Summary of Ohio's Proposed Sewage Treatment System Rules

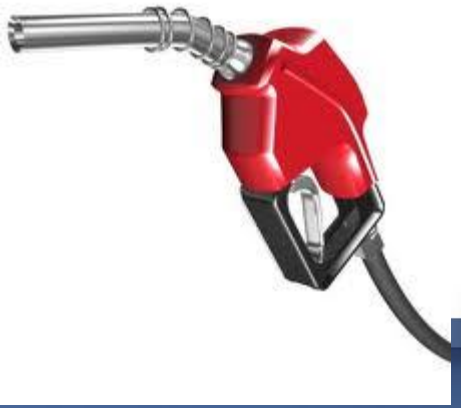
Ohio Water Environment Association
Government Affairs Workshop
3.13.2014

Residential Water and Sewage Program
Bureau of Environmental Health
Ohio Department of Health

What IS wrong with Ohio's 1977 sewage rules??

Consider How Much Things Cost in 1977

*Yearly Inflation Rate **USA**6.5%*
Interest Rates Year End Federal Reserve 7.75%
Average Cost of new house $49,300.00
Average Income per year $15,000.00
Average Monthly Rent $240.00
Cost of a gallon of Gas 65 cents



What IS wrong with Ohio's 1977 sewage rules??

Consider technology in 1977?

*The first **Apple II computers** went on sale*

The Trans Alaskan Oil Pipeline opens

***Jimmy Carter Elected President** of United States*

France - The last execution by guillotine

*NAVSTAR **Global Positioning System GPS** Inaugurated by US Department of defense*

***NASA space shuttle** makes its first test flight off the back of a jetliner*

What's wrong with Ohio's 1977 Sewage Rules??

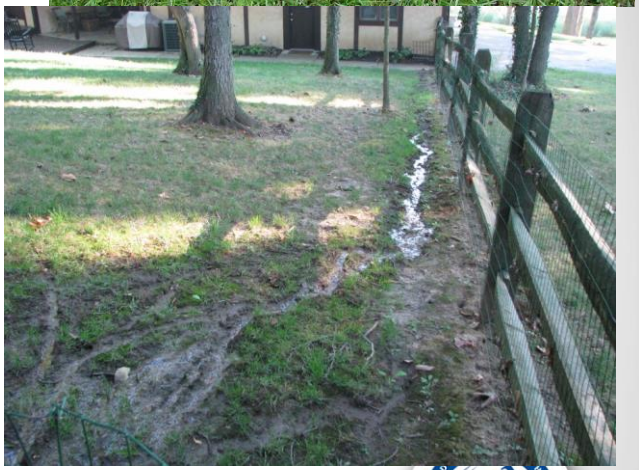
Change is LONG overdue……

- New Technologies to Treat Wastewater
- Significant Research and Science behind Wastewater Treatment
- Knowledge of Public Health Impact
- **Ohio has a new law requiring updated rules!**

Consider The Legacy Since 1977

- Over 1 million sewage systems in use in Ohio, with 6,000 (historically 10,000-17,000 annually) new systems permitted each year

- A recent ODH survey shows that 31% are reported as failing



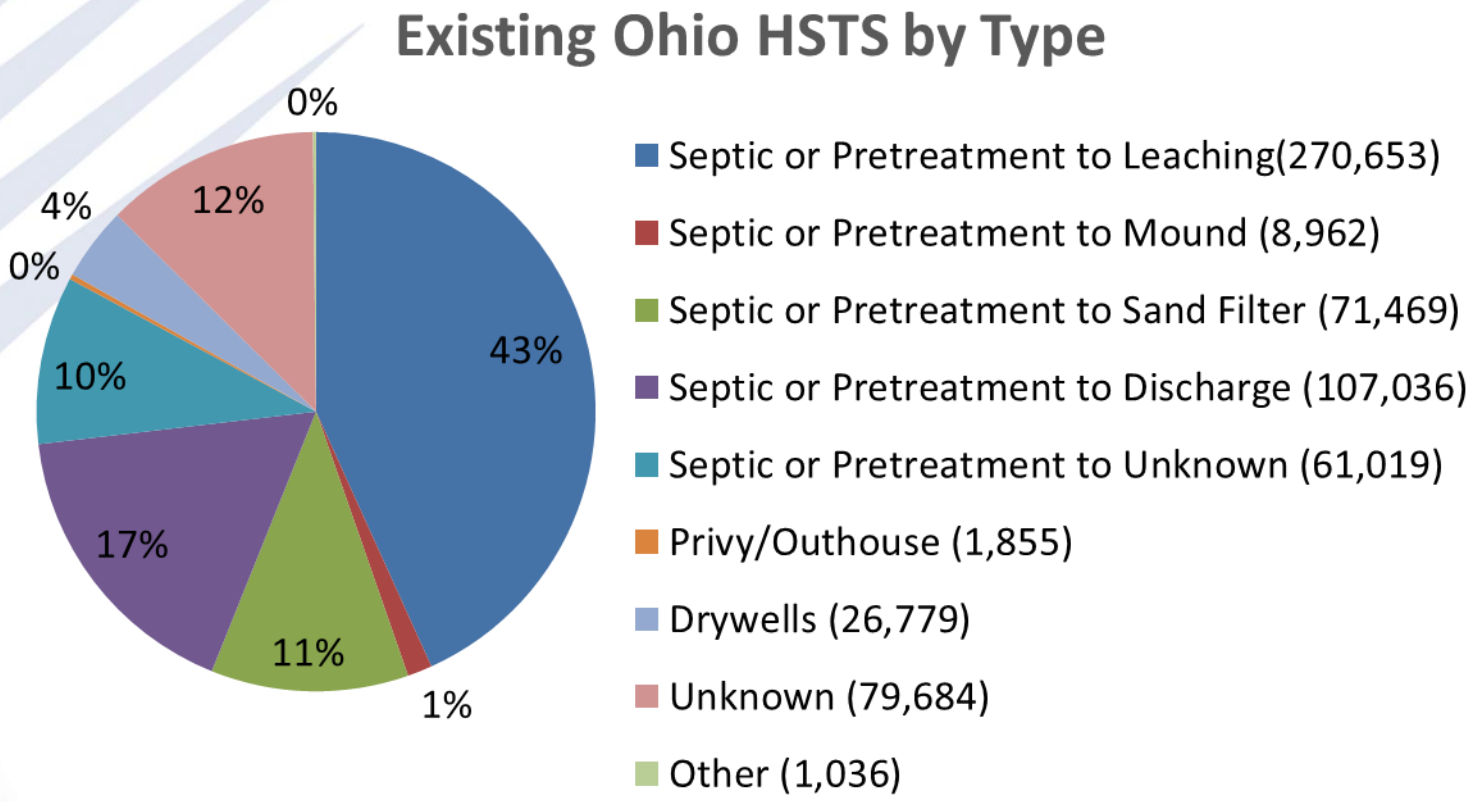
Clean Watersheds Needs Survey

Existing Systems and Failures by District

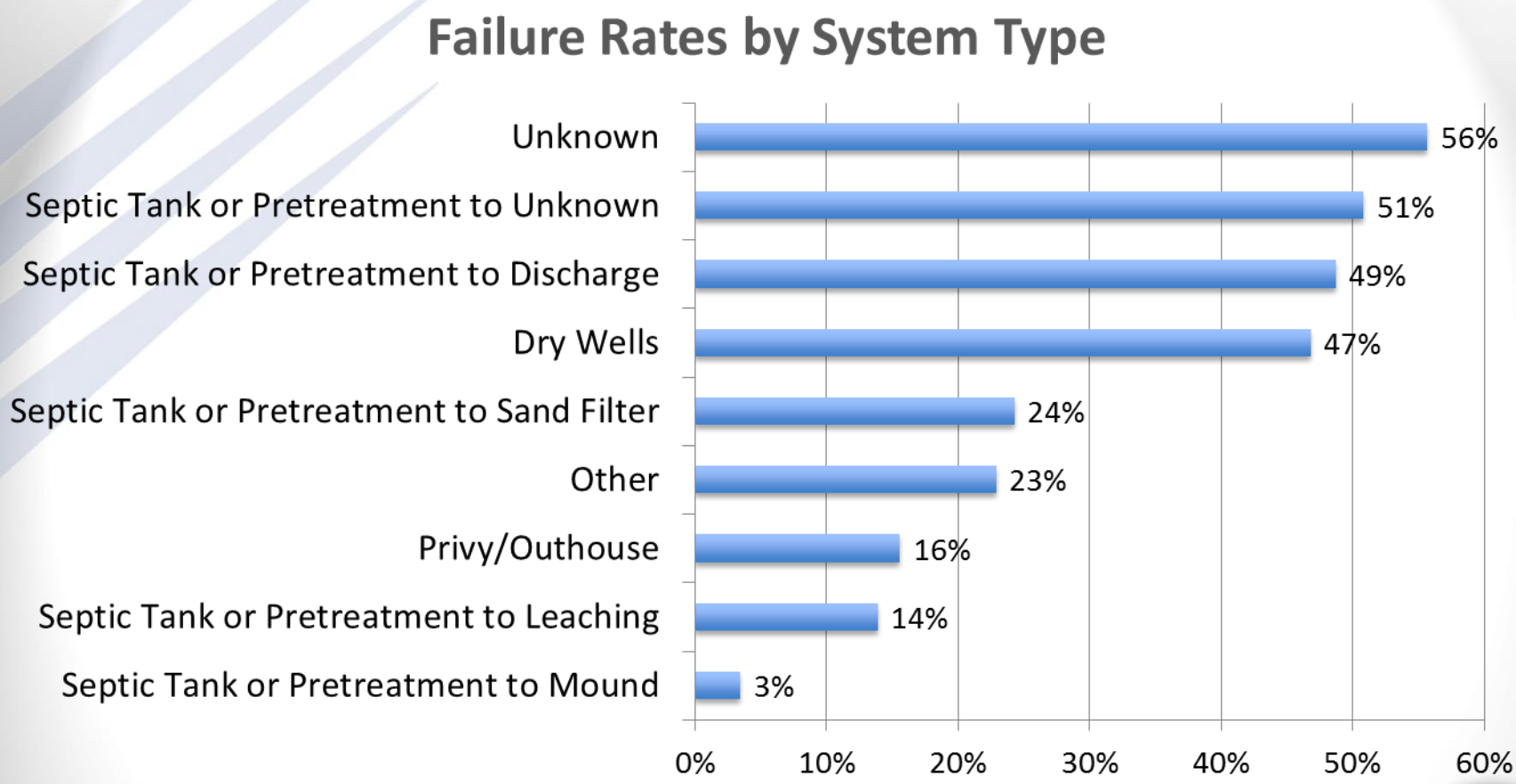
OEPA District	Central	Northeast	Northwest	Southeast	Southwest	Total
Existing Systems Reported	54,813	236,386	117,819	87,943	131,532	628,493
Failing Systems Reported	20,512	90,380	45,560	13,267	24,269	193,988
Failure Rate	37%	38%	39%	15%	18%	**31%**

Based on response from 88 health districts, 74 county health districts (84%).

Clean Watersheds Needs Survey



Clean Watersheds Needs Survey



Clean Watersheds Needs Survey

Principle Reasons for Failure	
Soil Limitations	**33%**
Design Issues	14%
Site Limitations	25%
Installation Issues	3%
No Leach Field	14%
Direct discharge exceeds limits	**43%**
System Owner Abuse	17%
Unapproved System	7%
Old System (age)	**44%**
Other (Specify):	1%

Consider The Cost……

The cost to Ohio taxpayers –

Since 1989, Ohio has spent **nearly 1.3 billion dollars in** low interest loans and grants to communities to run sewers to areas of failing septic systems

Timeframes – Draft STS Rules

1. First full draft ready for distribution and initial comment period – December 20, 2012 through March 1, 2013
2. During the first initial comment period – ODH scheduled and held 11 **regional meetings in January, 2013** around the state to discuss rules and obtain comments.
3. ODH received 2100+ comments. All comments were logged and reviewed/discussed.
4. Based on comments obtained during initial comment period, ODH reconvened the RAC to discuss key comments and revise the 1st draft (June, 2013)

•

Timeframes – Draft STS Rules

- 4. November 2013 –Released 2nd draft and begin Ohio Public Health Advisory Board 60 day review process and also Common Sense Initiative
  - Official 30 day electronic rule notification
  - Public comments submitted in the first 30 days (Days 1-30)
  - Days 30-60 – OPHAB to review public comments and provide recommendations/comments to the Director

5. January – March 2014 - Make changes and prepare rules for final filing with JCARR
6. Spring 2014 -Final rule filing and set anticipated effective date for the new rules for January 1, 2015.

2nd and 3rd Draft Rule Format

- Standard rule format
- Use of appendices for:
  - Leaching trenches – traditional, shallow, pressure distributed
  - Mound systems
  - Drip Distribution
  - Sand filters (gravity and time dosed)
  - Engineered drainage design options
- Gray water systems are separate or different than STS in the statute – added in many areas of the rules to ensure the same standards are applied
- Spray Irrigation – work with TAC to prepare a special device approval due to limited usage to date in the state

Draft Rules

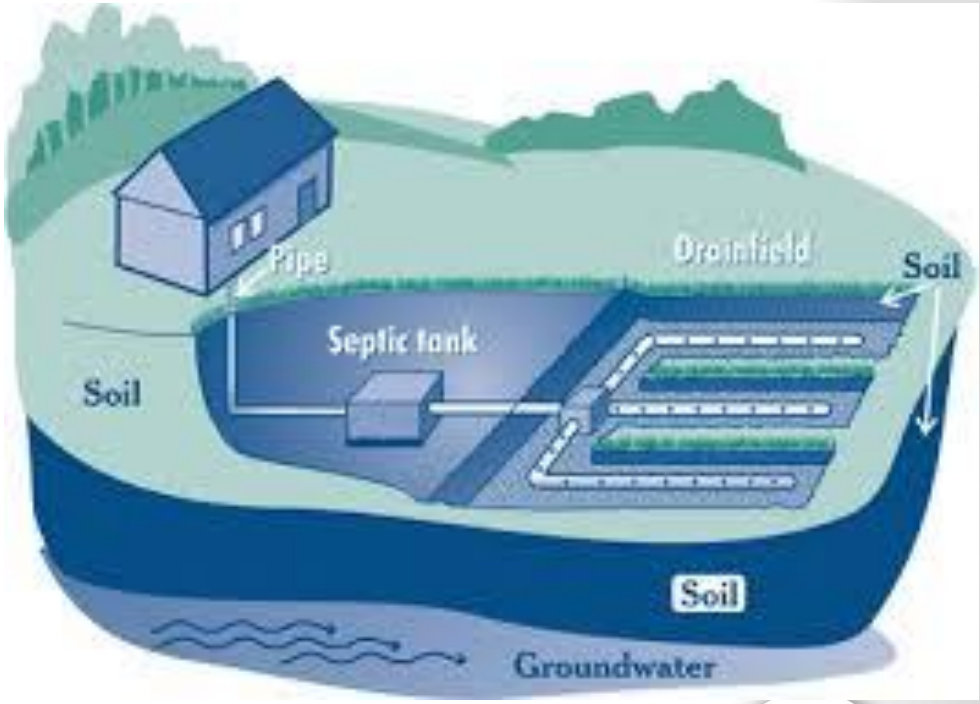
TABLE OF CONTENTS

Draft Rules

3701-29-16 Site drainage
3701-29-17 Grey water recycling systems
3701-29-18 Privies and holding tanks
3701-29-19 STS operation and management, and owner education
3701-29-20 Septage and sewage management
3701-29-21 STS abandonment
3701-29-22 Variances and more stringent standards
3701-29-23 Verification of compliance, enforcement and hearings
3701-29-13 Append A Low Pressure Dosed Sand Filter
3701-29-13 Appendix B Time Dosed Sand Filter
3701-29-15 Appendix A Leaching Trenches
3701-29-15 Appendix B Sand Mounds
3701-29-15 Appendix C Drip Distribution
3701-29-16 Appendix A Engineered Drainage

Sewage Treatment System Rules

- The rules establish new modern standards for system construction, alteration and maintenance when a system fails or breaks and must be altered or replaced, or a when a new system is installed.



Key Facts

- A wide range of modern design choices and technologies for new or replacement sewage systems are available that provide safe and sustainable treatment in the diverse soils and geology of the state. This promotes healthy communities and safe development in suburban and rural areas not served by public sewers.
- Lower cost, low maintenance systems such as septic tanks to leaching trenches that use the natural soils for treatment are the preferred design and will continue to be the primary system installed in Ohio. New technologies are available for use where the soils present greater challenges for sewage treatment.

Many Options

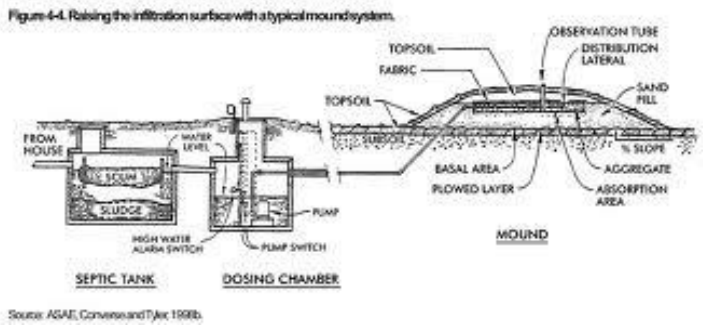
- Over 40 approved pretreatment products
- Basic to complex systems designs available that can be mixed and matched to meet the site conditions, homeowner preferences and water usage, and operation/maintenance requirements

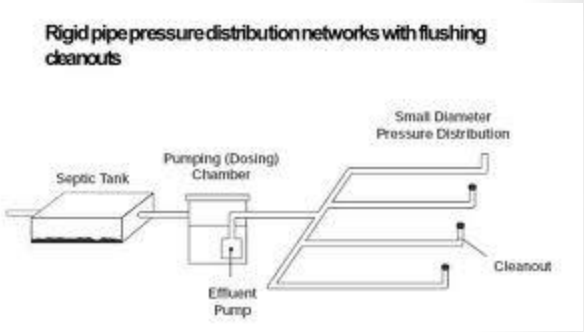
Key Facts

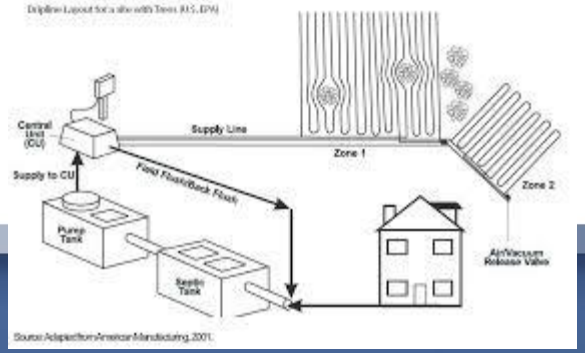
- The draft rules carefully balance the protection of public health and safety from sewage related diseases with system cost and reduce the discharge of nutrients to the environment protecting lakes and streams, and reducing growth of algae.
- Good design options for systems help protect the financial investment of the homeowner in their system. Proper system maintenance ensures systems are sustainable for many years.

System Design

- The rules implement a scientific approach to characterizing the site and soils to determine the best site design.
- Multiple design options are usually available for most sites.







Key Definition Changes

- "**Soil infiltration loading rate**" (SILR) means the daily volume of effluent applied per unit area of in situ soil expressed in gallons per day per square foot. The "soil infiltration loading rate" may also be referred to as the basal loading rate or the infiltration loading rate. The "soil infiltration loading rate" determines the total square footage of the soil absorption area.
- "**Hydraulic linear loading rate**" (HLLR) means the volume of effluent applied daily along the landscape contour expressed in gallons per day per linear foot. The HLLR is used to determine the required length of the distribution system parallel to surface contours.

Key Definition Changes

- "**Infiltrative distance**" means the distance from the depth where the effluent enters the in situ soil to depth of the uppermost limiting condition.
- "**Infiltrative surface**" means the point or area of application of effluent to the soil or sand fill for purposes of treatment, dispersal, or both.

Key Definition Changes

- "**Limiting condition**" means a flow restrictive soil layer, bedrock, a water table, ground water or highly permeable material that limits or precludes the treatment or dispersal of effluent in the soil of a property where a household sewage treatment system is located.
- "**Seasonal water table**" means soil that has water seasonally occupying one hundred percent of the void spaces indicated by greater than or equal to five percent redoximorphic depletions with soil colors of two chroma or less that is not hydraulically connected to an aquifer..

Soil Absorption – what are we trying to accomplish?

- Goals and requirements
  - No Direct discharge to an aquifer or ground water - prohibited
  - No Direct discharge to surface water without treatment
  - No Direct discharge to ground surface
  - Reasonable treatment of effluent through
    - The natural soil
    - Pretreatment combined with the natural soil
    - Use of sand media with soil
    - Use of even (pressure) distribution across the soil
  - Movement of treated effluent away in the landscape without surfacing (or discharge somewhere else before complete treatment occurs)

Soil Infiltration Loading Rates

- Soil infiltration loading rates determined by Ohio Table
  - Effluent quality: septic tank vs pretreated (BOD_5/TSS) effluent
  - Soil structure, texture, and consistence of the most limiting in situ soil layer within six inches of the infiltrative/basal surface is used to determine a soil loading rate, unless the soil layers below the upper six inches are significantly less permeable.
- Selected soil loading rate for the site shall be used to determine the total square feet of infiltrative surface area required for the soil absorption component.
  - Daily design flow divided by the soil loading rate = minimum square feet of infiltrative surface area required for soil absorption.

Table 2. Soil Infiltration Loading Rates

Soil Characteristics			Soil Infiltration Loading Rate (gpd/ft²)	
Texture	Structure		$CBOD_5$	
	Shape	Grade	>25mg/L (septic tank effluent)	≤25mg/L (Pretreated effluent)
COS, S, LCOS, LS	--	0SG	0.8	1.6
FS, VFS, LFS, LVFS	--	0SG	0.4	1
CSL, SL	--	0M	0.2	0.6
	PL	1	0.2	0.5
		2, 3	0	0
	PR/BK/GR	1	0.4	0.7
		2, 3	0.6	1
FSL, VFSL	--	0M	0.2	0.5
	PL	1, 2, 3	0	0
	PR/BK/GR	1	0.2	0.6
		2, 3	0.4	0.8
L	--	0M	0.2	0.5
	PL	1, 2, 3	0	0
	PR/BK/GR	1	0.4	0.6

Paragraph	Limiting Condition	Minimum VSD (inches)	Minimum unsaturated in situ soil within infiltrative distance (inches)
(D)	Limiting condition not specified in this table	18	8
(E)(1)	Fractured and/or Karst bedrock	36	12
(E) (2)	Ground water or aquifer	36	12
(E) (3)	Other limiting conditions identified in soil evaluation or by the board of health as having high risk or not meeting 3701-29-15 (A)	36	12
(F)	Highly weathered soils with weak structure or low to very low permeability developed on the low lime till plains are present	24	8
(G)	Perched seasonal water if not established by board of health	12	8
(G)	Perched seasonal water as established by a board of health	6-18	6-18

General Soil Absorption

- The VSD may be reduced using soil depth credits or through the use of an engineered drainage system to uniformly lower the level of the seasonal water table
  - minimum depth of suitable in-situ soil still required
  - soil depth must be adequate to accept and treat all effluent from the system.
- Soil depth credits
  - 1 to 1 equivalency for elevating the infiltrative surface using sand – mound
  - Pathogen reduction, as approved by Director
  - 12 inches for drip distribution (timed micro-dosing < ¼ gal/dose/day)
  - 6 inches for time dosed, uniform distribution of effluent (low pressure distribution in trenches)

Key Facts

- The draft rules combine state standards with options for local flexibility. For example, local health districts can establish a local vertical separation distance between 6 and 18 inches to the seasonal water table, representing the most common limiting condition for soils in the state. This approach will help lower system costs where local conditions can allow more basic system designs.

Hydraulic Linear Loading

The HLLR shall be used to determine the minimum required length of the soil absorption component or basal area parallel to surface contours and shall be based on soil characteristics, land slope, site conditions, infiltrative distance, and the nature and depth to limiting conditions.

(a) The HLLR shall be determined based on the soil evaluation information with reference to table 4 to determine the rate based on the soil conditions, slope and infiltrative distance.

(b) The minimum length of the soil absorption component shall be determined by dividing the daily design flow by the hydraulic linear loading rate selected from table 4 of this rule

Table 3: **Hydraulic Linear Loading Rate Table**

Soil Characteristics			Hydraulic Linear Loading Rate (gpd/ft)								
			Slope 0-4%			Slope 5-9%			Slope >10%		
Texture	Structure		Infiltrative Distance (inches)			Infiltrative Distance (inches)			Infiltrative Distance (inches)		
	Shape	Grade	8-12	12-24	24-48	8-12	12-24	24-48	8-12	12-24	24-48
COS, S, LCOS, LS	--	0SG	4.0	5.0	6.0	5.0	6.0	7.0	6.0	7.0	8.0
FS, VFS, LFS, LVFS	--	0SG	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0
CSL, SL	--	0M	3.0	3.5	4.0	3.6	4.1	4.6	5.0	6.0	7.0
	PL	1	3.0	3.5	4.0	3.6	4.1	4.6	4.0	5.0	6.0
		2, 3									
	PR/BK/GR	1	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0
		2, 3	3.5	4.5	5.5	4.0	5.0	6.0	5.0	6.0	7.0
FSL, VFSL	--	0M	2.0	2.3	2.6	2.4	2.7	3.0	2.7	3.2	3.7
	PL	1, 2, 3									
	PR/BK/GR	1	3.0	3.5	4.0	3.3	3.8	4.3	3.6	4.1	4.6
		2, 3	3.3	3.8	4.3	3.6	4.1	4.6	3.9	4.4	4.9
L	--	0M	2.0	2.3	2.6	2.4	2.7	3.0	2.7	3.2	3.7
	PL	1, 2, 3									
	PR/BK/GR	1	3.0	3.5	4.0	3.3	3.8	4.3	3.6	4.1	4.6

Adjustments to HLLR

- HLLR can be decreased when the “window” of soil to disperse effluent is limited (<8 inches)
- HLLR can be increased when the conditions in the soil will allow for effluent to move away
- HLLR can be adjusted when length along contour cannot be met due to site conditions for replacement systems (up to 30% reduction with certain design conditions)

Low pressure distribution of effluent

- Most systems use gravity, however there are exceptions
- Required when applying effluent to the sand fill infiltrative surface of an elevated soil absorption component, or when required by the product approval.
- May be required by LHD when the site and soil conditions at the location of the proposed soil absorption component present a significant risk for the surfacing of effluent, or where effluent may reach ground water or an aquifer before adequate treatment is acheived.
- Examples: the presence of highly permeable materials directly connected to ground water or an aquifer, shallow limiting conditions, and soils with slow to very slow permeability.

Key Facts

- Local health districts work directly with homeowners on system permitting, installation, education and monitoring of system maintenance.
- The rules do not require that all systems must be automatically upgraded. Nearly all existing systems are deemed approved under state law until they fail and cannot be repaired.
- System owners can request a timeline for the incremental repair and/or replacement of a failing system. This spreads system replacement costs out over time and also allows the owner to try common sense solutions like installing water saving fixtures, reducing water usage or fixing leaks to reduce flow to the system.

Key Definitions

“Alter” or “Alteration” means the same as section 3718.01 (A) of the Revised Code. For the purposes of this chapter, the terms "alter" or "alteration" shall include, but not be limited to a change in the nature of influent waste strength; a change in system components; an expansion of the treatment or dispersal system, and may include a change in the volume of the daily design flow.

“Repair” means act of fixing or replacing substandard or damaged devices to restore a sewage treatment system or component to proper working condition, and does not require a permit.

"Replacement" means the installation of a new sewage treatment system to replace an existing system. For the purposes of this chapter, the replacement or relocation of a soil absorption component or the treatment component providing the majority of the treatment shall be considered a replacement. “For the purposes of this chapter the addition of a treatment component to a discharging system not currently under a NPDES permit shall be considered a replacement..

Soil absorption technologies and drainage

- Use of appendices for:
  - Leaching trenches (gravity and pressure dosed)
  - Mound systems
  - Drip Distribution
  - Sand filters (gravity and time dosed)
  - Engineered drainage design options

Organization of appendices

I. Introduction
II. Siting Limitations and Conditions for Use
III. System Design
IV. Distribution Network and Media
V. Site Preparation and Installation
VI. Operation and Maintenance

Engineered Drainage

- STS design must identify the depth to the seasonal water table with no drainage and the depth the seasonal water table will be lowered to with drainage to demonstrate that the required VSD is met.
  - Design must demonstrate that drain spacing and depth can lower the seasonal water table to the desired depth to achieve a thickness of unsaturated soil to meet the vertical separation distance required at least three hundred and thirty days each year, with no more than thirty days of continuous saturation above the desired depth, at a recurrence frequency of 30%

Gray Water Systems

- "**Gray water**" means wastewater discharged from lavatories, bathtubs, showers, clothes washers, and laundry sinks that does not contain food wastes or urine or fecal matter.

- "**Gray water recycling systems**" means systems that treat and reuse wastewater discharged from lavatories, bathtubs, showers, clothes washers, and laundry sinks that does not contain food wastes or bodily wastes. For the purposes of this chapter, bodily waste is considered to be human urine or fecal matter.

Gray Water Recycling

- Nuisance standard (ORC 3718.011) applies to all gray water recycling systems
- All horizontal isolation distances must be met
- Minimum 12 inch VSD to limiting conditions
- Permit exemption for gray water systems installed for campgrounds under chapter 3729 of the revised code.

Gray Water Recycling

Type 1

- Permit optional (determined by LHD)
- Subsurface irrigation
- Seasonal use
- maximum 60 gallons
- No storage of gray water

Type 2

- Permit required
- Soil evaluation required
- Subsurface irrigation
- Seasonal use
- Between 60 and 1000 gallons per day
- No storage of gray water

Gray Water Recycling Systems

Type 3

- Permit required
- Soil evaluation required
- Subsurface irrigation
- Year-round use
- Must soil absorption and trench standards
  - pretreated effluent column for sizing & 2ft soil depth credit
- May receive hand-carried gray water into a disposal sump

Type 4

- Permit required
- Soil evaluation required
- Surface and sub-surface irrigation
  - Signage for surface irrigation
- Seasonal Use
- Pretreatment (NSF 350) required
- Between 60 and 1000 gallons per day

Gray Water Recycling Systems

- If a Type 1, 2 or 4 gray water recycling system fails or is suspected of failing, gray water must be diverted to the approved public sewer system or STS
- Owner must maintain complete records and ensure proper operation and maintenance
- Except for Type 3 gray water recycling systems, no reduction in the design and sizing of the STS
- All other sewage from a dwelling must be discharged to an approved STS or sanitary sewer.

Operation & Maintenance

- O&M management and system owner education is required for all systems installed or altered after the effective date of this chapter.
- Local health districts are provided flexibility to phase in maintenance tracking for existing systems.

Key Fact – Homeowner's are responsible for maintaining their sewage systems

- Just like any other part of a home, sewage systems require maintenance and this is recognized in state law. State law says a homeowner is responsible for maintaining their sewage system.
- State law also says that local health districts are responsible for developing a program to ensure maintenance.
- Operation permits have been required since 1977 are the way a local health district ensures that a homeowner is doing the necessary maintenance.

Key Fact – An operation permit will not require an inspection if proof of maintenance is provided.

- State law protects the homeowner from unwarranted inspections by allowing a homeowner to provide proof of an inspection (i.e. pumping receipts/service contracts) in lieu of an inspection.
- Operation permit fee costs will be set by the local health district and no portion of this fee is returned to ODH. These permit fees are to simply cover the costs for the local health district to track maintenance and provide reminders or education on system maintenance.
- An inspection is only authorized under specific conditions listed in state law – nuisance, imminent threat or danger to public health, etc.

Key Fact – Operation permits will not begin immediately in all counties

- The rules provide flexibility to local health districts to implement the maintenance monitoring programs.
- Some counties already have extensive operation permit programs in place, some have programs for only mechanical systems and some have no programs at all.
- The rules require local health districts to work with their community to develop a plan to phase in the program. No time period is specified and the implementation is locally determined.

Key Fact – The rules do not propose new types of permit fees

- Under the proposed rules there are three possible fees: installation, alteration and operational – these fees have been in place since 1977.
- Every county in Ohio already has a fee schedule established for new system installation/replacement or alteration.
- The proposed rules will allow counties that have never charged an operational fee to phase it in slowly with the least impact possible.
- The goal is to ensure systems ares being correctly maintained. A sewage treatment system that is not maintained could cost a significant investment down the road- you may have a system that could last for 30 years but fails after only 10 if it is not being maintained.
- Installation and alteration fees support both the local health district program and also the state sewage inspection program which will help ensure that local health jurisdictions are doing honest and accurate inspections.

Contact Information

Gene Phillips, Chief, Bureau of Environmental Health
Rebecca Fugitt, Program Manager
Nathan Johnson
Dusten Gurney
Andy Thomas

BEH@odh.ohio.gov.
Phone (614) 644-7551
Fax (614) 466-4556
www.odh.ohio.gov