

****DRAFT****

ISDS AMENDMENTS: LEACHFIELD CONSTRUCTION

September 6, 2001

Stricken text: Proposed to be deleted.

Double underlined text: New text proposed to be added or existing text that has been moved out of its original context (in most such cases the existing section is referenced, e.g. “partially from SD 13.04”).

Bold italicized text: Notes, which will not be included in final amendment, and issues that need discussion.

RULE 38. LEACHFIELDS – GENERAL

SD 10.00 Sewage Seepage Systems – General

38.1 Applicability – This rule (Rule 38) applies to leachfields with disposal trenches and leachfields with chambers in a trench configuration.

38.2 SD 10.01 Minimum Leaching Area - The minimum leaching area of a disposal system will be dictated by the number of bedrooms in the case of individual dwellings, or the maximum daily sewage flow for places other than individual dwellings, and the results of percolation tests performed in accordance with Section SD 16.00 or a soil evaluation done in accordance with SD 26.01. The minimum leachfield area necessary for disposal trenches and leaching chambers shall be determined by dividing the maximum daily sewage flow (design flow) for the facility, as determined from Rule 27, by the loading rate established in Rule 38.2.1 for applications without a site evaluation or by the loading rate established in Rule 38.2.2 for applications with a site evaluation. In the case of individual dwellings, all systems shall be designed to serve a minimum of three bedrooms, unless evidence is submitted that a sworn affidavit substantiating less than three two bedrooms has been filed with the land evidence office of the municipality. One bedroom systems shall be prohibited for new system construction.

38.2.1 The maximum leachfield loading rate for applications **without** a site evaluation shall be determined from Table 38.2.1 below:

~~SD 10.07 Minimum Leaching Area – The minimum leaching area shall be determined from the following table:~~

Percolation Rate (minutes per inch)	A		B	
	Disposal Trenches and Seepage Pits		Disposal Beds (see SD 10.08 for Restrictions)	
	leaching area	sq ft/ bedroom	leaching area	sq ft/bedroom
	max. rate of Application (Gals/SF/Day)	(1) (3)	max rate of application Gals/SF/Day	(2) (3) (4)
	(1) (3) (5)		(2) (3) (4)	
2 to 5	1.20	125	0.59	255
10	0.91	165	0.50	300
15	0.79	190	0.43	350

20	0.68	220	0.38	400
25	0.63	240		
30	0.60	250		
40	0.52	290		

Table 38.2.1

<u>Percolation Rate</u> <u>(minutes per inch)</u>	<u>Loading Rate</u> <u>(gals/sq ft/day)</u>
<u>(1)</u>	<u>(2)</u>
2 to 5	.93
10	.70
15	.61
20	.53
25	.49
30	.47
40	.40

(1) Rates ~~greater than five minutes/inch~~ not listed may be interpolated from this table to reflect actual readings.

(2) ~~(4)~~ Soil with a percolation rate of over 40 minutes per inch is unsuitable for disposal of sewage by any means of subsurface leaching.

(2) ~~Soil with a percolation rate of over 20 minutes per inch or where the maximum daily sewage flow is 2,000 gallons or more is unsuitable for these means of subsurface leaching.~~

(3) ~~To determine effective leaching area, see Sections SD 11.01, 12.02 and 13.02.~~

(4) ~~The use of disposal beds will not be permitted where an alternate type of seepage system can be utilized (i.e. trenches, chambers, pits, etc.) The system designer must demonstrate that the alternates to a bed are not feasible.~~

(5) ~~The fastest percolation rate allowed for applications for new systems submitted after the effective date of these regulations shall be 10 minutes per inch. [Not necessary since new systems must use soil category loading rate.]~~

38.2.2 ~~26.01(d)~~ Assigned Percolation Rates Using Soil Physical Properties ~~The maximum leachfield loading rate for applications with a site evaluation, shall be determined from Table 38.2.2 below the percolation rate used to determine the minimum leaching area in SD 10.07 shall be determined from the table below. The percolation rate applied shall be that assigned to the soil category with the slowest percolation rate. Use the lowest loading rate obtained in the manner described below:~~

(A) ~~(4)~~ If the bottom of the stone in the system is above the original grade, use the horizon with the ~~slowest percolation~~ lowest loading rate within 3 feet of the original ground surface;

(B) ~~(2)~~ If the bottom of the stone in the system is below the original grade, use the horizon with the ~~slowest percolation~~ lowest loading rate within 3 feet below the bottom of the stone.

(C) (3) If no natural soil will remain within the 3 feet referenced in 26.01(d)(1) and (2) Rule 38.2.2 (A) and (B) above, use the ~~percolation~~ loading rate of the first naturally occurring soil horizon below that depth.

Table 38.2.2. Soil Category and Loading Rate

NOTE: Soil texture, structure, consistence, occurrence for each soil category have been deleted from this section of the proposed rule and incorporated into Rule 25 Soil Evaluation.

Soil Category	Soil Texture*	Soil Structure	Soil Consistence	Relative Occurrence in RI**	Assigned Percolation Rate (min/inch) <u>Loading Rate (gals/sq ft/day)</u>
1	eos, s, leos, ls, eosl	structureless single grain	loose	very common	10 <u>.70</u>
2	vfs, fs	structureless single grain structureless massive	loose very friable	not common	10 <u>.70</u>
3	lfs, ls, fsl, sl, l	granular, subangular blocky	very friable to friable	common	10 <u>.70</u>
4	lvfs, vfsl, sil	granular, subangular blocky	very friable to friable	fairly common	15 <u>.61</u>
5	leos, ls, eosl	subangular blocky	friable	rare	10 <u>.70</u>
6	lfs, ls, sl, l	structureless massive	friable	common	10 <u>.70</u>
7	fsl, vfsl, sil, si	structureless massive	very friable or friable	common in southern RI	20 <u>.53</u>
8	leos, ls, eosl	structureless massive	firm to very firm	quite rare	30 <u>.47</u>
9	fs, sl, l, fsl, vfsl, sil, siel	platy, structureless massive	firm to very firm	very common	40 <u>.40</u>
10	all textures	structureless massive	extremely firm	fairly common	not allowed (impervious) <u>Repair and alterations only. Not suitable for new systems (restrictive layer or bedrock).</u>

* Soil texture shall be determined with no consideration of coarse fragment modifiers.

~~** "Relative Occurrence in RI" is a general indicator of abundance, and it may not apply equally to every soil texture in a particular soil category.~~

~~38.3 SD-10.06 Effective Leaching Area - The effective leaching area of individual sewage disposal systems shall be determined in accordance with Rule 39 for disposal trench Section SD-11.01 for bed or trench type systems; Section SD-12.02 for seepage pit type systems; and Rule 40 Section SD-13.02 for shallow leaching chamber type systems. Unperforated piping from the distribution box to the leachfield shall not be considered in determining the effective leaching area.~~

~~38.4 SD-10.02 Groundwater - The vertical separation distance from the bottom of the stone underlying the seepage system leachfield shall be at least 3 feet above the maximum elevation of the seasonal high groundwater table. The vertical separation distance shall be at least 4 feet where more than 5 feet (continuously or in total) of the 10 foot soil profile described in accordance with Rule 25 meets the characteristics of Soil Category 1 from Rule 25.3.~~

~~38.5 SD-10.03 Impervious Material Restrictive Layer or Bedrock - The vertical separation distance from the bottom of the stone underlying the seepage system leachfield shall be at least 5 feet above impervious formations a restrictive layer or bedrock, except within the coastal pond and Narrow River critical resource area where the separation distance to a restrictive layer or bedrock shall be 6 feet from the bottom of the leachfield (see also Rule 46.4). The horizontal separation shall be twenty-five feet from the side wall of the seepage system leachfield (see Figure XX). Excavating into impervious material a restrictive layer or bedrock is prohibited unless otherwise approved by the Director.~~

~~38.6 SD-10.05 Location - The minimum horizontal distance the sewage seepage system leachfield must be from items it might affect is found in Rule 28 Section SD-3.05. Trenches shall be parallel to the contours of the existing grade where possible.~~

~~38.7 SD-10.04 Excavation - All trees and brush within 10 feet of the leachfield shall be removed. [From 11.06(b)] The excavation for the seepage system may be made by mechanical means, however, if such means are used, Care must be taken to assure that the soil at the bottom and sides of the excavation for the leachfield is are not compacted or smeared. The bottom of the excavation shall be level and scarified. No part of the leachfield shall be excavated into groundwater. Any excavation required to depths below the groundwater table shall be done during the drier periods of the year. The Director may require that fill existing in the proposed leachfield and 5 feet around and below be removed prior to septic system installation. [from SD 15.04(e) in part]~~

~~SD-10.08 Disposal Bed Restrictions - A disposal bed is unsuitable when the maximum daily sewage flow is 2,000 gallons or more; see Section SD-10.07, column A for design.~~

~~38.8 When the first soil horizon encountered below the leachfield meets the requirements of Soil Category 1 from Rule 25.3, the effluent from the distribution box shall provide equal dosing to each distribution line. This shall be achieved by the use of a dosing distribution box, siphon or pump.~~

~~38.9 SD-11.04 Stone - The stone used in the leaching system to surround the distribution lines shall consist of double washed stone ranging from not less than 1/2- 3/4 inch to not more than 2 inches in size and free from iron, fines, soils, dust or debris. It shall cover the full width of the trench or bed and shall be placed to a depth not less than 6 inches below the bottom of the distribution lines in a disposal trench and not less than 12 inches below the bottom of the distribution lines in a disposal bed. The stone shall extend at least 2 inches above the top of the distribution pipes. The stone shall be covered with at least a 2 inch layer of straw or hay or by a layer of untreated building paper or by a layer of non-woven synthetic filter fabric which allows evaporation. Minimum average roll values for the filter fabric shall have a unit weight of 1.5 oz./yd² (per ASTM D-5261), a permittivity of 1.0 sec⁻¹ (per ASTM D-4491) and a trapezoid tear of 15 lbs. (per ASTM D-4533).~~

38.10 ~~SD 11.05~~ Gravel Base - Any ~~The gravel base material and, where applicable, the gravel between the trenches used under the stone layer shall consist of clean, coarse sand, or bank run gravel containing little or no fines, or organic material and containing little to no large fragments with no stones greater than 6 inches in diameter. Not more than 10% of the gravel can be made up of stones between 2 inches and 6 inches in diameter. The remaining gravel cannot exceed 2 inches in diameter. The gravel base material shall be placed in shallow lifts and properly compacted. The surface of the gravel upon which the stone will be laid shall be level and scarified. The gravel base after placement and compaction shall have a percolation rate equal to or better than 5 minutes per inch. The director may require that a percolation test be run in the presence of his agent in the gravel base after placement and compaction. Whenever a sewage leaching field will be located in fine textured soils containing fine sands, silts or clays, a minimum six (6) inch depth gravel base must be placed beneath the entire leaching field.~~

38.11 Depth of Cover -- The minimum cover over the invert of the distribution lines shall be 1.5 feet and the maximum cover shall be 2.5 feet. *[Note: minimum cover is same as existing rules]*

38.12 ~~11.07~~ Backfill - All backfill placed within the leachfield area shall be free of boulders and stones greater than six (6) inches in diameter, frozen clumps of earth, rubbish, masonry, stumps or waste construction materials. Backfill shall be placed carefully to avoid displacement and damage to piping and chambers. Heavy machinery shall not be permitted to pass over the leachfield area.

38.13 Where fill is required and where it is necessary to fill beyond the boundary of the subject property to meet the requirements of these regulations, no approval will be granted unless the adjoining property owner(s) has given a permanent legal release (easement, etc.) filed in the land evidence records of the municipality granting such right to the owner of the applicant property. A copy of such right of access and use shall be attached to the application.

38.14 A minimum 10 foot horizontal separation distance shall be provided between the outer disposal trench and any adjacent side slope, as measured from the outer edge of the stone in the trench at the elevation of the invert of the distribution line. The adjacent side slope shall not be steeper than 3:1 (horizontal:vertical). The toe of the slope shall be a minimum of 5 feet from any adjacent property line.

38.15 ~~3.04~~ Surface Water Drainage - Provision shall be made to prevent the flow of surface water from the surrounding area onto the ~~area of the seepage system leachfield. SD 15.02(b)(6)~~ The ISDS design shall consider the need for provide for diversion of surface water runoff so as not to increase stormwater runoff cause or exacerbate drainage problems to adjacent properties.

38.16 Curbing - Systems serving other than individual dwellings shall be adequately curbed or fenced so as to exclude vehicular traffic, unless the system is a leaching chamber system constructed in accordance with Rule 40.6. Parking areas adjacent to a leachfield shall be graded or curbed to divert runoff from the leaching area. *[Partially From SD 11.08]*

38.17 When the leachfield construction is completed, the boundary of the leachfield area shall be clearly marked with flagging until construction on the site is completed in order to prevent the use of the leachfield for any activities that might damage the leachfield. Such flagging is not intended to preclude the final grading and landscaping of the leachfield. [From Massachusetts 15.246]

RULE 39. SPECIFICATIONS FOR DISPOSAL TRENCHES

SD 11.00 Specifications for Disposal Trenches and Disposal Beds

39.1 SD 11.01 Effective Leaching Area -- the effective leaching area shall be determined by the amount of stone meeting the requirements of Rule 38.9 that is placed below the distribution line in the trench.

~~(a) Disposal Beds -- The effective leaching area of disposal beds shall be the entire bottom area.~~

39.1.1(b) Disposal Trenches - The effective leaching area of standard disposal trenches containing 0.5 feet of stone below the pipe invert shall be the total bottom area. Credit will be allowed for added sidewall absorption area gained by increasing the depth of stone in the trenches. Such credit shall be determined in accordance with ~~the following~~ Table 39.1.1 which gives the square footage allowed per lineal foot of trench as the depth of stone increases. The maximum depth of stone allowed is 1.5 feet. The bottom of the disposal trench shall have a maximum width of 3 feet.

Table 39.1.1

Depth of Stone Below Invert (feet)	Area Allowed per Lineal Foot of Trench (Sq ft/ft)		
	24" wide trench	30" wide trench	36" wide trench
0.5	2.0	2.5	3.0
1.0	2.7	3.2	3.7
1.5	3.2	3.7	4.2
2.0	3.7	4.2	4.7
2.5	4.2	4.7	5.2
3.0	4.7	5.2	5.7
3.5 (max. allowable)	5.2	5.7	6.2

~~Example: -- If a 5 minute per inch percolation rate is being used to size a trench type system for a 3 bedroom dwelling, 375 square feet of effective leaching area would be the minimum required. If a trench system with 0.5 foot of stone below the invert is used, 125 lineal feet of 3 foot wide trench would be required. If the stone depth is increased to 3.5 feet below the invert, then 60.5 lineal feet of 3 foot wide trench would be required.~~

39.1.2 The maximum depth of stone below the pipe invert shall be 0.5 feet when any of the following occur:

(A) The seasonal high groundwater table is within 2 to 4 feet of the original ground surface; [From SD 15.02(b)(1)]

(B) An impervious layer is within 4 to 6 feet of original ground surface; or [From SD 15.02(b)(1)]

(C) The leachfield is constructed on a sloping site in accordance with Rule 39.5.

39.2 SD 11.03 Distribution Lines

39.2.1 That portion of the distribution line from the distribution box to the beginning of the disposal trench shall be a minimum of 2 feet in length and shall be SDR 35 PVC, unperforated and laid with tight joints.

39.2.2 The first foot of the distribution line in the trench shall be unperforated SDR 35 PVC. Beyond the first foot the distribution lines in the trench must consist of schedule SDR 35 perforated PVC pipe with a minimum nominal diameter of 4 inches, or an equivalent pipe approved by the director in accordance with Rule 43. The size, location, and number of perforations shall be acceptable to the director. The perforations shall be evenly spaced in 2 rows, one on each side of center, located at 30 degrees off vertical center in the lower half of the pipe. The perforations shall be no smaller than 3/8 inch and no larger than 5/8 inch in diameter. [Partially from MA 15.25]

39.2.3 The distribution lines in the disposal trench may be level or pitched. Where the distribution lines are pitched they shall have a minimum slope of 1% and a maximum slope of 3%, and they shall all be of equal length. Where the distribution lines are level, the invert of the distribution pipe at the distribution box shall be 2 inches higher than the invert of the distribution lines at the beginning of the trench.

39.2.4 The maximum length of a disposal trench shall be as follows:

- (A) Without dosing – 50 feet;
- (B) With a dosing distribution box – 75 feet; or
- (C) With a pump or siphon – 100 feet.

39.2.5 The ends of all distribution lines shall be inter-connected with unperforated or perforated SDR 35 PVC pipe. unless otherwise approved by the Director. If the leachfield is on a sloping site constructed in accordance with Rule 39.5, an unperforated relief line shall connect the trenches. Where the distribution lines are connected by a perforated pipe, such pipe shall meet the requirements of Rule 39.2.2 and shall be laid within a disposal trench constructed in accordance with this Rule.

39.3 Stone – The stone surrounding the distribution lines shall meet the requirements of Rule 38.9. The stone shall cover the full width of the trench, extend to the proper design depth, and extend at least 2 inches above the top of the distribution lines.[Partially from SD 11.04]

39.4 Leachfield Construction Where Bottom of Stone is Below Grade (see Figure X)

39.4.1 When the bottom of the stone is in the B horizon, a 6 inch gravel base layer (gravel shall meet the requirements of Rule 38.10) shall be placed below the stone in the disposal trench. Where the bottom of the stone lies on or within a soil horizon that meets the description of Soil Category 1 from Rule 25.3 and such horizon is at least 6 inches thick, the 6 inch gravel base layer below the stone is not necessary. However, if this Soil Category 1 horizon is described as extremely gravelly, the 6 inch gravel base layer shall be required.

[What if bottom of stone is on fine textured C horizon?]

39.4.2 The minimum distance between walls of adjacent disposal trenches shall be 5 feet, however, greater distances are recommended.

39.4.3 The soil between the disposal trenches and within the leachfield perimeter may remain undisturbed. When all the soil is to be removed, the soil shall be replaced with properly compacted gravel meeting the requirements of Rule 38.10 to 2 inches above the top of the distribution lines, and the trench shall be excavated out of the compacted gravel.

39.5 Leachfield Construction Where the Bottom of the Stone is Above Grade (see Figure Y)

39.5.1 The leachfield and 5 feet into the leachfield perimeter shall be stripped of all topsoil and subsoil (A and B horizon).

39.5.2 The maximum depth of stone below the pipe invert shall be 0.5 feet.

39.5.3 The minimum distance between walls of adjacent disposal trenches shall be 10 feet.

39.5.4 Properly compacted gravel that meets the requirements of Rule 38.10 shall be placed below the stone and between the disposal trenches to 2 inches above the top of the distribution lines.

39.5.5 Disposal trenches shall be excavated out of the compacted gravel.

39.6 Leachfield Construction on Sloping Sites -- Where the disposal trenches are to be constructed such that the invert of the distribution lines in the trenches will not all be at the same elevation, the distribution lines in the trenches shall be laid level, and the leachfield shall be constructed in accordance with the following (see Figure Z):

39.6.1 The distribution box shall provide equal dosing to each disposal trench. This shall be achieved by the use of a dosing distribution box , siphon or pump;

39.6.2 The ends of the distribution lines shall be connected by a relief line that is unperforated, SDR 35 PVC laid with tight joints that is at least 4 inches in diameter and of the same diameter as the perforated pipe that it connects. The relief line shall be placed on firm undisturbed or well compacted soil;

39.6.3 The minimum distance between walls of adjacent disposal trenches shall be 10 feet;

39.6.4 The maximum depth of stone below the distribution pipe invert shall be 0.5 feet.

39.6.5 Gravel shall be placed below the stone in accordance with 39.4.1.

SD 11.06 Excavation Preparation

~~(a) Leach field strip requirements:~~

~~— (1) The leach field and five (5) feet into the leach field perimeter shall be stripped if the groundwater elevation is less than four (4) feet or ledge is less than six (6) feet from the original ground surface. The leach field and extending five (5) feet into the leach field perimeter from the trench side walls must be stripped of trees, brush, topsoil, subsoil, undesirable material and soil containing fines.~~

~~— (2) The five (5) foot leach field perimeter strip shall not be required if the groundwater elevation is at least four (4) feet or greater and ledge is at least six (6) feet or greater from the original ground surface. The leach field however, shall be stripped of trees, brush, topsoil, subsoil, undesirable material and soil containing fines.~~

~~— (3) Excavations referred to in SD 11.06(a)(1) and (2) shall be backfilled with gravel base as specified in SD 11.05.~~

~~(b) All trees and brush within ten (10) feet of the leach field shall be removed.~~

~~(c) The designer may specify additional soil where conditions warrant.~~

~~(d) Gravel backfill must be brought up around the bed or trench to at least 2 inches above the top of the distribution pipes in the leaching system.~~

~~(e) The leaching system shall not be constructed when the original soil was stripped to or into, the groundwater table unless approved by the director.~~

~~SD 11.07 Backfill~~ All backfill placed within the leachfield area shall be free of boulders and stones greater than six (6) inches in diameter, frozen clumps of earth, rubbish, masonry, stumps or waste construction materials. Backfill shall be placed carefully over disposal trenches or beds so as to avoid displacement and damage to piping. Heavy machinery shall not be permitted to pass over the leachfield area. *[Moved to Rule 38.12]*

~~39.7 SD 11.08 Parking Area Location Under Traffic Areas~~ - The area of the leaching system leachfield for a disposal trench system shall not be paved or used for vehicular parking or subject to vehicular traffic, including parking, except as allowed under SD 12.06 and SD 13.09. Systems serving other than individual dwellings shall be adequately curbed or fenced so as to exclude vehicular traffic. Parking areas adjacent to leaching system shall be graded or curbed to divert runoff from the leaching area. *[Language on "Curbing" Moved to Rule 38.16]*

~~39.8 SD 11.09 Finished Grade~~ -The surface area over the subsurface disposal disposal trench system shall be loamed, seeded and then grassed.

~~39.9 SD 11.02 Construction of Disposal Trenches and Beds~~ Disposal trenches and beds shall follow the construction details listed in the table below: Summary of Disposal Trench Construction Details:

Minimum lines per field or bed	2
Maximum length per line without dosing tank	75 50 feet
Maximum length per line with dosing tank	100 feet
Minimum diameter of distribution lines	4 inches
Grade/Slope of distribution lines (no gradient needed if closed by siphon or pumps)	2 4 inches per 100 feet 1% - 3%
Maximum width of disposal trench bottom	3 feet
Minimum distance between walls of adjacent trenches	5 feet/10 feet*
Minimum cover over invert of distribution lines	1.5 feet
Maximum cover over invert of distribution lines	3.5 feet**2.5 feet
Maximum distance between distribution lines in disposal beds	6 feet
Minimum distance between adjacent beds	10 feet
Maximum distance between distribution lines and edge of bed	3 feet
Termination of distribution lines from end of trench	2 feet

~~*Greater distances are recommended. 10 feet for those systems on sloping sites and for those systems where the bottom of the stone is above grade.~~

~~**System should be designed as shallow as practical but invert of distribution lines shall not be less than 1.5 feet below grade.~~

~~SD 12.00 Seepage Pits~~

~~SD 12.01 Acceptability~~ A seepage pit may be constructed in lieu of a disposal field, and must be preceded by a septic tank.

~~SD 12.02 Effective Leaching Area~~ The effective leaching area of a seepage pit shall be determined in accordance with provisions of Column A of Section SD 10.07. The sidewall area below the invert of the inlet and the bottom of excavation, not to exceed 2 feet around and below the liner, shall be used to determine the effective leaching area. Sidewall and bottom area having a percolation rate exceeding the design percolation rate shall not be used to determine the effective leaching area.

~~SD 12.03 Spacing~~ When more than one seepage pit is installed, a distance at least 20 feet between sidewalls shall separate the pits.

~~SD 12.04 Access~~ The top of a seepage pit shall be provided with an access manhole with a removable cover of concrete, iron or other durable material. The top of the manhole should be brought up to within 12 inches of the finished grade and properly marked.

~~SD 12.05 Construction~~ The lining of a seepage pit shall be of precast perforated concrete, stone, brick or cement block, laid dry with open joints. The space between the excavation and the lining shall be backfilled with washed stone, 1/2 inch to 2 inches in size, for a distance of at least 12 inches from the lining. Washed stone 1/2 inch to 2 inches in a size shall be placed on the bottom of the pit to a depth of at least 12 inches.

~~SD 12.06 Location Under Unpaved Traffic Areas~~ Where any portion of the seepage system is installed under an unpaved parking area, or subject to vehicular traffic, the structure must be capable of withstanding H 20 wheel loads. All access manholes under paved areas shall be brought to grade with covers and frames capable of withstanding H 20 wheel loads. Such systems must be vented with vents, located in a protected area, and screened. Paving over a system is limited to 25% of the total area without specific authorization of the director.

RULE 40. SPECIFICATIONS FOR SHALLOW LEACHING CHAMBERS

SD 13.00 Leaching Chambers

40.1 SD 13.01 Acceptability General – A leaching chamber system using shallow chambers (also called flow diffusers) that are 4 feet by 8 feet by 18” deep may be constructed in lieu of a disposal field disposal trench system. It must be preceded by a septic tank, and the leaching chambers must be installed in a trench configuration. Leaching chambers shall be prohibited where any of the following occur:

40.1.1 The seasonal high groundwater table is less than four (4) feet from the original ground surface; [From SD 13.02(a)]

40.1.2 The chamber invert would be above the original grade; or

40.1.3 The chamber inverts would be set at different elevations.

40.2 SD 13.02 Effective Leaching Area (a) Shallow Leaching Chambers Shallow leaching chambers (also called flow diffusers) are significantly wider than they are deep. The effective leaching area shall be the total bottom area extending to 12 inches on each side of the chamber, provided the excavation below and on each side of the chamber is filled with stone meeting the size and quality requirements of SD 11.04. Shallow chambers may be installed in a trench configuration if the overall width of the trench does not exceed 6 feet. Shallow chambers installed in a trench configuration may include sidewall areas beginning at the base of the chamber and extending to the depth of stone beneath the chamber not to exceed 24 inches. Shallow leaching chambers shall not be permitted in areas where the groundwater table is less than four (4) feet. [Moved to (above)] The effective leaching area for a leaching chamber installed in accordance with these Rules with 12 inches of stone meeting the requirements of Rule 38.9 on each side and 12 inches of stone below shall be 65 square feet per end unit and 60 square feet per interior unit.

(b) Deep Leaching Chambers Deep leaching chambers (also called galleys) are approximately equal in width and depth. The effective leaching area shall be the total bottom area extending to a maximum of 24 inches on each side of the chamber in addition to the total pervious side wall area beginning at the invert of the inlet to the chamber and extending to a maximum of 24 inches below the base of the chamber, provided the excavation below and outside the chamber is filled with stone meeting the size and quality requirements of SD 11.04. Deep chambers must be installed in a trench configuration. Deep chambers shall not be permitted in areas where the groundwater table is less than eight (8) feet

— EFFECTIVE AREA OF CHAMBERS IN TRENCH CONFIGURATION
— TYPE OF CHAMBER

————— DEEP (4 FT. CUBE) ————— SHALLOW (4 FT. WIDE)

W/12 inches of stone sides and under	W/24 inches of stone sides and under	W/12 inches of stone sides and under
EACH END UNIT (SQ.FT./UNIT)		
98	153	78
EACH INTERIOR UNIT (SQ.FT./UNIT)		
58	74	64

~~SD 13.03 Required Minimum Leaching Area~~ The required minimum leaching area shall be determined in accordance with Column A of Section SD 10.07 provided that the configuration of the units is that of trench type system. If the chambers are installed in a bed type configuration, the required minimum leaching area shall be determined in accordance with Column B of Section SD 10.07.

~~SD 13.04 Construction~~ The leaching chamber walls shall be of precast perforated concrete, stone, brick, or cement block, laid dry with open joints. The chambers shall be constructed to allow the liquid to pass easily through openings to the surrounding stone. The cover shall be constructed of reinforced concrete or other approved material. The space between the excavation and the lining shall be backfilled with washed stone, one half inch to two inches in size for a distance of at least 12 inches from the lining. The stone outside the chamber shall extend to with two inches of the top of the chamber and be covered with a two inch layer of washed stone pea or a two inch layer of straw or hay, or by a layer of untreated building paper. Washed stone one half inch to two inches in size shall be placed on the bottom of the excavation to a depth of at least 12 inches.

~~SD 13.07 Distribution~~ Effluent shall be applied to the leaching area in a uniform manner. If the leaching chambers are installed in a trench type configuration, the effluent shall be applied at least every 25 feet, and the leaching chambers shall be interconnected unless otherwise approved by the director. If the leaching chambers are installed in a bed type configuration, the effluent must be applied in such a manner to insure equal distribution. The bottom of the excavation shall be level and scarified.

40.3 Chamber Construction

40.3.1 The leaching chamber shall be constructed of precast perforated concrete or other material approved by the Director. The chambers shall be constructed to allow the liquid to pass easily through openings to the surrounding stone.[partially from SD 13.04]

40.3.2 SD 13.05-Access - The top of the chamber shall be provided with an access manhole opening at intervals not greater than 50 feet with a removable cover of concrete, iron or other durable material. For systems designed to dispose of up to 2,000 gallons per day and which are not located under a paved area the top of the access opening manhole should shall accommodate a water tight riser and shall be brought to within 12 inches of the finished grade and properly marked. ~~for systems designed to dispose of up to 2,000 gallons per day or to grade~~ For systems designed to dispose of greater than 2,000 gallons per day and all systems located under paved areas, the access openings shall meet the following requirements: (except as provided under SD 13.09). All manholes brought up to grade should be provided with a safe and solid cover and should be set to divert surface water away from the manhole.

[A-C mirror requirements of septic tanks]

(A) Access openings shall accommodate a water tight riser and shall be brought to finished grade;

(B) Lids below grade shall remain in place where practical. Lids for the openings at finished grade shall prevent unauthorized entry by meeting either of the following;

(i) Lids shall weigh a minimum of 59 pounds and fit tightly into the riser as shown in Figure XX; or

(ii) Lids shall be tamper resistant and mechanically fastened.

(C) Surface water shall be diverted away from the access openings; and

(D) Existing chambers (shallow chambers described herein and deep chambers also referred to as galleys) in place as of the effective date of this amendment to the rules that have access openings to finished grade shall be in compliance with the provisions of (B) above within five years of the effective date of this amendment.

40.4 Excavation and Construction of a Shallow Chamber Leachfield

40.4.1 The overall width of the trench must not exceed 6 feet.

40.4.2 ~~SD 13.06 Spacing~~ –If a ~~trench type configuration~~ is installed, The minimum distance between walls of adjacent trenches in a chamber leachfield shall be at least 6 feet. However, it is recommended that the spacing be increased up to 12 feet where possible.

40.4.3 The soil between the trenches and within the leachfield perimeter may remain undisturbed. When all the soil is to be removed, the soil shall be replaced with properly compacted gravel meeting the requirements of Rule 38.10 up to the top of the chamber.

40.4.4 Stone -- Stone meeting the requirements of Rule 38.9 shall be placed beneath the chamber to a depth of 12 inches. The space between the excavation and the chamber wall shall be backfilled with stone for a distance of 12 inches from the chamber wall to the top of the chamber.

[Cover chamber with filter fabric?]

40.4.5 When the bottom of the stone is in the B horizon, a 6 inch gravel base layer (gravel shall meet the requirements of Rule 38.10) shall be placed below the stone in the disposal trench. Where the bottom of the stone lies on or within a soil horizon that meets the description of soil Category 1 from Rule 25.3 and such horizon is at least 6 inches thick, the 6 inch gravel base layer below the stone is not necessary. However, if this Soil Category 1 horizon is described as extremely gravelly, the 6 inch gravel base layer shall be required.

[What if bottom of stone is on fine textured C horizon?]

40.5 Effluent Distribution

40.5.1 The maximum length of a chamber trench shall be as follows:

(A) Without dosing – 50 feet;

(B) With a dosing distribution box – 75 feet; or

(C) With a pump or siphon – 100 feet.

40.5.2 The maximum length of a chamber trench without dosing shall be 50 feet. The maximum length of a chamber trench with dosing shall be 100 feet.

40.5.3 Effluent shall be applied to the chamber trenches at least every 25 feet. *[partially from SD 13.07]*

40.5.4 The ends of the chamber trenches shall be interconnected with unperforated schedule 35 PVC pipe laid with tight joints, unless a single trench is constructed.

[Use perforated pipe in a disposal trench to connect chamber trenches?]

~~40.6 SD-13.09—Location Under Unpaved Traffic Areas – The area subject to vehicular traffic, including parking areas, shall be limited to 25% of the leachfield area. Where any portion of the leaching chamber leachfield is installed under an unpaved parking area, or area subject to vehicular traffic, the structure must be capable of withstanding HS-20 wheel loads. All access manholes under paved areas shall be brought to grade with covers and frames capable of withstanding HS-20 wheel loads, and meeting the requirements of 40.3.2 (A)-(D). Such systems must be vented with screened vents located in a protected area, and screened. Paving over a system is limited to 25% of the total area without specific authorization of the Director.~~

~~SD-13.08 Depth of Cover—The top of the leaching chambers shall be installed at an elevation to provide a minimum cover of 1.5 feet to a maximum cover of 3.5 feet over the invert of the distribution lines.~~ *[Moved to Rule 38.11]*