

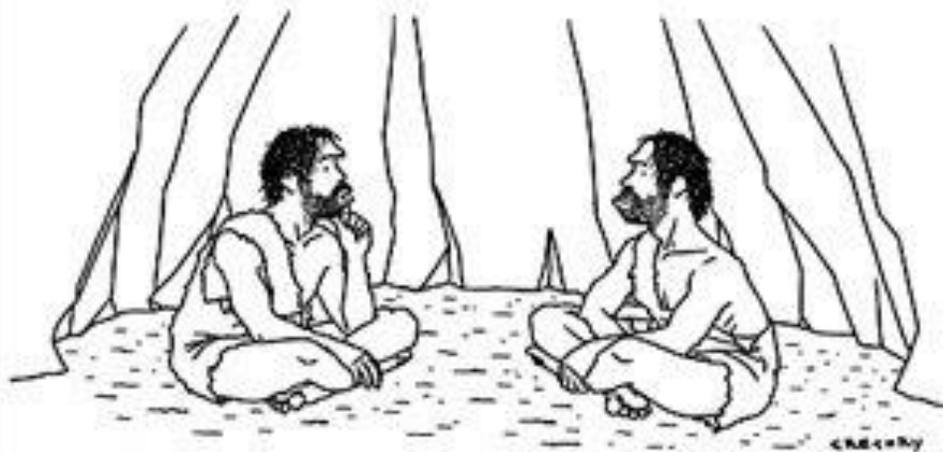


Residential level problems solved by  
engineered solutions.



# “There is no civilization without Civil engineering”

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*“Something’s just not right—our air is clean, our water is pure, we all get plenty of exercise, everything we eat is organic and free-range, and yet nobody lives past thirty.”*



# Homeowner concerns

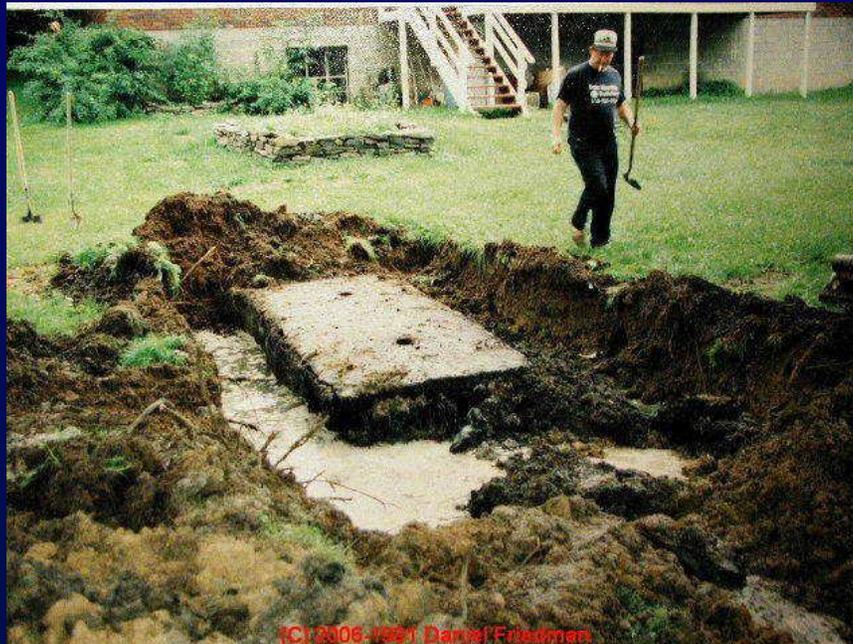


## Homeowner concerns

1) Does my toilet flush??

Homeowners largest fear and  
greatest mystery

“I just don’t even want to know.”



(C) 2006-2007 Daniel Friedman



Proper maintenance – “If your septic system costs as much as your car would you maintain it? Things like changing the oil, inspection, tire rotation.”



Your septic system costs more than your car and it is harder to replace.

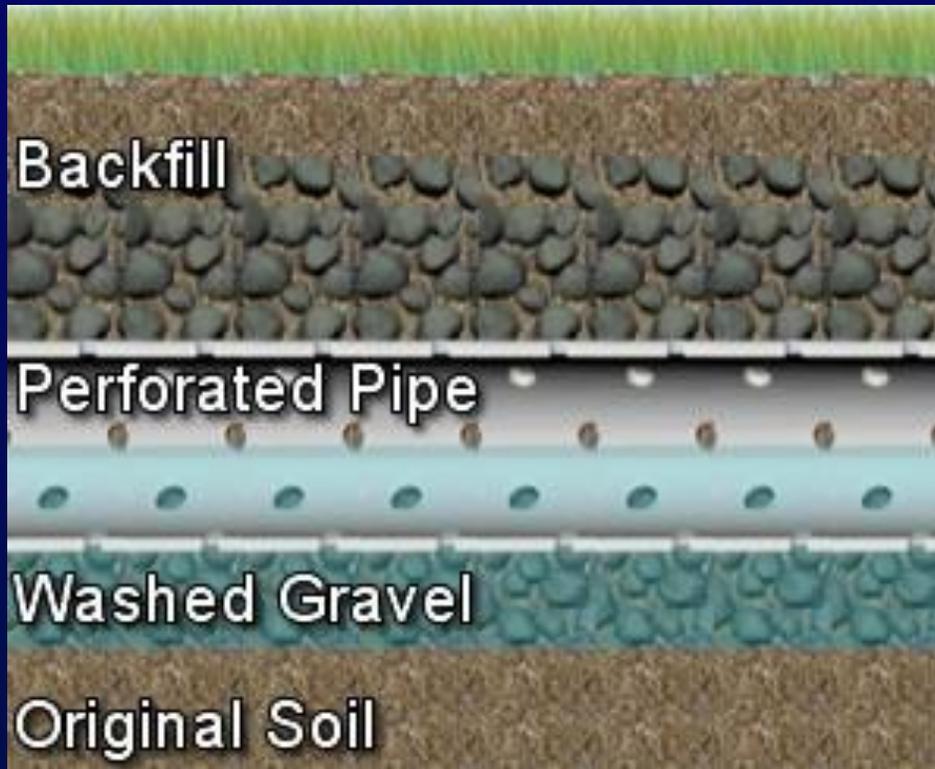


# Solutions---none are cheap

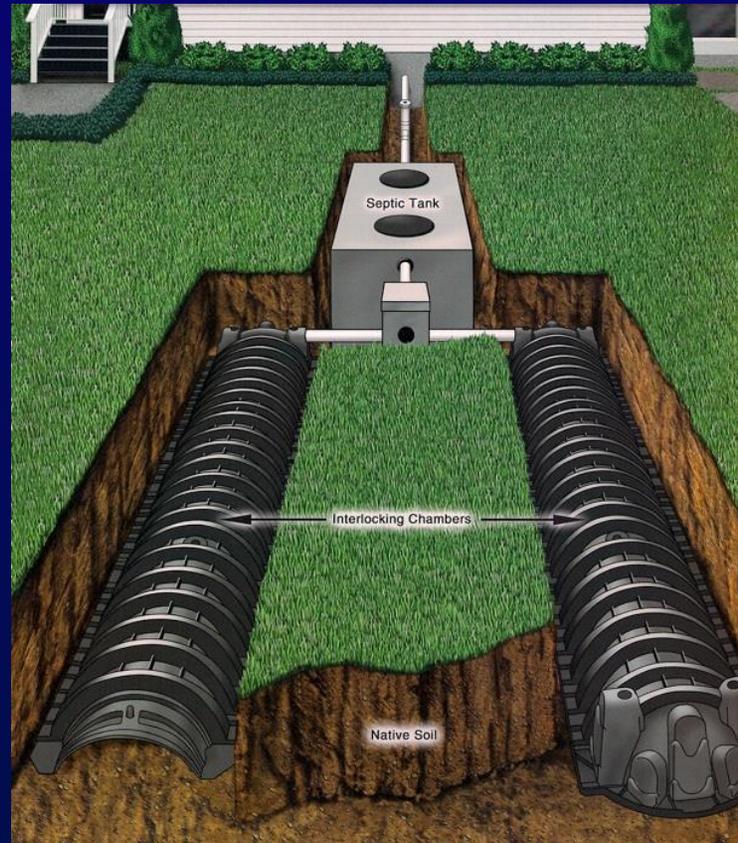


# Rebuilding a leachfield

- Pipe and Stone



# Septic Chambers



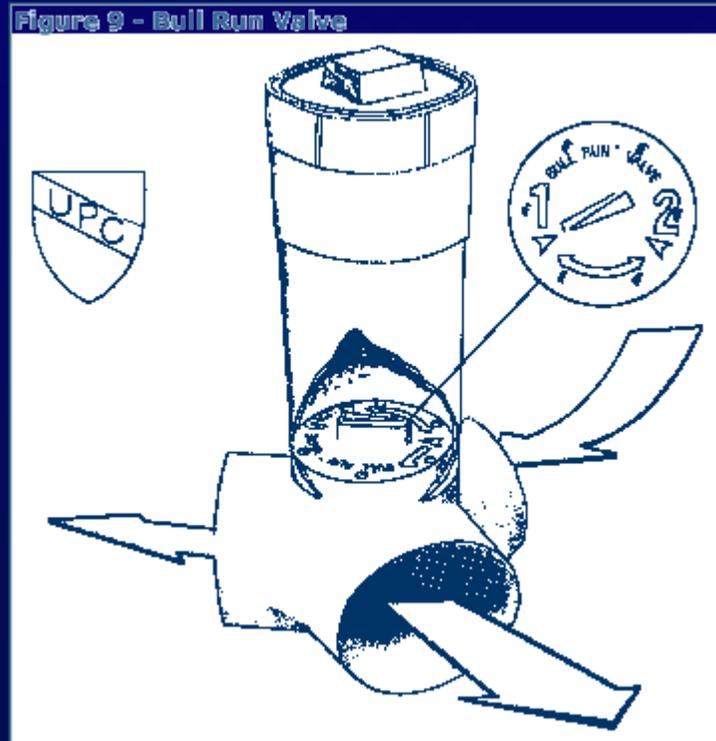
# Chamber advantage

- Masking—What is the flow through stone?
- -----What is the remaining area?
- -----How much of a biomat will I have in that infiltrative surface area that remains?

An idea that has been tried four times in 20 years



# Bull Run Valve

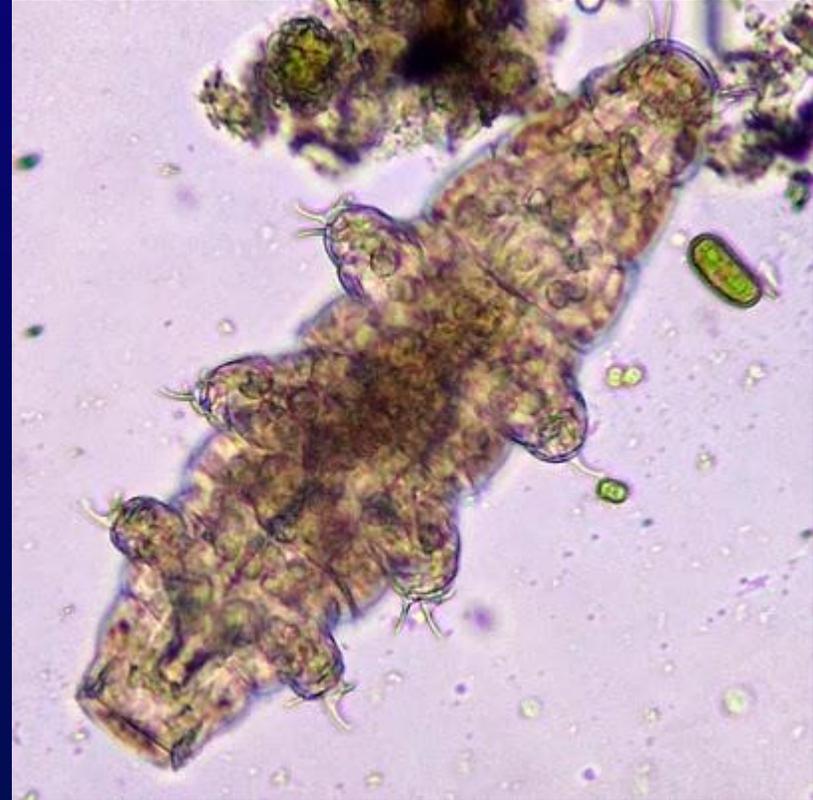


# Septic system resting

- Biomats form in all leachfields.
- Allowing the systems to rest with no added nutrients can clear the space in between soil particles and restore soil perc.
- The client already paid for his failed system that served the home for so long.
- Allowing the rest period can and will allow it to serve again.



# Biomat



# Homeowner concerns

- Does my toilet flush?
- Is my basement dry?



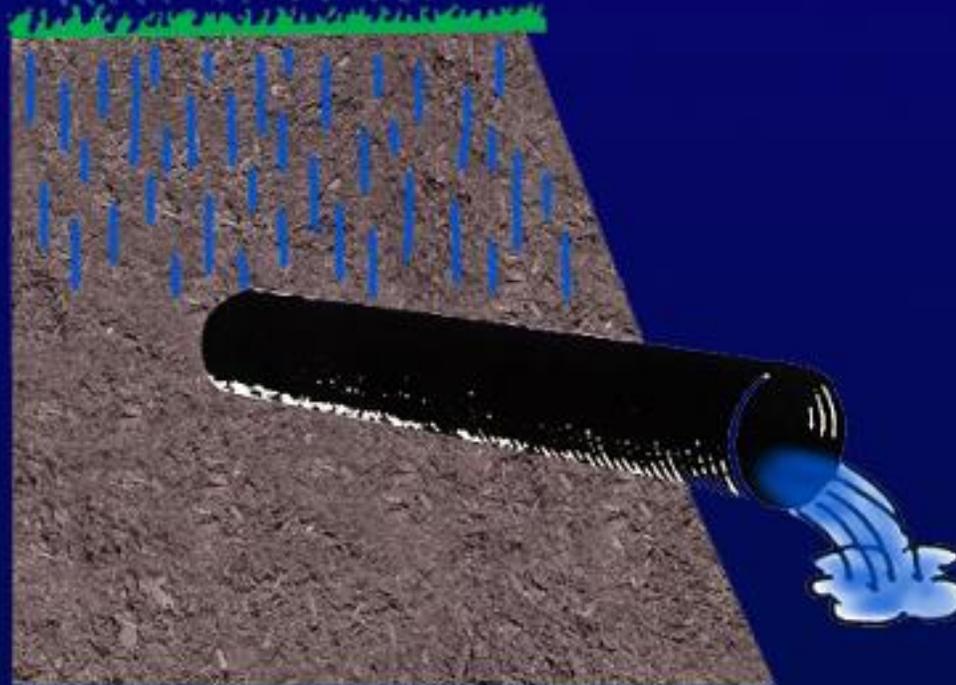
# Sump Pumps

- 1) Sump pumps are great!!!!!!!!!!!!
- 2) What's the one thing you need?
- 3) When does the power go out?
- 4) Usually when it rains very, very hard

# Water runs on Gravity

- Does the grade slope away from the home?
- Are gutters and down spouts maintained?
- What type of soils are you on?

**If you can't daylight it don't  
build it!!!!!!!**



# Tip for suitable soils



# Homeowner Concerns

- Does my toilet flush
- Is my basement dry?
- I'm on a well, will it run dry.

# Rain water harvesting





## Homeowner Concerns:

- 1) Does my toilet flush?
- 2) Is my basement dry?
- 3) I'm on a well, will it run dry?
- 4) How do I make the puddles go away?

# Under drain

- For over 50 years the industry has had plastic drainage pipe to make the puddles go away
- Farms
- Sports field
- Golf Courses
- Lawns
- Before that there was clay tile.



# Driveway slope the wrong way?



- Duraslot and other sheet flow can really help.



# Open grate or Expanded Aluminum Heel Guard



# Homeowner Concerns?

## Really should be who is going to the post season?

