PHASE 1
SEWAGE DISPOSAL CERTIFICATION

STATE OF CONNECTICUT
Department of Public Health

Presented by:

Connecticut Department of Public Health
Environmental Engineering Program
410 Capitol Avenue- MS# 51-SEW
P. O. Box 340480
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Website Information

- www.ct.gov/dph
  - Environmental Health Section
    - Subsurface Sewage Disposal
    - Training
- Includes: O&M of a SSDS, Home Buyers Guide, Regulations and Technical Standards, Design Manual, Inspection Form, Circular Letters

Purpose / Scope

- Phase 1 sewage disposal certification training
  - Overview of regulations
  - Installer plan review
  - Investigation
  - Inspection
  - Design practices pertaining to subsurface sewage disposal system
  - Soils information
- Phase 1 required for local health agent certification by a director of health

Required Training

- Commissioner of Public Health must certify agents of the Director of Health to:
  - Investigate
  - Inspect
  - Approve installers plans
  - Approve engineered plans (Phase 2)
    - Regulations and Technical Standards
    - Design Guide

Completion of Phase 1 Training

- Pass Exam (70 or better)
- Letter from Director of Health requesting certification
- Phase 1 Certification to investigate, inspect and approve installers plans.

Required Reading

- Regulations and Technical Standards for Subsurface Sewage Disposal Systems
  - Review regulations by 2/25/09
- Design Manual Chapters 1-17 and 26-32
  - Read chapters 1-11 by 2/25/09
  - Read chapters 26-32 by 3/4/09
  - Read chapters 12-17 by 3/11/09

CONNECTICUT PUBLIC HEALTH CODE

Regulations and Technical Standards

for Subsurface Sewage Disposal Systems

PHC Section 19-13-B100a (Building Conversions, Changes in Use, Additions)
Effective August 3, 1998

PHC Section 19-13-B103 (Design Flows 5,000 Gallons per Day or Less)
Effective August 16, 1982

Technical Standards (Pursuant to PHC Section 19-13-B103)
Effective August 16, 1982
Revised January 1, 2009

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January 2009

Regulations

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- 19-13-B103 Discharges 5000 Gallons Per Day or less (effective August 16, 1982)

- Design Manual
  Subsurface Sewage Disposal Systems for Households and Small Commercial Buildings. July, 1998

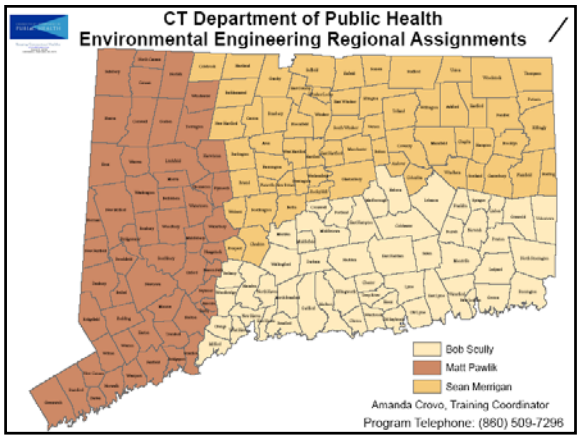
  Guidelines- acceptable practices in CT

Scope and Purpose

- Guidance for engineers, installers and YOU in the design and construction of subsurface sewage disposal systems for households and small business.
- Design considerations and practical solutions for overcoming specific installation problems.

Environmental Engineering Program

- Environmental Engineering Program
  - 3 Engineers and 1 Environmental Analyst
- On-site Sewage Disposal
- Dead Body Structures



Introduction : Onsite Sewage Disposal Systems and Design

February 2009

What is Sewage?

Domestic Sewage

Domestic Sewage

Domestic Sewage

- Water or human excretions incidental to the occupancy of a residential building or non-residential building
- Waste from restaurants and commercial buildings
- Toilet wastes, laundry wastes, kitchen wastes (garbage grinders)

Domestic Sewage

- Does **NOT** include process water, cooling water, water softener discharge (DEP), cellar or floor drains, surface water from roofs or yard drains, swimming pool backwash, etc.
- Wastes requiring permits from DEP: dry cleaning, car washes, oils, slaughter house, photographic processing liquids, furniture stripping

How we dispose sewage?

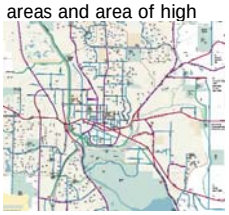
- Where does it go?

Methods of Sewage Disposal

- Public Sewers
- Conventional "Septic Systems"
- Alternative Treatment Systems

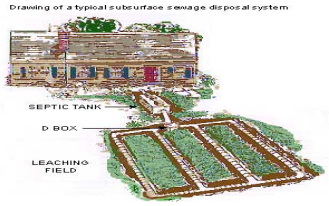
Public Sewers

- Serves approximately 70 percent of the CT population
- Predominantly in urban areas and area of high density development



Conventional "Septic Systems"

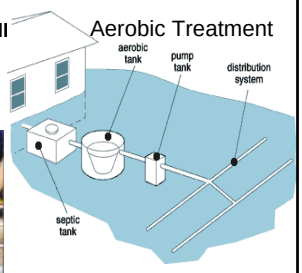
- **Served approximately 1 million people in CT**
- **Defined as Subsurface Sewage Disposal Systems in CT regulations**



Alternative Treatment Systems

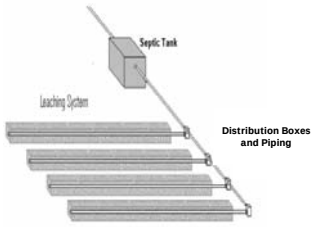
- **Wastewater Management District Legislation may all for broader use**
- **Requires DEP permit**

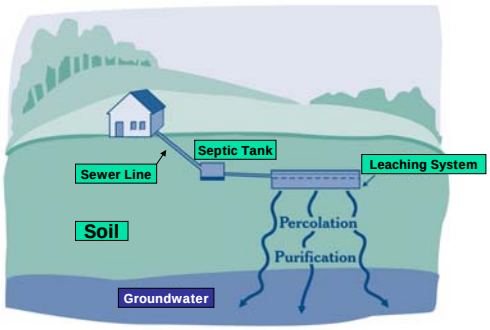
Intermittent Sand Filter



What is a Septic System?

- Building Sewer
- Septic Tank
- Distribution Piping
- Leaching System
- Necessary pumps, grease traps and groundwater control systems



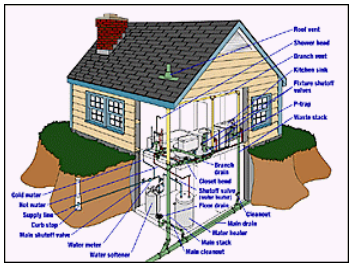


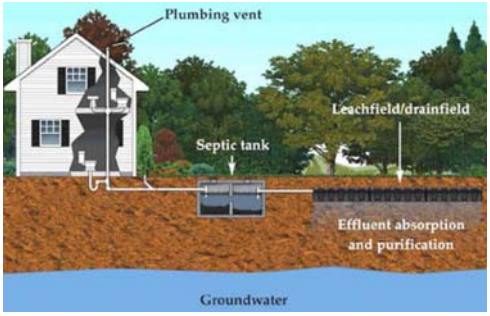
Construction of a Septic System

Building or House Sewer

- Refers to the pipe located between the building served connecting to the septic tank

Sewer Ventilation

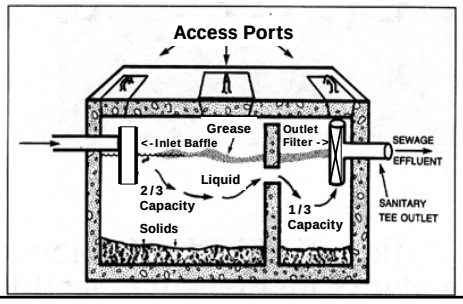




Septic Tank

- Provides the primary treatment: separates, settles and digests

Septic Tank



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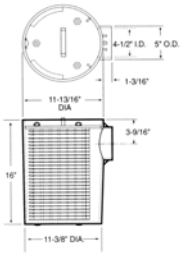
Septic Tank

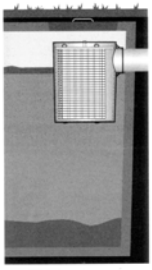
Septic Tank

Septic Tank

Septic Tank with Effluent Filter

Effluent Filter





Cleaning Effluent Filter

Plastic Septic Tank

Distribution Piping

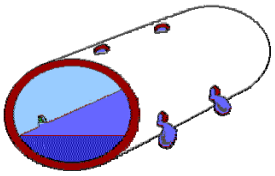
- Consists of the piping leading from the septic tank to the leaching system.

Distribution Piping

Distribution Box

Perforated Piping

Perforated Piping



4" Diameter Distribution Piping

Distribution Piping Being Installed

Distribution Box Installed

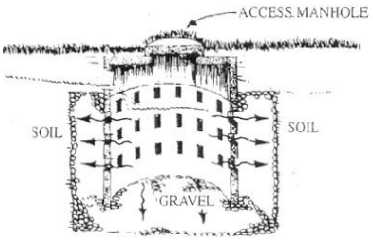
Distribution Box Installed

Leaching System

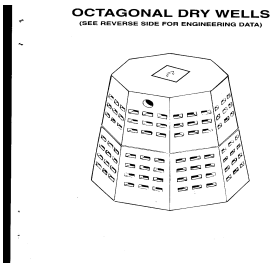
- Properly functioning leaching system should disperse effluent (liquid from the septic tank) into the surrounding soils without breaking out on the ground surface or polluting the groundwater.

Stone Trenches

Leaching Pit



Leaching Pit



Galleries – 12-inch high

Galleries - 27-inch Teepees

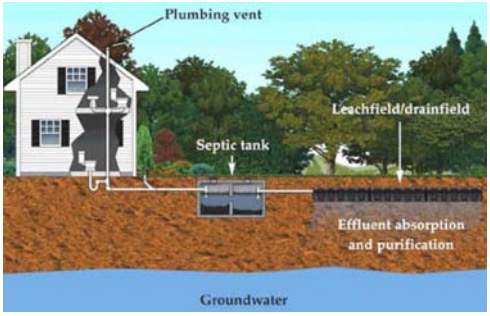
Galleries – 4’ x 4’

Gallery System

Filter fabric over gallery rows

Plastic Chambers-Infiltrators

Patented sidewall louvers allow lateral leaching of effluent into soil
Bottom open for greater infiltration
Large storage volume accommodates peak flows


Plumbing vent
Leachfield/drainfield
Septic tank
Effluent absorption and purification
Groundwater

Plastic Chambers

Cultec

Form Cell: Living Filter

Living Filter

GreenLeach Filter

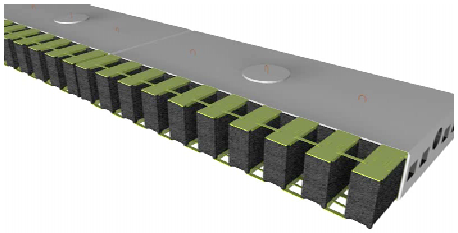
Cur-Tech Systems

Concrete Chambers

Combination of concrete chamber and plastic parts

Multi sizes

Endless Chain



Geomatrix

GeoMat Flat

Prepare bed

GeoMat Flat

Roll out mat

GeoMat Flat

Lay distribution pipe over system per design

GeoMat Flat

Cover system with minimum of
2” of permeable fill over system

Set form in trench

GeoMat Edge

Place mat into smaller slot in form

GeoMat Edge

Place lids on top of GeoMat slots

GeoMat Edge

GeoMat Edge

Fill with sand and compact

GeoMat Edge

Move form ahead

GeoMat Edge

Continue until desired length is met

Place distribution pipe on stone

GeoMat Edge

GST Leaching System

Prepare site

GST Leaching System

Assemble form

GST Leaching System

Place lids on form

GST Leaching System

Put sand in and around form

GST Leaching System

Compact and level sand

GST Leaching System

Remove lids from form

GST Leaching System

Place stone

GST Leaching System

Pull form

GST Leaching System

Place pipe and level to d-box

GST Leaching System

Cover system with fabric. Finish grading top soil over system area with a minimum of 6" of uniform cover. Final grade should facilitate storm water sheet flow away from system. Seed & hay to prevent erosion.

S-Box

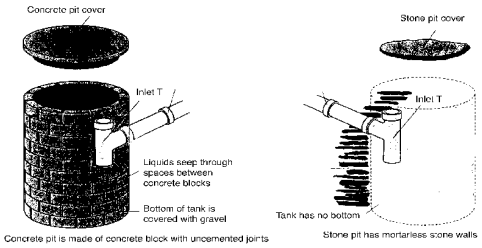
S-Box

Fins

Fabric-wrapped

Cuspated Core

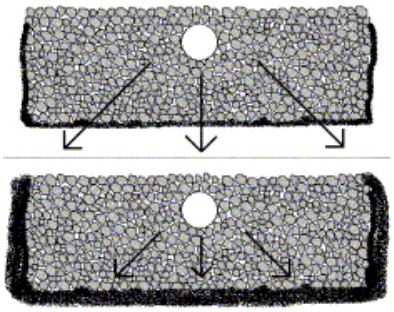
Cesspools – Not Allowed



How does a leaching system work?

- Effluent is directed to the leaching system by the distribution piping.
- Biomat forms on bottom and sides of trench
- Slows flow into the soil provide treatment

The top trench shows normal biomat growth. The bottom trench has thicker biomat growth



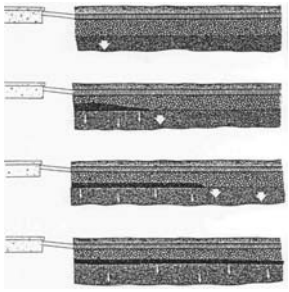
Formation of a Biomat

One Day

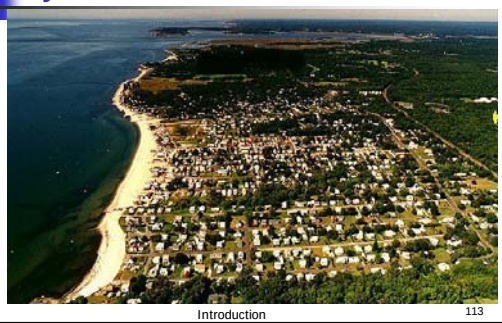
One Month

6 Months

One year



System Failure



Septic System Repair

Pollutants in Domestic Sewage

- Suspended Solids
- Bio-chemical Oxygen Demand (BOD_5)
- Total Nitrogen
- Total Phosphates
- Grease and Oils
- Coliform Bacteria

Bio-Chemical Oxygen Demand

- BOD
- measure of the amount of bio-degradable organic chemicals in the wastes
- High BOD = strong waste
- Low BOD = weak waste

Bio-Chemical Oxygen Demand

- Properly functioning septic tank will reduce the BOD in the effluent by about 25 to 30 percent. (more with a two compartment tank)
- Further reduction occurs when the effluent comes in contact with bacterial growth in the leaching system
- Amount of reduction depends on the volume of bacterial growth in the leaching system

Nitrogen

- Hazardous to infant children (methomoglobinemia or “blue baby disease”)
- Septic systems remove approximately 30% of total nitrogen with the remaining 70% being discharged to the groundwater.
- Separation distances to wells must be maintained

Phosphate

- Stimulates plant growth (lush green grass or algae growth in surface water)
- Readily removed by filtration through only a foot or two of soil

Coliform Bacteria

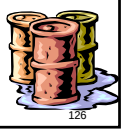
- indigenous to the tract of humans and warm-blooded animals

  - may not be harmful themselves, but indicates that pathogenic organisms (viruses) may be present

  - viruses are smaller than bacteria and not as easily filtered out

Chemical Pollutants in Sewage

- Paints, solvents, refinishing agents, cleaning chemicals, chlorinated hydrocarbons, etc.
- Considered to be hazardous chemicals since they can readily pass thru a septic system and enter the groundwater
- Amount of these chemicals in domestic sewage should be extremely small

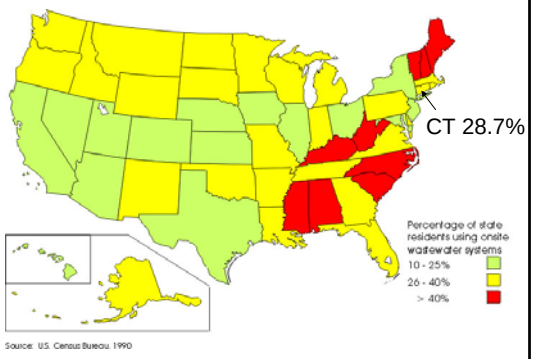


Non-Typical Domestic Sewage

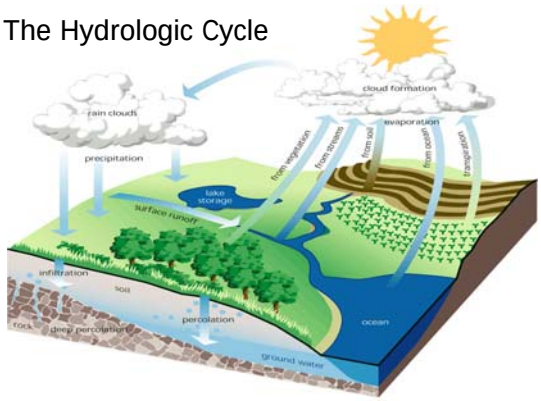
- Kitchen wastes – extremely high in grease
- Wastes from garbage disposal systems contain large amounts of settleable solids, should pump the tank more frequently
- Laundry wastes high in phosphates, clothing fibers, oils and bacteria shed from the body

Why A Septic System?

- Septics vs Sewers
  - Low Density – Towns Wish To Remain Rural
  - Sewers to costly in rural areas
  - Better In The Backyard?
  - The Goal - Avoid Groundwater Pollution
  - Typically cause less pollution
  - Cost Effective With Proper Maintenance



The Hydrologic Cycle



Regulatory Jurisdiction of On-Site Sewage Disposal Systems

- Who Regulates?

CT Department of Environmental Protection

Local and State Department of Public Health

Local and State Health Departments

- Conventional Septic Systems with Design Flows of 5,000 Gallons Per Day (GPD) and Less

Department of Environmental Protection

- Design Flows Exceeding 5,000 GPD, and Alternative & Community Systems

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Technical Standards

- Latest revision January 1, 2009
- Code Advisory Committee
  - COWRA
  - CEHA
  - CADH
  - Home Builders
  - DEP
  - Soil Scientist
  - DPH
  - Professional Engineers

- Design Manual

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Additional Reading

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