

2018 Technical Standards





Presented by:

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Environmental Engineering Program (EEP)

- * Program responsibilities
 - * Subsurface Sewage Disposal
 - * Disposition of Human Remains
 - * Water Treatment Wastewater



New to the Website

- * 2018 Technical Standards
- * Summary of revisions
- * Highlighted version
- * Water Treatment Wastewater highlighted version
- * Circular letters
- * Training Seminars



E-Mail Distribution

All Engineers, Installers, Cleaners, Product Manufacturers and other interested parties not currently on the Environmental Engineering Program's e-mail distribution list; if you would like to receive notifications from the EEP, please e-mail your electronic contact information to:

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Code Advisory Committee

- * CADH
- * CEHA
- * COWRA
- * DEEP
- * DPH
- * Home Builders and Remodelers Association
- * Professional Engineers
- * Soil Scientist
- * Other invited groups (i.e. CTWWA, CT Precasters)



Updated Cover Page

- * Removed former revision dates and added new revision date
- * Added DPH logo and referenced range of B103 and B104 regulation sections.
- * Added notation to 5,000 GPD references
 - * Public Act No. 17-146, Sec. 30 raised jurisdictional design flow from 5,000 GPD to 7,500 GPD effective July 1, 2017. (See Circular Letter #2017-17 for more information)
- * Address mail stop updated: 12 SEW



CONNECTICUT PUBLIC HEALTH CODE

On-site Sewage Disposal Regulations and Technical Standards for Subsurface Sewage Disposal Systems

Highlighted
Version of the
2018 updates is
available on the
website

PHC Section 19-13-B100a (Building Conversions, Changes in Use, Building Additions)

Effective August 3, 1998

PHC Sections 19-13-B103a through 19-13-B103f (Design Flows 5,000 Gallons per Day or Less*)

Effective August 16, 1982

Technical Standards for Subsurface Sewage Disposal Systems

Effective August 16, 1982

Revised January 1, 2018

PHC Sections 19-13-B104a through 19-13-B104d (Design Flows Greater than 5,000 Gallons per Day*)

Effective August 16, 1982

*Note: The 5,000 gallons per day jurisdictional design flow was increased to 7,500 gallons per day by Public Act No. 17-146, Section 30 effective July 1, 2017.

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January 2018

Table of Contents Changes

- * Added new page: Glossary of Acronyms and Abbreviations (pg. 10)
- * Revised section titles: Section IX (Groundwater and Surface Water Drainage), Section X (Water Treatment Wastewater).
- * Added new appendix (Appendix E)
- * Added note: Appendices may be updated prior to the next publication of the Technical Standards
- * Added dates of former Technical Standards revisions



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*Appendices may be updated prior to the publication of the next *Technical Standards for Subsurface Sewage Disposal Systems*. Updated appendices shall be posted on the Department of Public Health's website.

Former revisions to the *Technical Standards for Subsurface Sewage Disposal Systems* January 1st 1986, 1989, 1992, 1994, 1997, 2000, 2004, 2007, 2009, 2011, and 2015.

B100a Design Flow

- * Public Act No. 17-146, Section 30 raised the jurisdictional design flow from 5,000 GPD to 7,500 GPD effective July 1, 2017.
- * This increase applies to B100a

B100a Format Edits

- * Formatted to be consistent with the official B100a regulation (available on the Secretary of State's website)
- * The Technical Standards definition includes the old (now incorrect) program mailstop
- * Scrivener's error: standards prepared pursuant to PHC Section 19-13-B103d (b) not Section 19-13-B103d (d).

B103 Format Edits

- * Added notation that Public Act No. 17-146, Section 30 raised the jurisdictional design flow from 5,000 GPD to 7,500 GPD effective July 1, 2017.
- * Formatted to be consistent with the official B103 regulations with the exception of:
 - * References to the Commissioner of Health Services were changed to the Commissioner of Public Health to be consistent with the Technical Standards.

B103 Licensure Edits

- * Changed the licensed cleaner statutory reference in Section 19-13-B103c (c) (2) (A) from Chapter 393a to Section 20-341. to be consistent with official regulations.
- * CGS Chapter 393a covers licensure of SSDS installers and cleaners, not Section 20-341 (needs to be corrected with regulation revision)
- * Technical Standards Publication since 1989 cited this chapter.

PUBLIC HEALTH CODE B103 REGULATIONS*

On-Site Sewage Disposal Systems with Design Flows of 5,000 Gallons per Day or Less** and Non-Discharging Toilet Systems

*The reference to the Commissioner of Health Services was changed to the Commissioner of Public Health in the below printing of the B103 regulations (Sections 19-13-B103a through 19-13-B103f) to be consistent with the language in the *Technical Standards for Subsurface Sewage Disposal Systems*.

**Note: The 5,000 gallons per day jurisdictional design flow was increased to 7,500 gallons per day by Public Act No. 17-146, Section 30 effective July 1, 2017.

Sec. 19-13-B103a. Scope

These regulations establish minimum requirements for household and small commercial subsurface sewage disposal systems with a capacity of 5,000 gallons per day or less, non-discharging toilet systems and procedures for the issuance of permits or approvals of such systems by the director of health or registered sanitarian, as required by Section 25-54(g) of the General Statutes. (Effective August 16, 1982)

Sec. 19-13-B103b. Definitions

The following definitions shall apply for the purposes of Sections 19-13-B103c to 19-13-B103f, inclusive:

- (a) **Sewage** means domestic sewage consisting of water and human excretions or other waterborne wastes incidental to the occupancy of a residential building or a non-residential building, as may be detrimental to the public health or the environment, but not including manufacturing process water, cooling water, waste water from water softening equipment, blow down from heating or cooling equipment, water from cellar or floor drains or surface water from roofs, paved surface or yard drains.
- (b) **Septic tank** means a water-tight receptacle which is used for the treatment of sewage and is designed and constructed so as to permit the settling of solids, the digestion of organic matter by detention and the discharge of the liquid portion to a leaching system.
- (c) **Subsurface sewage disposal system** means a system consisting of a house sewer, a septic tank followed by a leaching system, any necessary pumps and siphons, and any groundwater control system on which the operation of the leaching system is dependent.
- (d) **Residential building** means any house, apartment, trailer or mobile home, or other structure occupied by individuals permanently or temporarily as a dwelling place but not including residential institutions.
- (e) **Residential institution** means any institutional or commercial building occupied by individuals permanently or temporarily as a dwelling, including dormitories, boarding houses, hospitals, nursing homes, jails, and residential hotels or motels.
- (f) **Nonresidential building** means any commercial, industrial, institutional, public or other building not occupied as a dwelling, including transient hotels and motels.
- (g) **Impervious soil** means soil that has a minimum percolation rate slower than one inch in sixty minutes when the groundwater level is at least eighteen inches below the bottom of the percolation test hole.
- (h) **Suitable soil** means soil having a minimum percolation rate of one inch in one to sixty minutes when the groundwater level is at least eighteen inches below the bottom of the percolation test hole.
- (i) **Maximum groundwater level** means the level to which groundwater rises for a duration of one month or longer during the wettest season of the year.
- (j) **Open watercourse** means a well defined surface channel, produced wholly or in part by a definite flow of water and through which water flows continuously or intermittently and includes any ditch, canal, aqueduct or other artificial channel for the conveyance of water to or away from a given place, but not including gutters for storm drainage formed as an integral part of a paved roadway; or any lake, pond, or other surface body of water, fresh or tidal, or other surface area intermittently or permanently covered with water.
- (k) **Local director of health** means the local director of health or his authorized agent.
- (l) **Technical Standards** means the standards established by the Commissioner of Public Health in the most recent revision of the publication entitled "Technical Standards for Subsurface Sewage Disposal Systems" available from the State Department of Public Health.
- (m) **Department** means the State Department of Public Health.
- (n) **Gray water** means domestic sewage containing no fecal material or toilet wastes.
- (o) **Drawdown area** means that area adjacent to a well in which the water table is lowered by withdrawal of water from the well by pumping at a rate not exceeding the recharge rate of the aquifer.

(Effective August 16, 1982)

Sec. 19-13-B103c. General Provisions

- (a) All sewage shall be disposed of by connection to public sewers, by subsurface sewage disposal systems, or by other methods approved by the Commissioner of Public Health, in accordance with the following requirements.
- (b) All sewers, subsurface sewage disposal systems, privies and toilet or sewage plumbing systems shall be kept in a sanitary condition at all times and be so constructed and maintained as to prevent the escape of odors and to exclude animals and insects.
- (c) The contents of a septic tank, subsurface sewage disposal system or privy vault shall only be disposed of in the following manner.
 - (1) If the contents are to be disposed of on the land of the owner, disposal shall be by burial or other method which does not present a health hazard or nuisance; or
 - (2) If the contents are to be disposed of on land of other than the owner,
 - (A) The contents shall be transferred and removed by a cleaner licensed pursuant to [Connecticut General Statutes § 20-341](#), and
 - (B) Only on the application for and an issuance of a written permit from the local director of health in accordance with the provisions of this section;
 - (3) If the contents are to be dispersed on a public water supply watershed, only on the application and issuance of a written permit by the Commissioner of Public Health in accordance with the provisions of this section.

Each application for a permit under (c) (2) and (3) shall be in writing and designate where and in what manner the material shall be disposed of.

- (d) All material removed from any septic tank, privy, sewer, subsurface sewage disposal system, sewage holding tank, toilet or sewage plumbing system shall be transported in water-tight vehicles or containers in such a manner that no nuisance or public health hazard is presented. All vehicles used for the transportation of such material shall bear the name of the company or licensee and shall be maintained in a clean exterior condition at all times. No defective or leaking equipment shall be used in cleaning operations. All vehicles or equipment shall be stored in a clean condition when not in use. Water used for rinsing such vehicles or equipment shall be considered sewage and shall be disposed of in a sanitary manner approved by the local director of health.
- (e) Septic tanks shall be cleaned by first lowering the liquid level sufficiently below the outlet to prevent sludge or scum from overflowing to the leaching system where it could cause clogging and otherwise damage the system. Substantially all of the sludge and scum accumulation shall be removed whenever possible, and the inlet and outlet baffles shall be inspected for damage or clogging. Cleaners shall use all reasonable precaution to prevent damaging the sewage disposal system with their vehicle or equipment. Accidental spillage of sewage, sludge or scum shall be promptly removed or otherwise abated so as to prevent a nuisance or public health hazard.
- (f) No sewage shall be allowed to discharge or flow into any storm drain, gutter, street, roadway or public place, nor shall such material discharge onto any private property so as to create a nuisance or condition detrimental to health. Whenever it is brought to the attention of the local director of health that such a condition exists on any property, he shall investigate and cause the abatement of this condition.

(Effective August 16, 1982)

Sec. 19-13-B103d. Minimum Requirements

- (a) Each subsurface sewage disposal system shall be constructed, repaired, altered or extended pursuant to the requirements of this section unless an exception is granted in accordance with the following provisions:
 - (1) A local director of health may grant an exception, except with respect to the requirements of Section 19-13-B103d (d) and Technical Standard IIA, for the repair, alteration, or extension of an existing subsurface sewage disposal system where he determines the repair, alteration or extension cannot be effected in compliance with the requirements of this section and upon a finding that such an exception is unlikely to cause a nuisance or health hazard. All exceptions granted by the local director of health shall be submitted to the Commissioner of Public Health within thirty days after issuance on forms provided by the Department.
 - (2) The Commissioner of Public Health may grant an exception to the requirements of Section 19-13-B103d (d) upon written application and upon a finding that:
 - (A) A central subsurface sewage disposal system serving more than one building is technically preferable for reasons of site limitations, or to facilitate construction, maintenance or future connection to public sewers, or;
 - (B) A subsurface sewage disposal system not located on the same lot as the building served is located on an easement attached thereto. Such easement shall be properly recorded on the land records and

Acronyms and Abbreviations

* Glossary of Acronyms and Abbreviations (pg. 10)

* New page created to list the various acronyms and abbreviations that are used in the Technical Standards.

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ABS	Acrylonitrile butadiene styrene
AGRU	Automatic grease recovery unit
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
C to C	Center to center
D-box	Distribution box
DOH	Local Director of Health
ELA	Effective leaching area
FDM	Free draining material
FF	Flow factor
GIT	Grease interceptor tank
GPD	Gallons per day
GPM	Gallons per minute
HF	Hydraulic factor
Hg	Mercury
Large SSDS	Large subsurface sewage disposal system (2,000 to 7,500 gallons per day)
lbs	Pounds
LF	Linear feet
LPD	Low pressure distribution
MLSS	Minimum leaching system spread
NCR	Non-compliant repair
O & M	Operation and maintenance
OSHA	Occupational Safety and Health Administration
P.E.	Professional Engineer licensed in Connecticut
PE	Polyethylene
PF	Percolation factor
PHC	Public Health Code
PNR	Passive nitrogen reduction
PP	Polypropylene
PPD	Proprietary pressure-dosed dispersal
psi	Pounds per square inch
PVC	Polyvinyl chloride
QC/QA	Quality Control/Quality Assurance
RS Depth	Receiving soil depth
SDR	Standard Dimension Ratio
SF	Square feet
SSDS	Subsurface sewage disposal system
SWIS	Storm water infiltration system
UL	Underwriters Laboratories
WTW	Water treatment wastewater

Section I Definitions

- * Added definition for Commissioner:
Commissioner of Public Health
- * Free Draining Material: Changed the CT Department of Transportation (DOT) form reference from Form 816 to Form 817. Note: Form 817 released in 2016.
- * Stone Aggregate: Changed the CT DOT form and specification reference from Form 816/Specification M.01.01 to Form 817/Tables M.01.02-1 and M.01.02

Section I Definitions

- * Stone aggregate shall meet the soundness (S), loss of abrasion (LOA), and fines (material passing #200 sieve: 1% maximum) criteria for coarse aggregate by pit/quarry source per Table M.01.02-1, and the gradation in Table M.01.02-2 for No. 4 or No. 6 coarse aggregate that are also included in Section VIII A.
- * Removed the previously cited LOA and S specifications.



CONNECTICUT DEPARTMENT OF TRANSPORTATION QUALIFIED MATERIALS LIST

AGGREGATES FOR PORTLAND CEMENT CONCRETE

06/02/17

QML-Agg v4.3

Producer	Location	State	Note	Coarse Aggregate				Fine Aggregate	
				#4	#6	#67	#8	Natural	Manufactured
Brick-Wall Corporation	Forked River	NJ	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Century Acquisitions	Falls Village	CT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cherenzia Sand and Gravel	Westerly	RI		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Corbett Industries	Salem	NJ		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Delta Sand and Gravel	Sunderland	MA		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Desiato Sand and Gravel	Eagleville	CT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dunning Sand and Gravel	Farmington	CT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Galasso Materials	East Granby	CT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gateway Terminal	New Haven	CT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Lane Industries, J.S.	Westfield	MA		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
O&G Industries	Burrville	CT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	New Milford	CT	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
	Southbury	CT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Torrington	CT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Rawson Sand and Stone	Plainfield	CT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Putnam	CT	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Suzio York Hill	Meriden	CT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tilcon Connecticut	Granby	CT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Griswold	CT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Newington	CT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	New Britain	CT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	North Branford	CT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Southington	CT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Wallingford	CT		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Windham Materials	Windham	CT		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Shading added for reader convenience.

Notes:

1. Use of this aggregate requires use of supplemental cementitious material.
2. Use may be restricted based on application. See Standard Specifications, Section M.03.01-2(d).

Inclusion Criteria:

Producer must have a Quality Control Plan (QCP) on file with the Department for each facility listed. The QCP must address the issues determined by the Engineer to be appropriate for each source on a case-by-case basis.

Materials included on this list may be tested at any time or location by the Department or its representative and are subject to acceptance or rejection at that time.





Section I Definitions

- * Added: Water Treatment Wastewater
- * Added: Water Treatment Wastewater Dispersal System. The system includes solid conveyance piping, intermediate settling or filtration structures if any, and a receiving structure.
- * Receiving structures include stone filled excavations, dry wells, galleries, pits, plastic chambers, or other structures approved by DPH.



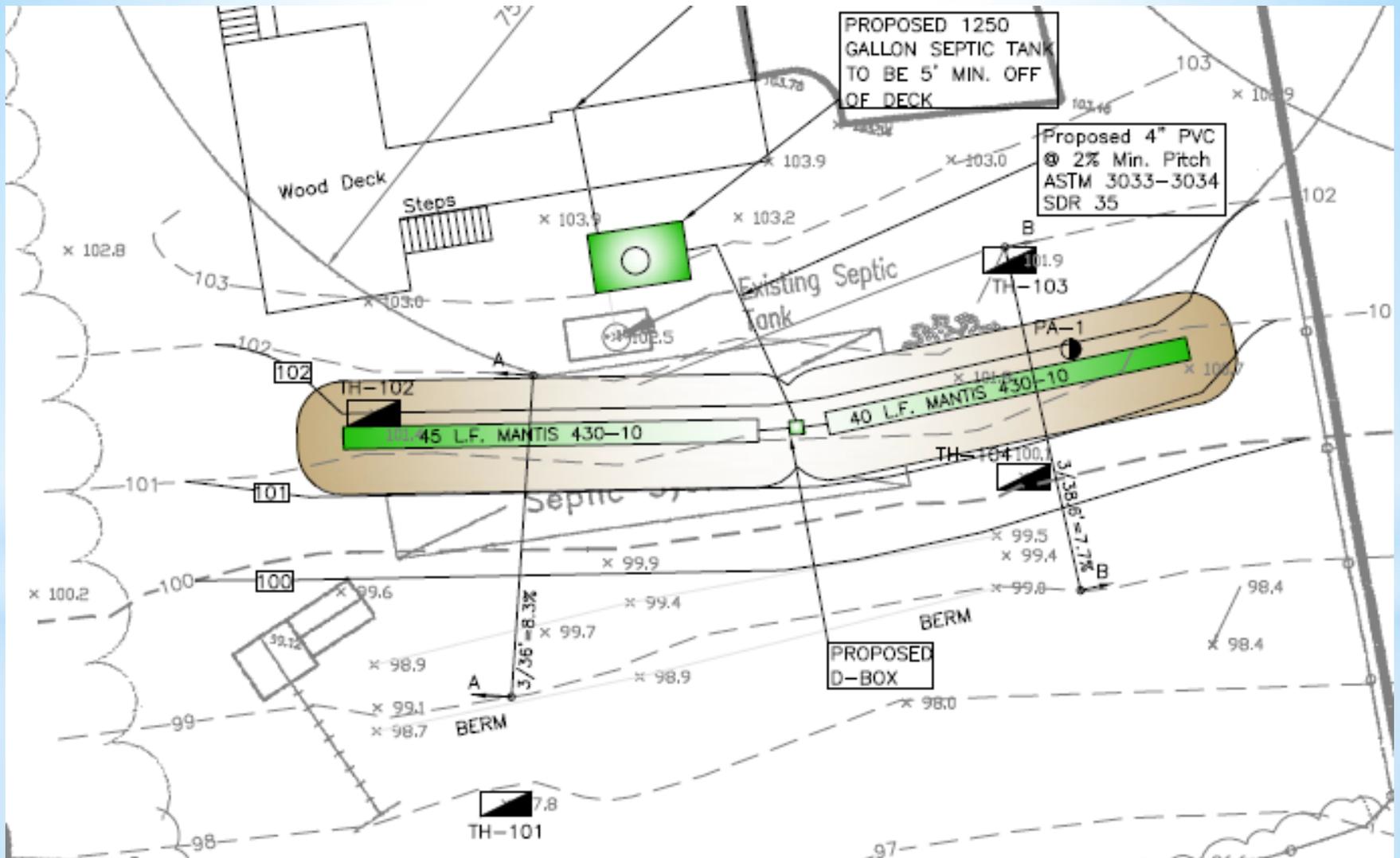
- used as a leaching system, excluding the dispersal component of a proprietary pressure-dosed dispersal system.
- P. Proprietary pressure-dosed dispersal system** means a manufactured dosing and dispersal system that uniformly applies effluent into the receiving soil via small diameter holes in small diameter distribution piping, and has been approved by the Commissioner of Public Health to be used as a leaching system.
- Q. Receiving soil** means the soil in the leaching system area and surrounding soil that is available to disperse effluent. Receiving soil characteristics (e.g., depth, percolation rate) determine the configuration and sizing of a leaching system.
- R. Select fill** means clean bank run sand, clean bank run sand and gravel, or approved manufactured fill each having a gradation which conforms to the specifications stipulated in Section VIII A or ASTM C 33. Note: See Section VIII A for additional manufactured fill approval requirements.
- S. Solid pipe** means pipe that has no loose or open joints, perforations, slots or porous openings that would allow liquid to leak into or out of the pipe.
- T. Stone aggregate** means crushed or broken stone, or crushed and uncrushed gravel meeting the gradation requirements for No. 4 or No. 6 coarse aggregate (See Section VIII A) in Table M.01.02-2 and the coarse aggregate criteria by pit/quarry source in Table M.01.02.1 per Connecticut Department of Transportation Form 817 (or latest revision). The above noted criteria concerns Loss of Abrasion, Soundness by Magnesium Sulfate, and fines (material passing No. 200 sieve: 1% maximum).
- U. Tight pipe** means a solid pipe that exhibits both acceptable wall strength and watertight joints. Pipes approved for use under this designation are listed in Table 3.
- V. Watertight tank seal** means a pipe to tank connection (inlet & outlet pipe seal) that meets ASTM C 1644, ASTM C 923, or is accepted by the Commissioner of Public Health as an approved equal based on review of a company's submission of specifications and supporting documentation.
- W. Water Treatment Wastewater** is wastewater generated by a device used for the treatment of well water that enhances the quality of water and/or provides for the removal of iron, manganese, radionuclides or other substances.
- X. Water Treatment Wastewater Dispersal System** means a system of a solid conveyance pipe, followed by a structure designed to receive water treatment wastewater and allow it to percolate into the underlying soil. Such systems may include a filter or an intermediate settling structure. Receiving structures include stone filled excavations, drywells, galleries, pits, plastic chambers, or other structures approved by the Commissioner of Public Health.

Section II: Location of Sewage Systems

- *Subsection B. Benchmarks and Plan Adherence: Added language about DOH confirming field staking.

“Leaching systems can be built and designed per the PHC. However any construction and code is only as good as the enforcement it gets.”

Richard Sullivan P.E. '78 PHC Testimony



Section II: Location of Sewage Systems

- * Subsection C. Record Plans: Noted other individuals (e.g., licensed land surveyor) may submit record plan if acceptable to the DOH.
- * Subsection D. System Abandonment: Noted off-site disposal of abandoned sewage system structures must be approved by the DOH.

Tables 2, 3, 4, and 5 do not apply to SSDS piping for building sewers, effluent distribution pipes, and force mains, and the tables specify minimum separation distances to water supply wells and other items. SSDS groundwater control systems need only to comply with the distances cited in Items E and G. Proposed relocation of lot lines governed by PHC Section 19-13-B100a (e) shall comply with the distances cited in Item J. Separating distance compliance shall be based on horizontal measurements except for non-vertical closed loop geothermal bore holes that utilize measurements taken from the closest point of the bore hole. References to sewage tanks in the special provision column in Table 1 include septic tanks, grease interceptor tanks, pump chambers, and holding tanks.

Item H specifies the minimum separating distances between a storm water infiltration system (SWIS) and a sewage system, however there are certain instances where increased separation may be warranted. SWISs that receive large quantities of water collected from impervious cover areas on sites that have hydraulic limitations may represent a concern for the proper operation of nearby SSDSs. SWISs shall not create localized groundwater mounding in the vicinity of SSDSs in order to maintain unsaturated soil conditions beneath the leaching systems for wastewater renovation purposes. SWISs may impact hydraulic conditions, and installation of these systems may be subject to a DOH review pursuant to PHC Section 19-13-B100a (e). DOHs may require an evaluation of a proposed SWIS on groundwater mounding to ensure the SWIS will not affect the operation of a nearby SSDS. Evaluations must demonstrate the receiving soil in the leaching system area is not hydraulically overloaded and that unsaturated soil conditions beneath the leaching system shall be maintained for 1-inch rain events. Municipal low impact development and storm water management programs should be coordinated with the DOH for new lot creation, new construction, and SWIS retrofits on developed sites in areas utilizing SSDSs.

B. Benchmarks and Plan Adherence

SSDS plans shall provide benchmarks with both vertical and horizontal controls, unless field staking is required and confirmed by the DOH. SSDS plans shall include information about the placement of the SSDS relative to restrictive layers and fixed reference points. Licensed installers are responsible to construct the SSDS in accordance with the plans approved by the DOH in accordance with PHC Section 19-13-B103e (f). Modifications to an approved plan shall be authorized by the plan designer and approved by the DOH.

C. Record Plans

Following a SSDS installation and final inspection, a record plan of the SSDS, as built, shall be submitted to the DOH in accordance with PHC Section 19-13-B103e (g) (4). The record plan shall identify the building sewer exit location from the building, sewage system access points (tank cleanouts, distribution boxes, etc.) and leaching system ends. The as-built drawing can be a plan to scale or a tie-plan from two or more permanent reference points. Tie-plans shall note the distance between reference points. A licensed installer shall prepare and submit the record plan, unless an engineered record drawing is required by the DOH in accordance with PHC Section 19-13-B103d (e) (5) or the DOH accepts a record plan from another individual (e.g., licensed land surveyor). Record plans shall be submitted in a timely manner to avoid delays in permit issuance by the DOH in accordance with PHC Section 19-13-B103e (k).

D. System Abandonment

Abandonment of any hollow SSDS component (e.g., septic tank, pump chamber, leaching chamber) or cesspool shall be performed in a manner to eliminate the danger of an inadvertent collapse. It is the property owner's responsibility to make arrangement for abandonment of any hollow SSDS component or cesspool. Hollow structures shall be emptied of all septage prior to abandonment. Structures shall be filled with sand or gravel, crushed in place, or removed from the site for disposal as approved by the DOH.

Table 1 Revisions

- *Item A. Wells: Clarified the special provision perc rate is the receiving soil perc rate.

Table 1 Revisions

- * Item H. Storm Water Infiltration System (SWIS): Changed name to SWIS.
- * Revised special provision for single-family residential building lots to allow DOH to approve a reduced distance to 10 feet between sewage tanks/leaching systems and minor infiltration systems (e.g., rain gardens).

Table 1 Revisions

- *Item P. Buried Fuel Tanks: Added special provision language noting distance to sewage tank shall be reduced to 10 feet.

Table 1 Revisions

- * Item Q. Water Treatment Wastewater Dispersal System: Revised special provision relative to setbacks for the three discharge categories. (<150GPD, 150-500GPD and >500GPD)
- * All categories now have reduced setback provisions, and the largest category (>500 GPD) includes an increased setback provision.



Table 1 Revisions

- * Item S. Grade Cuts or Soil Disturbance Down-gradient of Leaching System: Revised special provision language to ensure preservation of receiving soil added reference to MLSS Appendix

* Item S: Grade cuts or Soil Disturbance

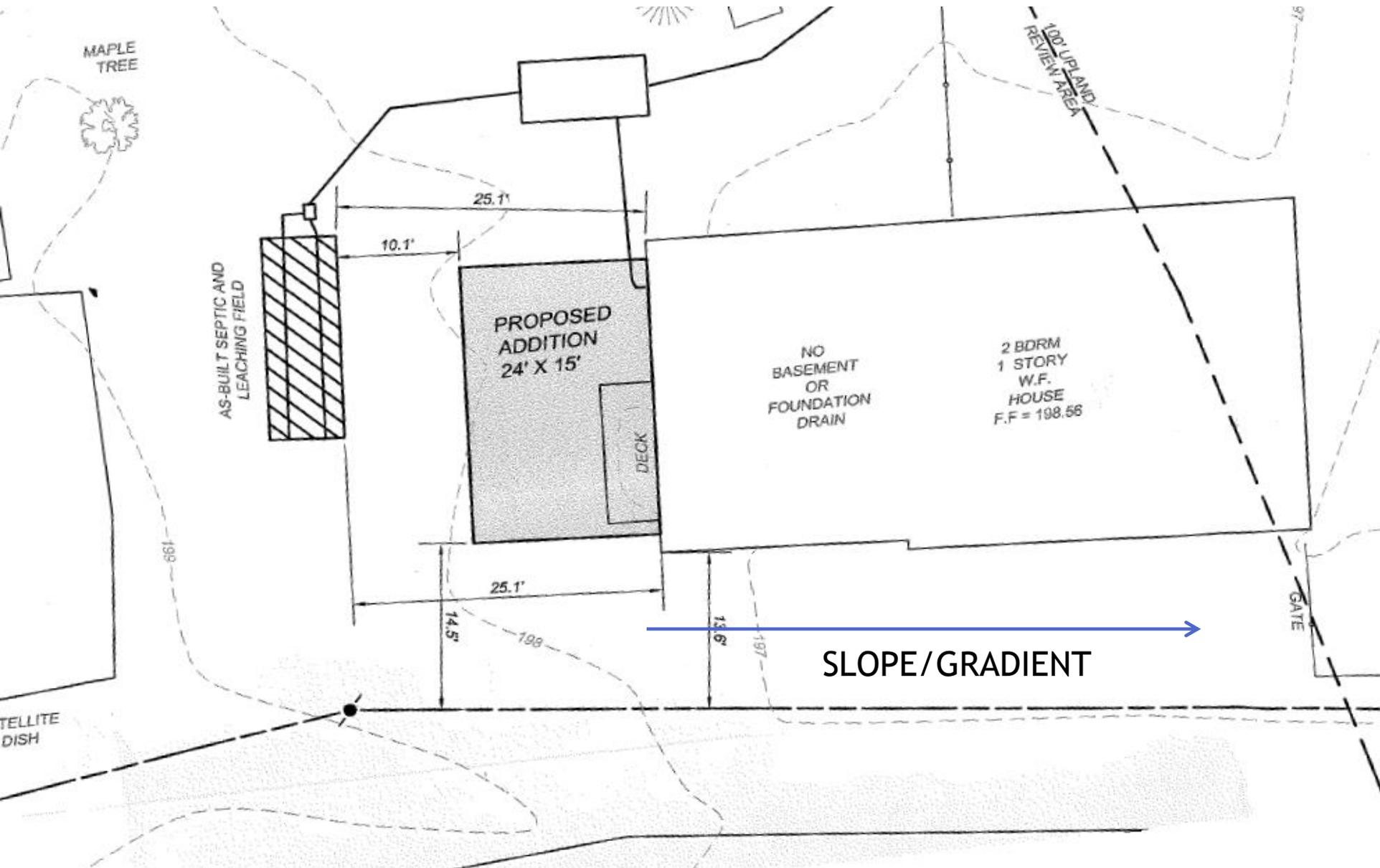


Table 1 Revisions

* Item S. Grade Cuts or Soil Disturbance Down-gradient of Leaching System: Revised special provision language to ensure preservation of receiving soil added reference to MLSS Appendix

Table 1

1/1/18

1/1/18

Item	Separating Distance (Feet)	Special Provisions
A. Water supply well (potable, open loop geothermal, irrigation, spring) with a required withdrawal rate in gallons per minute (GPM): <ul style="list-style-type: none"> < 10 GPM 10 to 50 GPM > 50 GPM 	<ul style="list-style-type: none"> 75 150 200 	Distance from a water supply well to a leaching system shall be doubled if the receiving soil percolation rate is faster than 1.0 minute per inch and the bottom of the leaching system is less than 8 feet above ledge rock.
B. Building served	10	See Item G for buildings with groundwater control drains.
C. Open watercourse	50	For lots in existence prior to 8/16/82 that are not on a public water supply watershed, the distance shall be reduced to not less than 25 feet. In coastal areas, the Coastal Jurisdiction Line shall be considered the open watercourse limit, unless site specific information on high tide elevations on a property establishes the open watercourse limit.
D. Public water supply reservoir	100	
E. Solid piping for the conveyance of surface or groundwater drainage	25	Distance to tight pipe (See Table 3) shall be reduced to 5 feet as long as the pipe excavation is not backfilled with free draining material (FDM).
F. Storm water structure (e.g., catch basins, manholes)	25	Distance to sewage tank shall be reduced to 10 feet if storm water structure is watertight and constructed with rubber joint seals and watertight pipe connection seals (e.g., ASTM C 923). Storm water structures shall not be designed to collect groundwater (See Item G).
G. Groundwater drain (e.g., curtain, foundation, sumps) Up-gradient or on sides Down-gradient	<ul style="list-style-type: none"> 25 50⁽¹⁾ 	No drain shall be constructed near a sewage system for the purpose of collecting partly treated sewage regardless of the distance. 1. Distance to sewage tank shall be reduced to 25 feet if tank is verified to be watertight.
H. Storm water infiltration system (SWIS) Single-family residential building lots Other lots (e.g., commercial, multi-family)	<ul style="list-style-type: none"> 50⁽¹⁾ 75⁽²⁾⁽³⁾ 	Distance shall be reduced to 25 feet to sewage tank. 1. Distance shall be reduced to 25 feet to a leaching system if MLSS is not applicable or the SWIS is not up-gradient or down-gradient. Distances may be further reduced to 10 feet for minor SWIS (e.g., rain gardens) with the approval from the DOH if demonstrated that the leaching system or sewage tank shall not be adversely impacted. 2. Distance shall be reduced to 50 feet to a leaching system if MLSS is not applicable or the SWIS is not up-gradient or down-gradient, or with the approval from the DOH if demonstrated that the leaching system or sewage tank shall not be adversely impacted. 3. The DOH may require increased distances or an engineered assessment on the operation of the leaching system if localized groundwater mounding is a concern.
I. Top of embankment (i.e., fill package around perimeter of leaching system)	10	See Figure 13. Distance does not apply to sewage tank.

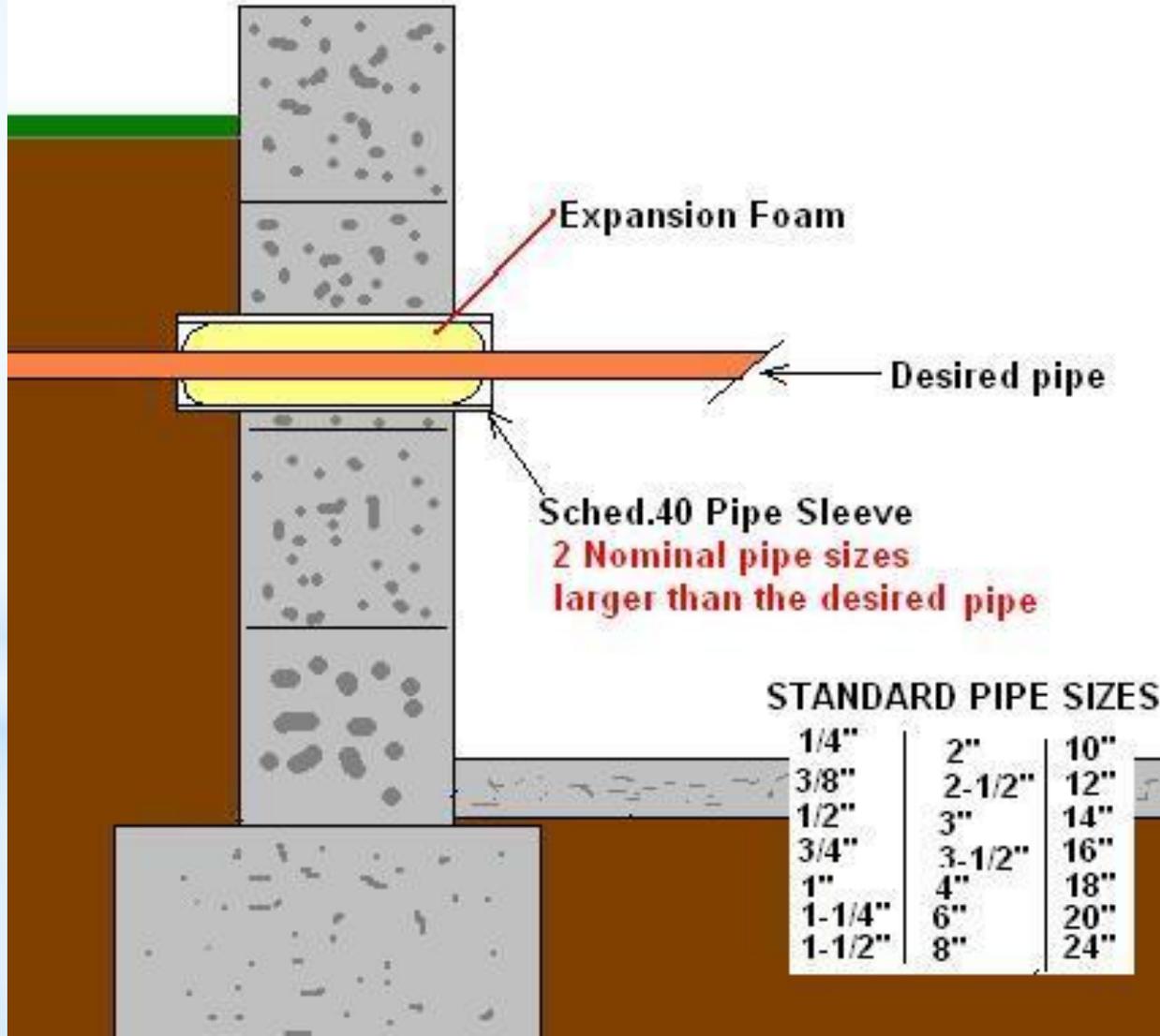
J. Property line Up-gradient and on sides Down-gradient	<ul style="list-style-type: none"> 15⁽¹⁾ 25⁽²⁾ 	Distance to sewage tank and reserve leaching area shall be reduced to 10 feet. 1. Distance shall be reduced to 10 feet if the top of the leaching system is below original grade, grading rights from affected property owner are secured, or retaining walls are utilized (See Section VIII A for retaining wall provisions). 2. Separating distance between the leaching system and down-gradient property line shall be reduced to 15 feet if MLSS is not applicable or on flat groundwater table lots; further reduction may be allowed as cited in footnote 1 if either condition exists.
K. Water Piping Pressure (e.g., potable, irrigation) Water supply suction	<ul style="list-style-type: none"> 10⁽¹⁾ 75⁽²⁾ 	1. Water line trench excavations less than 25 feet from leaching system shall not be backfilled with FDM. 2. Distance between water suction pipe and sewage tank shall be reduced to 25 feet if tank is verified to be watertight.
L. Below ground swimming pool	25	See Item G for down-gradient pools with groundwater control drains.
M. Above ground swimming pool	10	Includes hot tubs (except on decks).
N. Accessory structure	10	Distance to structure without full-wall, frost protected footings shall be reduced to 5 feet. See Item G if drains provided.
O. Utility service trench (e.g., electric, gas)	5	Utility trench excavations less than 25 feet from leaching system shall not be backfilled with FDM.
P. Buried fuel tanks	25	Distance to sewage tank shall be reduced to 10 feet. Distance to leaching system shall be reduced to 10 feet if not down-gradient of leaching system. See Item G if drains provided.
Q. Water treatment wastewater (WTW) dispersal system Small discharge (<150 GPD) Med. discharge (150 – 500 GPD) Large discharge (>500 GPD)	<ul style="list-style-type: none"> 25⁽¹⁾ 50⁽²⁾ 75⁽³⁾ 	Distance to sewage tank shall be reduced to 10 feet. Distance to WTW dispersal system non-discharging settling or filtration structures and solid piping shall be reduced to 10 feet, however solid piping excavations shall not be backfilled with FDM. 1. Distance to leaching system shall be reduced to 10 feet if MLSS is not applicable or the WTW dispersal system does not discharge up-gradient or down-gradient of the leaching system. 2. Distance to leaching system shall be reduced to 25 feet if MLSS is not applicable or the WTW dispersal system does not discharge up-gradient or down-gradient of the leaching system. 3. The DOH may require an increased distance or an engineered assessment on the impacts of localized groundwater mounding in the vicinity of a SSDS.
R. Closed loop geothermal system Bore hole, Trench Geothermal piping to Borehole/Trench	<ul style="list-style-type: none"> 50 10 	Distance to leaching system shall be reduced to 25 feet as long as geothermal system is not down-gradient of leaching system. Distance to sewage tank shall be reduced to 25 feet. Geothermal piping excavations less than 25 feet from leaching system shall not be backfilled with FDM.
S. Grade cuts or soil disturbance down-gradient of leaching system	50	A soil cut within 50 feet down-gradient of a leaching system shall not be allowed if bleed-out from cut is a concern. Distance may be reduced with the approval of the DOH if it is demonstrated the cut/soil disturbance preserves the leaching system's receiving soil (See MLSS Appendix A).



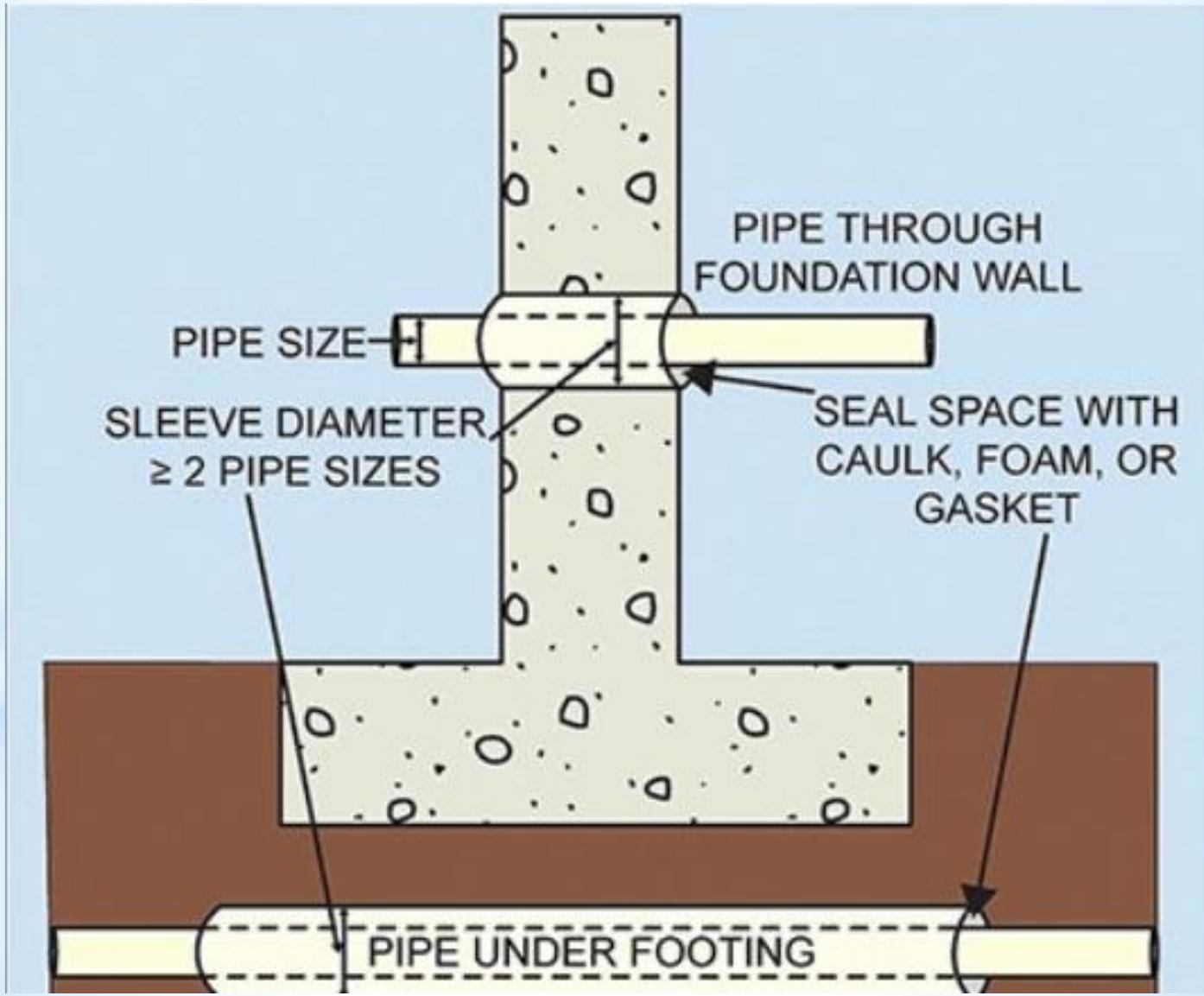
Section III Piping

*Subsection A. Building sewer foundation penetrations shall comply with the plumbing code enforced by local building official.

Section III Piping



Section III Piping





304.4 Openings for pipes.

In or on structures where openings have been made in walls, floors or ceilings for the passage of pipes, the annular space between the pipe and the sides of the opening shall be sealed with caulking materials or closed with gasketing systems compatible with the piping materials and locations.

SECTION 305 PROTECTION OF PIPES AND PLUMBING SYSTEM COMPONENTS

305.1 Corrosion.

Pipes passing through concrete or cinder walls and floors or other corrosive material shall be protected against external corrosion by a protective sheathing or wrapping or other means that will withstand any reaction from the lime and acid of concrete, cinder or other corrosive material. Sheathing or wrapping shall allow for movement including expansion and contraction of piping. The wall thickness of the material shall be not less than 0.025 inch (0.64 mm).

305.2 Stress and strain.

Piping in a plumbing system shall be installed so as to prevent strains and stresses that exceed the structural strength of the pipe. Where necessary, provisions shall be made to protect piping from damage resulting from expansion, contraction and structural settlement.

305.3 Pipes through foundation walls.

Any pipe that passes through a foundation wall shall be provided with a relieving arch, or a pipe sleeve pipe shall be built into the foundation wall. The sleeve shall be two pipe sizes greater than the pipe passing through the wall.

305.4 Freezing.

Water, soil and waste pipes shall not be installed outside of a building, in attics or crawl spaces, concealed in outside walls, or in any other place subjected to freezing temperatures unless adequate provision is made to protect such pipes from freezing by insulation or heat or both. Exterior water supply system piping shall be installed not less than 6 inches (152 mm) below the frost line and not less than 12 inches (305 mm) below grade.

305.4.1 Sewer depth.

Building sewers that connect to private sewage disposal systems shall be installed not less than [NUMBER] inches (mm) below finished grade at the point of septic tank connection. *Building sewers* shall be installed not less than [NUMBER] inches (mm) below grade.

305.5 Waterproofing of openings.

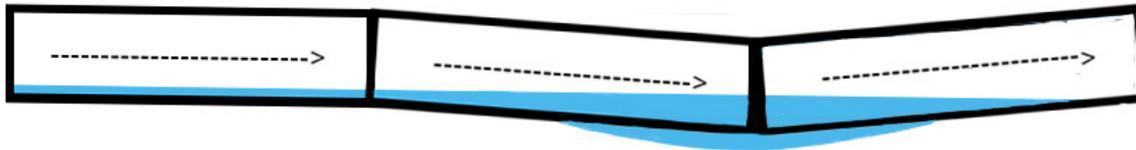
Joints at the roof and around vent pipes shall be made water tight by the use of lead, copper, galvanized steel, aluminum, plastic or other *approved* flashings or flashing material. Exterior wall openings shall be made water tight.

Section III Piping

- *The minimum grade (pitch) on building sewers shall be provided for the entire building sewer.

Low Area “Belly” or “Sag”

Water and debris build up and create blockages. Must be dug up and repaired.



Positive Slope (Correct)

The grade and slope allow water to flow correctly.

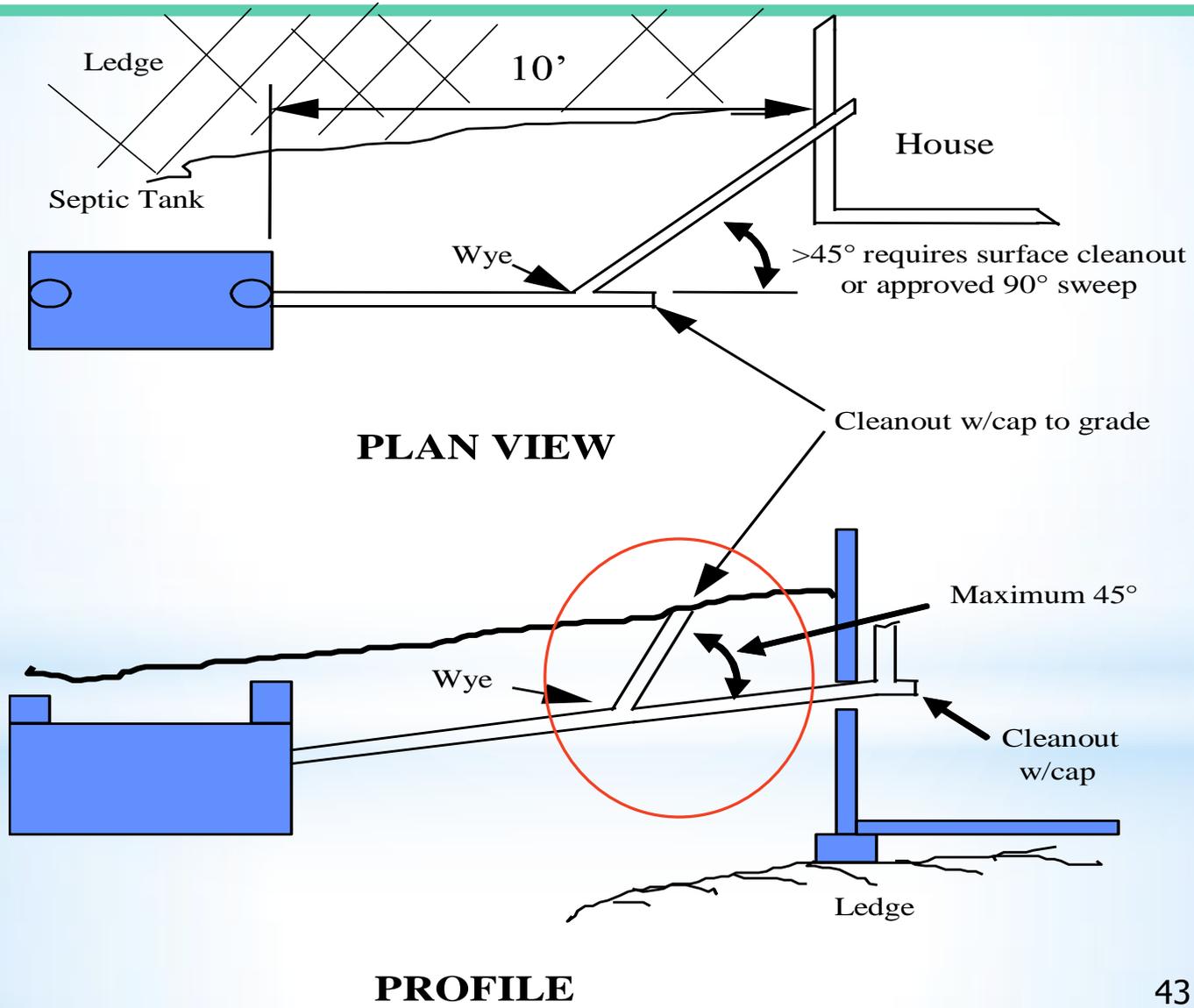


Section III Piping

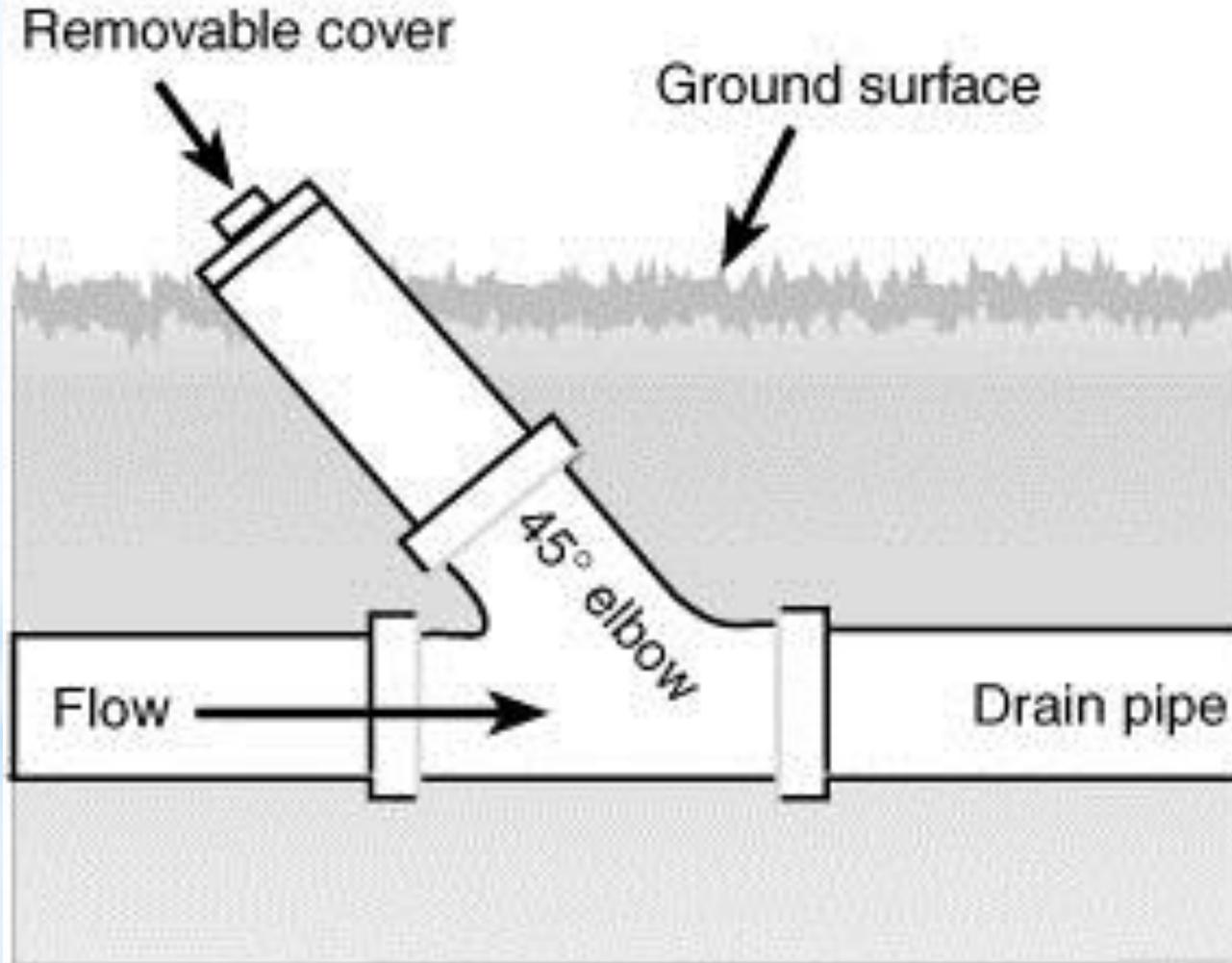
- *Table 3 (Approved Tight Pipe): Added ADS HP Storm pipe and ADS SaniTite Sanitary pipes.



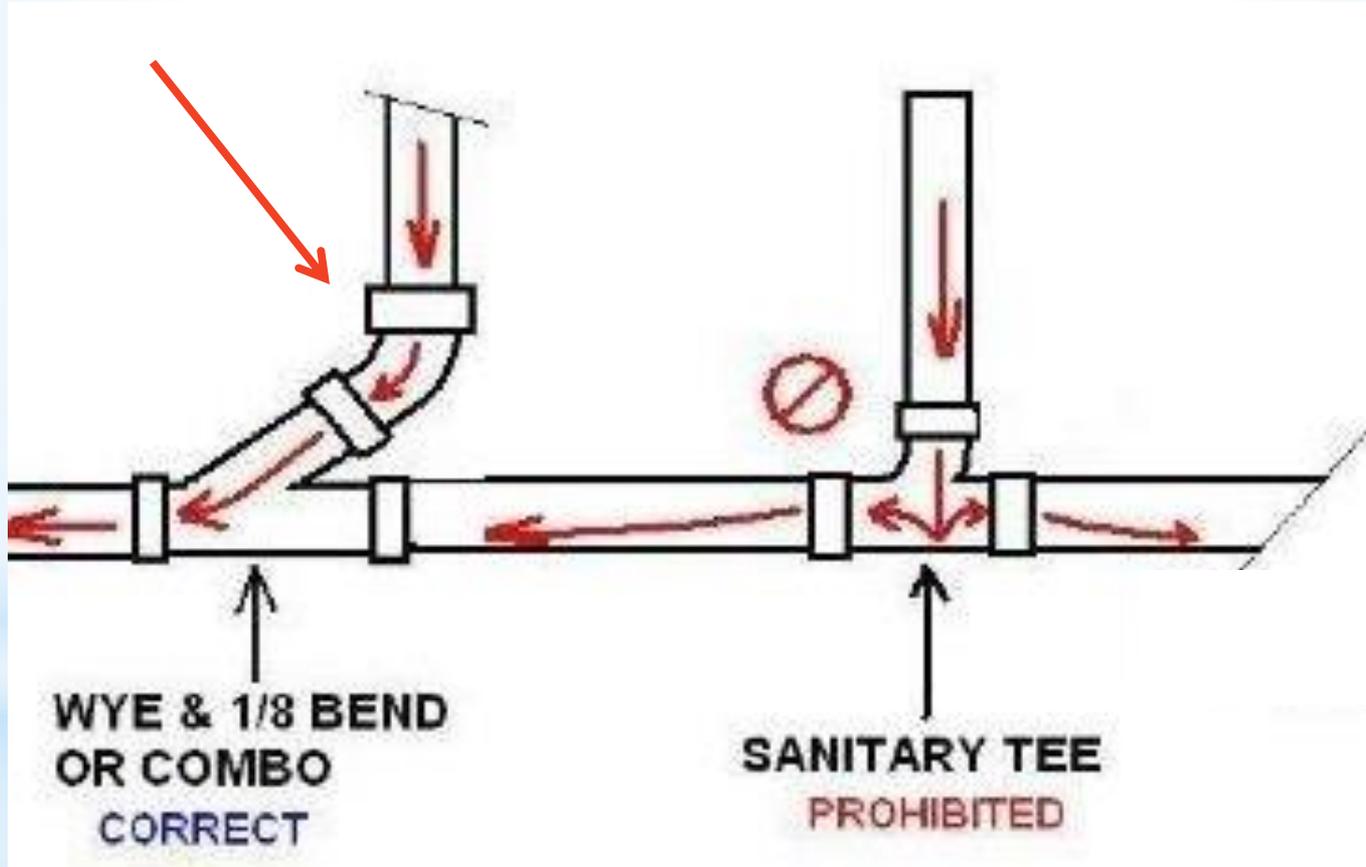
Cleanouts to Grade



Cleanout



Cleanout to Grade



Cleanout to Grade

Not acceptable

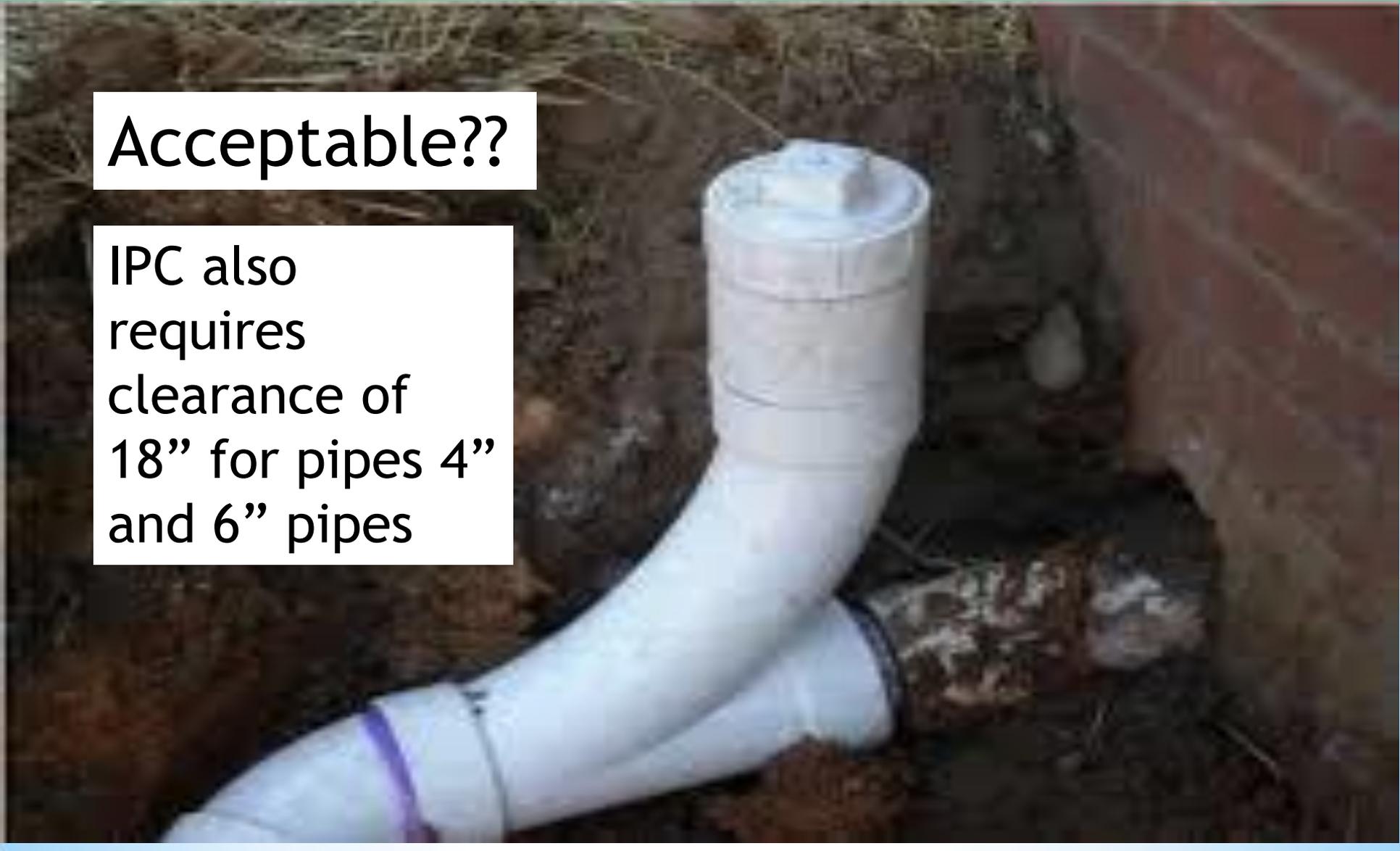


Not acceptable



Acceptable??

IPC also
requires
clearance of
18" for pipes 4"
and 6" pipes



Historic Design Flows

- * Current data indicates a 22% decrease in residential water usage from 1999-2016.
- * Decrease primarily associated with the usage of low flow toilets and high efficiency washing machines.
- * Data supports the reduction in flow for single family bedroom flows for bedrooms beyond 3 to 75 gallons per day. (single person occupancy of bedrooms beyond 3)

Historic Design Flows

Period	# of bedrooms (single-family homes)		
	4	6	8
1982-2000	600 <small>GPD</small>	900	1200
2000-2007	600	780	960
2007-2018	600	750	900
2018-	525	675	825

Design Flows Reductions

- * Table 5 (single family home septic tank capacity)
- * Table 6 (single family home effective leaching area)
- * Residential flow factors for the MLSS calculations have been revised to reflect the reduction in single family home water usage.

Section IV Design Flows

- * Subsection A. Residential Buildings: The design flow for single-family residential buildings is 75 GPD for each bedroom beyond 3 (previously beyond 4 bedrooms).

IV. DESIGN FLOWS

A. Residential buildings

Design flows for residential buildings shall be based on the number of bedrooms (refer to Section I). The design flow per bedroom is 150 GPD, except for bedrooms beyond three in single-family homes that have a design flow of 75 GPD for each additional bedroom.

Section IV Design Flows

- * Subsection B: Revised Table 4 laundromat language by replacing “Commercial: Requires DEEP Permit” with “Non-DEEP regulated”
DOH regulates coin-operated, DEEP regulates commercial and industrial.

Section IV Design Flows

- * Subsection C. Water Usage Monitoring and Permits to Discharge:
 - * Cited the design flow range (2,000 to 7,500 GPD) for large SSDSs.
 - * Added language noting permit to discharge for limited SSDS repairs (e.g., septic tank or leaching system replacement only) should document which SSDS components were and were not replaced.



PERMIT TO DISCHARGE

Approval is hereby given to Mr. Green, in accordance with Public Health Code Section 19-13-B103e (h) to discharge to a subsurface sewage disposal system located at 1 Main Street in the town of Hartford, CT that will receive domestic sewage from a:

- X Residential building containing: Three (3) bedrooms, Single family (Y/N): Y.
- Restaurant containing _____ seats.
- Commercial/Office building providing _____ square feet.
- Other structure as described: _____.

Design Flow = 450 gallons per day. Permitted Flow = 315 gallons per day. The design flow shall equal the permitted flow, except for non-compliant repairs (See Section IV D).

In order to provide a sufficient factor of safety it is recommended that the average daily discharge not exceed 2/3 of the permitted flow or 210 gallons per day.

Operation and Maintenance: Septic tank shall be inspected regularly and pumped as needed but not less frequently than every five years. The septic tank has an effluent filter (Y/N) N. Effluent filters require periodic cleaning. Failure to clean filters can result in sewage backup into the building or effluent breakout. Restaurants serviced by external grease interceptor tank(s) require quarterly inspections and cleaning as necessary. Tank pump-outs tracked by local health department (Y/N) N. If yes, stipulate pump-out requirements: _____.

Special Requirements and Restrictions:1. Leaching system replaced; existing single compartment 1000 gal septic tank not replaced. Riser added over manhole opening. Refer to inspection report dated 4/1/2017.

Exceptions (Repairs Only): 1. 70 percent of the NCR MLSS has been provided; 100 percent of ELA has been provided. Refer to approved plan dated 6/1/2017 in file for additional information.
2. Leaching system 8 feet to property line. 3. Leaching system 65 feet to subjects private well (see CT DPH well exception issued 7/1/2017).

File Information: Construction Permit No. 100. Approved as-built on file (Y/N) Y.

Date of Final Inspection: 9/31/2017 Inspected By: SANITARIAN.

Permit Issuance: Issued by: _____ Title: _____
(Director of Health or Registered Sanitarian)

Signature: _____ Date: _____

Permit expiration date (5 years from issuance date): _____



Swimming pool, per bather	10
Tennis Court, per court: indoor/outdoor	400/150
Theater, Sport Complex, per seat	3.5
Church/Religious Building	
Worship Service, per seat	1
Sunday School, per pupil	2
Social Event (Meals served), per person (Table 7 App. Rate)	5
Miscellaneous	
Auto Service Station, per car serviced	5
Salon, (Table 7 App. Rate)	
Per styling chair/station (hair)	200
Per pedicure chair/spa (5 gallon maximum basin)	100
Per manicure chair/station	50
Barber Shop, per chair	50
Dental/Medical Office with Examination Rooms, per SF of gross area	0.2
Dog Kennel, per run (Roof shall be provided) (Table 7 App. Rate)	25
Pet Grooming, per station (Table 7 App. Rate)	250
Laundromat (Non-DEEP Regulated), per machine (Table 7 App. Rate)	400
Motel (Transient, No Food Service, Kitchenette or Laundry Facilities), per room	75
Motel (Transient, With Kitchenette but no Laundry Facilities), per room	100
Marina (Bath-house & Showers Provided), per boat slip	20

C. Water usage monitoring and Permits to Discharge

Plans for large SSDSs (2,000 to 7,500 GPD) shall include provisions to monitor domestic sewage generation via the use of water meters or other available means (e.g., pump cycling and dose volume documentation). Permits to discharge issued by the DOH shall be on approved forms (Form #4 or approved equal) as required by PHC Section 19-13-B103e (h). Permits to discharge for limited SSDS repairs (e.g., septic tank or leaching system replacement only) shall document which SSDS components were and were not replaced. The discharge permits shall specify the design flow and permitted flow. The design flow shall equal the permitted flow, except for leaching system repairs that do not provide the required ELA or MLSS. The permitted flow for these leaching systems shall be prorated by using the most limited percentage of the required ELA or MLSS provided. The discharge permit shall recommend the average daily discharge not exceed 2/3 of the permitted flow in order to allow the SSDS to operate with a sufficient factor of safety and to accommodate peak flow conditions.

D. Management programs

DOHs and municipalities implementing decentralized sewage system management programs (e.g., Sewer Avoidance and Pump-out Ordinances, Decentralized Wastewater Management Districts) shall submit proposed or revised ordinances and regulations to the Commissioner for review prior to adoption.

Section V: Septic Tanks & Grease Interceptor Tanks

- * Subsection A. General: Removed language concerning plastic tank submissions
- * All plastic tanks must meet the IAPMO/ANSI Prefabricated Septic Tank Standard, unless otherwise approved by DPH.

Section V: Septic Tanks & Grease Interceptor Tanks



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Section V: Septic Tanks & Grease Interceptor Tanks



Section V: Septic Tanks & Grease Interceptor Tanks

- * Recommended a secondary safety device be provided anytime a tank cover is removed and a riser is used. Similar language in Subsection C for grease interceptor tanks.
- * Required when riser cover weighs <59lbs.

Section V: Septic Tanks & Grease Interceptor Tanks



Section V: Septic Tanks & Grease Interceptor Tanks

- * Added language Figure 4: an air gap is required above the compartment divider.

approximately 2/3 of the required capacity in the first compartment (Figure 4). No compartment wall shall extend to the interior roof without providing for venting. The transfer port shall be at mid-depth (opening in middle 25 percent of liquid depth). Mid-depth T-baffles similar to those shown in Figure 5 may be used as the mid-depth connection. Inlet and outlet piping shall be sealed with a sealed flexible joint connector. Inlet and outlet pipe seals shall be watertight tank seals when specified on the approved plan. The minimum liquid depth of septic tanks shall be 36 inches.

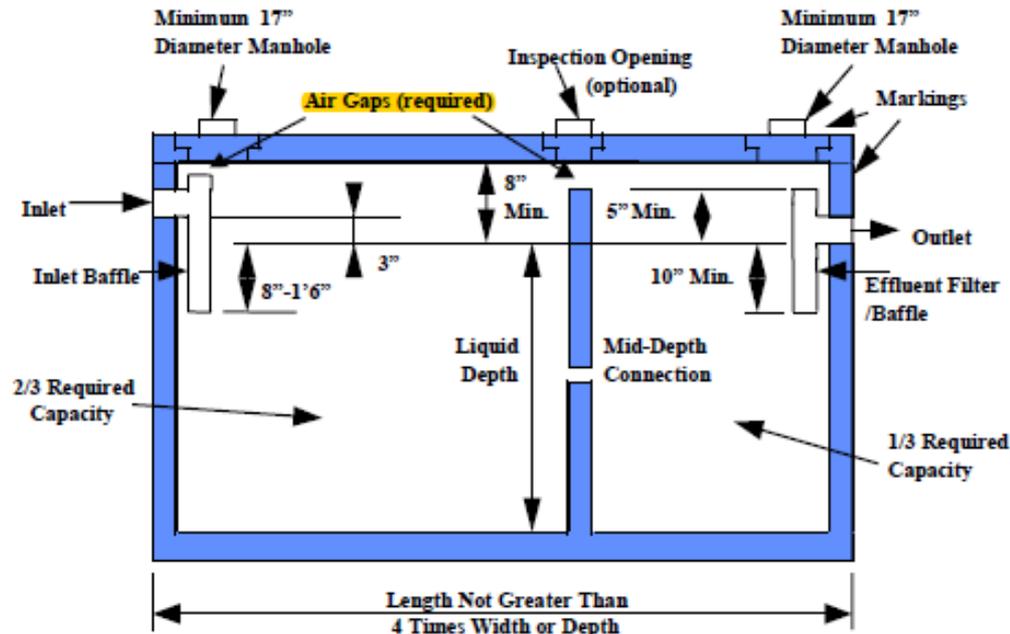
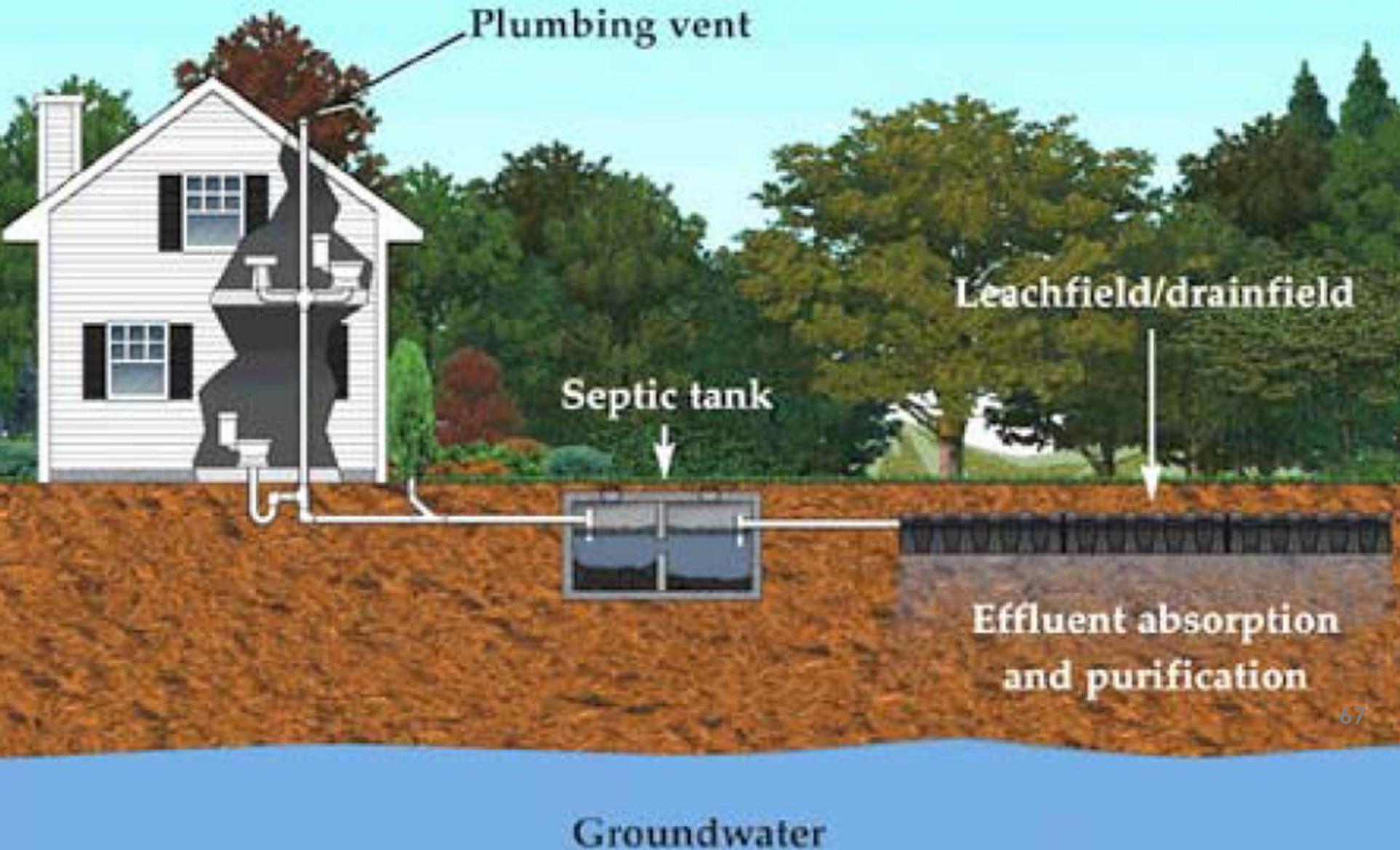


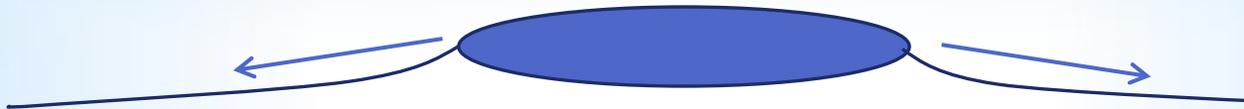
Figure 4 – Typical Septic Tank

Section III Piping



* Section V: Septic Tanks & Grease Interceptor Tanks

- * Added language noting positive drainage away from manhole covers shall be provided when riser and manhole extension to grade are provided.
- * No pick holes in cover



Section V: Septic Tanks & Grease Interceptor Tanks

- *Subsection B. Septic Tank Capacities: Revised Table 5 so septic tank capacity increment for residential buildings occurs after the 3rd bedroom (previously 4th bedroom).

B. Septic tank capacities

1. Residential Buildings

The minimum liquid capacities/volumes of septic tanks serving residential buildings shall be based on Table 5.

Table 5

	Single-family	Multi-family
1-3 bedrooms	1,000 gallons	1,250 gallons
For Each Bedroom Beyond 3	Add 125 gallons per bedroom	Add 250 gallons per bedroom

*Changes made require septic tank size slightly smaller for single family homes and slightly larger for multi-family homes with 4 or more bedrooms

Section V: Septic Tanks & Grease Interceptor Tanks

- * Subsection B. Increased Septic Tank Capacities: Added WTW discharge to SSDS.
- * 250 gallons additional capacity required for WTW discharges of 50 to 150 gallons (per Appendix E)
- * 500 gallons additional capacity required for WTW discharges greater than 150 gallons.



* Section V: Septic Tanks & Grease Interceptor Tanks

4. Garbage Grinders, Large Bathtubs, & Water Treatment Wastewater

Garbage grinders are not recommended for use with SSDSs. Only certain water treatment wastewater (WTW) is authorized to discharge to a SSDS (refer to Section X and Appendix E for WTW discharge requirements). The minimum liquid capacity of a septic tank shall be increased whenever a building contains a garbage grinder, large capacity bathtub, or WTW is discharged to the SSDS in accordance with the following:

Garbage grinder: Add 250 gallons.

Large bathtub: Add 250 gallons for 100 to 200 gallon bathtubs.
Add 500 gallons for bathtubs over 200 gallons.

WTW: Add 250 gallons for discharges of 50 to 150 gallons per cycle.
Add 500 gallons for discharges greater than 150 gallons per cycle.



Section V: Septic Tanks & Grease Interceptor Tanks

- * Subsection C. Grease Interceptor Tanks: Removed reference to food service establishment classifications.
- * CT is adopting the FDA model food code, new classifications coming.

Pump Systems

- *High-level alarms shall be both audible and visual, and located to readily alert building occupants.



Pump Systems

- * Raw sewage force main foundation penetrations shall comply with the plumbing code.
- * Made several revisions (check valve and weep hole locations, electrical box designations) to Figure 11

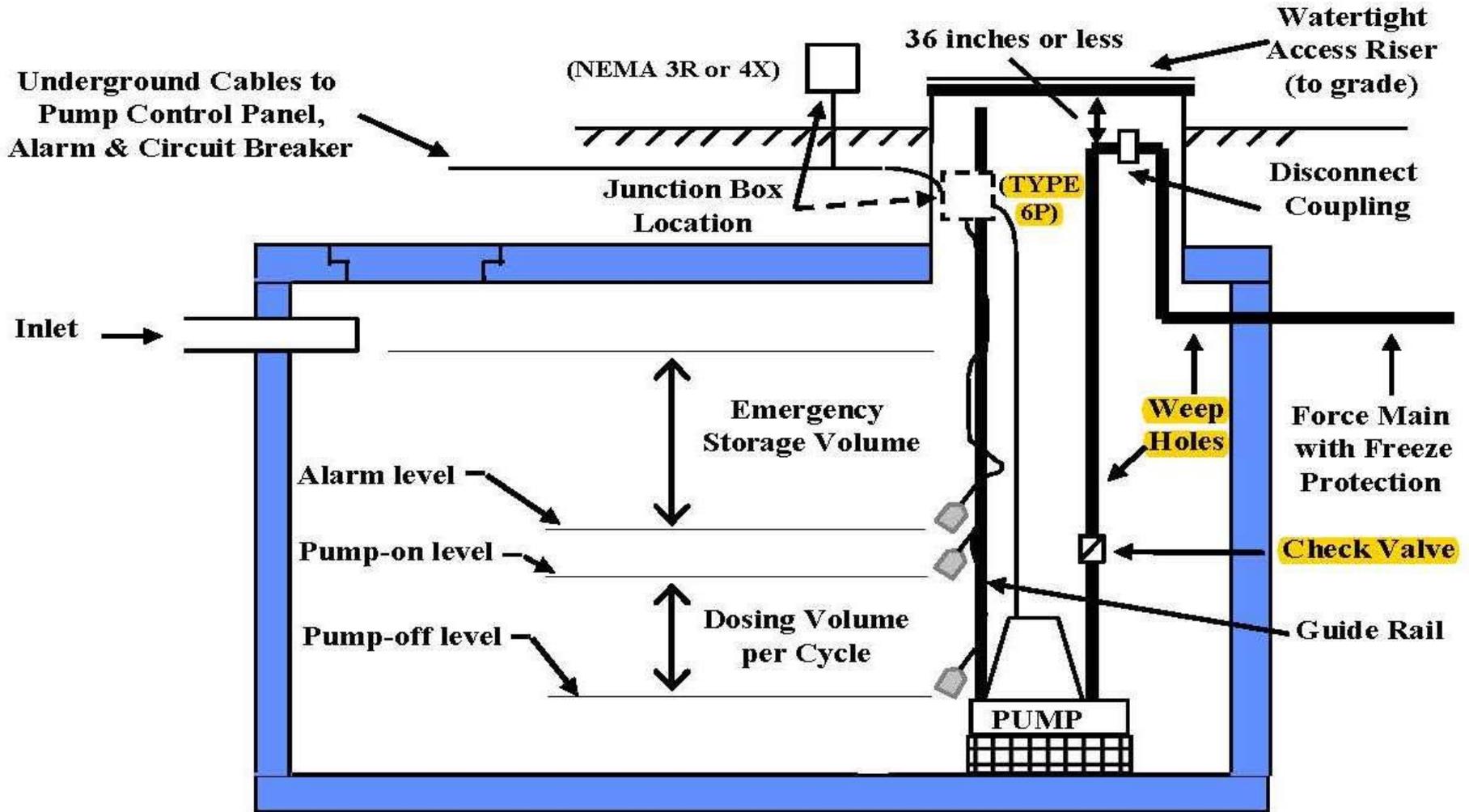


Figure 11 - Pump Chamber

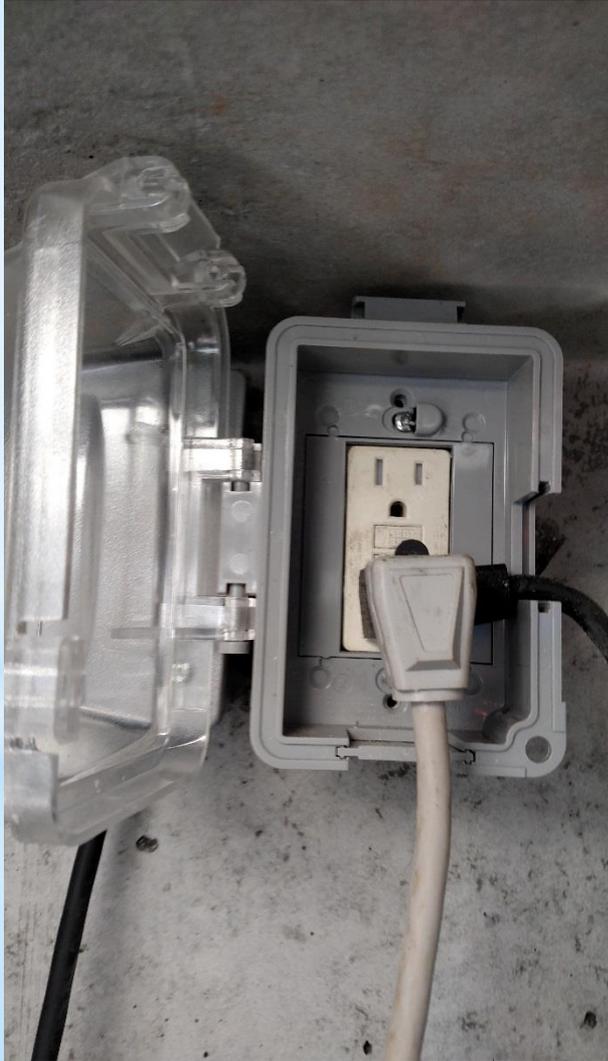




Table 2
[From NEMA 250-2003]
Comparison of Specific Applications of Enclosures
for Outdoor Nonhazardous Locations

Provides a Degree of Protection Against the Following Conditions	Type of Enclosure									
	3	3X	3R*	3RX*	3S	3SX	4	4X	6	6P
Access to hazardous parts	X	X	X	X	X	X	X	X	X	X
Ingress of water (Rain, snow, and sleet **)	X	X	X	X	X	X	X	X	X	X
Sleet ***	...	...	...	...	X	X	...	...	...	...
Ingress of solid foreign objects (Windblown dust, lint, fibers, and flyings)	X	X	...	...	X	X	X	X	X	X
Ingress of water (Hosedown)	...	...	...	...	...	...	X	X	X	X
Corrosive agents	...	X	...	X	...	X	...	X	...	X
Ingress of water (Occasional temporary submersion)	...	...	...	...	...	...	...	...	X	X
Ingress of water (Occasional prolonged submersion)	...	...	...	...	...	...	...	...	...	X

* These enclosures may be ventilated.

** External operating mechanisms are not required to be operable when the enclosure is ice covered.

*** External operating mechanisms are operable when the enclosure is ice covered.

Passive Nitrogen Reduction Technology (PNR)

- * Subsection C. PNR technology, where warranted (e.g., community pollution areas), can be used in conjunction with SSDSs that utilize low-pressure effluent distribution (requires PE design unless otherwise approved by DPH) or a proprietary pressure-dosed dispersal system.

Passive Nitrogen Reduction Technology (PNR)

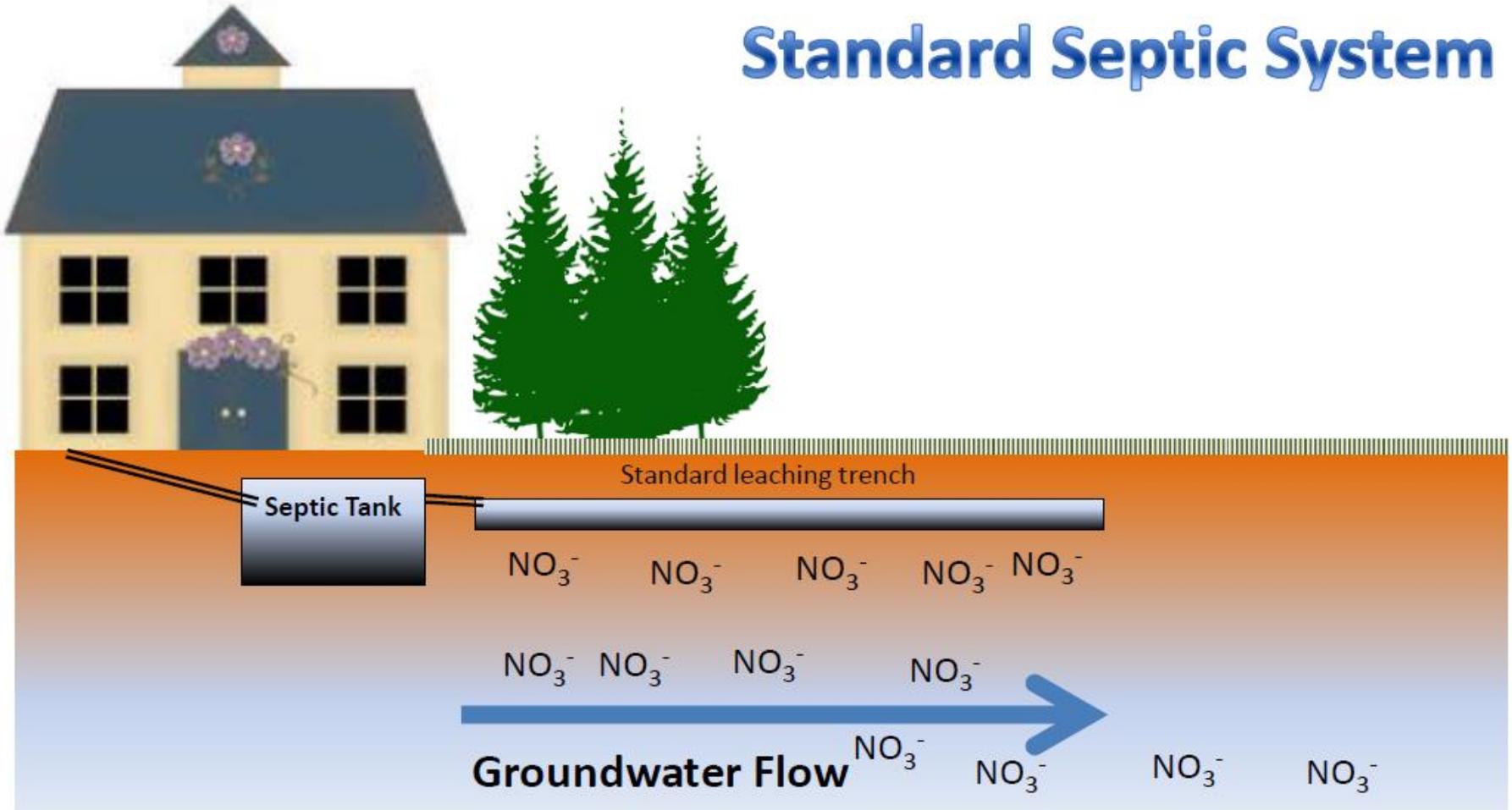
- * PRN technology should only be permitted if deemed its usage is appropriate and the DOH has sufficient resources to ensure the systems are properly designed and installed.
- * DPH notification required, can't be deemed an alternative treatment system, which can only be permitted by DEEP.

What is PNR Technology?

- * Uses a wood product (sawdust, wood chips, mulch) as a carbon source for denitrification of wastewater below or downgradient of a leaching system.
- * Does not aerate the contents of a septic tank.
- * Only uses pump(s) to distribute effluent to the leaching system.

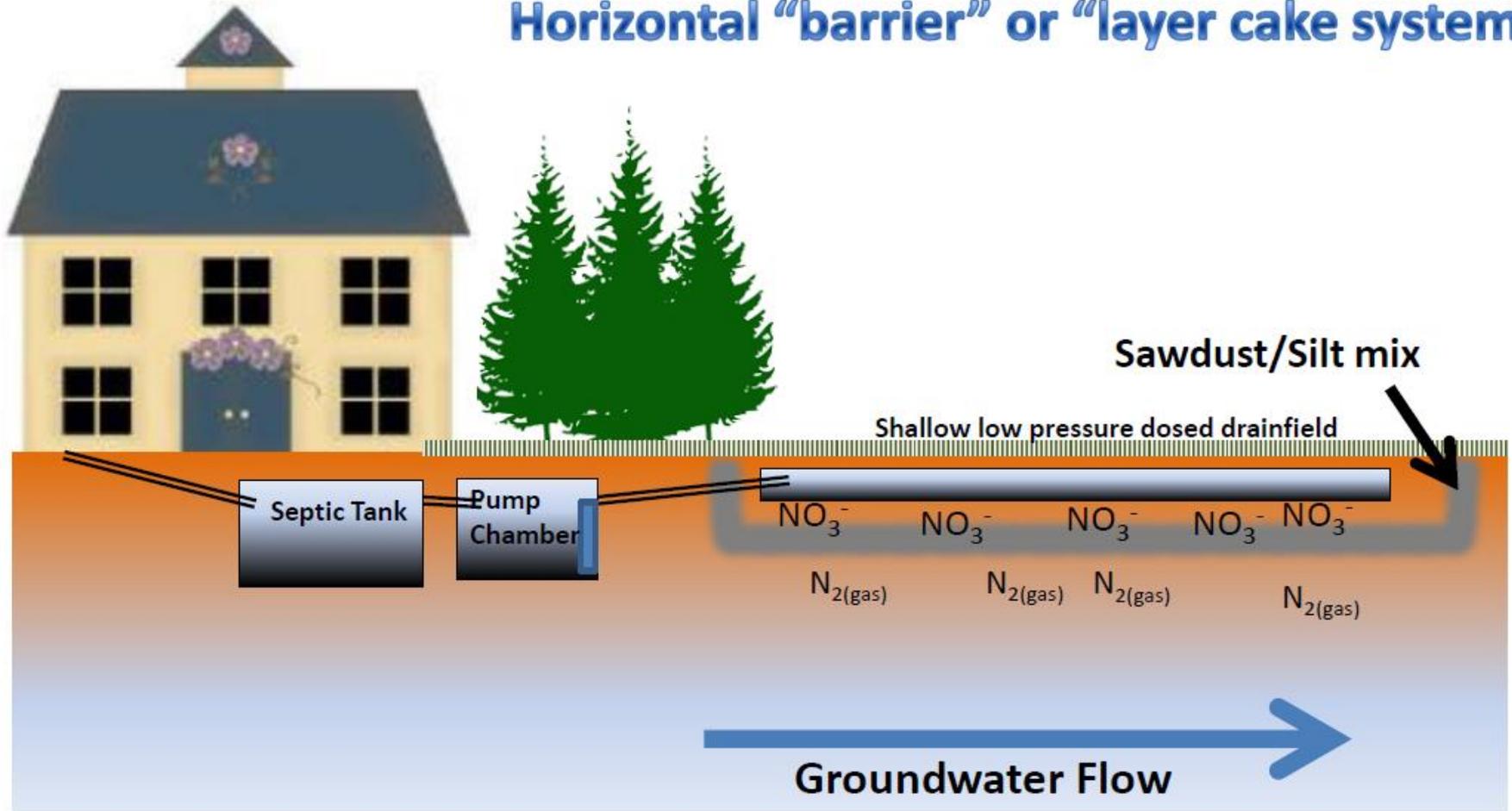
Example of PNR technology (cross-section)

Standard Septic System

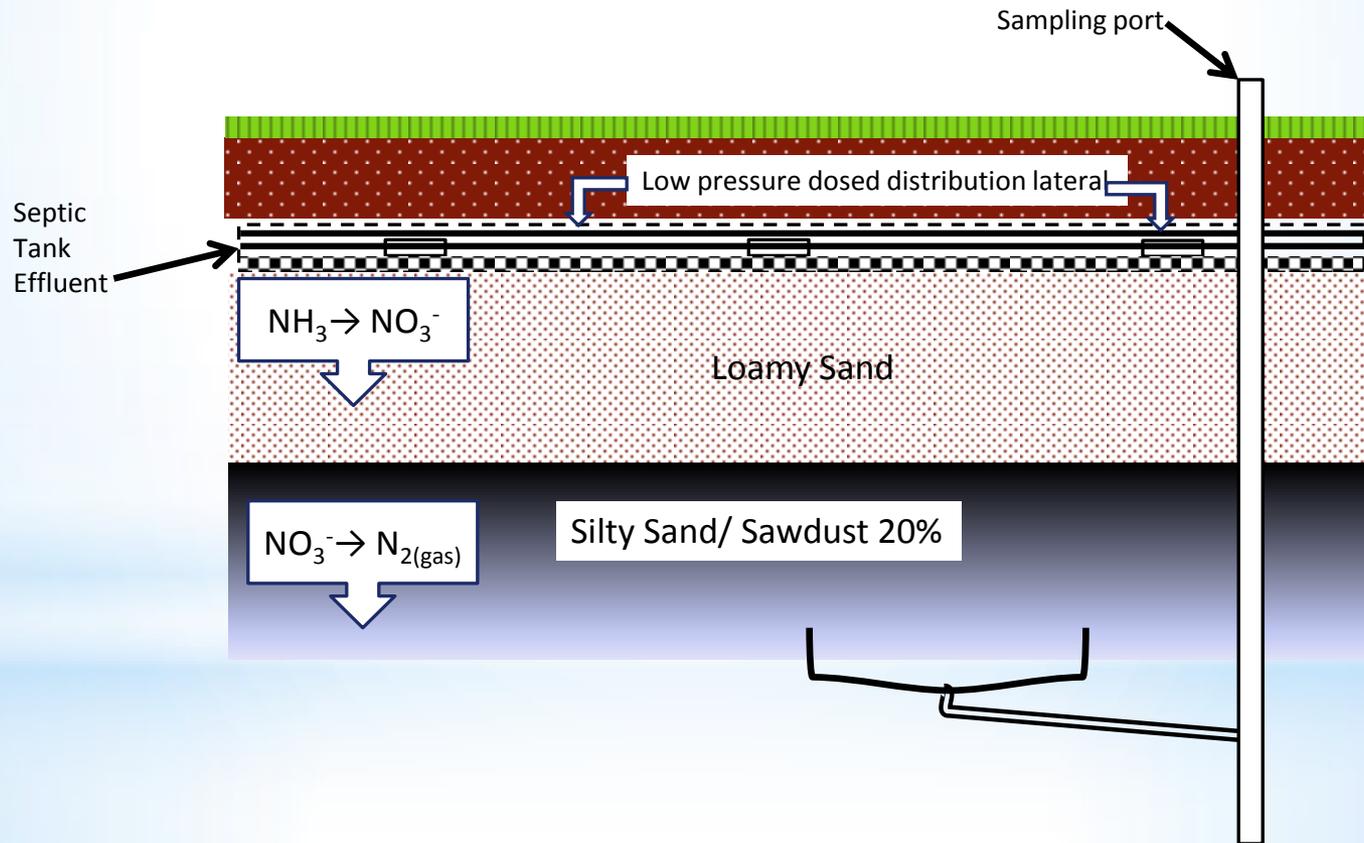


Example of PNR technology (cross-section)

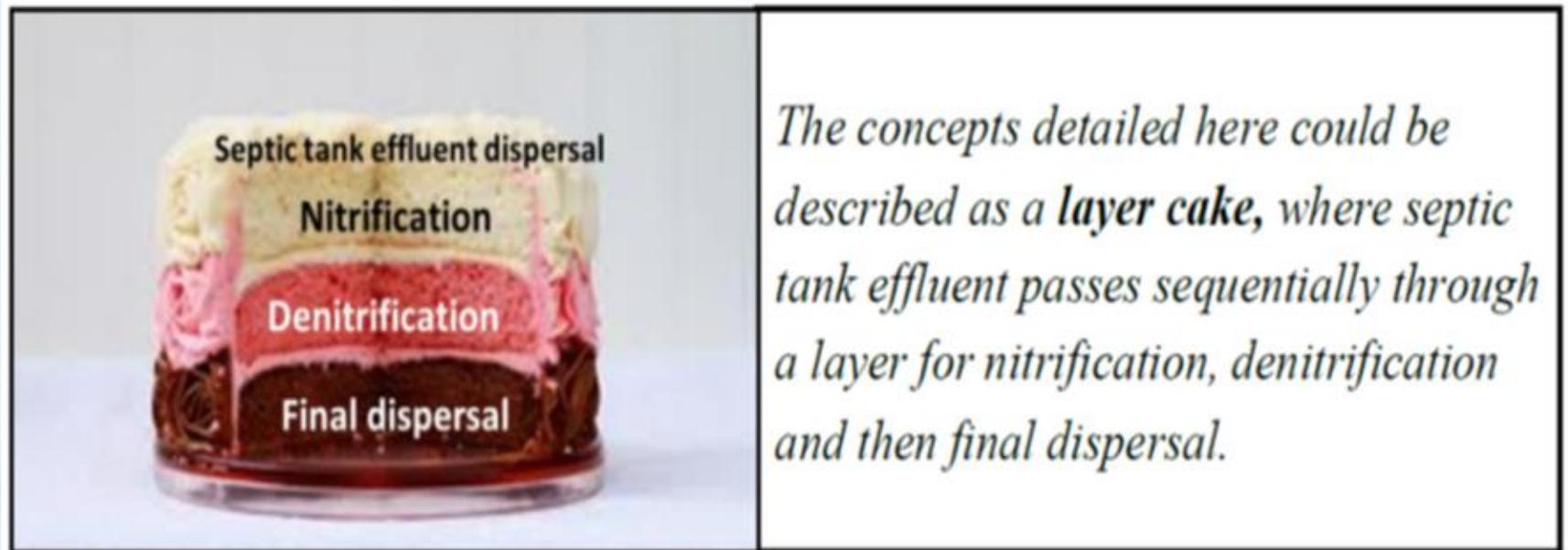
Horizontal "barrier" or "layer cake system"



Example of PNR technology (cross-section)



PNR Technology



*The concepts detailed here could be described as a **layer cake**, where septic tank effluent passes sequentially through a layer for nitrification, denitrification and then final dispersal.*

Leaching System Clogging Break-up

- * Subsection E. Added the patented EarthBuster process, and cited same permitting requirements as the patented Terra-lift process.
- * Added new limitations (depth and proximity of air injection relative to leaching system) for both processes.

Leaching System Clogging Break-up

Terra-lift



Leaching System Clogging Break-up

EarthBuster



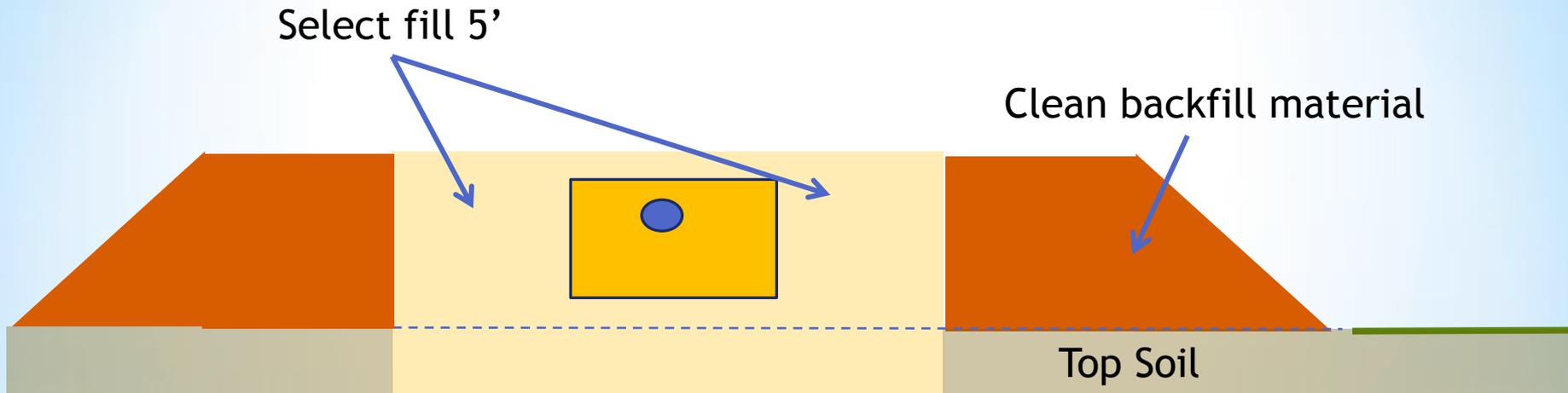
Leaching System Clogging Break-up

- * Permit required for either Terra-lift or EarthBuster
- * Leaching system must provide the minimum separation above ledge rock and groundwater
- * Air injection must not exceed depth of system
- * No closer than 2 feet horizontally to sidewall

Section VII Percolation Tests

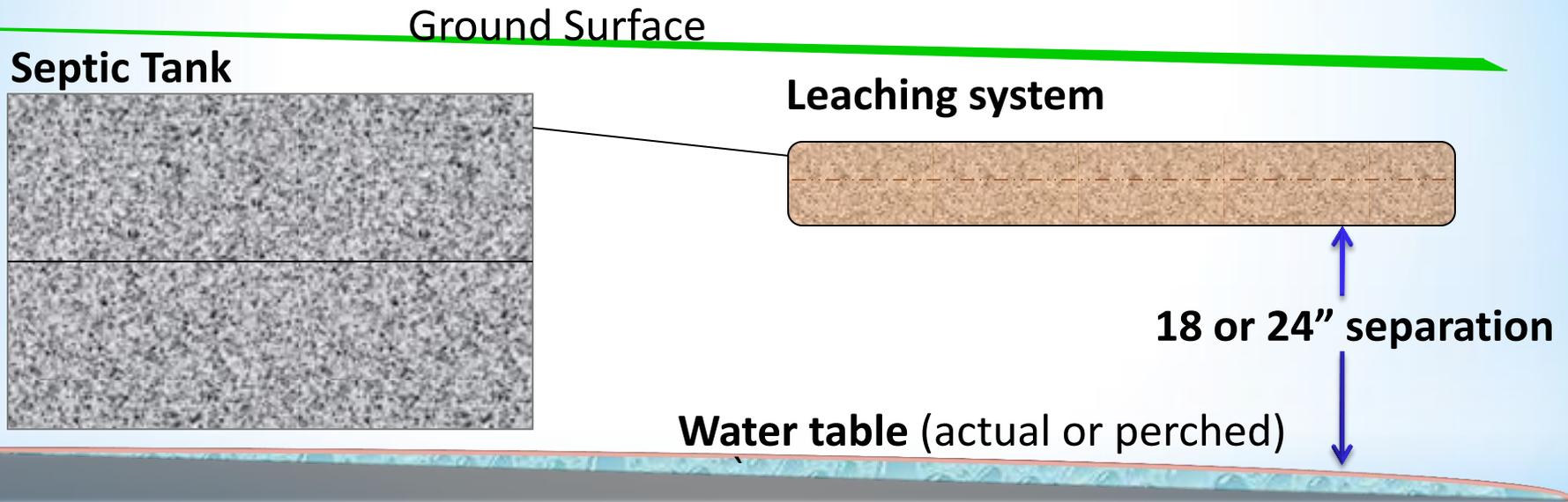
- * Revised language about sizing leaching systems constructed entirely in select fill, which means the bottom of the leaching system must be above existing grade in order to design ELA on the percolation rate of select fill provided.

System Entirely* in Select Fill



* leaching system bottom above existing grade

Leaching system elevation above GW



- * Subsection A. General: Revised and bulleted the language concerning separation above ledge and max groundwater(GW).

Bulleted Separation Distances

- If the receiving soil percolation rate is faster than 5.0 minutes per inch, the minimum separation to maximum groundwater shall be increased to 24 inches.
- If the receiving soil percolation rate is faster than 1.0 minute per inch, the minimum separation above ledge rock shall be increased to 8 feet or the distances shall be doubled from any water supply well in accordance with the special provisions in Table 1 (Item A).



Bulleted Separation Distances

- Large SSDSs shall provide a minimum 24 inch separation above maximum groundwater.
- SSDSs in coastal areas on sites with tidally impacted groundwater tables shall provide a minimum 24 inch separation above maximum groundwater.

New Lots & SSDSs, & CCAs

- * There should not be “unsuitable soil” conditions in the leaching system area (within 10 feet of primary and reserve leaching areas).



$\geq 4'$ to ledge and $\geq 18''$ to maximum groundwater

Leaching System General

- * Subsection A. Removed the #40 and #200 sieve specifications from the chart for No. 4 & No. 6 stone aggregate.
- * new stone aggregate definition includes a maximum percent passing the #200 sieve of 1.0% at the pit/quarry source, also recommended at site, but in no case >1.5%
- * Added similar aggregate language (clean, hard, tough, durable fragments) included in CT DOT Form 817 M.01.02.



Leaching System General

- * Subsection A. General: For DPH manufactured fill approvals the minimum average permeability shall be 10 feet per day.
- * Additional testing may be required for manufactured fill with a minimum average permeability of 10 to 15 feet per day.
- * Manufactured fill approval applications and approved supplier annual registrations shall include a signed statement attesting that the test results submitted to DPH are typical of routine quality control/quality assurance (QC/QA) test results.

Manufactured Fill & Pipe Cradling

- * Subsection A: Stipulated approved supplier of manufactured fill shall include updated test results and QC/QA narratives in the annual registration submittals.
- * Subsections B and D (Leaching Trenches and Leaching Galleries)
 - * When distribution pipe is placed on top of aggregate, the stone must be cradled around the bottom portion of the pipe to prevent filter fabric from obstructing the perforated pipe openings.

Proprietary Leaching and Pressure-Dosed Dispersal Systems

- * New subsection title. Subsection broken into 2 categories (Proprietary Leaching Systems & Proprietary Pressure-Dosed Dispersal Systems).
- * Added proprietary leaching systems (Eljen Mantis Double-wide, Infiltrator Quick 4, Geomatrix Concrete System (GCS)) approved since the last Technical Standards. Changed name of Eljen Type “B” units to B43.
- * Changed the DOT form and specification reference from Form 816 Specification M.03.01 to Form 817 Table M.01.03-1

Leaching System Sizing

- * New list of bulleted exceptions to the residential building sizing requirements in Table 6.
- * Revised Table 6 to eliminate the 4-Bedroom Building column, and revised the header of the last column from “For each bedroom above 4” to “For each bedroom above 3”.
- * Table 6 revisions make leaching systems slightly smaller for single-family homes with 4 or more bedrooms.

Leaching System Sizing

F. Leaching System Sizing

1. Residential Buildings

The required effective leaching area (ELA) for a SSDS serving a residential building shall be based on the number of bedrooms and the percolation rate in accordance with Table 6, except for the following:

- A separate SSDS for a one bedroom residential outbuilding on a single-family residential building lot shall have a required ELA equal to 50 percent of that required for a 2-bedroom building.
- The required ELA for a multi-family residential building shall be based on a minimum of 4-bedrooms.
- A central SSDS serving a residential outbuilding and a single-family residential building shall base the outbuilding's required ELA on a multi-family classification unless the outbuilding doesn't have additional plumbing fixtures (e.g., kitchen sink, dishwasher, washing machine) beyond a full bathroom.

Table 6

Percolation Rate (Minutes to Drop One Inch)	Square Feet of Required Effective Leaching Area (ELA)			
	2-Bedroom Building	3-Bedroom Building	For Each Bedroom Above 3	
			Single Family	Multi-family
LESS THAN 10.1	375	495	82.5	165
10.1-20.0	500	675	112.5	225
20.1-30.0	565	750	125	250
30.1-45.0	675	900	150	300
45.1-60.0	745	990	165	330

Leaching System Spacing

- * Subsection G Leaching System Product Approvals, ELA Ratings, Center to Center Spacing.
- * Limited the center to center spacing reduction consideration language to shallow leaching systems in low-pressure distribution applications.
- * A minimum of 6 inches edge to edge for each 1 square feet, or part thereof, per linear foot ELA credit shall be provided.

Section IX Groundwater and Surface Water Drainage

- * Removed separating distances, and added additional references for minimum separating distance requirements for storm water collection/drainage/infiltration systems and groundwater drainage systems.

Section IX Groundwater and Surface Water Drainage

- * Separated language concerning storm water and groundwater drainage systems.
- * Groundwater drainage shall not discharge into or within 25' of a SSDS, and an increased separating distance may be needed if the discharge location may impact the operation of the leaching system.

Section X Water Treatment Wastewater

- * Changed section title from Other Wastewater to Water Treatment Wastewater (WTW)
- * Removed reference to DEEP's General Permit for Low Flow Water Treatment Wastewater and 500 GPD permit limits.
- * Referenced the July 2017 DEEP/DPH WTW Delegation Agreement that provides the authority for the DOH or licensed sanitarian to approve and permit discharges to a WTW dispersal system, WTW holding tank, or if authorized by DPH to a SSDS.

Section X Water Treatment Wastewater

* WTW discharges shall also be in accordance with any future regulations promulgated by DPH. WTW discharges to the ground surface, wetlands or open watercourse are not authorized. Note: See Circular Letter #2017-26 for more information and the delegation agreement.

Section X Water Treatment Wastewater

WHAT IS NOW REQUIRED??

- *The applicant (property owner or duly authorized agent) shall submit a plan/sketch to the DOH showing the proposed WTW dispersal system, WTW holding tank, or connection to the SSDS. The name and contact information of the installer shall be noted.

Section X Water Treatment Wastewater

- *The applicant shall submit information on the water treatment system including WTW backwash volume per cycle and cycle frequency.
- *Plans for new SSDSs should designate an area where a WTW dispersal system could be installed.

Section X Water Treatment Wastewater

- * Compliance with PHC Section 19-13-B100a (e) may need to be demonstrated. Note: This B100a subsection concerns sewage disposal area preservation and it governs activities that affect soil characteristics or hydraulic conditions that may reduce a potential repair area or eliminate a code complying area.

Section X Water Treatment Wastewater

- *The DOH or licensed sanitarian shall approve the design prior to the installation of WTW dispersal system or WTW holding tank.
- *DPH approval is not required for a WTW holding tank; however DPH approval is required for WTW discharges directed to a sewage holding tank.

Section X Water Treatment Wastewater

- *The WTW disposal system installer shall provide twenty-four (24) hour minimum advance notice to the DOH prior to commencement of installation, unless otherwise approved by the DOH.
- *DOHs may request an inspection prior to covering the WTW disposal system.
- *Applicable permits (electrical, plumbing) shall be obtained from the local building official.



WTW Receiving Structures

- * Minimum storage volume of 1.5 times of either the anticipated discharge per cycle or daily average, whichever is greater.
- * Stone aggregate used shall be free of silt, dirt and debris and covered with approved filter fabric.

Section X Water Treatment Wastewater

- * WTW solid conveyance pipe shall be approved by DOH and protected from freezing. Referenced gravity and pressure pipes in Tables 2-A and 2-B as acceptable pipes.
- * WTW dispersal systems shall meet the minimum separating distances to sewage systems per Item Q in Table 1.
- * WTW holding tanks, including piping, shall be located at least 10' from SSDSs.



Section X Water Treatment Wastewater

WTW dispersal system receiving structures shall meet the minimum separating distances in Table 9.

Item	Separation Distance (feet)	Special Provisions
Public or private water supply well with required withdrawal rate of: <div style="text-align: right; margin-right: 50px;"> < 10 GPM 10 to 50 GPM > 50 GPM </div>	<div style="text-align: center; margin-top: 100px;"> 75 150 200 </div>	The DOH may allow certain separation distance reductions on existing developed properties if compliance cannot be met due to site limitations. ⁽¹⁾⁽²⁾⁽³⁾
Open watercourse	25	
Public water supply reservoir	100	
Property line	10	
Subsurface sewage disposal system	See Table 1 (Item Q)	

Section X Water Treatment Wastewater

(Table 9 provisions)

- * DOH can reduce certain distances on existing developed properties when warranted based on site limitations; however distance reductions for water supply wells can only be considered for private wells and the distance shall not be reduced to less than 25 feet.

Section X Water Treatment Wastewater

(Table 9 provisions)

- * WTW discharges less than 75 feet up-gradient of private wells shall be avoided, whenever possible.
- * The DOH may not allow a reduced setback to a private well if there is a concern the WTW may impact the quality of the groundwater.

Section X Water Treatment Wastewater

- * Non-discharging WTW disposal system components (WTW holding tanks, WTW settling or filtration structures) and any air gaps/breaks in conveyance piping outside of building foundation shall meet the minimum separating distances in Table 9, unless otherwise authorized by DPH.

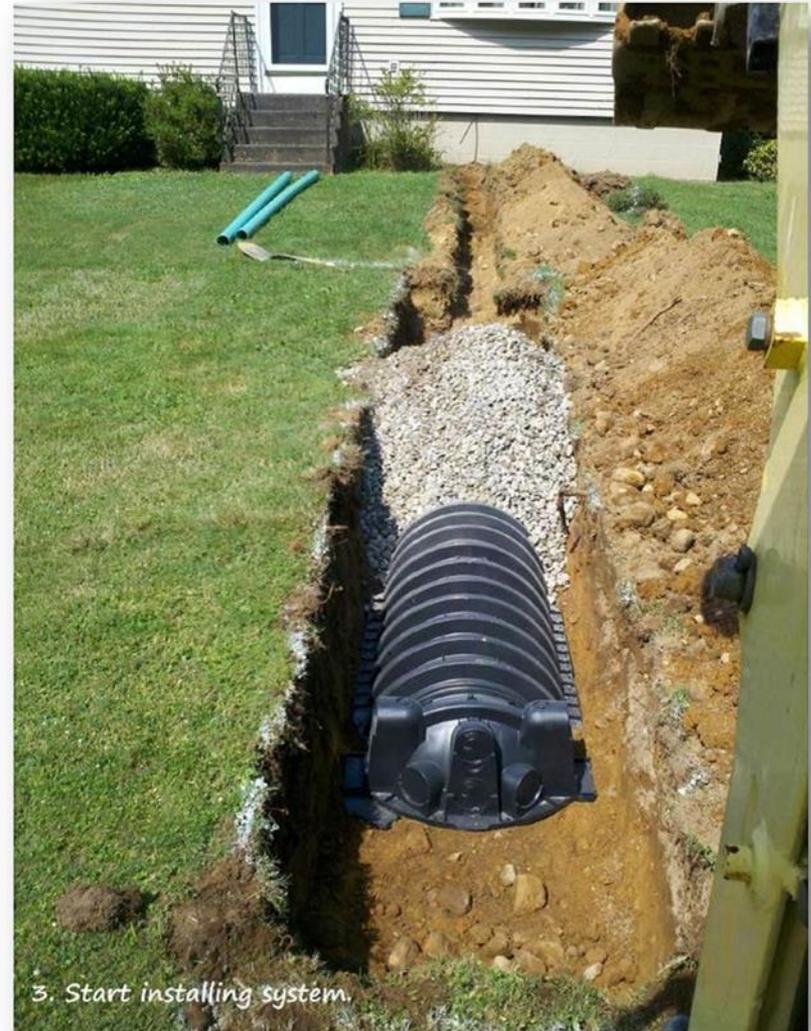
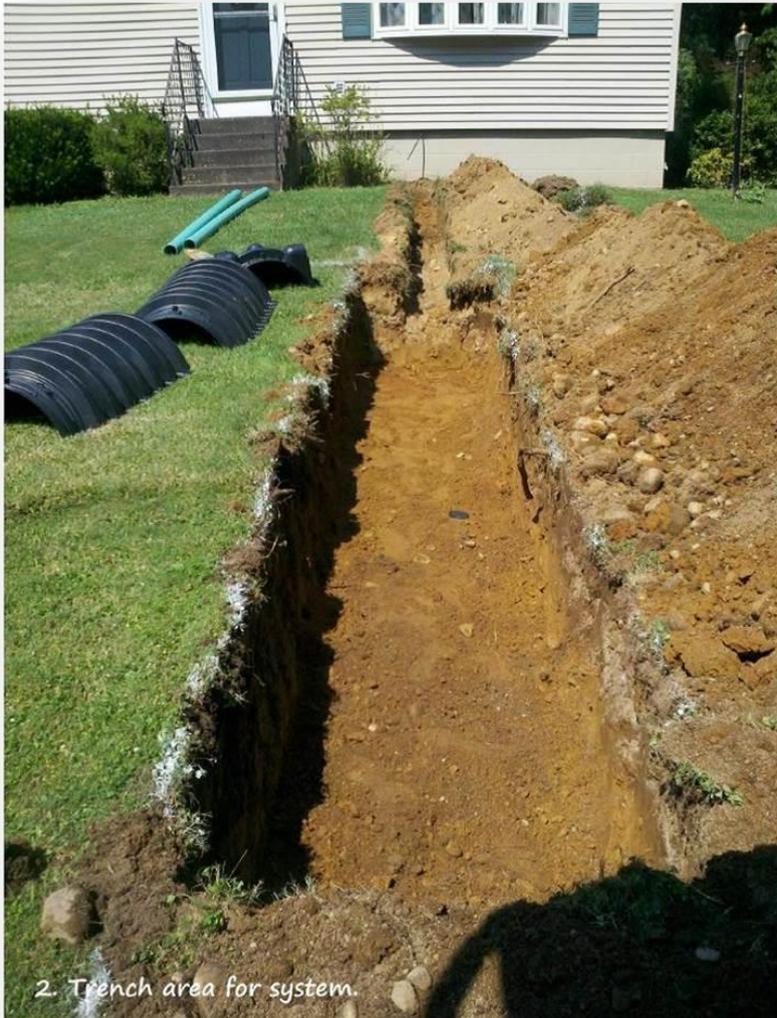
WTW Dispersal System Receiving Structures

- * WTW receiving structure bottoms shall be located a minimum 12 inches above maximum groundwater and 24 inches above ledge rock.
- * WTW Holding tanks shall provide an access cleanout to grade and be equipped with a high-level alarm.

WTW Dispersal System Receiving Structures

- * WTW dispersal systems and holding tanks in vehicular travel areas shall be H-20 load rated.
- * An as-built drawing (swing ties to 2 or more fixed reference points) shall be submitted to the DOH

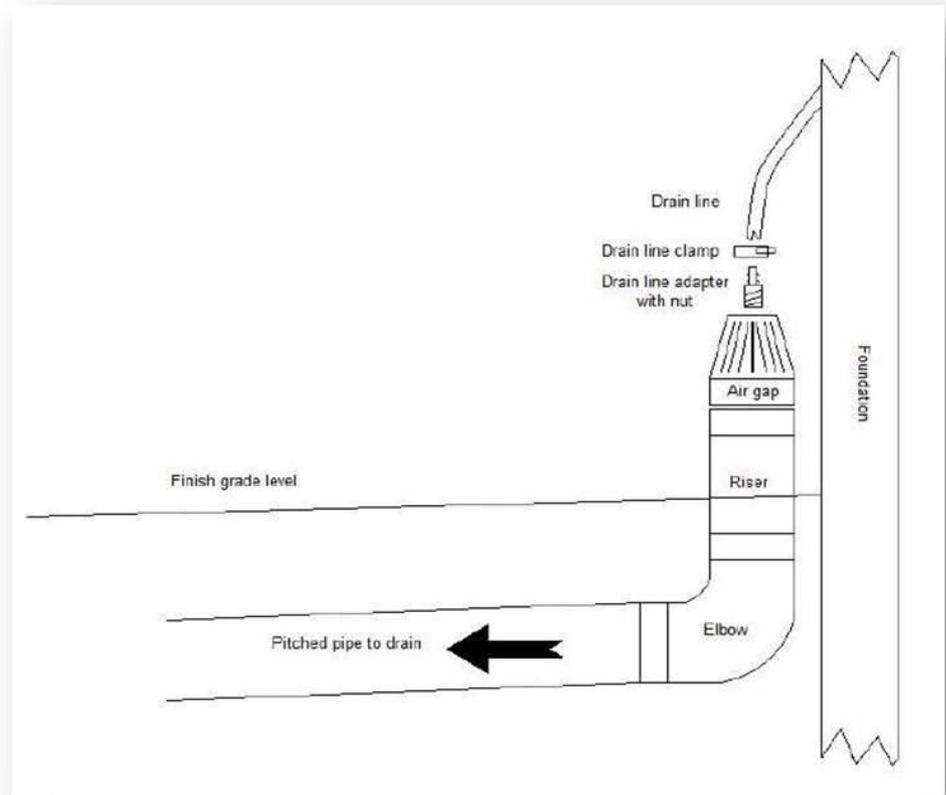
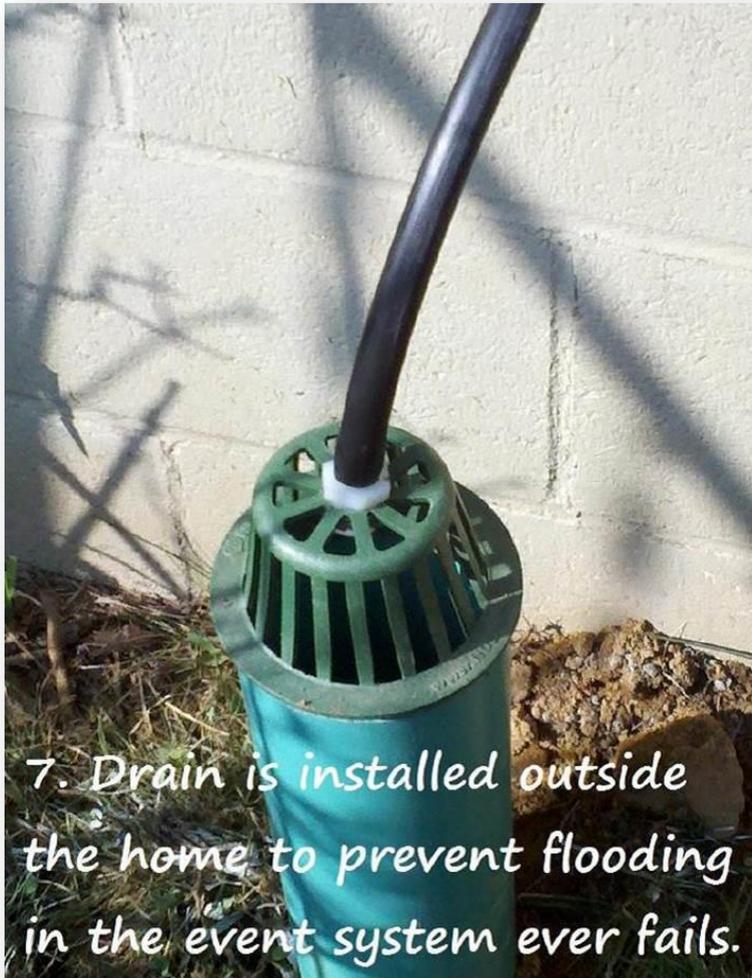
Section X Water Treatment Wastewater



Section X Water Treatment Wastewater



Section X Water Treatment Wastewater



Stone Excavation Storage Calculations

- * For calculation purposes it can be assumed stone filled excavations provide 40% void space (storage volume). Cubic feet (ft³) times 7.48 equals gallons.
- * Example: A WTW Dispersal System that consists of a stone filled excavation (Dimensions: 10 feet long, 3 feet wide, 2 feet deep) has a volume of 60 ft³ ($10' \times 3' \times 2' = 60 \text{ ft}^3$) and a void space of 24 ft³ ($60 \text{ ft}^3 \times 0.4 = 24 \text{ ft}^3$), which equates to 179.5 gallons ($24 \text{ ft}^3 \times 7.48 \text{ gallons/ft}^3 = 179.5 \text{ gallons}$) of WTW storage capacity.

Section X Water Treatment Wastewater

- * DPH may authorize certain WTW to discharge to a SSDS (see Appendix E).
- * Ion exchange systems, both cationic (a.k.a., softeners) and anionic (e.g., radionuclide treatment systems), are not be authorized to discharge to a SSDS.
- * No WTW is authorized to discharge to a cesspool.

Section XI Non-Discharging Toilet & Sewage Disposal Systems

- * Subsection title changed from Holding Tanks to Sewage Holding Tanks.
- * Recommended a secondary safety device be provided for a holding tank without a cover that has a riser cover weighing more than 59 pounds. Required if riser cover is <59lbs.
- * High-level alarm requirements: audible and visual, alarm location to alert building occupants.

Forms

- * Form #1: Minor changes
- * Forms #2 and #2A: Add soil scientist to the list of possible individuals participating in site investigation
- * Form #3: Removed Approved Plan, Approval to Construct, As-built, and Permit to Discharge questions. Added WTW and secondary safety device questions. Changed approved aggregate reference to stone aggregate. Added leaching system elevation table.
- * Form #4 (Permit to Discharge): Removed item 1 in¹²⁶ the Special Requirements and Restrictions section.

Appendix A: MLSS

- * Added Receiving Soil (RS) Depth formula and calculation information.

$$\text{RS Depth} = (A+B)/2$$

- * Created three categories for RS Depth determinations and each category includes language and cross sections that detail receiving soil measurements in the leaching system area and surrounding soil.

MLSS Category 1

- * Category 1 includes Conceptual B100a Areas (Code-Complying & Potential Repair), and SSDS Layouts for New Lots. This category only allows consideration of naturally occurring soil (a.k.a., natural soil) for receiving soil measurements, which is noted in the category language and Diagrams 1 & 2.

MLSS Category 1

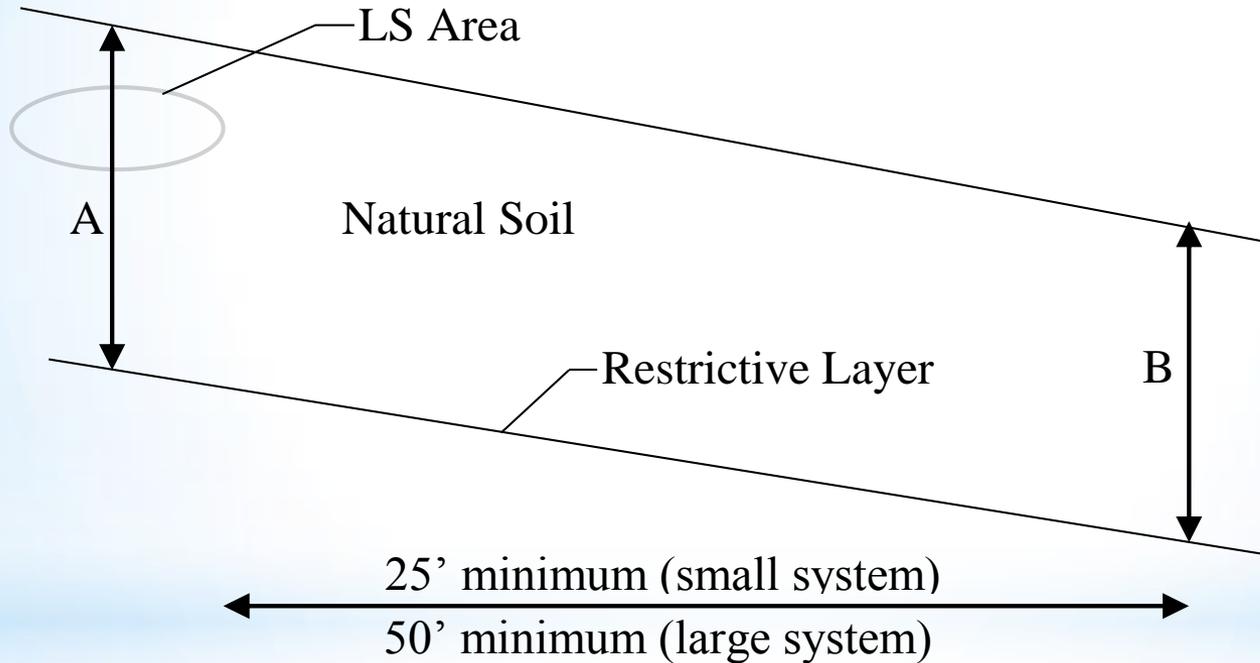


Diagram 1 - Sloped Restrictive Layer

MLSS Category 1

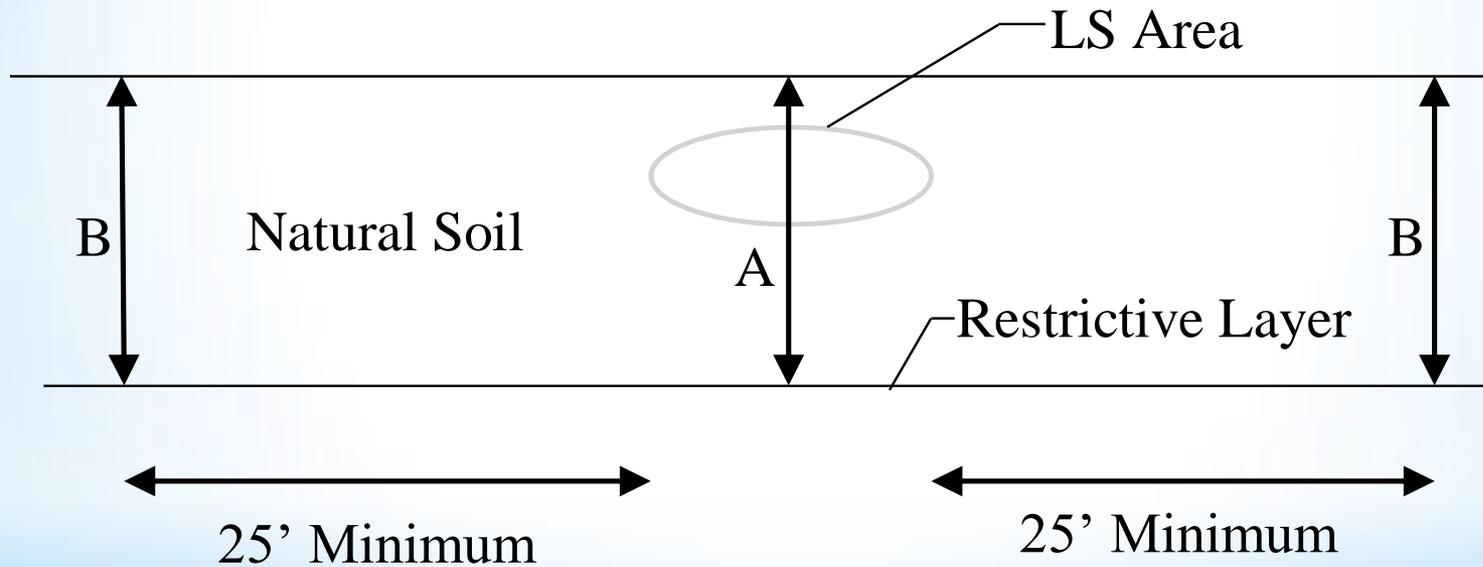
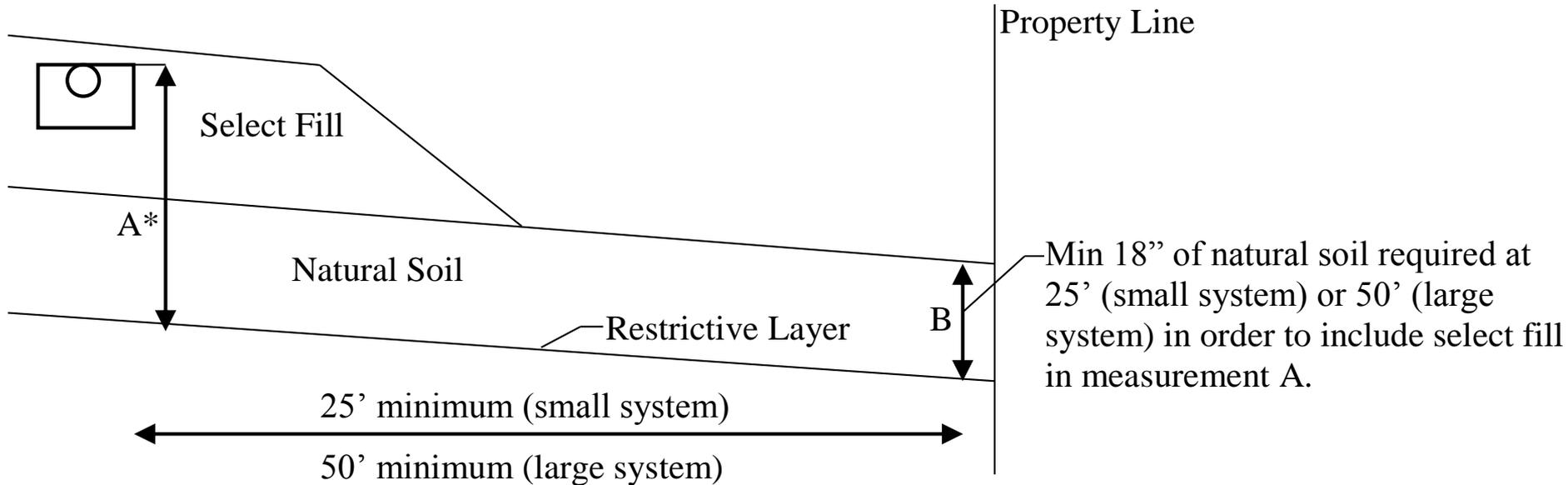


Diagram 2 - Flat Groundwater Table

MLSS Category 2

- * Category 2 includes New SSDSs and MLSS Compliant Repairs.
- * Receiving soil in the leaching system area can include and select fill.
- * Measurement from top of leaching system, minimum natural soil requirements for including select fill in the leaching system area
- * Receiving soil measurements are noted in both the category language and in Diagram 3.
- * Limits natural soil measurements in the leaching system area when the top of the system is more than 12 inches below natural grade are noted in both the category language and in Diagram 4.

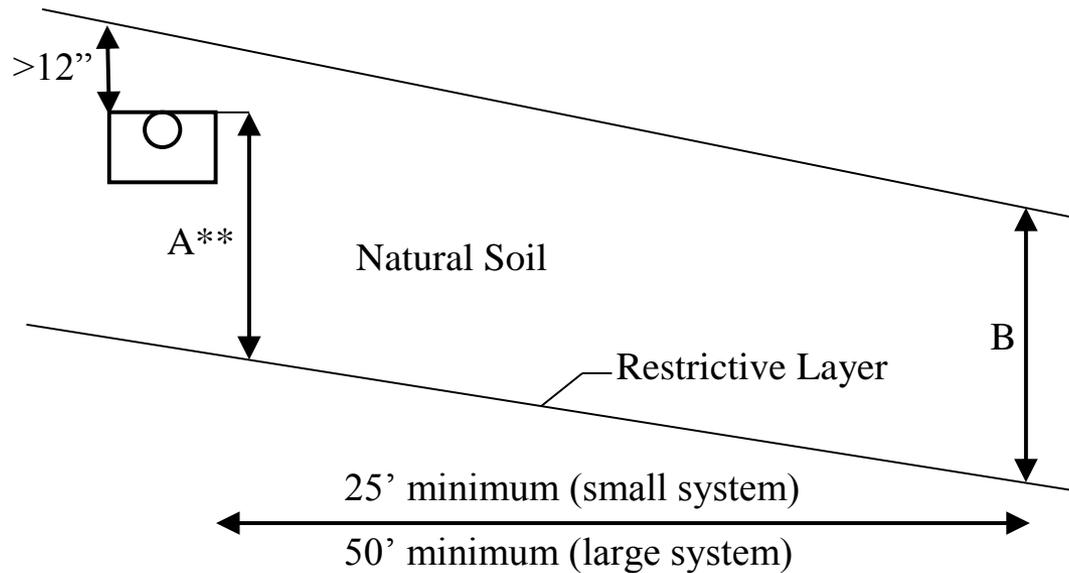
MLSS Category 2



*Receiving soil in LS area may include up to 24'' of select fill measured from top of system if all receiving soil is on property and there is at least 18'' of natural soil throughout the receiving soil.

Diagram 3 – LS in Select Fill (Sloped Restrictive Layer)

MLSS Category 2



**Receiving soil in the LS area is measured from natural grade; if the top of system is more than 12" below natural grade then it is measured from the top of the system.

Diagram 4 – LS in Natural Soil (Sloped Restrictive Layer)

MLSS Category 3

- * Category 3 includes MLSS Non-compliant Repairs and B100a MLSS Non-compliant Potential Repair Areas.
- * Existing receiving soil, both fill and natural soil, and additional fill that is included in the SSDS design.
- * Diagrams (5 & 6) provide conditions and limitations for considering the various types of soil in determining the receiving soil measurements.

MLSS Category 3

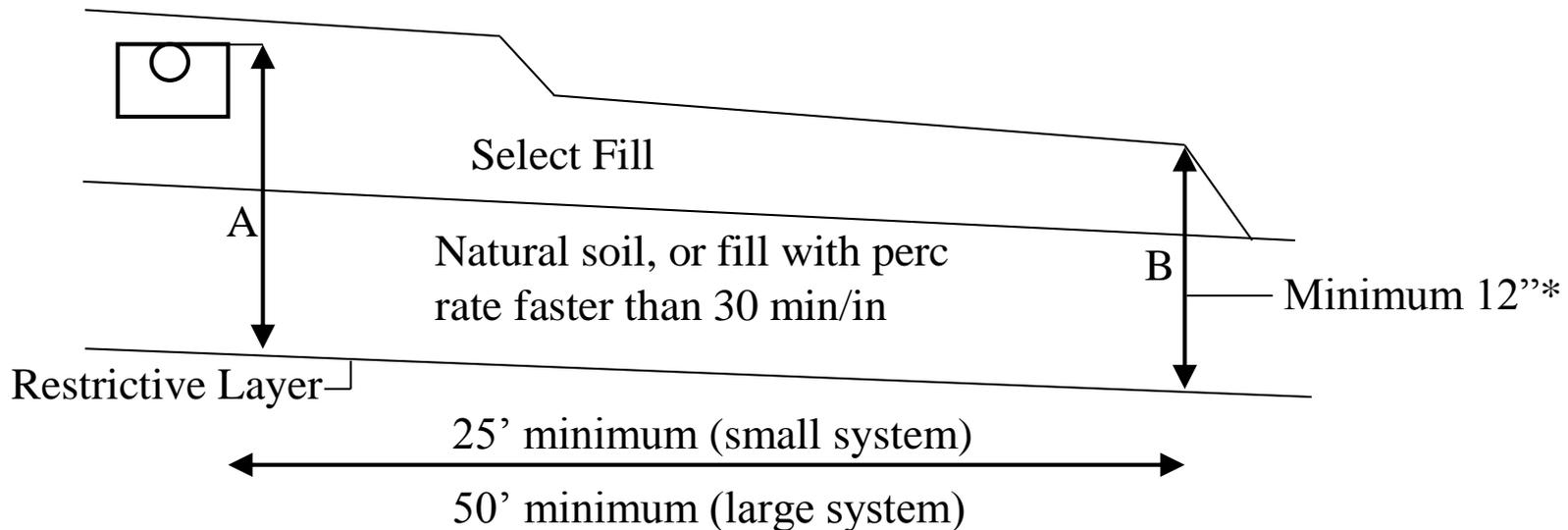


Diagram 5 – Select Fill, and Natural Soil or Fill
as Receiving Soil (Sloped Restrictive Layer)

MLSS Category 3

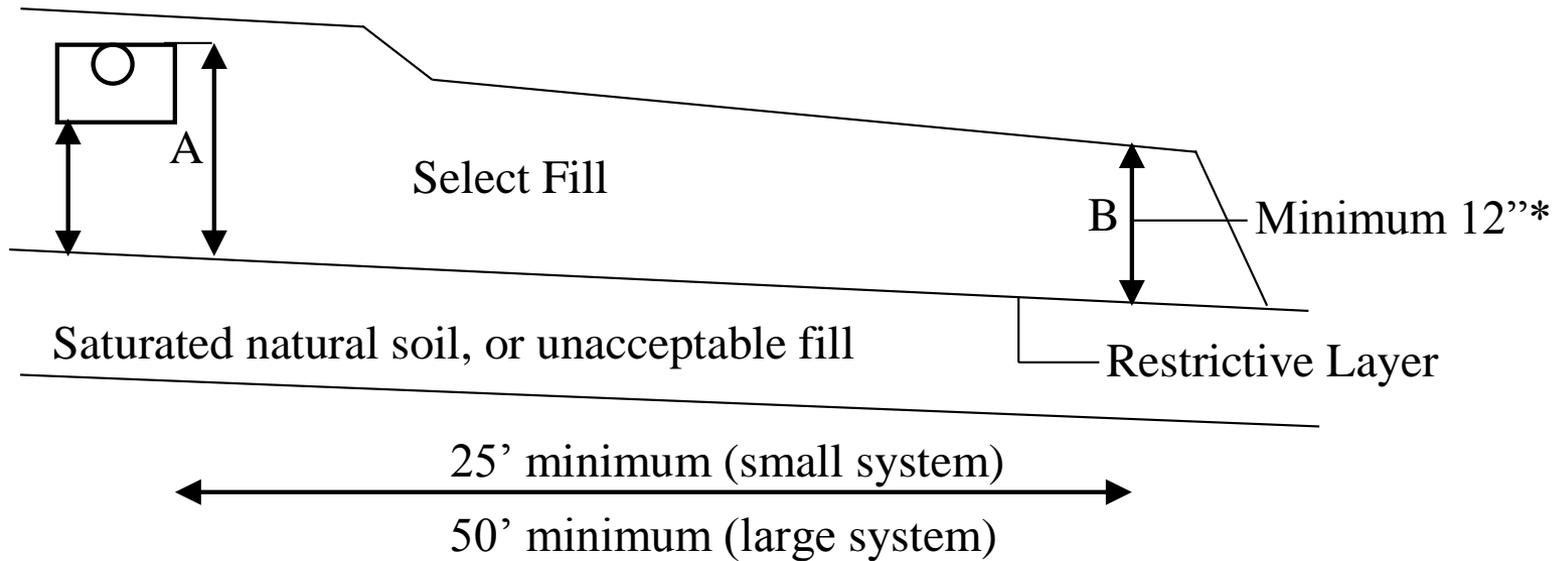
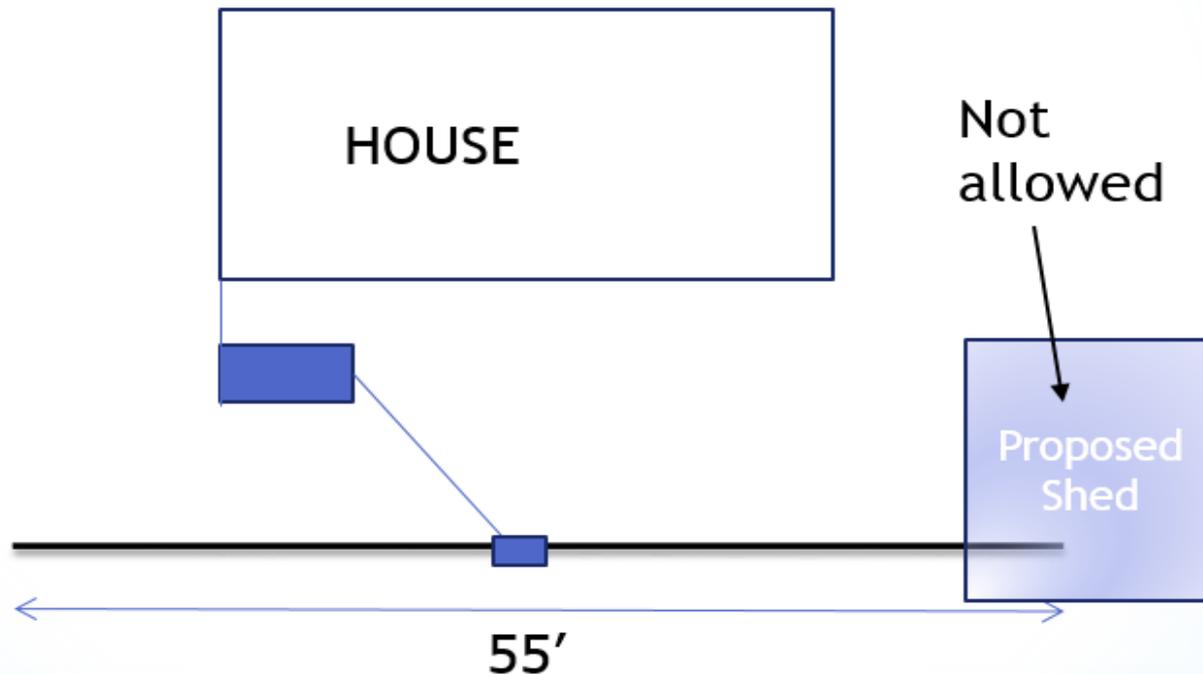


Diagram 6 – Select Fill Receiving Soil (Sloped Restrictive Layer)

*On flat groundwater table lots there shall be a minimum of 6" of receiving soil 25' around the perimeter of the leaching system.

NCR MLSS Requirement



If NCR MLSS based on 18" = 55 feet, then each row must be at least 55 feet in length if it can be installed on the property. Additional fill cannot be used to reduce the NCR MLSS and to allow for shed!

MLSS Flow Factor Chart

- * Revised the single-family residential building design flow language to note that the 75 GPD/bedroom design flow allocation starts with bedrooms beyond 3 rather than 4.
- * The cited FF for a 4-bedroom home is now: $525/300 = 1.75$; each bedroom beyond 3 increases by 0.25. Eliminated the 5-bedroom line from the chart.

Flow Factor

2015 FLOW FACTORS (FF)

3 Bedroom = $450/300$ 1.5

4 Bedroom = $600/300$ 2.0

5 Bedroom = $675/300$ 2.25 Increase FF by 0.25 for each additional bedroom

2018 FLOW FACTORS (FF)

3 Bedroom = $450/300$ 1.5

4 Bedroom = $525/300$ 1.75 Increase FF by 0.25 for each additional bedroom

MLSS Percolation Factor Chart

- * Combined the previous 2 percolation rate categories (Up to 5.0 Min/Inch, 5.1 to 10.0 Min/Inch) into a single category (Up to 10.0 Min/Inch) that has a PF of 1.0.
- * Lowered the PF for the remaining categories. 30.1 to 45.0 and 45.1 to 60 Min/Inch categories
- * Added allowances for further reductions of the PF if leaching system is entirely in select fill and bottom is ≥ 24 " above max GW



Perc Factor Table 2015 and 2018

2015

Percolation Rate	Percolation Factor (PF)
Up to 5.0 Minutes/Inch	1.0
5.1 to 10.0 Minutes/Inch	1.2
10.1 to 20.0 Minutes/Inch	1.5
20.1 to 30.0 Minutes/Inch	2.0
30.1 to 45.0 Minutes/Inch	3.0
45.1 to 60.0 Minutes/Inch	5.0

2018

Percolation Rate	Percolation Factor (PF)
Up to 10.0 Minutes/Inch	1.0
10.1 to 20.0 Minutes/Inch	1.25
20.1 to 30.0 Minutes/Inch	1.5
30.1 to 45.0 Minutes/Inch	3.0, or 2.0*
45.1 to 60.0 Minutes/Inch	5.0, or 3.0*

MLSS Example based on reductions

Site conditions: 4 bedroom house
perc= 10.1-20m/i

GW=18"
slope = 5%

Per 2009 TS

$$\begin{aligned} \text{MLSS} &= \text{HF} \times \text{FF} \times \text{PF} \\ &= 42 \times 2 \times 1.5 \\ &= 126 \text{ feet} \end{aligned}$$

Per 2018 TS

$$\begin{aligned} \text{MLSS} &= \text{HF} \times \text{FF} \times \text{PF} \text{ (new lot)} \\ &= 42 \times 1.75 \times 1.25 \\ &= 92 \text{ feet (27\% less)} \end{aligned}$$

If installing 12" high system,
RS depth -> $30 + 18/2 = 24$;

$$\begin{aligned} \text{MLSS} &= 34 \times 1.75 \times 1.25 \\ &= 75 \text{ feet (40\% less!)} \end{aligned}$$

Appendix B, C, and D Updates

- * **Appendix B**

- * Updated list to include the filters listed on the last revised Appendix B list dated July 8, 2015.

- * **Appendix C:**

- * No changes

- * **Appendix D:**

- * Updated list to include the non-concrete tanks listed on the last revised Appendix D list dated December 17, 2015.

Appendix E: WTW Discharges to SSDSs

- *New appendix that is referenced in Section X. The appendix cites authorized WTW sources, WTW discharge limits, existing SSDS requirements, and proprietary leaching system considerations.

Appendix E: WTW to SSDSs

- * Appendix E: Water Treatment Wastewater Discharges to SSDSs
- * Authorized WTW Sources
- * WTW shall only be from a calcite filter, granular activated carbon filter, or a Point of Use (POU) reverse osmosis unit.
- * Can't be discharged to a significantly undersized (<50%) leaching system.

Appendix E: WTW to SSDSs

- * WTW Discharge Limits
- * Single-family residential buildings: WTW discharge is less than 150 gallons per backwash cycle, and cannot exceed a daily average of 50 GPD.
- * Other buildings: WTW discharge is less than 150 gallons per backwash cycle or less than 10 percent of the building's SSDS daily design flow, whichever is greater. Discharges cannot exceed a daily average of 50 GPD or 2 percent of the buildings SSDS daily design.



Discharge to a single family residential SSDS

Max 150 gal/cycle and cannot exceed 50 GPD average.

- WTW system discharge 140 gal/cycle 2 times per week.

280 gal/7 days = 40 GPD daily average < 50 GPD
(OK)

- WTW system discharge 140 gal/cycle 3 times per week

420 gal/7 days = 60 GPD daily average > 50 GPD
(NO)

Discharge to a non-residential SSDS

Max 150 gal/cycle or less than 10% of Daily Design Flow; whichever is greater. AND discharge cannot exceed 50 GPD daily average or 2% of Daily Design Flow; whichever is greater.

Example: 6000 GPD commercial building and
WTW system discharges 300 gal/cycle.

- If WTW cycles 2 times per week, daily average $(600/7) = 85$ GPD average
 1. 10% of 6000 GPD = 600 GPD ($300 < 600$ OK)
 2. 2% of 6000 GPD = 120 GPD ($85 < 120$ OK)
- If WTW cycles 3 times per week, daily average $(900/7) = 128$ GPD average
 1. 10% of 6000 GPD = 600 GPD ($300 < 600$ OK)
 2. 2% of 6000 GPD = 120 GPD ($128 > 120$ NOT OK!)

Appendix E: WTW to SSDSs

- * Existing SSDS Requirements
- * Septic tanks must have two compartments, an effluent filter, and be properly sized for the daily design flow of the building.
- * Single compartment tanks can remain if receiving WTW from a POU reverse osmosis unit that discharges less than 50 GPD.
- * Septic tanks must have been cleaned and inspected within three years with no reported signs of malfunctioning.

Appendix E: WTW to SSDSs

- * Proprietary leaching system companies may not support the discharge of WTW into their SSDS products. Therefore the applicant should consult with the proprietary company to determine if use of their leaching system product is suitable with WTW discharge.

B104 Format Edits

- * Added notation that Public Act No. 17-146, Section 30 raised the jurisdictional design flow from 5,000 GPD to 7,500 GPD effective July 1, 2017.
- * Raised the jurisdictional design flow from 5,000 GPD to 7,500 GPD effective July 1, 2017.
- * Formatted to be consistent with the official B104 regulations with the exception of:
 - * References to the Commissioner of Health Services were changed to the Commissioner of Public Health to be consistent with the Technical Standards.

B104 Format Edits

- * Changed the licensed cleaner statutory reference in PHC Section 19-13-B104c (b) (2) (A) from Chapter 393a to Section 20-341. To be consistent with official regulations.
- * CGS Chapter 393a covers licensure of SSDS installers and cleaners, not Section 20-341 (needs to be corrected with regulation revision)
- * Technical Standards Publication since 1989 cited this chapter.

Disclaimer

*This presentation is not all inclusive and is intended to highlight the most significant revisions to the Technical Standards publication. Refer to the summary of revision for additional information.