

Pursuant to the authority vested in the Commissioner of Health by Section 201(1)(1) of the Public Health Law, Appendix 75-A of Part 75 of the Administrative Rules and Regulations contained in Chapter 11 of Title 10 (Health) of the Official Compilation of Codes, Rules and Regulations of the State of New York, is REPEALED in its entirety and replaced by a new Appendix 75-A, to read as follows:

APPENDIX 75-A

WASTEWATER TREATMENT STANDARDS - INDIVIDUAL HOUSEHOLD SYSTEMS

[Statutory Authority: Public Health Law, 201(1)(1)]

SECTION	SECTION
75-A.1 Introduction	75-A.7 Distribution devices
75-A.2 Regulation by other agencies	75-A.8 Subsurface treatment
75-A.3 Sewage flows	75-A.9 Alternative systems
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75-A.5 House or building sewer	75-A.11 New product/system design interim approval
75-A.6 Septic tanks	

Effective 12/1/90



**SECTION 75-A.1 Introduction.** (a) This appendix applies to on-site wastewater treatment systems serving residential properties and receiving sewage without the admixture of industrial wastes or other wastes, as defined in Environmental Conservation Law, Section 17-0701, in quantities of less than 1,000 gallons per day (gpd).

(b) Definitions - As used in this Appendix, the following words and terms shall have the indicated meaning:

- (1) Absorption Area - an area to which wastewater is distributed for infiltration to the soil.
- (2) Absorption Field - the area to which sewage is distributed for infiltration to the soil by means of a network of pipes.
- (3) Absorption Trench - a long narrow area which includes a pipe for the distribution of septic tank effluent.
- (4) Aerobic Treatment Unit - a system that provides for the biological decomposition of the organic portion of the wastewater by mechanical aeration of the wastewater.
- (5) Aggregate - washed gravel or crushed stone 3/4 - 1 1/2 inches in diameter.
- (6) Application Rate - the rate at which septic tank effluent is applied to a subsurface absorption area, for design purposes, expressed in gallons per day per square foot (gpd/sq. ft.).
- (7) Baffle - a flow deflecting device used in septic tanks and distribution boxes to inhibit the discharge of floating solids, reduce the amount of settleable solids that exit, and reduce the exit velocity of the wastewater.
- (8) Building Sewer - that part of the drainage system which extends from the end of the building drain and conveys wastewater to the sewage system or sewer.
- (9) Cleanout - an opening providing access to part of the sewage system.
- (10) Commissioner - the State Commissioner of Health.
- (11) Curtain Drain - a subsurface drain designed and constructed to control groundwater and surface water intrusion into the area of the sewage system.
- (12) Design Professional - a person licensed or registered in the State of New York and authorized by the State Education Law to design the systems described in the standards.
- (13) Distribution Device - a device used to uniformly distribute sewage to the absorption area.

(14) Distribution Line - the perforated pipe used to distribute wastewater to the absorption area.

(15) Drinking Water - water whose physical, chemical and biological quality is or is intended to be satisfactory for human consumption, food preparation or culinary purposes.

(16) Effective Grain Size - a measure of the diameter of soil particles, when compared to a theoretical material having an equal transmission constant. It is the dimensions of that mesh screen which will permit 10 percent of the sample to pass and will retain 90 percent.

(17) Gas Baffle - a device on the outlet of a septic tank which deflects gas bubbles away from the outlet and reduces the carry over of solid particles from the septic tank.

(18) Groundwater - subsurface water occupying the saturation zone from which wells and springs are fed.

(19) Heavy Equipment - all equipment which would result in the compaction of the design absorption area at a depth equivalent to the design depth of the distribution lines.

(20) Infiltration - the flow or movement of water into the interstices or pores of a soil through the soil interface.

(21) Invert - the floor, bottom, or lowest point of the inside cross section of a pipe.

(22) Local Health Department - a city, county, or part-county department of health or a State Department of Health District Office.

(23) Percolation - the movement of water through the pores of a soil or other porous medium following infiltration through the soil interface.

(24) Permeability - a measure of the rate of movement of liquid through soil.

(25) Scum - the wastewater material which is less dense than water and floats on top of the water.

(26) Sewage - the combination of human and household waste with water which is discharged to the home plumbing system including the waste from a flush toilet, bath, sink, lavatory, dishwashing or laundry machine, or the water-carried waste from any other fixture, equipment or machine.

(27) Stabilized Rate of Percolation - the rate corresponding to two consecutive equal or near equal percolation test results.

(28) Useable Soil - unless otherwise stated a soil with a percolation rate of faster than 60 min/in with a compatible soil classification.



(29) Wastewater - any water discharged from a house through a plumbing fixture to include, but not limited to, sewage and any water or waste from a device (e.g., water softener brine) which is produced in the house or property.

(30) Watercourse - a visible path through which surface water travels on a regular basis. Drainage areas which contain water only during and immediately after a rainstorm shall not be considered a watercourse.

(31) Watershed - an area of drainage for a body of water that serves as a source of drinking water and for which watershed rules and regulations have been adopted by the Commissioner.

(32) Well head area - the area surrounding a well which includes the cone of influence (where the drawdown of groundwater causes groundwater flow).

(33) Wetland - an area(s) of marshes or swamps which have been designated as such by the State Department of Environmental Conservation or other agency having jurisdiction. Marshes or swamps that have not been classified by an agency as a wetland shall not be treated for design purposes as a wetland.

**75-A.2 Regulation by Other Agencies.** (a) Where sewage treatment systems are to be located on the watersheds or well head area of public water supplies, the rules and regulations enacted by the State Department of Health for the protection of these supplies must be observed. Where systems are to be located on the watershed of any stream or body of water from which the City of New York obtains its water supply, the approval of the New York City Department of Environmental Protection, Division of Water Resources, must also be obtained.

(b) This appendix establishes the minimum standards acceptable in New York State. Other agencies, such as the Adirondack Park Agency or local health departments may establish more stringent standards. Where such standards have been established, or approval by another agency is required, the more stringent standard shall apply.

(c) A local health department may not adopt standards less stringent than the State standard unless a General Waiver has been issued by the State Commissioner of Health or his designated representative as provided in Part 75, of this Title, or the local health department is otherwise legally authorized to adopt such standards.

(d) When individual sewage systems overlay a drinking water aquifer, local health departments may establish population density limits and minimum lot sizes for residential development with on-site sewage treatment systems.

**75-A.3 Sewage Flows.** (a) Roof, footing, garage, cellar and surface water drainage must be excluded from the system. Water softener, water recharge and backwash wastes normally are not to be discharged to the system unless a separate subsurface discharge to an area 250 feet from wells or water courses is unavailable.

(b) Minimum design flows for various configurations of plumbing fixtures shall be as shown in Table 1.

TABLE 1

Plumbing Fixtures	Design Flows GPD Per Bedroom
Old standard fixtures (Pre-1979)	150
3.5+ gal per flush (GPF) toilet and 3.0+ gpm faucets/showerheads	
New standard fixtures	
3.5 gpf max. toilet and 3.0 gpm max. faucets/showerheads	130
Water-saving toilets 1 gpf or less with new standard fixtures (3.0 gpm max.)	90
Waterless toilet (e.g., compost) with new standard fixtures	75 (greywater only)

**75-A.4 Soil and Site Appraisal.** (a) Site Investigation.

(1) Areas lower than the 10 year flood level are unacceptable for on-site systems. Slopes greater than 15% are also unacceptable.

(2) There must be at least four feet of useable soil available above rock, unsuitable soil, and high seasonal groundwater for the installation of a conventional absorption field system (75-A.8(b)).

(3) Soils with very rapid percolation rates (faster than one minute per inch) are not suitable for subsurface absorption systems unless the site is modified by blending with a less permeable soil to reduce the infiltration rate throughout the area to be used.

(4) Subsurface treatment systems and components of the sewage system shall be separated from buildings, property lines, utilities and wells, to maintain system performance, permit repairs and reduce undesirable effects of underground sewage flow and dispersion. The minimum separation distances are shown in Figures 1 and 2. Reduced separation distances may be approved upon request when the site evaluation by a design professional or soil scientist clearly establishes there will be no adverse environmental impact and will not interfere with the satisfactory operation and maintenance of the system. Table 2 shows the acceptable minimum separation distances from the various components of treatment systems.

(5) Once the required infiltration area is determined by daily flow, percolation tests and soil evaluation, the required useable area of the property for subsurface treatment can be found. An additional useable area of 50 percent shall be set aside for future expansion or replacement whenever possible.



(b) Separation Requirements:

TABLE 2  
SEPARATION DISTANCES FROM WASTEWATER SYSTEM COMPONENTS

System Components	Well or Suction Line	To Stream, Lake, watercourse (b), or Wetland	Dwelling	Property Line
House sewer (watertight joints)	25' if cast iron pipe, 50' otherwise	25'	10'	10'
Septic tank	50'	50'	10'	10'
Effluent line to distribution box	50'	50'	10'	10'
Distribution box	100'	100'	20'	10'
Absorption field	100' (a)	100'	20'	10'
Seepage pit	150' (a)	100'	20'	10'
Dry well (roof and footing)	50'	25'	20'	10'
Raised or Mound system (c)	100' (a)	100'	20'	10'
Evapotranspiration-absorption system (c)	100' (a)	50'	20'	10'
Composter	50'	50'	20'	10'

NOTES:

(a) When sewage treatment systems are located in coarse gravel or upgrade and in the general path of drainage to a well, the closest part of the treatment system shall be at least 200 feet away from the well.

(b) Mean high water mark.

(c) For all systems involving the placement of fill material, separation distances are measured from the toe of slope of the fill.

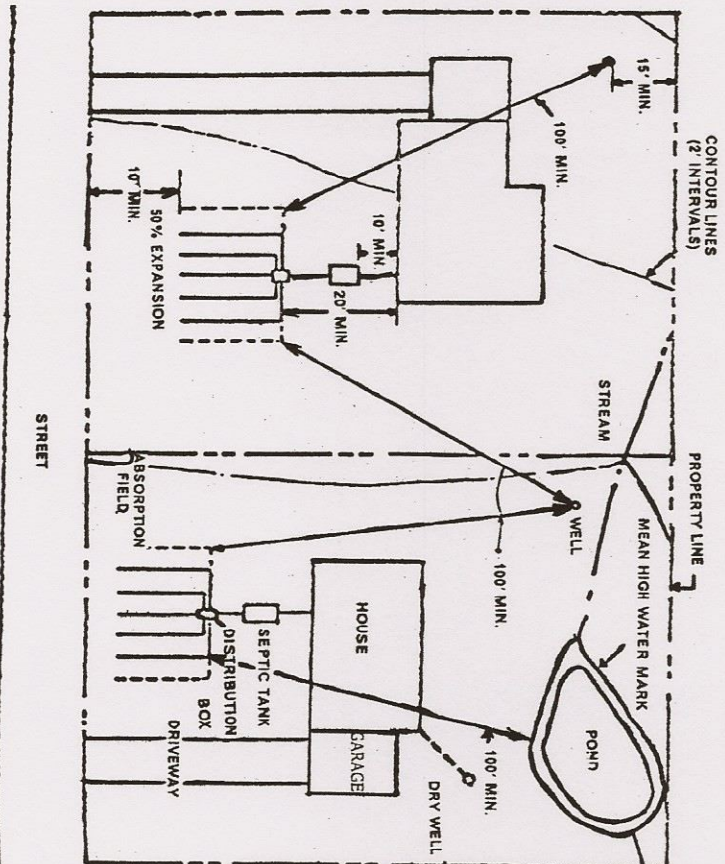


FIGURE 1  
ABSORPTION FIELD SEPARATION REQUIREMENTS



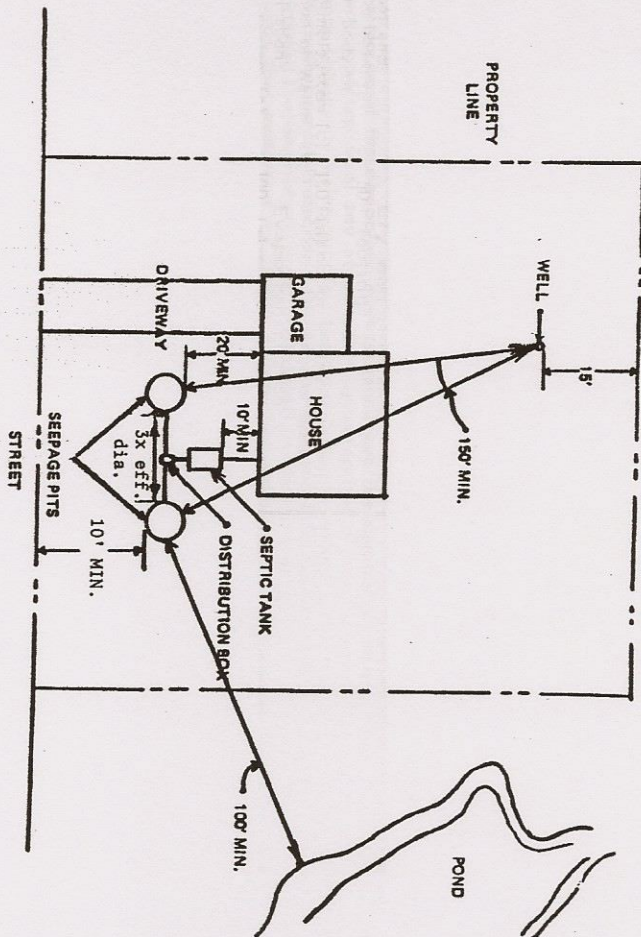


FIGURE 2  
SEEPAGE PIT SEPARATION REQUIREMENTS

(c) Soil Investigation. (1) The highest groundwater level shall be determined and shall include the depth to the seasonal high groundwater level and the type of water table -- perched, apparent, or artesian.

(2) If a subsurface treatment unit such as an absorption field is planned, at least four feet of useable soil shall be available over impermeable deposits (i.e., clay or bedrock). Highest groundwater level shall be at least two feet below the proposed trench bottom. Where systems are to be installed above drinking water aquifers, a greater separation distance to bedrock may be required by the local health department having jurisdiction. At least one test hole at least six feet deep shall be dug within or immediately adjacent to the proposed leaching area to insure that uniform soil and site conditions prevail. If observations reveal differing soil profiles, additional holes shall be dug and tested. These additional holes shall be spaced to indicate whether there is a sufficient area of useable soil to install the system. Treatment systems shall be designed to reflect the most severe conditions encountered. If the percolation tests results are inconsistent with field determined soil conditions, additional percolation tests must be conducted and the more restrictive tests must be the factor used for the system design.

(3) Test holes for seepage pits shall extend to at least mid-depth and full depth of the proposed pit bottom. At least three feet of useable soil shall exist between the pit bottom and rock or other impermeable soil layer and the highest groundwater level. This shall be confirmed by extending at least one deep test hole three feet below the deepest proposed pit.

(4) A local health department may accept or require other soil tests in lieu of the percolation test when such tests are conducted or observed by local health department personnel.

(d) Soil Percolation Test. (1) At least two percolation tests shall be made at the site of each proposed sewage treatment system.

(2) For seepage pits, one test shall be conducted at the bottom depth, and the other at half the pit depth. If different soil layers are encountered when digging the test pit, a percolation test shall be performed in each layer with the overall percolation rate being the weighted average of each test based upon the depth of each layer. The local health department having jurisdiction may adopt an alternative procedure for determining the permeability of soil for the installation of seepage pits.

(3) A percolation test is only an indicator of soil permeability and must be consistent with the soil classification of the site as determined from the test holes.

75-A.5 House Sewer. (a) House sewers are laid on firm foundation at a minimum grade of one-quarter inch per foot preferably without bends. At least one cleanout with a properly fitted plug is to be provided. The house sewer shall allow for venting of gases from the sewage system.

(b) House sewer construction including materials shall comply with the applicable requirements of the State Uniform Fire Prevention and Building Code contained in 9NYCRR, Parts 903 through 907, inclusive, and Part 1280.

(c) A minimum horizontal separation of 10 feet should exist between the house sewer and any water line. Where lines must cross, the water service



line shall be at least 12 inches above the house sewer. If a water line must pass below the house sewer, the vertical separation must be at least 18 inches.

(d) Suction waterlines shall never cross under house sewers or any other component of the sewage system.

**75-A.6 Septic Tanks.** (a) General information.

(1) Septic tank capacities shall be based upon the number of household bedrooms. An expansion attic shall be considered as an additional bedroom. Table 3 specifies minimum septic tank capacities and minimum liquid surface areas.

**TABLE 3**

**MINIMUM SEPTIC TANK CAPACITIES**

Number of Bedrooms	Minimum Tank Capacity (gallons)	Minimum Liquid Surface Area (sq. ft.)
1, 2, 3	1,000	27
4	1,250	34
5	1,500	40
6	1,750	47

**NOTE:** Tank size requirements for more than six bedrooms shall be calculated by adding 250 gallons and seven square feet of surface area for each additional bedroom. A garbage grinder shall be considered equivalent to an additional bedroom for determining tank size.

(2) Septic tank covers shall always be accessible. Where manholes are more than 12 inches below final grade, an extension collar shall be provided over each opening. Extension collars shall not be brought flush with the ground surface unless the cover can be locked to prevent tampering. Driveways or other facilities shall not be constructed above septic tanks unless specially designed and reinforced to safely carry the load imposed.

(b) Design and Installation. (1) General Requirements. The following applies to all septic tanks regardless of material.

(i) A minimum liquid depth of 30 inches. The maximum depth for determining the allowable design volume of a tank shall be 60 inches. Deeper tanks provide extra sludge storage, but no credit shall be given toward design volume.

(ii) The minimum distance between the inlet and outlet shall be six feet. All tanks shall meet the minimum surface area requirement for the specific design volume specified in Table 3. The effective length of rectangular tanks should not be less than two nor greater than four times the effective width.

(iii) Tanks must be watertight, constructed of durable material not subject to corrosion, decay, frost damage, or cracking. After installation, all septic tanks shall be able to support at least 300 pounds per square foot (psf).

(iv) Tanks with a liquid depth of 48 inches or more shall have a top opening with a minimum of 20 inches in the shortest dimension to allow entry into the tank. Tanks with a liquid depth less than 48 inches shall have a top opening that is at least 12 inches in the shortest dimension.

(v) Tanks shall have inlet and outlet baffles, sanitary tees or other devices to prevent the passage of floating solids and to minimize disturbance of settled sludge and floating scum by sewage entering and leaving the tank. Outlet designs such as gas deflection baffles are strongly recommended in all tanks. Inlet and outlet baffles shall extend a minimum of 12 inches and 14 inches respectively, below the liquid level in tanks with a liquid depth of less than 40 inches, and 16 and 18 inches respectively, in tanks with a liquid depth of 40 inches or greater. The distance between the outlet baffle and the outlet shall not exceed six inches. Baffles shall be constructed of a durable material not subject to corrosion, decay or cracking.

(vi) There shall be a minimum of one inch clearance between the underside of the top of the tank and the top of all baffles, partition and/or tees to permit venting of tank gases. Multi-chamber and multi-tank systems shall also be designed to permit the venting of tank gases.

(vii) Tanks shall be placed on at least a three inch bed of sand or pea gravel. This will provide for proper leveling and bearing. Additional instructions provided by the manufacturer shall also be followed.

(viii) There shall be a minimum drop in elevation of two inches between the inverts of the inlet and outlet pipes.

(ix) Garbage grinders. An additional 250 gallons of capacity and seven square feet of surface area is required when a garbage grinder can reasonably be expected at the time of construction or in the future. A gas deflection baffle or other acceptable outlet modification, and a dual compartment tank or two tanks in series must also be provided.

(2) Multi-compartment tanks or tanks in series.

(i) Dual compartments are recommended for all tanks and shall be required on all tanks with an interior length of ten feet or more.

(ii) The first compartment or tank (inlet side) shall account for 60 - 75% of the required total design volume.

(iii) The baffle separating the compartments shall extend from the bottom of the tank to at least six inches above the invert of the outlet pipe.

(iv) Compartments shall be connected by a four inch vertical slot at least 18 inches in width, a six inch elbow, or two 4-inch elbows



**TABLE 4A**  
**REQUIRED LENGTH OF ABSORPTION TRENCH**  
**(based upon 2 ft wide trench)**

PERCOLATION RATE	Flow Rate (Gals/Day)										
	min / inch	2 Bdrms		3 Bdrms		4 Bdrms		5 Bdrms		6 Bdrms	
		260	300	390	450	520	600	650	750	780	900
	1 – 5	108	125	162	187	216	250	270	312	325	374
	6 – 7	130	150	195	225	260	300	325	375	390	450
	8 – 10	145	167	217	250	290	333	360	417	433	500
	11 – 15	162	188	244	281	325	375	406	469	488	563
	16 – 20	186	214	279	321	372	429	464	536	557	643
	21 – 30	217	250	325	375	433	500	542	625	650	750
31 – 45	260	300	390	450	520	600	650	750	780	900	
46 – 60	290	333	433	500	578	667	722	833	867	1000*	
Dosing Not Required					Dosing or Alternate Design Required						

\*Greater than 1000 ft of trench requires Alternate Dosing

TABLE 4B APPLICATION RATES for NON-STANDARD DESIGN FLOWS	
PERCOLATION RATE minutes/inch	APPLICATION RATE gal/day/sq ft
1 - 5	1.2
6 - 7	1.00
8 - 10	0.90
11 - 15	0.80
16 - 20	0.70
21 - 30	0.60
31 - 45	0.50
46 - 60	0.45
Soil with a percolation of less than 1 min/in is unsuitable for a conventional system	
Required Area (sq ft) = Flow Rate(GPD)/Application Rate(GPD/sq ft)	
Required Absorption Field Length = Required Area(sq ft) / 2 ft (trench width)	



inch layer of hay or straw is acceptable. Polyethylene and treated building paper are relatively impervious and shall not be used.

(4) Construction. (i) Trench locations and depths should be marked by stakes before the trenches are excavated. The natural surface shall not be significantly disturbed. If the site is regraded or similarly disturbed, the soil shall be allowed to stabilize and new percolation tests conducted.

(ii) The trench depth shall be as shallow as possible, but not less than 18 inches. At least six inches of aggregate is placed below the distribution line and two inches above the line. The earth cover over the aggregate should not exceed 12 inches in order to enhance natural aeration and nitrogen uptake by plant life. Trenches shall be excavated to design depth with bottoms practically level. Heavy equipment shall be kept away from the field because the weight may permanently alter soil characteristics due to compaction, cause trench cave-ins, and/or misalign and break pipe.

(iii) Trench bottoms are to be raked and immediately covered with at least six inches of aggregate.

(iv) Any smeared surfaces on the trench walls are to be raked. Distributor lines are carefully placed on the aggregate and covered with aggregate to a depth of at least two inches over the top of the pipe. Additional aggregate may be required to bring the top of the aggregate to within six to 12 inches of the surface.

(v) In gravity distribution systems, the pipe shall be carefully sloped at between 1/16 inch and 1/32 inch per foot. Grades shall be determined by an engineer's level, transit or carpenter's level.

(vi) After the upper aggregate is placed, the geotextile, untreated building paper, hay or straw is to be immediately installed and the trench backfilled with native soil. If the trenches cannot be immediately backfilled, they should be temporarily covered with an impervious material such as treated building paper to prevent sidewall collapse and sitation into the aggregate.

(vii) The earth backfill is to be mounded slightly above the original ground level to allow for settling and after settlement the entire area should be graded without the use of heavy equipment and seeded with grass.

(c) Gravelless Absorption Systems. (1) In one type of system, a large diameter corrugated plastic pipe (eight inches or greater in diameter) surrounded by a hydrophilic geotextile is installed in an excavated trench using only the original soil as backfill. Other systems utilizing products such as galleries, flow diffusers or leaching chambers can be installed without aggregate backfill. One linear foot of these products shall be equivalent to one linear foot of conventional (24 inch wide) absorption trench.

(2) Site requirements. These systems shall be used on sites that have been classified as having a design percolation rate of one to 45 minutes per inch, and meet the vertical and horizontal separation distances in Table 2.

(3) Design criteria. The local health department having jurisdiction shall be contacted prior to construction regarding the acceptability of specific products for use as a gravelless distribution system.

(4) Construction. Gravelless distribution systems shall be installed in conformance with the manufacturer's instructions because of the proprietary design of some products.

(d) Deep Absorption Trenches. (1) Site Requirements. These are used on sites where an useable layer of soil is overlaid by three to five feet of impermeable soil.

(2) Design Criteria. (i) There shall be at least four feet of useable soil beneath the impermeable layer.

(ii) The required length of absorption trench is determined from Table 4A based upon percolation tests conducted in the underlying soil.

(3) Construction. (i) Trenches are excavated at least two feet into the useable layer and backfilled with aggregate or coarse sandy material containing a low percentage of fines more permeable than the underlying material to a level 30 inches below the original ground surface.

(ii) An absorption trench system as described in Section 75-A.8(b) is constructed in the upper 30 inches of the excavation.

(e) Shallow Absorption Trenches. (1) Site Requirements. These systems are used where there is at least two feet but less than four feet of useable soil and/or separation to boundary conditions.

(2) Design criteria. (i) A minimum two foot separation must be maintained between the bottom of each trench and all boundary conditions.

(ii) The bottom of each trench must not be above the original ground surface.

(iii) Material of the same permeability as the underlying original soil shall be used as fill material. The depth of the fill shall not be greater than 30 inches above the original ground elevation.

(iv) An absorption trench system as described in Section 75-A.8(b) is designed using the percolation of the underlying original soil.

(3) Construction. (i) Heavy equipment shall be kept out of the absorption area.

(ii) Fill material is carefully placed within the absorption area.

(iii) The edge of the fill material shall be tapered at a slope of no greater than one vertical to three horizontal. On sloped sites a diversion ditch shall be placed on the uphill side to prevent runoff from entering the fill.

(iv) The absorption trench system is constructed in the fill material, extending into the existing natural soil.



(f) Cut and Fill Systems. (1) A cut and fill system is an absorption trench system installed on sites where impermeable soil overlies a permeable soil.

(2) Site Requirements. Cut and fill systems may be used where all the following conditions are found:

(i) A soil with a percolation rate slower than 60 minutes per inch, such as clay or clay loam, overlies a useable soil with a percolation rate faster than 60 minutes per inch;

(ii) At least three feet of useable soil is available beneath the tight soil;

(iii) All minimum vertical and horizontal separation distances can be maintained as described in Table 2.

(3) Design criteria. (i) It shall provide for the removal of the overlying unusable soil and replacement by soil having a percolation rate comparable with the underlying soil;

(ii) An absorption trench system is designed as described in Section 75-A.8(b).

(iii) The required length of absorption trench is based upon the percolation of the underlying soil or the fill material, whichever has the slower percolation (lower permeability).

(4) Construction. (i) The area excavated and filled must provide at least a five foot buffer in each direction beyond the trenches.

(ii) The material placed above the trenches shall have a percolation rate faster than 60 minutes per inch.

(iii) Original surface material shall not be used as backfill above the trenches.

(iv) The surface area of the fill system must be mounded and graded to enhance the runoff of rainwater from the system and seeded to grass.

(g) Absorption Bed Systems. (1) General. An absorption bed system operates on a principal similar to the absorption trench except that several laterals, rather than just one, are installed in a single excavation. This reduces the effective sidewall infiltration area per linear foot of lateral or leachline.

(2) Site Requirements. (i) A bed system may be built in soils with a percolation rate between one and 30 minutes per inch. A bed shall not be built where the soil evaluation indicates silty loam, clay loam, or clay.

(ii) Slope of the site shall not exceed eight percent.

(iii) Bed systems are more practical on sites that are long and narrow with a minimal slope.

(iv) All vertical and horizontal separation distance requirements shall be met.

(3) Design Criteria. (i) Pressure distribution is required for the installation of an absorption bed system. The local health department having jurisdiction may allow the use of siphon dosing on specific sites.

(ii) The maximum width of the bed shall be 20 feet. The maximum length of each lateral from a pressure manifold shall be 100 feet. Utilizing a center manifold system, a bed may then have a maximum length of 200 feet. Laterals for siphon dosing systems in beds are limited to 75 feet.

(iii) The depth of the bed shall be between 18 and 30 inches below original ground level.

(iv) Laterals shall be spaced five (5) feet apart. Two and one-half feet (2 1/2') must be provided between the laterals and the sidewalls. In the maximum width of 20 feet, only four laterals may be installed.

(v) Using pressure distribution with a center manifold, a bed system shall have maximum dimensions of 205 feet by 20 feet.

(vi) The required bed bottom area shall be calculated from the application rates shown in Table 5.

TABLE 5

ABSORPTION BEDS -- REQUIRED BOTTOM AREA

Percolation Rate Minutes/Inch	Application Rate Gallons/Day/Sq. ft.
1 - 5	0.95
6 - 7	0.80
8 - 10	0.70
11 - 15	0.60
16 - 20	0.55
21 - 30	0.45
30+	Not Acceptable

(4) Construction. (i) Heavy construction equipment shall be kept outside the proposed bottom area of the bed.

(ii) The required bed bottom area is excavated as level as practical. The bottom and sides of the excavation are hand raked to reduce soil smearing.



(iii) After excavation, a six inch layer of aggregate is placed across the bottom of the bed.

(iv) The laterals are laid level on the aggregate and covered with aggregate to a level two inches above the top of the pipe.

(v) The entire bed area is covered with a permeable geotextile. Untreated building paper or a four inch layer of loose hay or straw may be substituted if a permeable geotextile is unavailable.

(h) Seepage Pits. (1) General. A seepage pit, sometimes called a leaching pit, leaching pool, or incorrectly a cesspool, is a covered pit with an open-jointed or perforated lining through which septic tank effluent seeps into the surrounding soil.

(2) Site Requirements. (i) If soil and site conditions are adequate for absorption trenches, seepage pits shall not be used.

(ii) A minimum three foot vertical separation must exist between the bottom of any pit and the high groundwater level, bedrock, or other impervious layer.

(3) Design Criteria. (i) The required "effective seepage pit area" is obtained from Tables 6 and 7.

(ii) No allowance for infiltration area is made for the bottom area of a pit or the surface area of impervious soil layers (percolation rate slower than 60 minutes/inch).

(iii) The effective diameter of a pit includes the diameter of the lining plus the added diameter provided by the annular ring of aggregate. Any area surrounding the liner with rock smaller than 2 1/2 inches in size shall not be included as part of the effective diameter.

(iv) Effective depth is measured from the invert of the seepage pit inlet to the floor of the pit, with the thickness of impervious layers deducted.

TABLE 6

SEEPAGE PITS - REQUIRED ABSORPTIVE AREA  
(IN SQUARE FEET) FOR HOUSEHOLD SYSTEMS

TABLE 7

SEEPAGE PITS (CYLINDRICAL) - DIMENSIONS FOR  
REQUIRED ABSORPTIVE AREA (IN SQUARE FEET)

Table 6  
SEEPAGE PITS - REQUIRED ABSORPTIVE AREA (IN SQUARE FEET)  
FOR HOUSEHOLD SYSTEMS

PERCOLATION RATE MIN/IN	SEWAGE APPLICATION GPD/SQ. FT.	300 GPD 2 BR	450 GPD 3 BR	600 GPD 4 BR	750 GPD 5 BR	900 GPD 6 BR
1.5	1.20	250	375	500	625	750
6.7	1.00	300	450	600	750	900
8.10	0.90	333	500	667	833	1000
11.15	0.80	375	563	750	938	1125
16.20	0.70	429	643	857	1071	1286
21.30	0.60	500	750	1000	1250	1500
31.45	0.50	600	900	1200	1500	1800
46.60	0.45	667	1000	1333	1667	2000

UNSUITABLE . . . . . USE SPECIAL DESIGN

Table 7  
SEEPAGE PITS (CYLINDRICAL) - DIMENSIONS FOR REQUIRED ABSORPTIVE AREA  
(IN SQUARE FEET)

DIAMETER OF SEEPAGE PIT (FEET)	EFFECTIVE STRATA DEPTH BELOW FLOW LINE (BELOW INLET)									
	1 FOOT	2 FEET	3 FEET	4 FEET	5 FEET	6 FEET	7 FEET	8 FEET	9 FEET	10 FEET
3	9.4	19	28	38	47	57	66	75	85	94
4	12.6	25	38	50	63	75	88	101	113	126
5	15.7	31	47	63	79	94	110	126	141	157
6	18.8	38	57	75	94	113	132	151	170	188
7	22.0	44	66	88	110	132	154	176	198	220
8	25.1	50	75	101	126	151	176	201	226	251
9	28.3	57	85	113	141	170	198	226	254	283
10	31.4	63	94	126	157	188	220	251	283	314
11	34.6	69	104	138	173	207	242	276	311	346
12	37.7	75	113	151	188	226	264	302	339	377

Absorptive Area for Cylinder =  $\pi D \cdot h$  ( $\pi = 3.14$ )  
 Absorptive Area for Rectangle =  $(2 \pi + 21) h$   
 h - effective depth (invert of inlet to bottom of seepage pit)  
 D - outside diameter in ft.  
 W - outside width in ft.  
 L - outside length in ft.



(v) Linings may be precast concrete, cast-in-place concrete, or built in place with unmortared hollow cinder or concrete blocks. Concrete shall have a minimum compressive strength of 2,500 psi and 3,000 psi is recommended. Material with comparable structural strength, determined in accordance with commonly accepted sewage construction standards, principles or practices, may be allowed on an individual basis to prevent unreasonable hardship, provided public health is not prejudiced.

(vi) The separation between the outside edges of seepage pits shall be three times the effective diameter of the largest pit. This separation is measured as the undisturbed soil between pit excavations.

(vii) Pits shall be designed with sufficient structural stability to withstand lateral soil forces as well as vertical loads.

(4) Construction. (i) Laterals leading to each seepage pit must be at least four inches in diameter with a minimum slope of 1/8 inch per foot.

(ii) Seepage pits shall not be connected in series. A distribution box shall be required where more than one seepage pit is installed.

(iii) The pit excavation is to be raked to minimize sidewall smearing that may occur and reduce infiltration capacity. If groundwater is encountered, the pit shall be backfilled with the original soil to a level at least three feet higher than maximum groundwater and adjustments made in the pit dimensions.

(iv) The linings are placed upon a concrete block, poured concrete, or precast footing and surrounded by a six inch minimum annular ring of large aggregate (2 1/2 - 4 inches in size).

(v) The rock is covered to prevent soil from filling the void spaces. Building paper, a four inch thick layer of hay or straw may be used.

(vi) The seepage pit cover shall be structurally sound and capable of supporting 300 pounds per square foot at the weakest point. Covers may be precast concrete or cast-in-place and shall be reinforced. A manhole with an opening of at least 20 inches in the shortest dimension shall be provided.

#### 75-A.9 Alternative Systems. (a) General Information.

(1) Alternative systems described in this subsection must be designed and submitted by a design professional. The design professional shall certify to the local health department that the site/soil evaluation and the plans meet the minimum requirements of these standards. Construction must be supervised by the design professional, and certification of construction in conformance with the approved plans shall be provided by the design professional to the local health department. Any of these requirements may be waived by a local health department which provides that particular service(s).

(2) Alternative designs not shown herein may be considered by the local health department on a limited experimental basis or for replacement systems on difficult sites, but are also subject to the requirements of Section 75-A.9(1). Performance monitoring of these systems should be required.

(b) Raised System. (1) A raised system is an absorption trench system constructed in fill material with acceptable permeability placed above the natural soil on a building lot.

(2) Site Requirements. A raised system may be used where all the following conditions are found:

(i) There is at least one foot of original soil with a faster than 60 minutes percolation rate, above any impermeable soil layer or bedrock, but not more than two feet.

(ii) The maximum high groundwater level must be at least one foot below the original ground surface.

(iii) Slopes shall not exceed 15%.

(iv) All minimum vertical and horizontal separation distances can be maintained as described in Table 2.

(3) Design Criteria. (i) Percolation tests shall be conducted in the fill material at the borrow pit and after placement and settling at the construction site. The slower percolation rate of these tests shall be used for design purposes.

(ii) The total area beneath the absorption trenches, extending 2.5 feet in all directions from the outer edge of all trenches, is defined as the basal area. The minimum size of the basal area of the raised bed shall be calculated based upon 0.2 gpd/sq.ft.

(iii) An absorption trench system as described in Section 75-A.8(b) is designed using the percolation rate of the fill material. The use of slowly permeable soils for the fill material will result in a trench system that will have a basal area larger than the minimum area calculated in (ii) above.

(iv) Sufficient soil with a percolation rate of between 5 - 30 min/in is required to maintain at least two feet separation between the proposed bottom of the trenches and any boundary condition such as groundwater, bedrock, clay or other relatively impermeable soil or formation.

(v) The edge of the fill material shall be tapered at a slope of no greater than one vertical to three horizontal with a minimum 20 foot taper.

(vi) Horizontal separation distances shall be measured from the outside edge of the taper.

(vii) The system shall incorporate siphon dosing or pressure distribution except where the following conditions are met:



(aa) The local health department has a program incorporating site evaluation, system design approval, and construction inspection/certification.

(bb) A minimum of two feet of fill material with a percolation rate of 5 - 30 min/in shall be placed between the bottom of the trenches and the existing ground.

(viii) Curtain drains may be used to intercept and carry underground water away where high groundwater levels exist. Curtain drains shall be upslope from the system and at least 20 feet from the toe of slope of the fill material.

(4) Construction. (i) Heavy construction equipment shall not be allowed within the area of the system. The underlying soil shall be undisturbed although the surface may be plowed with at least a double bottomed blade/furrow plow and the furrow turned upslope.

(ii) A system shall not be built in unstabilized fill material. The fill material shall be allowed to settle naturally for a period of at least six months to include one freeze-thaw cycle.

(iii) The absorption trenches shall be constructed in the fill material.

(iv) The entire surface of the system including the tapers shall be covered with a minimum of six inches of topsoil, mounded to enhance the runoff of rainwater from the system and seeded to grass.

(v) On sloping sites a diversion ditch or curtain drain shall be installed uphill to prevent surface water runoff from reaching the bed area.

(c) Mounds. (1) General. A mound system is a soil absorption system that is elevated above the natural soil surface in a suitable fill material. It is a variation of the raised bed utilizing sandy fill material but not requiring a stabilization period prior to the construction of the absorption area. On sites with permeable soils of insufficient depth to groundwater or creviced or porous bedrock, the fill material in the mound provides the necessary treatment of wastewater. The overall size of the mound system will normally be substantially smaller than a raised bed.

(2) Site Requirements. A mound system may be used where all the following conditions are found:

(i) The maximum high groundwater level must be at least one foot below the original ground surface.

(ii) Bedrock shall be at least two feet below the natural ground surface.

(iii) The percolation rate of the naturally occurring soil shall be faster than 120 minutes/inch.

(iv) The natural ground slopes shall not exceed 12%.

(v) All minimum horizontal separation distances can be maintained as described in Table 2.

(3) Design Criteria. (i) The designer shall consult with the health unit having jurisdiction regarding the method for detailing the hydraulic design.

(ii) The basal area of a mound system is defined differently than a raised bed. The basal area for a system on level ground includes all the area beneath the absorption trenches or bed and the area under the tapers. On a sloping site, the basal area includes only the area under the absorption trenches/bed and the lower or downhill taper. The basal area is designed upon the percolation of the naturally occurring soil. Where the percolation rate is 60 min/in or faster, refer to Table 4B. For soils of 61 to 120 min/in, a rate of 0.2 gpd/sq. ft. shall be used for determining the minimum basal area required.

(iii) Percolation tests for the fill material shall be conducted at the borrow pit. Only soils with a percolation rate between five and 30 minutes per inch shall be used for the fill material. Sands with greater than 10% by weight finer than 0.05 mm material must be avoided. At least 25% of the material by weight shall be in the range of 0.50 mm to 2.0 mm. Less than 15% of the material by weight shall be larger than a half-inch sieve. A sieve analysis may be necessary to verify this requirement. The required absorption area is based upon the percolation rate of the fill material as determined from Table 4B.

(iv) The system shall be designed to run parallel with the contours of the site. The width of the system (up and down the slope) shall be kept to a minimum, but in no case shall the absorption area be wider than 20 feet. In a distribution network using a center pressure manifold, distribution lines shall have a maximum total length of 200 feet. In a network using an end manifold, distribution lines shall have a maximum length of 100 feet.

(v) Mound dimensions shall meet or exceed those required by the health unit having jurisdiction.

(vi) A pressure distribution network shall be required.

(vii) A dual chamber septic tank or two tanks in series in addition to the dosing tank shall be provided. A gas baffle or other outlet modification that enhances solids retention is recommended.

(4) Construction. (i) Heavy construction equipment shall not be allowed within the basal area and area downslope of the system which will act as the dispersal area for the mound.

(ii) The vegetation shall not be scraped away, roto-tilled, or compacted. Excess vegetation shall be removed with trees cut at the ground surface but stumps left in place. The area shall be plowed to a depth of seven or eight inches with a double bottomed blade/furrow plow and the furrow turned upslope.

(iii) The fill material is placed from the upslope side of the system to the full depth required in the design and shall extend to the edge



of the basal area at a slope not to exceed one vertical to three horizontal.

(iv) The absorption area is then formed within the mound. A minimum of six inches of aggregate shall be placed beneath the distribution lines.

(v) The pressure distribution lines are placed parallel to the contours of the slope and a minimum of two inches of aggregate is placed above the lines.

(vi) A permeable geotextile is placed over the entire absorption area to prevent the infiltration of fines into the aggregate.

(vii) On sloping sites a diversion ditch or curtain drain shall be installed uphill to prevent surface water runoff from reaching the absorption area.

(viii) A minimum of six inches of finer materials such as clayey loam is placed over the top of the absorption area, and the entire mound including the tapers is then covered with six inches of top soil and seeded to grass.

(d) Intermittent Sand Filters. (1) General. In a sand filter, the septic tank or aerobic unit effluent is intermittently spread across the surface of a bed of sand through a network of distribution lines. Collector pipes beneath the filter collect treated effluent after it has passed through the sand.

(2) Site Requirements. (i) All horizontal separation distances shown in Table 2 must be met and the minimum required vertical separation to groundwater must be met from the bottom of the collector pipes.

(ii) An environmental assessment determines that the development of the site with a sand filter is consistent with the overall development of the area and will cause no adverse environmental impacts.

(3) Design Criteria. (i) Septic tanks installed before a sand filter shall have dual compartments or two tanks in series. The use of a gas baffle on the outlet is strongly recommended.

(ii) The direct discharge of sand filter effluent to the ground surface or to a body of water shall not be approved by the Department of Health or a local health department acting as its agent.

(iii) Distributor lines shall be placed at three foot center lines as level as possible.

(iv) Collector pipes shall be centered between distribution lines at a slope of 1/16 to 1/8 inch per foot.

(v) Effluent shall be distributed to the sand filter by means of pressure distribution or siphon dosing. Pressure distribution lines shall be a minimum of 1.5 inches and a maximum of three inches in diameter. If siphon dosing is allowed, the distributor pipe(s) shall have a diameter of three to four inches.

(vi) The distribution system shall be designed to dose the filter at least three times daily based upon the design flow rates with each dose.

(vii) The sand media shall have an effective grain size of 0.25 to 1.0 mm. If nitrification is not required by the local health department, the effective grain size shall be in the range of 0.5 to 1.00 mm. All sand shall pass a 1/4 inch sieve.

(viii) The uniformity coefficient of the sand shall not exceed 4.0.

(ix) The maximum allowed daily sand loading rate shall be 1.15 gal/day/sq. ft.

(x) Effluent from the collector pipes shall be discharged to an absorption bed located below the original ground level or a mound that is built up above the original ground surface. The size of the bed/mound shall be based upon the estimated quantity of effluent reaching the collector pipe and an application rate of 1.2 gal/day/sq. ft. regardless of the underlying soil percolation. The fill material for the bed/mound shall consist of medium sand with a percolation rate, tested at the borrow pit, not faster than five minutes per inch. All minimum vertical and horizontal separation distances shall be maintained as described in Section 75-A.4.

(4) Construction. (i) After excavation, the collector pipe shall be placed in 3/4 inches to 1 1/2 inches size aggregate.

(ii) There shall be a minimum of four inches of this aggregate beneath the entire system above the collectors.

(iii) A three inch layer of crushed stone or clean gravel with a size of 1/8 inches to 1/4 inches is carefully placed on top of the aggregate.

(iv) A minimum of 24 inches of the approved sand is placed above the crushed stone or gravel.

(v) The distributor pipes are placed in a layer of aggregate that provides a minimum of four inches across the entire surface of the filter and at least two inches above and below the distributor pipes.

(vi) A permeable geotextile, two inches of hay or straw, or untreated building paper is placed over the entire bed area to prevent the infiltration of fines into the filter.

(vii) The entire surface of the filter shall be covered with six to 12 inches of topsoil, mounded to enhance the runoff of rainwater from the system and seeded to grass.

(viii) The bed/mound following the filter shall be covered with six to 12 inches of topsoil and seeded to grass.



(e) Evaporation-Transpiration (ET) and Evapo-Transpiration Absorption (ETA) Systems.

(1) General. ET systems rely on the upward movement of moisture through the soil, surface vegetation and into the air rather than absorption into the soil. ETA systems also use the absorptive capabilities of the soil and are less dependent on evaporation and transpiration.

(2) Site Requirements. (i) All systems previously discussed, except intermittent sand filters, have been determined to be unacceptable for the planned building site.

(ii) An expansion area equal to or greater than 50% of the required basal area shall be available on the site.

(iii) All minimum vertical and horizontal separation distances can be maintained as described in Table 2 from both the edges of the basal area and the designated expansion area.

(iv) An environmental assessment determines that the development of the site with this system is consistent with the overall development of the area and will cause no adverse environmental impacts.

(3) Design Criteria. (i) The designer must consider all of the items listed below and be able to document from reliable sources (i.e., National Weather Service, Soil Conservation Service) the parameters used and show that the net outflow from the system exceeds the inflow without the exposure of sewage or partially treated sewage on the surface of the ground:

Total rainfall and snowfall.

The percentage of the rainfall and snowfall that will infiltrate into the soil and the percentage that can be expected to runoff the system.

The annual land evaporation rate of the area.

The vertical rise of water than can be expected in the soil due to capillary action.

The amount of transpiration expected from the surface vegetation.

The permeability of the underlying soil and the impact the system will have on the groundwater level.

(ii) The design must provide for a trench depth that is not greater than 30 inches below the surface.

(iii) Pressure distribution of effluent throughout the system is required.

75-A.10 Other Systems. (a) Holding Tanks. The use of holding tanks shall not be permitted for new home construction except where occupancy of a home is permitted while the sewage treatment system is under construction. Tank size shall be based upon five days design flow or 1,000 gallons, whichever is greater and meet the same construction as a septic tank except that the holding tank shall not have an outlet. Holding tanks are not acceptable for long term use on year-round residences.

(b) Non-Waterborne Systems. (1) General. In certain areas of the State where running water is not available or is too scarce to economically support flush toilets, or where there is a need or desire to conserve water, the installation of non-waterborne sewage systems may be considered however, the treatment of wastewater from sinks, showers, and other facilities must be provided when non-flush toilets are installed. Household wastewater without toilet wastes is known as greywater.

(2) Composters. These units shall be installed in accordance with the manufacturers instructions. The units shall have a label indicating compliance with the requirements of National Sanitation Foundation (NSF) Standard 41 or equivalent. Only units with a warranty of five years or more shall be installed.

(3) Chemical and Recirculating Toilets. (i) Chemical toilets provide a toilet seat located directly above a vault containing chemicals to disinfect and remove odors from the wastewater. Recirculating toilets use chemicals as the toilet flush fluid. The wastes are separated from the fluid, wastes discharged to an internal holding tank, and the fluid reused.

(ii) The liquids used in these types of toilets do not completely disinfect the wastes; therefore, waste products from these units shall not be discharged to surface waters or to the ground surface.

(iii) The reduced volume wastewater from recirculating toilets may be discharged to a larger holding tank but not to a subsurface absorption system.

(4) Incinerator Toilets. These units accept human waste into a chamber where the wastes are burned. They have a very limited capacity and require a source of electricity or gas. The ash remains must be periodically removed. They must be installed according to the manufacturer's instructions.

(5) Greywater Systems. Greywater systems shall be designed upon a flow of 75 gpd/bedroom and meet all the criteria previously discussed for treatment of household wastewater.



(c) Engineered Systems. (1) A treatment system of a type not discussed in this document may be allowed only through the issuance of a Specific Waiver by the health unit having jurisdiction as provided for in Part 75, of this Title.

(2) Special Conditions. (i) The system shall be designed by a design professional.

(ii) An environmental assessment determines that the development of the site with this system is consistent with the overall development of the area and will cause no adverse environmental impacts. The homeowner/purchaser shall be informed of the expected reliability or problems with the design.

(iii) The design professional supervises the installation of the system and certifies that the system was built in accordance with the approved plan and/or submits as-built plans of the system.

75-A.11 New Product/System Design Interim Approval. Based upon submission of engineering research and testing data indicating that certain products, design and performance are equivalent to these standards, the Commissioner may grant interim approval for the use of systems, products or procedures differing from these standards.