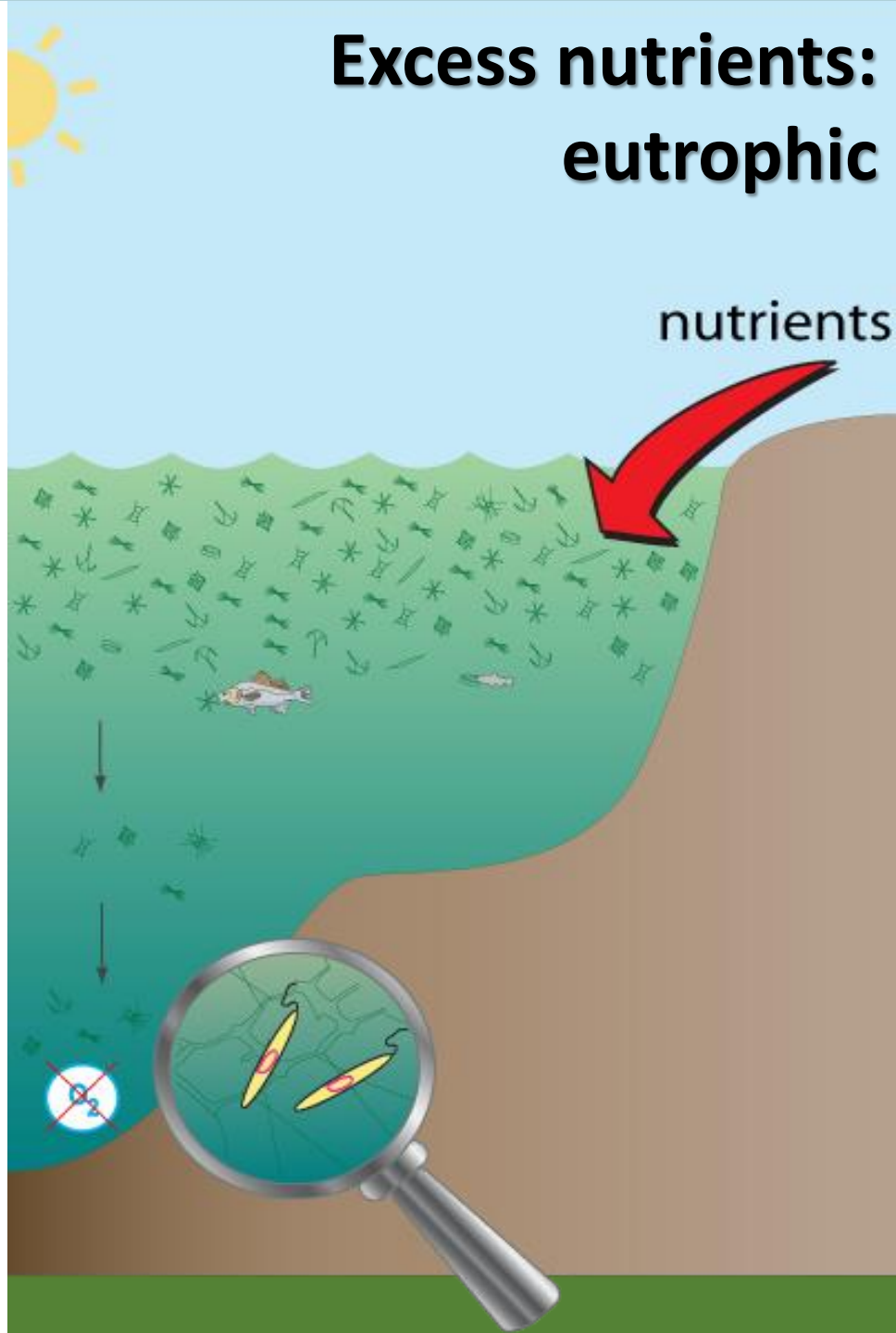


Lake Carmi

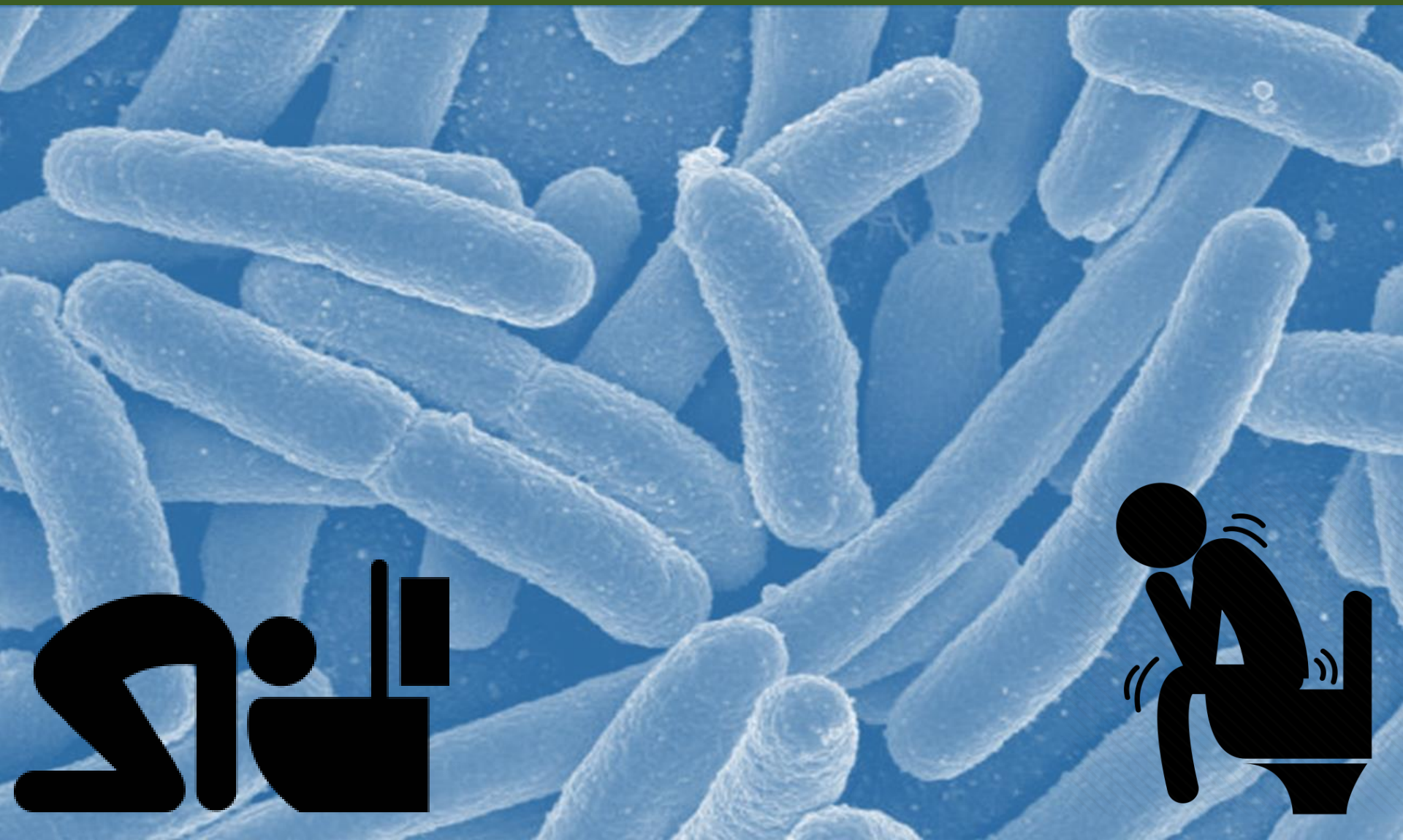
Estimated 1% phosphorus from septic.

Subject of ongoing research

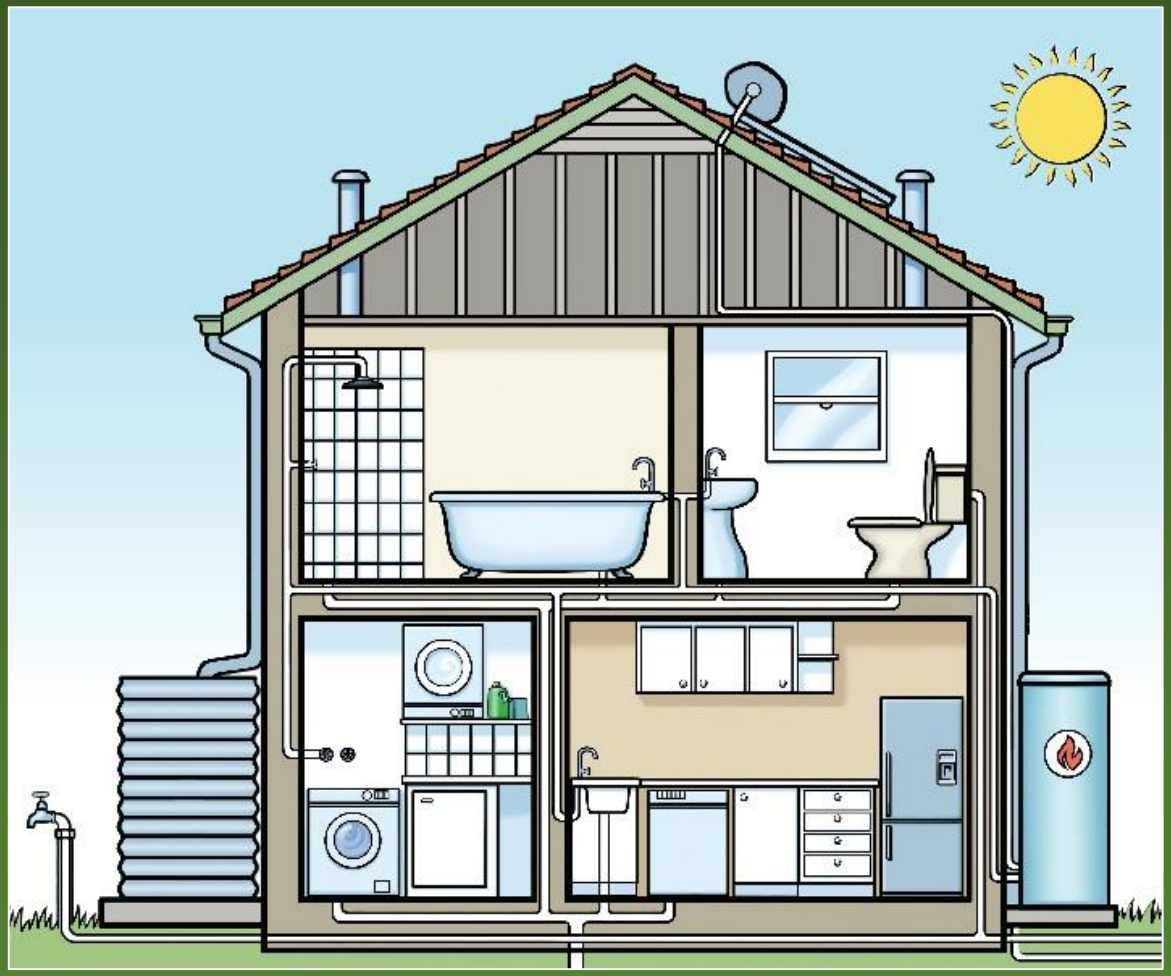
Excess nutrients: eutrophic



Vermont Wastewater Rules Address Pathogens



How much wastewater per house?

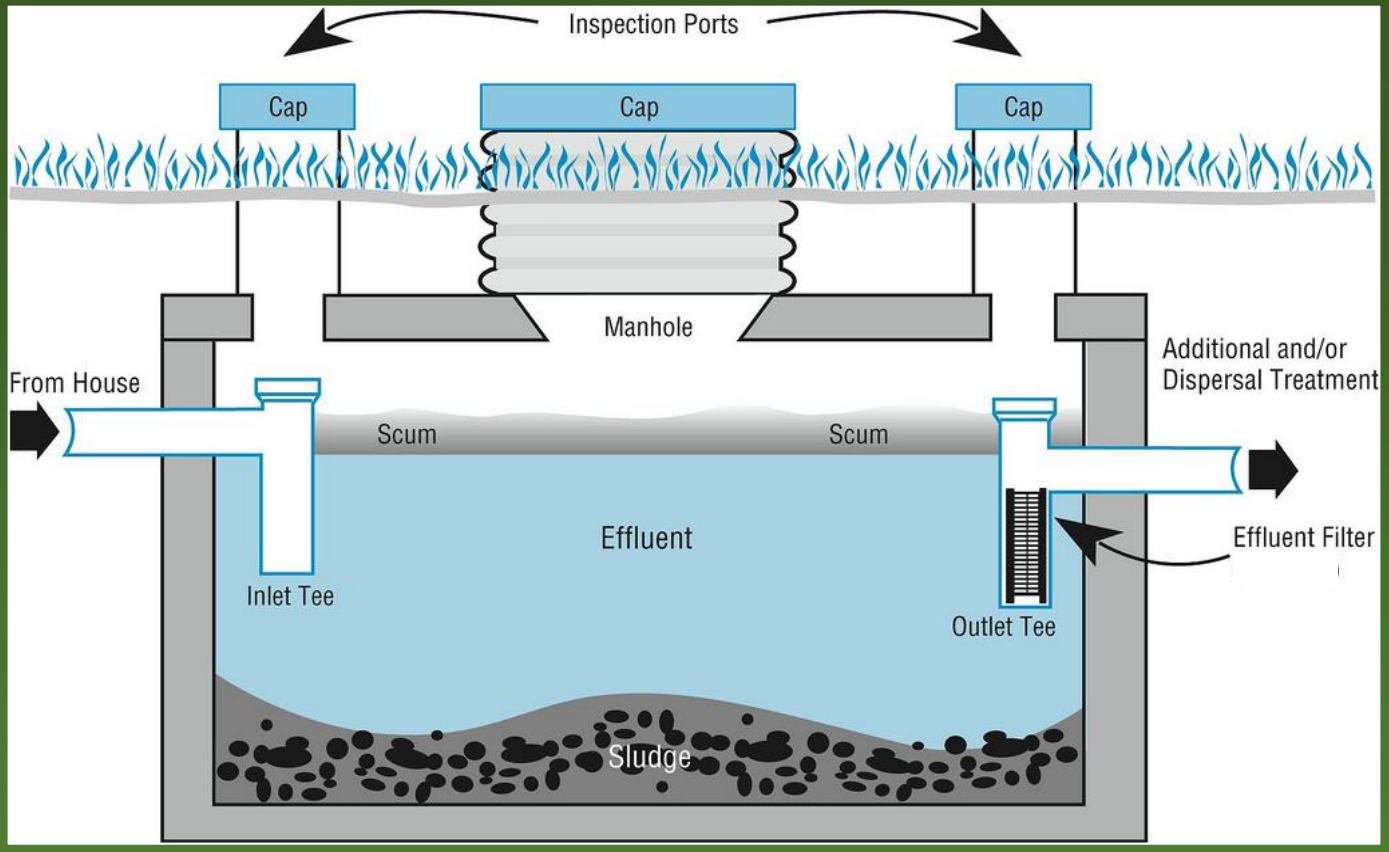


Design Flow

- 70 gallons per person per day
- Based on number of bedrooms
- 2 people in first three bedrooms
- 1 person in further bedrooms

Five Bedroom House: (3 × 2 x 70) + (2 × 1 × 70) = 560 gpd

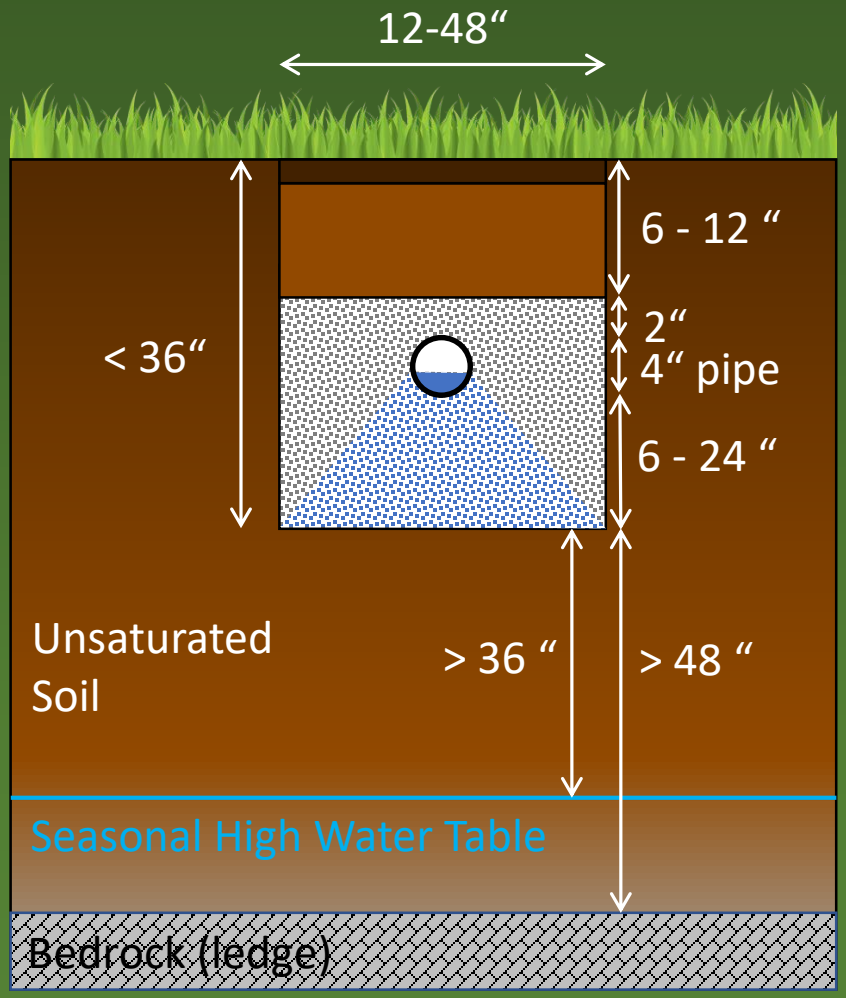
Septic Tank: separates liquid from solid



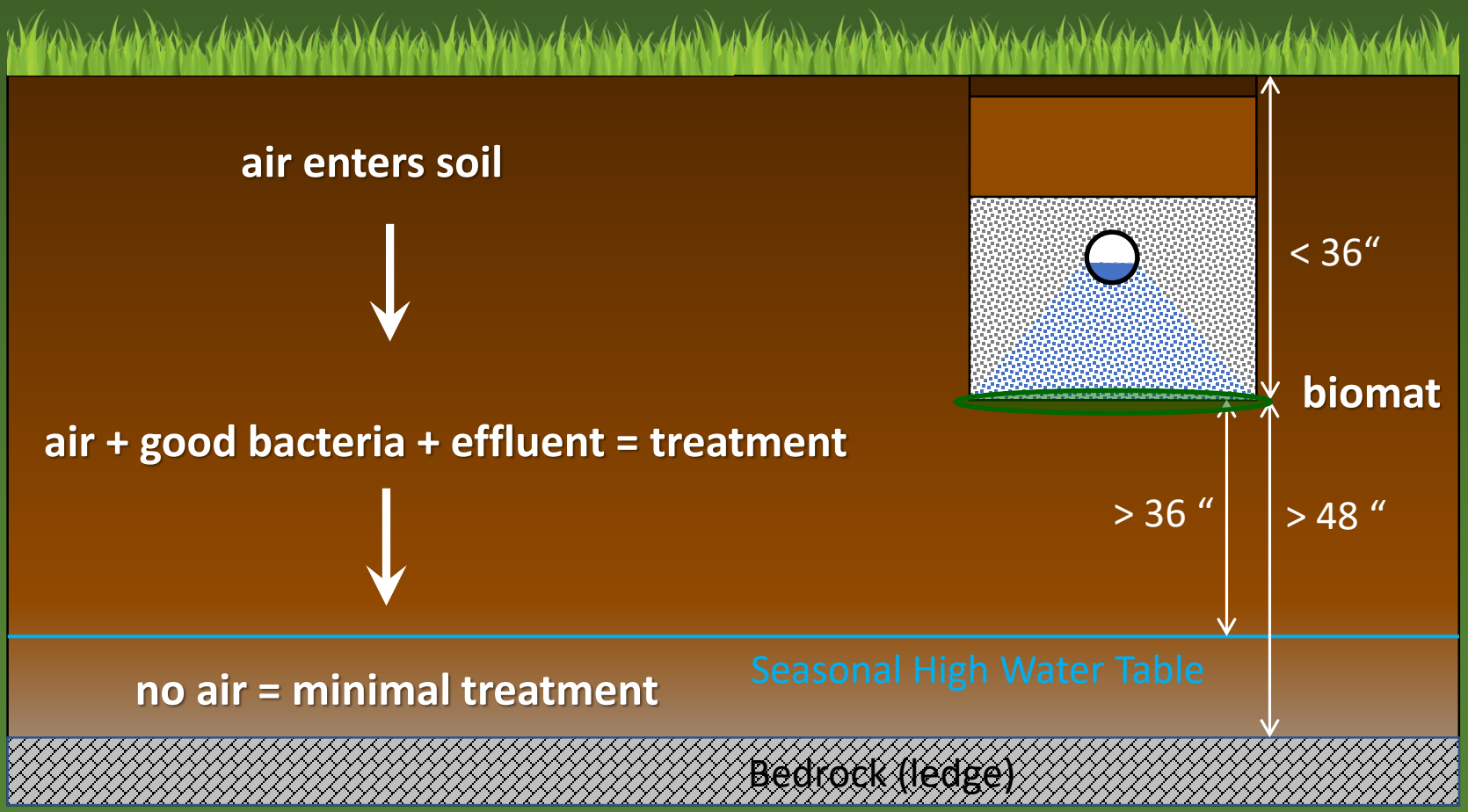
- Wastewater must reside in tank at least two days
- Floating solids form the scum layer
- Sinking solids form the sludge layer
- Wastewater goes to the leachfield

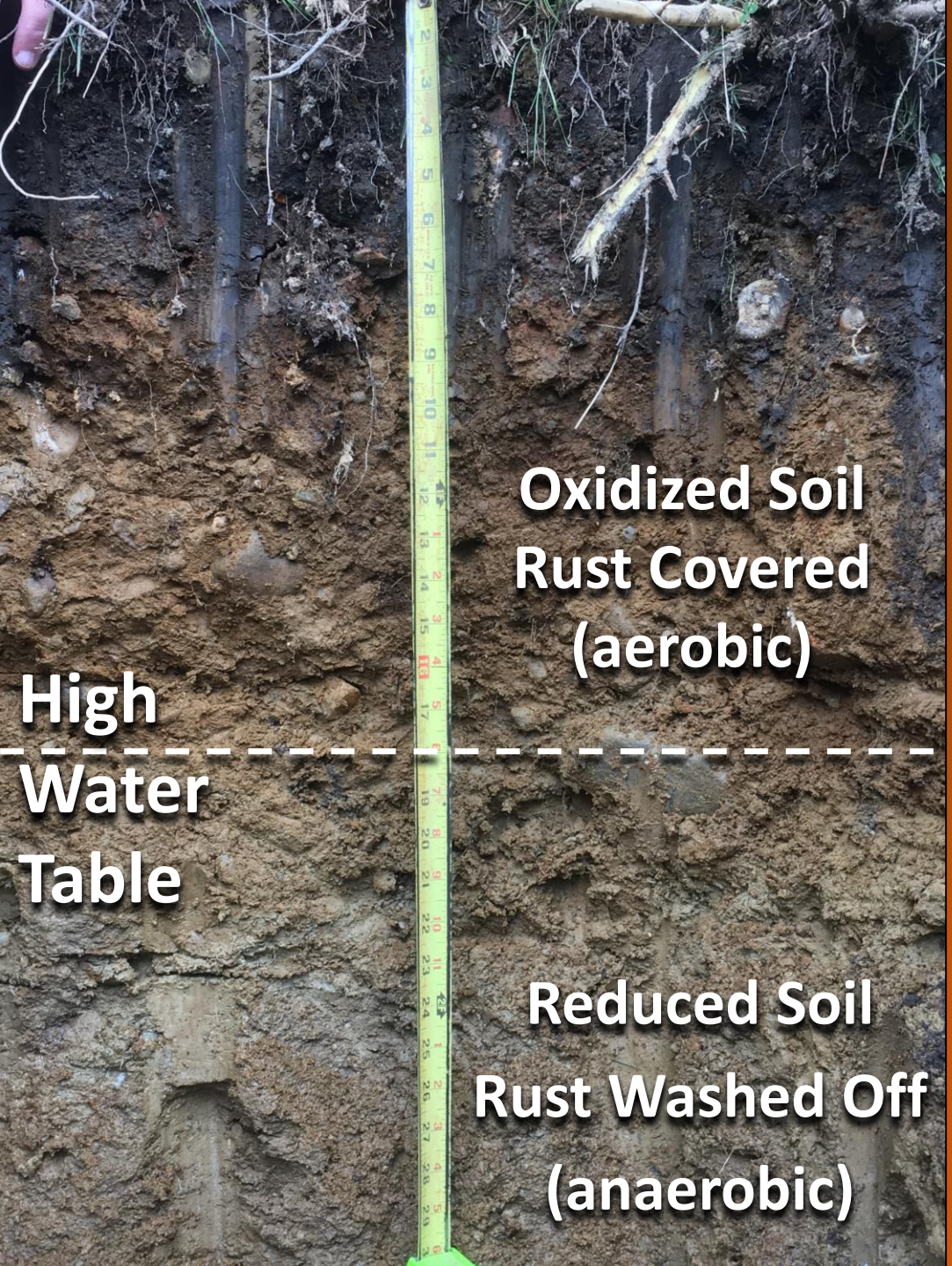
Leachfield: treats the wastewater

Trenches



Leachfield: treats the wastewater

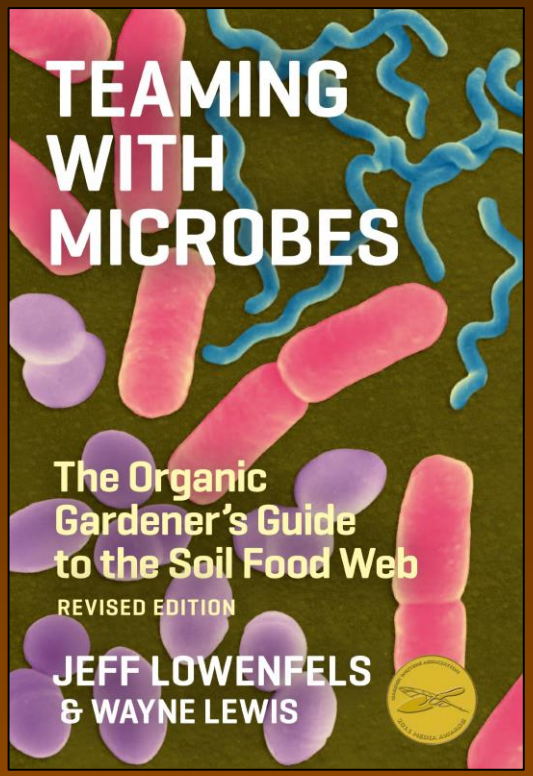


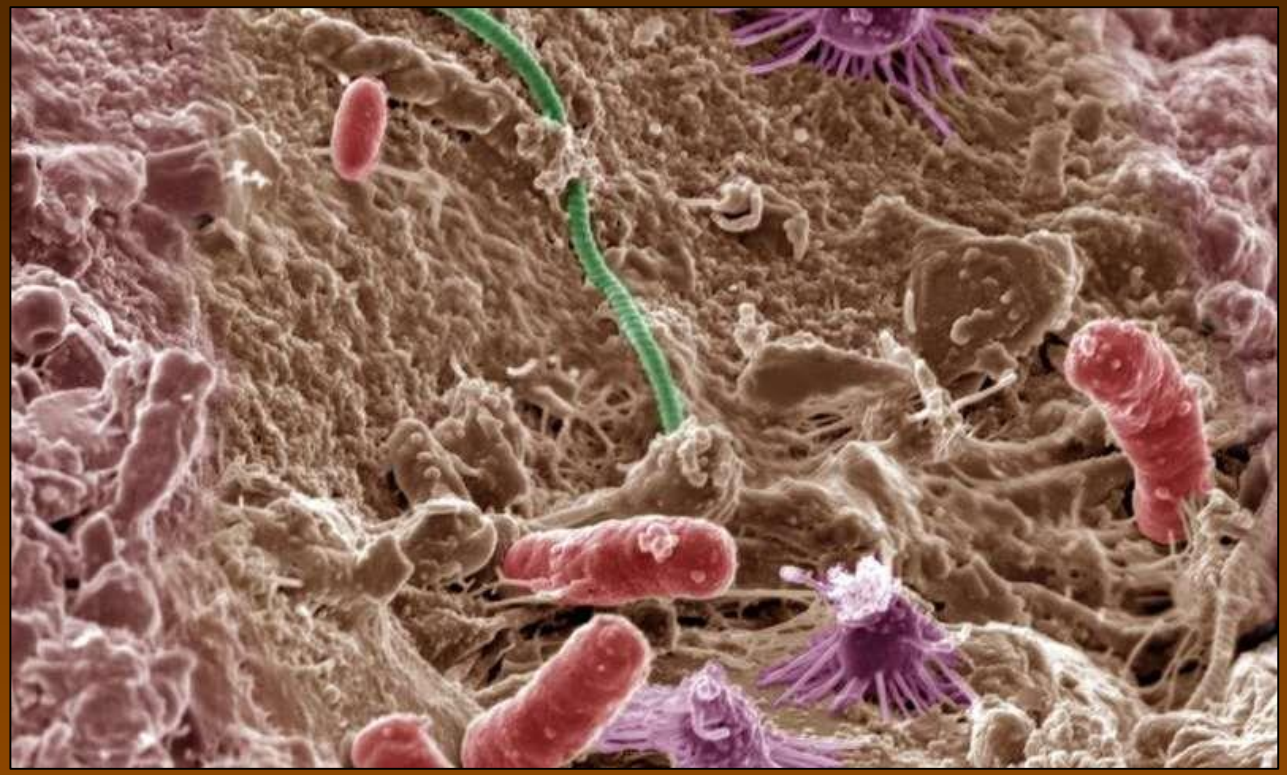


Where do the wastewater treating bugs live?

Look for the rust covered (red-brown) soil!

Grey soil indicates the rust has been dissolved & washed off below the Spring water table.





You and your wastewater system designer are microbe farmers!

Leachfield: treats the wastewater

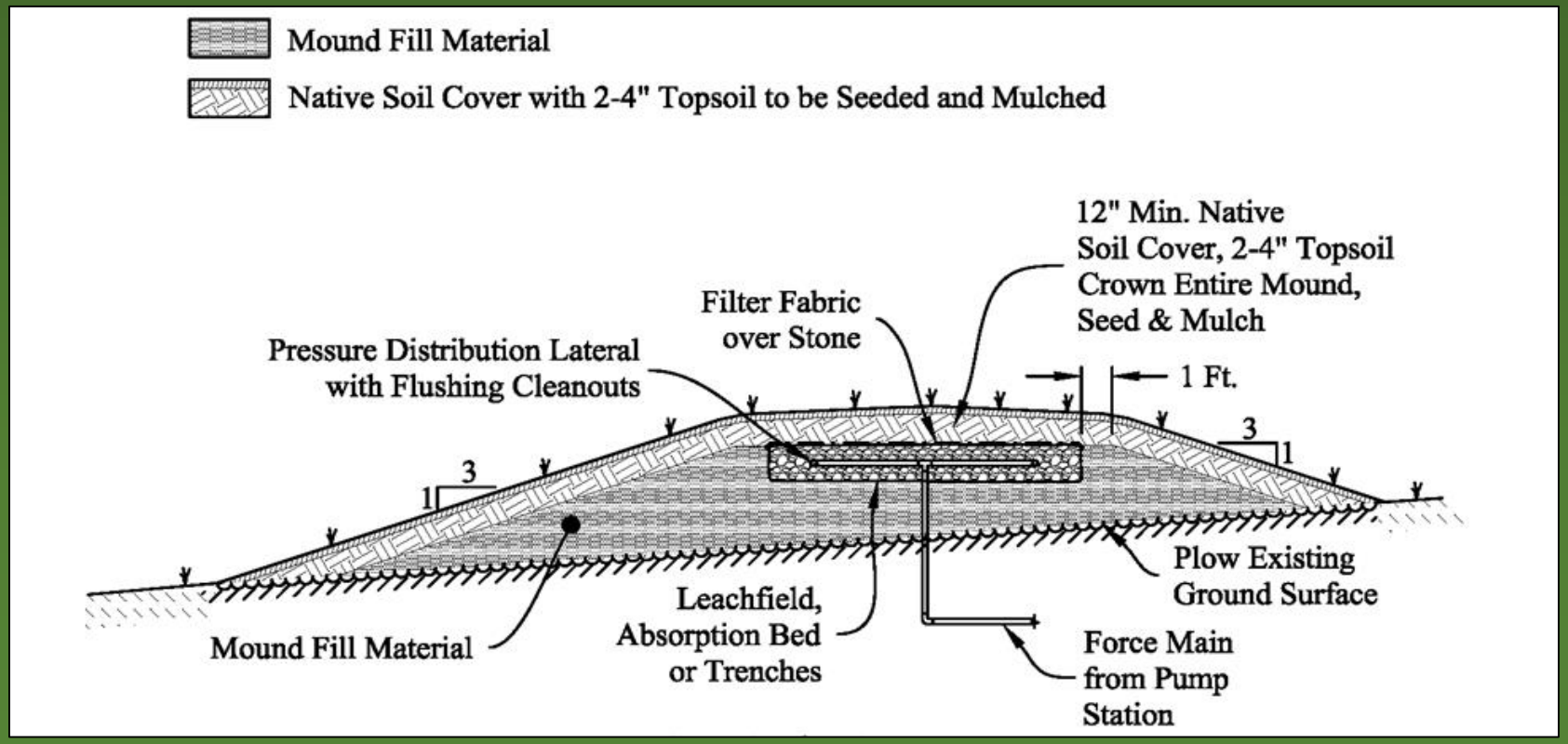
Beds

What if you don't have 3 feet to the water table?

Leachfield in a Mound

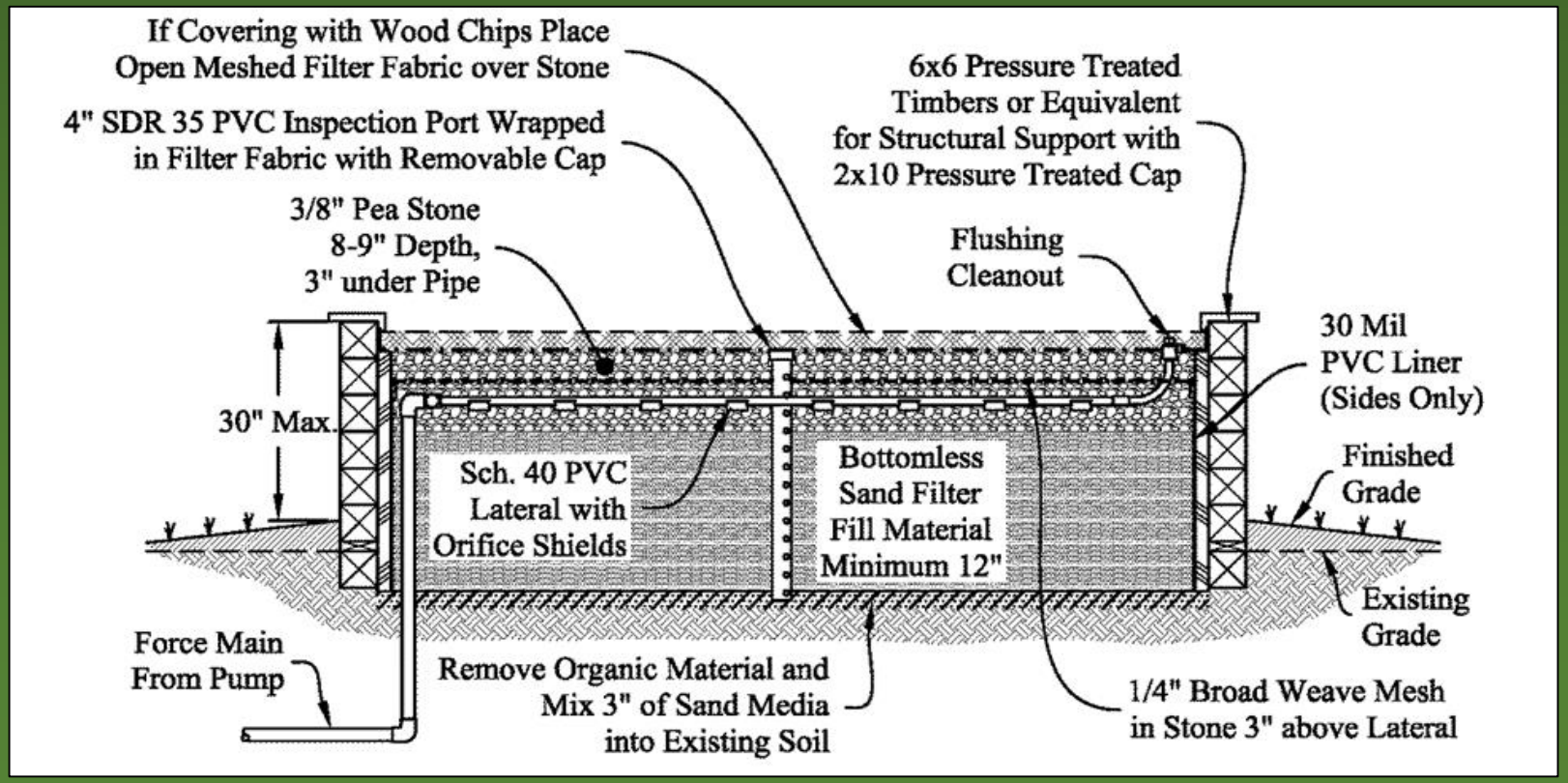
high water table

or thin soil



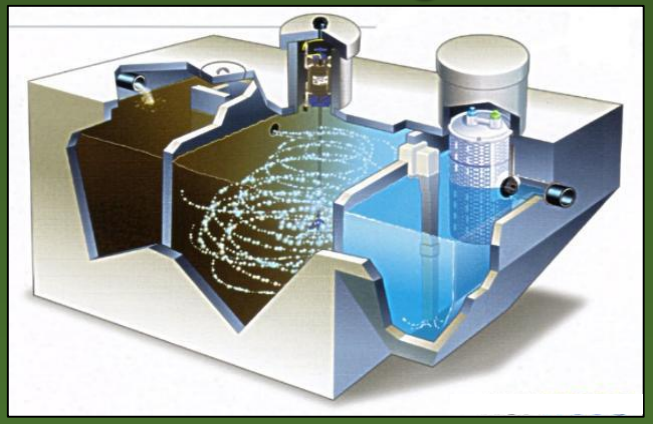
Leachfield in a Bottomless Sand Filter

shallow water table, thin soil, & little space

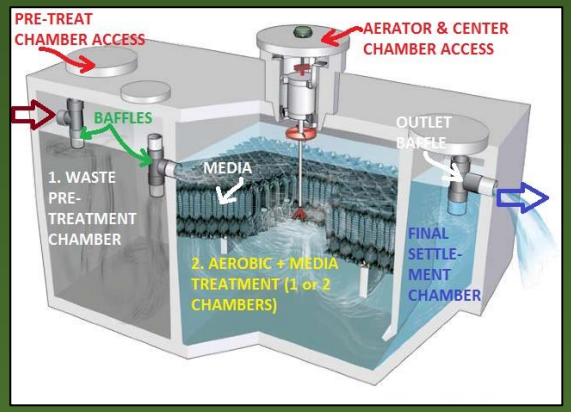


If you don't have enough soil: pretreatment

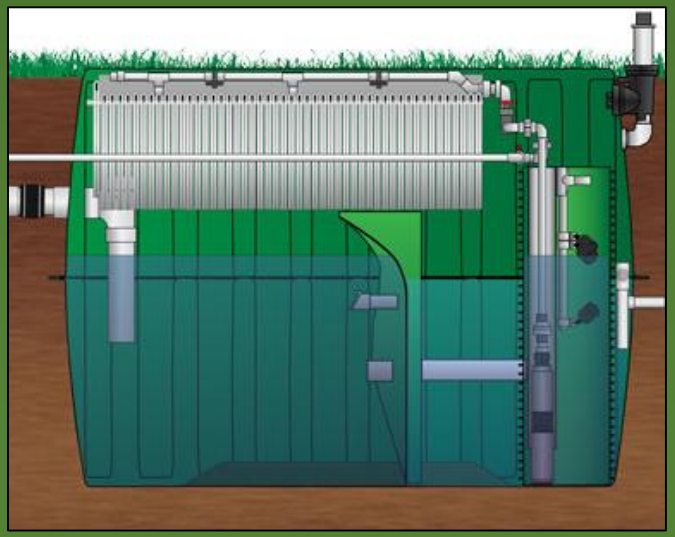
Bubble air through effluent with free-floating microbes



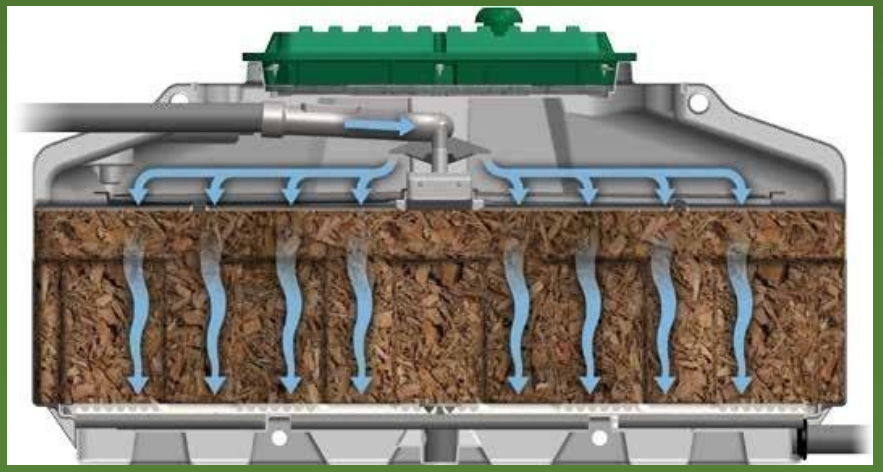
Bubble air through synthetic material microbes can live on



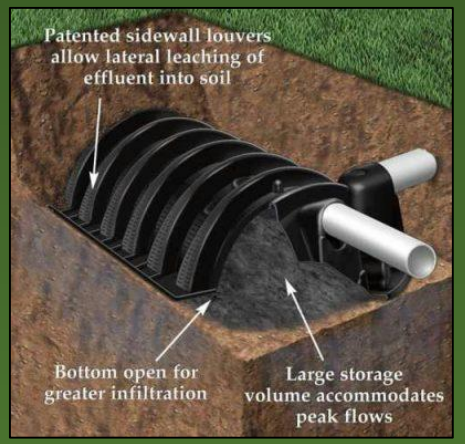
Trickle effluent through synthetic material microbes can live on



Trickle effluent through organic material microbes can live on

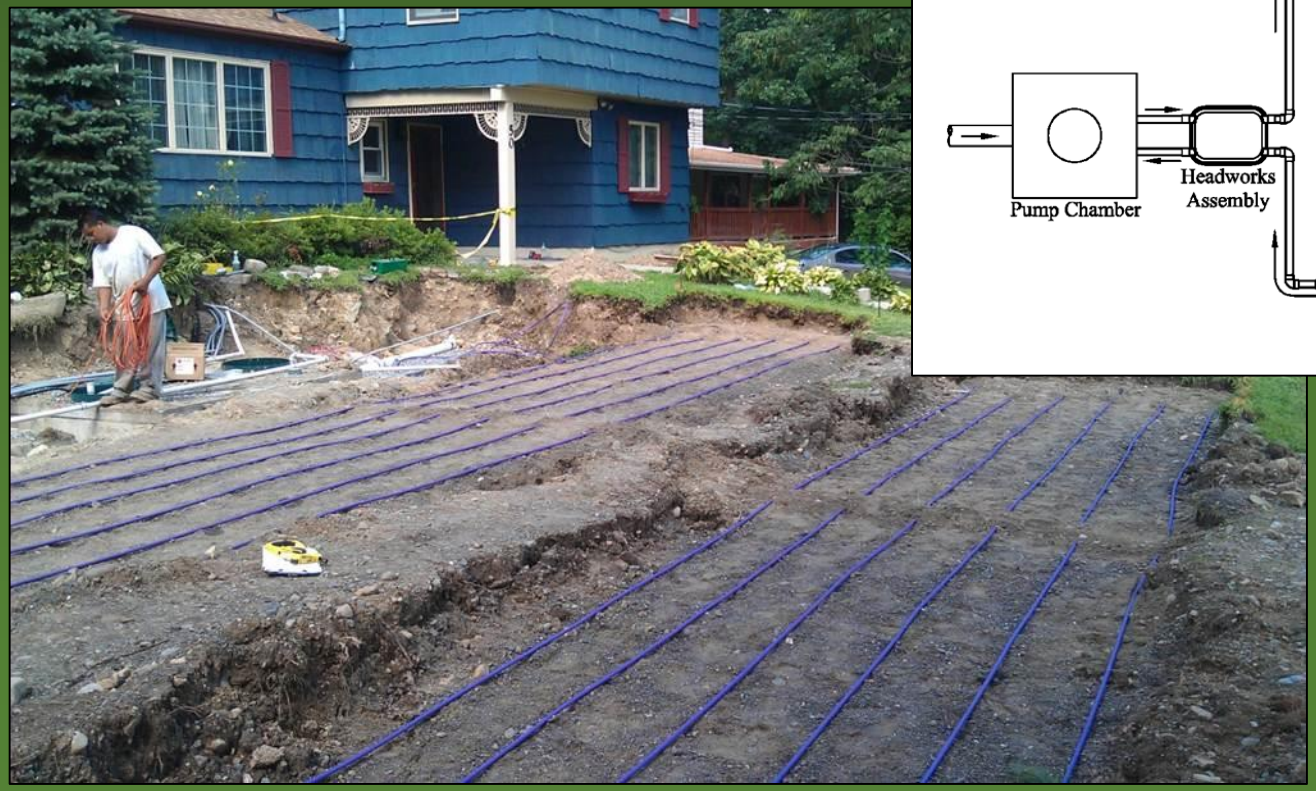


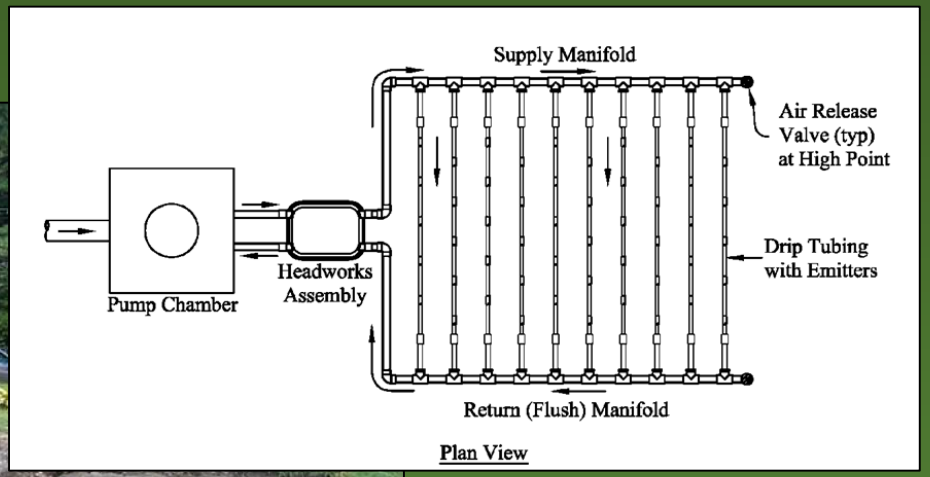
If you don't have enough area: gravelless disperse and treat systems



If you don't have enough soil and/or have an awkward space:

pressure-dosed drip system





When is it time to get a new septic system?

- When the existing system has failed
- When you want to increase the design flow (by adding a bedroom or changing use)

How do you know when a wastewater system has failed?

How do you know when a wastewater system has failed?

When wastewater is:

1. Exposed on ground surface
2. Discharged to surface water
3. Backed up in building

Who can design a new septic system in Vermont?


STATE OF VERMONT

On behalf of the Agency of Natural Resources, Department of Environmental Conservation, Division of Drinking Water and Groundwater Protection I hereby certify that

A. DeSigner

has passed the

Class A Designer Exam

in fulfillment of the requirement to become a Wastewater System and Potable Water Supply Designer.

Certified by: _____ Date: July 11, 2017

Dr. J. Graham Bradley, Designer Program, DWGWP

Licensed Designers:

- **Class 1** (Professional Engineers) authorized for all aspects of design
- **Class A –** authorized to design trench & bed systems
- **Class B –** authorized to do most aspects of design, except store & dose, high strength wastewater, and some innovative or alternative systems
- **Class BW –** same as Class B, but can design potable water supplies for multiple residences

https://dec.vermont.gov/water/licensed-designers

Quiz! What are the challenges installing a septic system on a lakeshore lot?