Chapter ILHR 83

PRIVATE SEWAGE SYSTEMS

Note: Chapter H 63 was created as an emergency rule effective 6-21-80; chapter H 63 as it existed on June 30, 1983 was renumbered to chapter ILHR 83.

ILHR 83.01 Purpose. (1) GENERAL. The underlying principles of this chapter as authorized in s. 145.02 (2), Stats., are basic goals in envirnomental health and safety accomplished by proper siting, design, installation, inspection, and maintenance of private sewage systems. The prerequisites necessary for the essential protection of the health of the public and the environment are the same everywhere. As unforeseen situations arise which are not specifically covered in this chapter the basic principles enumerated in this section shall serve to define intent.

(2) BASIC PRINCIPLES. (a) *Need.* Every building intended for human habitation or occupancy shall be provided with a properly functioning system for treatment and disposal of domestic waste.

(b) *Public sewers.* Every building intended for human habitation or occupancy on land abutting a street, right-of-way, or easement in which there is a public sewer, or on land deemed accessible to public sewer, shall have an individual connection to the public sewer and the private sewage system serving such building shall be properly abandoned.

(c) *Discharges prohibited.* Every private sewage system shall be designed, located and constructed to prevent any discharge of sewage or partially treated sewage into drain tiles, onto the ground surface, into the structure served, into the surface waters of the state or into the groundwater of the state including zones of seasonal soil saturation.

(d) *Maintenance.* Every private sewage system shall be adequately maintained.

(e) *Nuisance.* Every private sewage system shall be designed, located and constructed so as not to create a nuisance.

(f) *Sizing.* Every private sewage system shall be designed and constructed to adequately dispose of all the wastewater generated in the structure or facility it is serving.

History: Cr. Register, December, 1980, No. 300, eff. 1-1-81; renum. from H 63.01, Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 83.02 Definitions. For the purpose of this chapter, the following definitions shall apply. The dictionary meaning shall apply for all other words.

(1) "Aggregate" means washed graded hard rock that has been washed with water under pressure over a screen during or after grading to remove fine material and with a hardness value of 3 or greater on Moh's Scale of Hardness. Aggregate that can scratch a copper penny without leaving any residual rock material on the coin would have a harness of 3 or more on Moh's Scale of Hardness.

(2) "Alternative private sewage system" means a system as defined in s. 145.022 (1) (a), Stats. The alternative private sewage systems included in this chapter, but not limited by enumeration, are mound systems and shallow sub-surface pressure distribution systems used on sites not meeting the soil criteria for conventional private sewage systems.

(3) "Approved" means approved or accepted by the department.

(4) "Bedrock" means the rocks that underly soil material or are at the earth's surface. Bedrock is encountered when the weathered in-place consolidated material, larger than 2 mm in size, is greater than 50% by volume.

(5) "Building" means a structure having walls and a roof erected or set upon an individual foundation or slab-constructed base designed or used for the housing, shelter, enclosure or support of persons, animals or property of any kind. A mobile home is included in this definition. Each structure abutting another structure which does not have an ingress-egress doorway through the basement foundation walls, or structures with separate exterior or exterior abutting walls, or public use structures separated by an unpierced firewall, shall be considered as a separate or individual building.

(6) "Cesspool" means a covered excavation in the ground which receives sewage or other organic wastes from a drainage system, and so designed as to retain the organic matter and solids, permitting the liquids to seep into the soil cavities.

(7) "Cleanout" means a plug or cover made of material approved by the department joined by means of a screw thread to an opening in a pipe, which can be removed for the purpose of cleaning or examining the interior of the pipe.

(8) "Clear water wastes" means cooling water and condensate drainage from refrigeration compressors and air-conditioning equipment, water used for equipment chilling purposes, liquid having no impurities or where impurities have been reduced below a minimum concentration considered harmful, and cooled condensate from steam heating systems or other equipment.

(9) "Color" means the moist color of the soil based on Munsell soil color charts.

(10) "Conventional private sewage system" means a system as defined in s. 145.022 (1) (b), Stats. Conventional private sewage systems included in this chapter are systems using a conventional soil absorption system, a system installed in a filled area approved in writing by the department, and a dosing soil absorption system.

(11) "Conventional soil absorption system" means a system that employs gravity flow from the septic or other treatment tank and applies effluent to the soil through the use of a seepage trench, bed or pit. The distribution piping is 4 inch diameter pipe.

(12) "County" means the local government unit responsible for the regulation of private sewage systems. County government is the local governmental unit responsible except that towns, villages and cities are the responsible unit of government in any county that has a population in excess of 500,000.

(13) "Department" means the department of industry, labor and human relations.

(14) "Detailed soil map" means a map prepared by or for a state or federal agency participating in the national cooperative soil survey showing soil series, type and phases at a scale of not more than 2,000 feet to the inch and includes related explanatory information.

(15) "Dosing soil absorption system" means a system that employs a pump or automatic siphon to elevate or distribute effluent to the soil through the use of a seepage trench or bed. Distribution piping in seepage trenches or beds shall be 4 inch perforated pipe approved by the department.

(16) "Dwelling unit" means one or more rooms with provisions for living, sanitary and sleeping facilities which are used or intended to be used by one person or by 2 or more persons maintaining a common household.

(17) "Effluent" means liquid discharged from a septic or other treatment tank.

(18) Failing private sewage system is defined in s. 144.24 (10) (d), Stats., as follows: "A failing private sewage system is one which causes or results in any of the following conditions:

1. The failure to accept sewage discharges and back up of sewage into the structure served by the private sewage system.

2. The discharge of sewage to the surface of the ground or to a drain tile.

3. The discharge of sewage to any waters of the state.

4. The introduction of sewage into zones of saturation which adversely affects the operation of a private sewage system."

(19) "Farm" means a parcel of 35 or more acres of contiguous land which is devoted primarily to agricultural use, as defined in s. 91.01 (1) and (5), Stats., which during the year preceeding application for a mound produced gross farm profits as defined in s. 91.09 (11) (a) 3m, Stats., of not less than $6,000 or which during the 3 years preceeding

application produced gross farm profits, as defined in s. 91.09 (11) (a) 3m, Stats., of not less than $18,000.

(20) "Flood fringe" means that portion of a flood plain which is outside of the floodway and which is covered by flood waters during any regional floods. It is generally associated with standing water rather than rapidly flowing water.

(21) "Flood plain" means the land which has been or may be covered by flood water during regional floods. The flood plain includes the floodway and the flood fringe.

(22) "Floodway" means the channel of a river or stream and those portions of the flood plain adjoining the channel which carry and discharge flood water or flood flows during the regional floods.

(23) "Grease interceptor" means a watertight tank which is installed underground for the collection and retention of grease from cooking or food processing and which is accessible for periodic removal of the contents.

(24) "High groundwater"' means zones of soil saturation which include: Perched water tables, shallow regional groundwater tables or aquifers, or zones that are seasonally, periodically or permanently saturated.

(25) "High water level" means the highest known flood water elevation of any lake, stream, pond or flowage or the regional flood elevation established by a state or federal agency.

(26) "Holding tank" means an approved watertight receptacle for the collection and holding of sewage.

(27) "Horizontal reference point" means a stationary, easily indentifiable point to which horizontal dimensions can be related.

(28) "Industrial waste" means liquid wastes which result from processes employed in industrial establishments.

(29) "Legal description" means an accurate Metes and Bounds description, a lot and block number in a recorded subdivision, a recorded assessor's plat or a public land survey description to the nearest 40 acres.

(29m) "Local station" means a National Weather Service (NWS) precipitation station or other precipitation station accepted by the department as collecting precipitation data in accordance with NWS methods.

(30) "Manhole" means an opening of sufficient size to permit a person to gain access to a sewer or any portion of a plumbing system.

(31) "Mobile home" means a transportable structure mounted on a chassis and designed to be use with or without a permanent foundation as a dwelling unit. The phrase "without a permanent foundation" indicates that the support system is constructed with the intent that the mobile home thereon may be moved from time to time at the convenience of the owner. See ss. 218.10 (2) and 340.01 (29), Stats.

(32) "Mobile home park" means any plot or plots of ground owned by a person, state or local government upon which 2 or more units, occupied for dwelling or sleeping purposes regardless of mobile home ownership,

are located, and whether or not a charge is made for such accommodation. See s. 66.058 (1) (i), Stats.

(33) "Nuisance" means any source of filth, odor or probable cause of sickness pursuant to the provisions of s. 146.14, Stats.

(34) "Percolation test" means the method specified in s. ILHR 83.09 (5) of testing absorption qualities of the soil.

(35) "Permeability" means the ease with which liquids move through the soil. One of the soil qualities listed in soil survey reports.

(36) "Pipe diameters" means the inside diameter.

(37) "Plumbing system" means a system as defined in s. 145.01 (10), Stats.

(38) "Potable water" means water which is satisfactory for human consumption, hygiene and culinary use and meets the requirements of the state administrative authority having jurisdiction.

(39) "Pressure distribution system" means a soil absorption system that employs a pump or automatic siphon and small diameter distribution piping with small diameter perforations to introduce effluent into the soil. Plan review and departmental approval is required for each system of this type.

(40) Private sewage system is defined in s. 145.01 (12), Stats.

(41) "Private residence" means a one- or 2-family building or dwelling. See dwelling unit.

(42) "Privy" means a structure that is not connected to a plumbing system which is used by persons for the deposition of human body wastes.

(43) "Public building" means any structure, including exterior parts of such building, such as a porch, exterior platform or steps providing means of ingress or egress, used in whole or in part as a place of resort, assemblage, lodging, trade, traffic, occupancy or use by the public, or by 3 or more tenants in accord with s. 101.01 (2) (g), Stats.

(44) "Reservoir" means a watertight receptacle basin or vault constructed above the ground surface or underground for the storage of potable water.

(45) "Public garage" means a building or part of a building used for the storage of land, air or water vehicles by 3 or more persons not of the same family or habitation.

(46) "Regional flood" means as defined in ch. NR 116, Wis. Adm. Code.

(47) "Regional flood elevation" means as defined in ch. NR 116, Wis. Adm. Code.

(48) "Seepage bed" means an excavated area larger than 5 feet in width which contains a bedding of aggregate and has more than one distribution line.

(49) "Seepage pit" means an underground receptacle so constructed as to permit disposal of effluent or clear wastes by soil absorption through its floor and walls.

(50) "Seepage trench" means an area excavated one to 5 feet in width which contains a bedding of aggregate and a single distribution line.

(51) "Septic tank" means a tank which receives and partially treats sewage through processes of sedimentation, oxygenation, flotation and bacterial action so as to separate solids from the liquid in the sewage and discharges the liquid to a soil absorption system.

(52) "Sewage" means the liquid and water carried wastes created in and to be conducted away from residences, industrial establishments and public buildings.

(53) "Soil" means the unconsolidated material over bedrock.

(54) "Soil boring" means an observation pit dug by hand or backhoe, a hole dug by augering or a soil core taken intact and undisturbed with a probe.

(54m) "Soil consistence" means the cohesion among soil particles and the adhesion of soil to other substances.

(55) "Soil mottles" means spots or streaks of contrasting soil colors usually caused by soil saturation for some period of a normal year.

Note: Grayish colored mottles are called low chroma; reddish brown, red or yellow mottles are called high chroma.

(56) "Soil saturation" means the state when all the pores in a soil are filled with water. Water will flow from saturated soil into a bore hole.

(56m) "Soil structure" means the combination or arrangement of individual soil particles into definable aggregates or peds, which are characterized and classified on the basis of size, shape and degree of distinctness.

(56n) "Soil texture" means the relative proportions of the various soil separates in a soil, as specified in the United States department of agriculture system.

(57) "Topsoil" means the undisturbed surface horizon of a soil often characterized by a black or dark grayish brown color due to a higher content of organic matter.

(58) "Vent cap" means an approved appurtenance used for covering the vent terminal of an effluent disposal system to avoid closure by mischief or debris and still permit circulation of air within the system.

(59) "Vertical elevation reference point" means an easily indentifiable stationary point or object of constant elevation for establishing the relative elevation of percolation tests, soil borings and other locations.

(60) "Water service" means a pipe extended from the water main or private pumping system or other supply source with or without lateral extensions to the building, structure or other system to be served.

(61) "Workmanship" means work of such character that will fully secure the results sought in all the sections of this chapter as intended for the safety, welfare and health protection of all individuals.

(62) "Watercourse" means a stream usually flowing in a particular direction, though it need not flow continually, it may sometimes be dry. It must flow in a definite channel, having a bed, sides or banks, and usually discharges itself into some other stream or body of water. It must be something more than a mere surface drainage over the entire face of a tract of land, occasioned by unusual freshets or other extraordinary causes. It does not include the water flowing in the hollows or ravines in land, which is the mere surface water from rains or melting snow, and is discharged through them from a higher to a lower level, but which at other times are destitute of water. Such hollows or ravines are not in legal contemplation watercourses. (*Hoyt vs. City of Hudson* 27 Wis. 656 (1871), Wisconsin Supreme Court)

(63) MISCELLANEOUS. Standards or Specifications Abbreviations.

A.G.A. ..... American Gas Association, Inc.
..... 420 Lexington Ave., New York, New York 10017

A.N.S.I. ..... American National Standards Institute, Inc.
..... 1430 Broadway, New York, New York 10018

A.S.M.E. ..... American Society of Mechanical Engineers
..... 29 W. 39th St., New York, New York 10018

A.S.S.E. ..... American Society of Sanitary Engineering
..... P.O. Box 97, Bay Village, Ohio 44140

A.S.T.M. ..... American Society for Testing and Material
..... 1916 Race St., Philadelphia, Pennsylvania 19103

A.W.W.A. ..... American Water Works Association
..... Data Processing Department
..... 6666 West Quincy Avenue
..... Denver, Colorado 80235

C.S. ..... Commercial Standards, Supt. of Documents
..... Governmental Printing Office
..... Washington, D.C. 20401

F.S. ..... Federal Specifications
..... General Services Administration Regional Office 3
..... Washington, D.C. 20407

M.S.S. ..... Manufacturers Standardization Society
..... of the Valve and Fittings Industry
..... 127 Park Street, N.E., Vienna, Virginia 22180

N.S.F. ..... National Sanitation Foundation
..... Testing Laboratory, Inc., P.O. Box 1468
..... Ann Arbor, Michigan 48106

U.L. ..... Underwriters' Laboratories, Inc.
..... 333 Pfingsten Road, Northbrook, Illinois 60062

W.C.F. ..... Water Conditioning Foundation
..... 1201 Waukegan Road, Glenview, Illinois 60025

Note: For definitions of master plumber, journeyman, restricted plumbers, apprentices, registered learners and certified soil tester, refer to ch. 145, Stats.

History: Cr. Register, December, 1980, No. 300, eff. 1-1-81; renum. from H 63.02, Register, June, 1983, No. 330, eff. 7-1-83; cr. (29m), (54m), (56m) and (56n), Register, June, 1991, No. 426, eff. 7-1-91.

ILHR 83.03 Approvals and limitations. (1) ALLOWABLE USE. Septic tank and effluent absorption systems or other treatment tank and effluent disposal systems as may be approved by the department may be constructed when no public sewerage system is available to the property to be served. Unless specifically approved by the department, the private sewage system of each building shall be entirely separate from and independent of that of any other building. A private sewage system may be owned by the property owner or by a special purpose district. The use of a common system or a system on a different parcel than the structure will be subject to the same plan review procedures as for systems serving public buildings.

(2) PUBLIC SEWER CONNECTION. When public sewers approved by the department of natural resources become available to the premises served, the use of the private sewage system shall be discontinued within that period of time required by order, but not to exceed one year. The building sewer shall be disconnected from the private sewage system and be connected to the public sewer. All abandoned treatment tanks and seepage pits shall have the contents pumped and disposed of in accordance with ch. NR 113, Wis. Adm. Code. The top or entire tank shall be removed and the remaining portion of the tank or excavation shall be immediately filled with suitable soil material.

(3) FAILING SYSTEM. When a failing or malfunctioning private sewage system is encountered, the sewage disposal system shall be corrected or its use discontinued within that period of time required by county or departmental order, with a maximum time limit of one year.

History: Cr. Register, December, 1980, No. 300, eff. 1-1-81; renum. from H 63.03, Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 83.04 Specific limitations. (1) DOMESTIC WASTE. All water carried wastes derived from ordinary living uses shall enter the septic or treatment tank unless otherwise specifically exempted by the department or this chapter.

(2) CESSPOOLS. Cesspools are prohibited.

(3) INDUSTRIAL WASTES. The department of natural resources shall be contacted in regard to the treatment and disposal of all industrial wastes including those combined with domestic waste.

(4) CLEAR WATER. The discharge of surface, rain and other clear water into a private sewage system is prohibited.

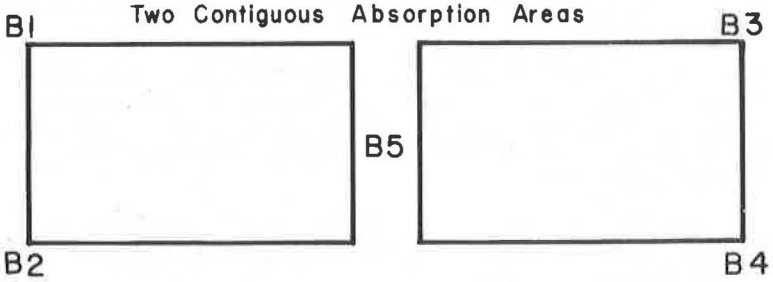
(5) WATER SOFTENER AND IRON FILTER BACKWASH. Water softener or iron filter discharge may be directed to the private sewage system, or to the ground surface if a nuisance is not created.

(6) FLOODPLAIN. (a) *General.* A soil absorption system shall not be installed in a floodway. Soil absorption systems in the flood fringe shall not be installed unless written approval is received from the department. The department shall receive written approval from the local government and the department of natural resources for construction in, and filling of, the floodplain area prior to reviewing and approving plans.

(b) *New developments.* 1. Floodway. New private sewage systems shall not be installed in a floodway.

2. Exceptions. On new parcels, the requirement of 6 borings (3 for initial area and 3 for replacement area) may be reduced to 5 if the initial and replacement system areas are contiguous and one boring is made on each outer corner of the contiguous area and the fifth boring is made between the system areas. See diagram.

Example Of Soil Boring Locations For Two Contiguous Absorption Areas



3. Reports. Regardless of the number of borings evaluated and conditions observed in borings, all soil information derived from borings shall be reported.

4. Location. Each borehole location shall be accurately located and referenced to the vertical elevation and horizontal reference point. Reports of boring locations shall either be drawn to scale, or have the horizontal dimensions clearly indicated between the borings and the horizontal reference point.

(c) *Soil description.* Soil profile descriptions shall be written for all borings. The thickness in inches of the different soil horizons observed shall be indicated. Horizons shall be differentiated on the basis of color, texture, soil mottles or bedrock. Depths shall be measured from the ground surface.

(d) *Soil mottles.* Zones of seasonal or periodic soil saturation shall be estimated at the highest level of soil mottles. The county or department may require a detailed description of the soil mottling on a marginal site. The abundance, size, contrast and color of the soil mottles should be described in the following manner.

1. Abundance. Abundance shall be described as few if the mottled color occupies less than 2% of the exposed surface; common if the mottled color occupies from 2 to 20% of the exposed surface; or many if the mottled color occupies more than 20% of the exposed surface.

2. Size. Size refers to length of the mottle measured along the longest dimension and shall be described as fine if the mottle is less than 5 millimeters; medium if the mottle is from 5 millimeters to 15 millimeters; or coarse if the mottle is greater than 15 millimeters.

3. Contrast. Contrast refers to the difference in color between the soil mottle and the background color of the soil and is described as faint if the mottle is evident but recognizable with close examination; distinct if the mottle is readily seen but not striking; or prominent if the mottle is obvious and one of the outstanding features of the horizon.

4. Color. The color(s) of the mottle(s) shall be given.

(e) *Observed groundwater.* The depth to groundwater if present shall be reported. Observed groundwater shall be reported at the level groundwater reaches in the soil borehole, or at the highest level of sidewall seep-

age into the boring. Measurements shall be made from ground level. Soil above the water level in the boring shall be checked for the presence of soil mottles.

(f) *Color patterns not indicative of soil saturation.* 1. One foot exception. Soil profiles that have an abrupt textural change with finer textured soils overlying more than 4 feet of unmottled, loamy sand or coarser soils can have a mottled zone in the finer textured material. If the mottled zone is less than 12 inches thick and is immediately above the textural change, then a soil absorption system may be installed in the loamy sand or coarser material below the mottled layer. If any soil mottles occur within the sandy material, then the site shall be unsuitable. The county or department may determine certain coarse sandy loam soils to be included as a coarse material.

2. Other soil color patterns. Soil mottles can occur that are not due to zones of seasonal or periodic soil saturation. Examples of such soil conditions not limited by enumeration are:

a. Soil mottles formed from residual sandstone deposits.

b. Soil mottles formed from uneven weathering of glacially deposited material, or glacially deposited material that may be naturally gray in color. This may include concretionary material in various stages of decomposition.

c. Deposits of lime in a profile derived from highly calcareous parent material.

d. Light colored silt coats deposited on soil ped faces.

e. Soil mottles that are usually vertically oriented along old or decayed root channels with a dark organic stain usually present in the center of the mottled area.

3. Reporting exceptions. A certified soil tester shall report any mottled soil condition. If soil mottles are observed that may not be due to soil saturation, the soil tester still shall report such condition and may request a determination from the department or the county authority on the acceptability of the site.

(g) *Bedrock.* The depth to bedrock except sandstone shall be established at the depth in a soil boring where greater than 50% of the weathered in-place material is consolidated. Sandstone bedrock shall be established at the depth where an increase in resistance to penetration of a knife blade occurs.

(4m) SOIL EVALUATION FOR ABSORPTION SYSTEMS. System sizing and siting for all soil absorption systems shall be based on soil morphological conditions specified in sub. (4) and Table 0, or percolation tests specified in sub. (5). Percolation tests shall not be performed nor shall percolation test results be accepted after July 1, 1994 except in accordance with sub. (4n).

TABLE 0

MAXIMUM WASTEWATER INFILTRATION RATES
FOR SOIL ABSORPTION SYSTEMS

	Soil Condition	If the answer to the condition is yes, the infiltrative, exposed natural soil surface for the system shall be sized using the identified soil loading factor in gallons per square foot per day [1,2,3]. Beds	Trenches
A.	Is the soil texture of the entire profile 3 feet below the infiltrative surface extremely gravelly sand, gravelly coarse sand or coarser?	0.4[4]	0.4[4]
B.	Is the soil structure of the horizon moderate or strong platy?	NP[5,6]	0.2[7]
C.	Is the soil texture of the horizon sandy clay loam, clay loam, silty clay loam, silt loam or finer, and the soil structure weak platy?	NP[5,6]	0.3[7]
D.	Is the moist soil consistence of the horizon stronger than firm or any cemented class?	NP[5,6]	NP[5,6]
E.	Is the soil texture of the horizon sandy clay, clay or silty clay of high clay content, and the soil structure massive or weak?	NP[5,6]	NP[5,6]
F.	Is the soil texture of the horizon sandy clay loam, clay loam, silty clay loam, silt or silt loam and the soil structure massive?	NP[5,6]	0.2[7]
G.	Is the soil texture of the horizon sandy clay, clay or silty clay of low clay content, and the soil structure moderate or strong?	0.2	0.3
H.	Is the soil texture of the horizon sandy clay loam, clay loam, silty clay loam or silt loam and the soil structure weak?	0.2	0.3
I.	Is the soil texture of the horizon sandy clay loam, clay loam or silty clay loam, and the soil structure moderate or strong?	0.4	0.5
J.	Is the soil texture of the horizon loam or sandy loam and the soil structure massive?	0.3	0.4
K.	Is the soil texture of the horizon loam or sandy loam and the soil structure weak?	0.4	0.5
L.	Is the soil texture of the horizon sandy loam, loam or silt loam, and the soil structure moderate or strong?	0.5	0.6
M.	Is the soil texture of the horizon very fine sand or loamy very fine sand? Or condition N below but with massive soil structure?	0.4	0.5
N.	Is the soil texture of the horizon fine sand or loamy fine sand?	0.5	0.6
O.	Is the soil texture of the horizon loamy sand, sand or coarse sand?	0.7	0.8

Footnotes to Table 0

1. The infiltration rates may be adjusted due to crossing horizons at the proposed infiltrative surface. Where such conditions occur, a weighted average may be used to determine the infiltration rate.
2. The infiltration rates and soil conditions specified may be verified by the county or department, who may require modification of these rates, particularly where soil conditions exist that are not specifically referenced in this table.
3. A soil description report (SBD-8330) shall be completed for each soil profile. The reported texture, structure and consistence shall be used in calculating the loading rate of the infiltrative soil surface.
4. Pressure distribution shall be provided in accordance with s. ILHR 83.14, except that doses shall be provided more than 4 times per day to increase retention time. Department written approval is required for sites where voids between gravels and cobbles are not filled with soil material of 2 millimeters or less in size. If at least a 6-foot separation below the proposed system to a limiting factor is evaluated and determined, or if a sand textured blanket at least one-foot thick is provided at the infiltrative surface, then a soil loading rate of 0.8 may be used with or without pressure distribution. Split spoon or power auger equipment may be used for evaluations at depths of more than 3 feet below the proposed system, provided such usage is noted on the soil description report.
5. NP = Not permitted. Systems may be permitted in these soils only with prior department approval. Site specific department approval will not be required where standard approvals have been issued based on a design concept or regional soil conditions.
6. Soil horizons meeting conditions D or E are not permitted within 3 feet below the infiltrative surface of either seepage beds or trenches. Soil horizons meeting conditions B, C or F are not permitted within 3 feet below the infiltrative surface of seepage beds.
7. Pressure distribution is required.

(4n) PERCOLATION TEST RESULTS FOR ABSORPTION SYSTEMS. (a) New systems. For systems constructed after July 1, 1991 soil absorption areas based on percolation test results shall be sized in accordance with Table 1 or 4 if the following conditions are met:

1. The percolation test results are filed in accordance with sub. (1) with the county prior to July 1, 1994;

2. A sanitary permit is obtained and is not allowed to expire; and

3. Construction began after July 1, 1991 but prior to July 1, 1994.

(b) Replacement systems. For existing systems constructed prior to July 1, 1991 percolation test results may be used indefinitely for sizing replacement systems in replacement areas that have been established in accordance with sub. (2) (a). That sizing shall be in accordance with the rules in effect at the time the sanitary permit for the existing system was issued by the county. If a replacement area had not been previously established, system sizing shall be conducted as specified in sub. (4m).

(5) PERCOLATION TESTS AND PROCEDURES. (a) *Number and location.* At least 3 percolation tests in each system area shall be conducted. The holes shall be located uniformly in the location and to the bottom depth of the proposed absorption system. More percolation tests may be necessary depending on system design.

(b) *Exemption.* Percolation tests may not be required where a detailed soil map clearly indicates loamy sand or coarser material conditions at the depth of the proposed system, and for 3 feet below and the soil condition is confirmed by soil borings. The percolation rate for design purposes shall be calculated using the slowest permeability listed in the soil survey report for the map unit. The county or department may require proof of the map findings or soil texture and resultant anticipated percolation rate. The exemption of percolation tests does not eliminate the required bore hole test data.

(c) *Percolation test hole.* The test hole shall be dug or bored. It shall have vertical sides and have a horizontal dimension of 4 to 8 inches. The bottom and sides of the hole shall be carefully scratched with a sharp pointed instrument to expose the natural soil. All loose material shall be removed from the hole and the bottom shall be covered with 2 inches of gravel or coarse sand.

(d) *Test procedure—sandy soils.* For tests in sandy soils the hole shall be carefully filled with clear water to a minimum depth of 12 inches above the bottom of the hole. The time for this amount of water to seep away shall be determined and this procedure shall be repeated. If the water from the second filling of the hole seeps away in 10 minutes or less, the test may proceed immediately as follows. Water shall be added to a point not more than 6 inches above the gravel or coarse sand. Thereupon, from a fixed reference point, water levels shall be measured at 10-minute intervals for a period of one hour. If 6 inches of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 6 inches. If 6 inches of water seeps away in less than 2 minutes, the test shall be stopped and a rate of less than 3 minutes per inch shall be reported. The final water level drop shall be used to calculate the percolation rate. Soils not meeting the above requirements shall be tested as in par. (e).

(e) *Test procedure—other soils.* The hole shall be carefully filled with clear water and a minimum water depth of 12 inches shall be maintained above the bottom of the hole for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours shall not be removed. Thereafter the soil shall be allowed to swell not less than 16 hours nor more than 30 hours. Immediately following the soil swelling period, the measurements for determining the percolation rate shall be made as follows. Any soil which has sloughed into the hole shall be removed and the water level shall be adjusted to 6 inches over the gravel or coarse sand. Thereupon, from a fixed reference point, the water level shall be measured at 30-minute intervals for a period of 4 hours unless 2 successive water level drops do not vary by more than 1/16 of an inch. At least 3 water level drops shall be observed and recorded. The hole shall be filled with clear water to a point not more than 6 inches above the gravel or coarse sand whenever it becomes nearly empty. Adjustment of the water level shall not be made during the last 3 measurement periods except to the limits of the last measured water level drop. When the first 6 inches of water seeps away in less than 30 minutes, the time interval between measurements shall be 10 minutes and the test run for one hour. The water depth shall not exceed 6 inches at any time during the measurement period. The drop that occurs during the final measurement period shall be used in calculating the percolation rate.

(f) *Mechanical test equipment.* Mechanical percolation test equipment shall be submitted to the department for approval.

(6) VERIFICATION. (a) *Borings.* Depth to soil mottles, depth to high groundwater, soil textures, depth to bedrock and land slope may be subject to verification by the county or the department. The county or the department may require backhoe pits to be provided for verification of soil boring data.

(b) *Percolation tests.* The results of percolation tests may be subject to verification by the county or the department. The county or the depart-

ment may require that percolation tests be reconducted under supervision.

(c) *Filling.* Where the natural soil condition has been altered by filling or other methods used to improve wet areas, the department may require observation of high groundwater levels under saturated soil conditions.

Note: Detailed soil maps are of value for determining estimated percolation rates and other soil characteristics.

(7) MONITORING GROUNDWATER LEVELS. (a) *General.* A property owner or developer may provide documentation to the department and the county that soil mottling or other soil color patterns at a particular site are not an indication of seasonally saturated soil conditions or high groundwater levels. Documentation shall be made by conforming to the criteria in either subd. 1. or 2., unless sites are monitored against broad regional water tables in accordance with par. (b) 2.

1. A written report evaluating soil mottling and soil color patterns may be submitted to the department for review and approval. The report shall be prepared by a certified soil tester who has passed the examination specified in s. ILHR 81.646. The written report shall include the following:

a. A review of the soils and landscape in the area of the proposed system installation;

b. Soil descriptions to a depth of 5 feet below the bottom of the proposed system, to the depth of bedrock, or to a saturated zone, whichever is shallower, using the United States department of agriculture system. The soil description shall identify each soil horizon for its texture, structure, consistence, Munsell colors, depth measured from the soil surface, macroporosity, continuity, boundary conditions, and any other factors that would influence the operation or design of the proposed soil absorption system;

c. Description of the mottling including size, abundance, contrast and Munsell color and reasons for the mottling;

d. A recommended design loading rate from Tables 0, 1 or 4; linear loading rate; depth of the proposed system, geometry, and type of suitable soil absorption system that should be used on the site for disposal of wastewater;

e. The soil types or series listed in a United States department of agriculture soil survey in the immediate area;

f. A description of the site, including a 2 foot topographic contour map of the system area and 25 feet beyond; description of the vegetation and current land use; details of any artificial drainage; location of all compacted areas including roads and drives; and drainage patterns that may affect the proposed soil absorption system; and

g. Written comments provided by the county. If the county has no comments, the county shall so state.

2. Groundwater levels may be monitored at specific sites in accordance with the procedures in pars. (b) through (f). Written notice of an intent to monitor shall be submitted to the department and the county with a completed "Soil Description Report" (SBD-8330) prior to monitoring.

Note: The Soil Description Report form (SBD-8330) is available from Safety and Buildings Division, Private Sewage Section, P.O. Box 7969, Madison, Wisconsin, 53707.

3. The report shall be submitted to the department for review and approval. The department may perform an onsite inspection to review the soil conditions.

(b) *Precipitation.* 1. In areas not subject to broad regional water tables, monitoring results shall be considered when the highest of either the precipitation received at a local station, or the average of the 3 closest local stations, equals or exceeds, for both the periods (September 1 through the last day of February, and March 1 through May 31), 8.5 inches and 7.6 inches respectively.

2. Where sites are subject to broad regional water tables, such as large areas of sandy soils, the fluctuation observed over a several year cycle shall be considered. In such cases, data obtained from the United States geological survey or other independent agency utilizing United States geological survey procedures shall be used to determine if a regional water table is at or near its normal level. Determinations shall be made using hydrograph data and submitted on forms provided by the department.

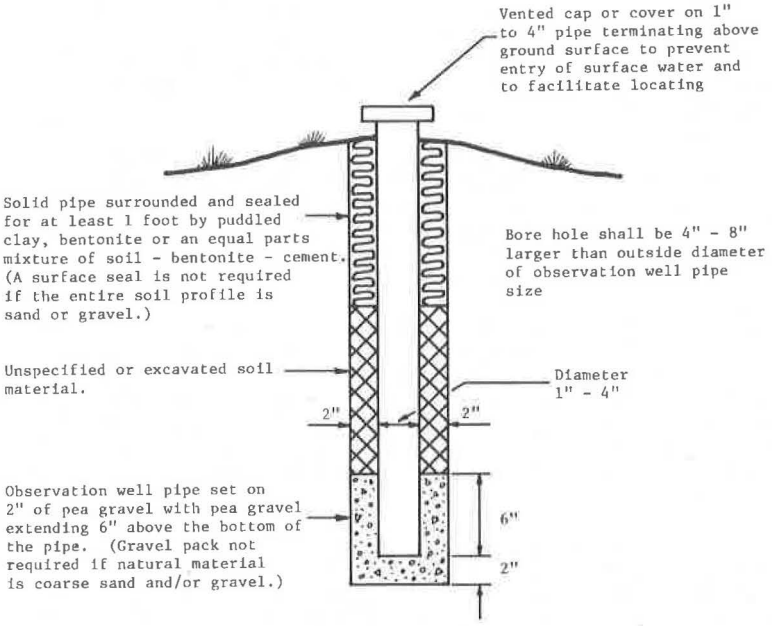
(c) *Artificial drainage.* Areas which are to be monitored shall be carefully checked for drainage tile and open ditches which could have altered natural high groundwater levels. Where such factors are involved, information on the location, design, ownership and maintenance responsibilities for such drainage shall be provided. Documentation shall be provided to show that the drainage network has an adequate outlet, and can and will be maintained. Sites affected by agricultural drain title shall not be acceptable for system installation.

(d) *Procedures.* 1. Soil tester. Monitoring shall be done by a certified soil tester.

2. Notification. The certified soil tester shall notify in writing, the county sanitary permit issuing authority or the department, of intent to monitor. It is expected the county authority or department may field check the monitoring at least once during the time of expected saturated soil conditions.

3. Number of wells. At least 3 wells shall be monitored at a site for a proposed system and replacement. If in the judgement of the county authority or the department more than 3 monitoring sites are needed, the certified soil tester shall be so advised in writing.

4. Monitoring well design. Monitoring wells designed as shown in the following sketch shall be constructed for monitoring. At least 2 wells shall extend to a depth of at least 6 feet below ground surface and shall be a minimum of 3 feet below the designed system depth. However, with layered mottled soil over permeable unmottled soil, at least one well shall terminate within the mottled layer. Site conditions may, in some cases, require monitoring at greater depths. It will be the responsibility of the certified soil tester to determine the depth of the monitoring wells for each specific site and if in doubt, they shall request the guidance of the county or the department.



(e) *Observations.* 1. Minimum frequency. The first observation shall be made on or before March 15th. Observations shall be made thereafter every 7 days or less until June 1st or until the site is determined to be unacceptable, whichever comes first. If water is observed above the critical depth at any time, an observation shall be made 1 week later. If water is present above the critical depth at both observations, monitoring may cease because the site is considered unacceptable. If water is not present above the critical depth at the second observation, monitoring shall continue until June 1st. If any 2 observations 7 days apart show the presence of water above the critical depth, the site is unacceptable and the department shall be notified in writing.

2. More frequent interval. The occurrence of rainfall(s) of ½ inch or more in a 24 hour period during monitoring may necessitate observations at more frequent intervals.

(f) *Reporting data.* 1. Unsuccessful site. When monitoring shows saturated conditions, data giving test locations, ground elevations at the wells, soil profile descriptions, soil series if available from soil maps, dates observed, depths to observed water and local precipitation data (monthly from September 1st to June 1st and daily during monitoring) shall be submitted in writing, with 2 copies sent to the department and one to the county authority.

2. Successful site. When monitoring discloses that the site is acceptable, documentation including location and depth of test holes, ground elevations at the wells, soil profile descriptions; soil series if available from soil maps; dates observed; results of observations, local precipitation data (monthly from September 1st to June 1st and daily during monitoring) and information on artificial drainage shall be submitted in

writing, with 2 copies to the department and one to the county authority. A request to install a soil absorption system shall be made to the department along with the appropriate review fee in s. ILHR 83.08 (3) (c).

(8) WINTER SOIL TESTING. (a) *General.* Soil testing should be done only when weather and light conditions make accurate evaluation of site conditions possible. Soil testing attempted under winter conditions is difficult and precautions should be observed.

(b) *Soil borings.* Soil borings and profile evaluations conducted between November 15th and March 15th shall be in accord with the following procedures. Borings shall be made with a backhoe. Soil profiles shall only be evaluated between the hours of 10:00 a.m. and 2:00 p.m. Soil profiles shall not be evaluated during times when the sky is completely overcast. When soil horizons are frozen, soil material must be thawed for hand texturing.

(c) *Percolation tests.* Percolation tests that are unprotected shall be conducted only on days when the air temperature is 20° F. or higher and the wind velocity is 10 m.p.h. or less. A heated structure or other protection from freezing shall be provided when the weather conditions listed above are not met. The bottom of the percolation hole shall be at least 12 inches below frost depth. If water freezes in the test hole at any time, the test data shall be void.

History: Cr. Register, December, 1980, No. 300, eff. 1-1-81; renum. from H 63.09, Register, June, 1983, No. 330, eff. 7-1-83; cr. (4m) and (4n), r. and recr. (7) (a) and (b), Register, June, 1991, No. 426, eff. 7-1-91.

ILHR 83.10 Site requirements. (1) SOIL ABSORPTION SITE LOCATION. The surface grade of all soil absorption systems shall be located at a point lower than the surface grade of any nearby water well or reservoir on the same or adjoining property, however, when this is not possible, the site shall be so located that surface water drainage from the site is not directed toward a well or reservoir and will by-pass the well or reservoir site by several feet. The soil absorption system shall be located not less than 5 feet from any lot line; 10 feet from a water service, or an uninhabited slab constructed building; 15 feet fom a swimming pool or habitable slab constructed building measured from the slab; 25 feet from the below grade foundation of any occupied or habitable building or dwelling, public water main or cistern; 50 feet from any water well, reservoir or from the high water mark of any lake, stream or other watercourse. Private sewage systems in compacted areas such as parking lots and driveways are prohibited. Surface waters shall be diverted away from any soil absorption site on the same or neighboring lots.

(2) GROUNDWATER, BEDROCK OR SLOWLY PERMEABLE SOILS. There shall be a minimum of 3 feet of soil between the bottom of the soil absorption system and high groundwater, or bedrock. Soil having a percolation rate of 60 minutes per inch or faster shall exist for the depth of the proposed soil absorption system and for at least 3 feet below the proposed bottom of the soil absorption system. There shall be 56 inches of suitable soil from original grade for a conventional soil absorption system.

(3) PERCOLATION RATE OR SOIL EVALUATION—TRENCH OR BED. A trench or bed type soil absorption system shall not be installed if the percolation rate for any one of the 3 tests is greater than 60 minutes per

inch. The soil infiltration rate listed in Table 0 or the slowest percolation rate shall be used to determine sizing of the soil absorption area.

(4) PERCOLATION RATE OR SOIL EVALUATION—SEEPAGE PIT. For a seepage pit, percolation tests shall be made in each horizon penetrated below the inlet pipe. Soil strata in which the percolation rates are greater than 30 minutes per inch shall not be included in sizing the soil absorption area. The infiltration rate determined from Table 0 or the slowest percolation rate shall be used to size the soil absorption area.

(5) SOIL MAPS. When a parcel of land consists entirely of soils having very severe or severe limitations for on-site liquid waste disposal as determined by use of a detailed soil map and interpretive data, that map and interpretive data may be used as a basis for denial for an on-site waste disposal system. However, the property owner shall be permitted to present evidence that a suitable site for an on-site liquid waste disposal system does exist.

(6) FILLED AREA. (a) *Departmental approval.* A soil absorption system shall not be installed in a filled area unless written approval is received from the department except if filled prior to certification as a subdivision lot under ch. ILHR 85.

(b) *Placement of fill.* Placement of fill does not guarantee approval for the installation of a soil absorption system. When evidence is made available showing that the filled area does meet the code requirements with regard to this area, percolation and elevation; departmental approval can be expected. This, in effect, would support application for a conventional system designed in fill.

(c) *Site and soil requirements.* 1. Bedrock. Sites that have less than 56 inches but at least 30 inches of soil over bedrock, where the original soil texture is sand or loamy sand (sand that has very few fine particles of silt or clay), may be filled with the same soil texture as the natural soil or coarser material up to and including medium sand in an attempt to overcome the site limitations. The fill material shall not be of a finer texture than the natural soil.

2. High groundwater. Sites that have less than 56 inches of soil over high groundwater or estimated high groundwater, where the original soil texture is sand or loamy sand (sand that has very few fine particles of silt or clay), may be filled following the criteria noted in this subsection.

3. Natural soil. Sites with soils finer than sand or loamy sand shall not be approved for systems in fill.

4. Monitoring. Sites that will have 36 inches of soil or less above high groundwater after the topsoil is removed shall be monitored for high groundwater levels in the filled area in accordance with s. ILHR 83.09 (7).

5. Inspection of fill. Placement of the fill material shall be inspected by the county or the department.

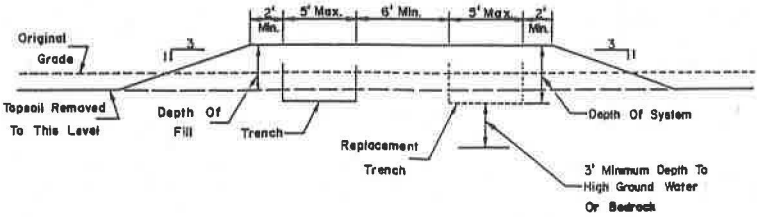
(d) *Design requirements.* 1. Size. A filled area shall be large enough to accommodate a shallow trench system and a replacement system. The size of the filled area shall be determined from the percolation tests or soil infiltration rate as determined from Table 0, based on natural soil and use of the building. When any portion of the trench system or its replace-

ment is in the fill, the fill shall extend to 2 feet beyond all sides of both systems before the side slope of the fill begins.

2. Soil test. Soil borings and percolation tests shall be conducted before filling to determine soil textures and depth to high groundwater or bedrock.

3. Topsoil. Vegetation and topsoil shall be removed prior to filling.

4. Side slope. Slopes at the edge of the filled areas can be a maximum 3 to 1 ratio, providing the 2 foot separating distance is maintained. See following sketch.



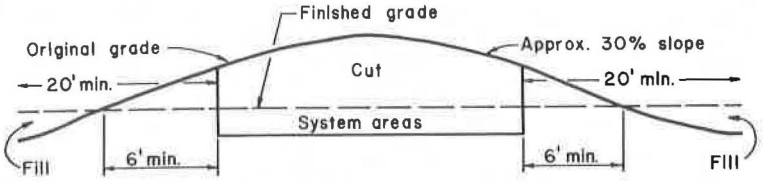
(7) ALTERING SLOPES. (a) *General.* In some cases, areas with slopes exceeding those specified in s. ILHR 83.09 (3) may be graded and reshaped to provide soil absorption sites. Care must be taken when altering any natural landscapes. Successful site alteration may be accomplished in accord with the following:

(b) *Site investigation.* Soil test data shall show that a sufficient depth of suitable soil material is present to provide the required amount of soil over bedrock and groundwater after alteration. In addition, a complete site evaluation as specified in s. ILHR 83.09 shall be performed after alteration of the site.

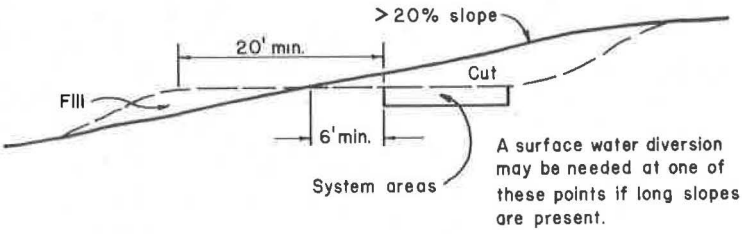
(c) *System location.* A soil absorption system must be installed in the cut area of an altered site. A soil absorption system shall not be installed in the fill area of an altered site. The area of fill on an altered site may be used as a portion of the required 20 foot separating distance from the crown of a critical slope. There shall be a minimum of 6 feet of natural soil between the edge of a system area and the downslope side of the altered area.

(d) *Site protection.* All altered slope areas shall be altered such that surface water drainage will be diverted away from the system areas. In some cases this may require the use of grassed waterways or other means of diverting surface waters. All disturbed areas shall be seeded or sodded with grass and appropriate steps must be taken to control erosion. Conceptual design sketches for altering slopes follow.

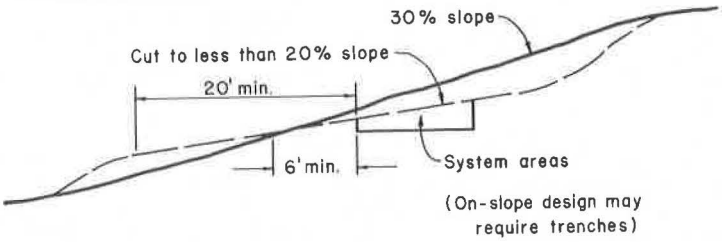
A. Excavation of complete hilltop



B. Excavation into hillside



C. Regrade of hillside



History: Cr. Register, December, 1980, No. 300, eff. 1-1-81; renum. from H 63.10 and am. (6) (a), Register, June, 1983, No. 330, eff. 7-1-83; am. (3), (4), (6) (d) 1. and 4., Register, June, 1991, No. 426, eff. 7-1-91.

ILHR 83.11 Initial adverse determination. In all cases where property owners and/or developers receive initial adverse determinations and sanitary permits are refused by the county or the department, rejecting the use of a conventional private sewage system because of site limitation, the aggrieved party shall be given the reason, in writing, for rejection and any alternate course of actions available to them. The department shall provide to all sanitary permit issuing agents a list of alternatives which may be applied in the event conventional means of waste disposal are not acceptable.

History: Cr. Register, December, 1980, No. 300, eff. 1-1-81; renum. from H 63.11, Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 83.12 Sizing soil absorption systems. (1) GENERAL. Effluent from septic tanks and other approved treatment tanks shall be disposed of by soil absorption or by such other manner approved by the department.

(a) *Daily wastewater volumes of 5,000 gallons or less.* For systems having a daily effluent application of 5,000 gallons or less, sizing shall be in accord with this section.

(b) *Daily wastewater volumes of 5,000 gallons or more.* For systems receiving effluents in excess of 5,000 gallons per day, this section shall apply except that 2 systems of equal size shall be required. Each system shall have a capacity of no less than 75% of the area required for a single system. A suitable means of alternating waste application shall be provided. The dual system shall be considered as one system.

(c) *Pressure system.* A pressure distribution network may be used in place of a conventional or dosing conventional soil absorption system where a site is suitable for a conventional private sewage system. Pressure distribution systems may be approved as an alternative private sewage system if the site is unsuitable for conventional treatment. For sizing and design criteria, see s. ILHR 83.14.

(2) METHOD OF DISCHARGE. (a) *Daily flow 1,500 gallons or less.* For facilities having a daily effluent application of 1,500 gallons or less, flow from the septic or treatment tank to the soil absorption system may be by gravity or by dosing.

(b) *Systems over 1,500 gallons.* For systems over 1,500 gallons, the tank effluent must be discharged by pumping or by use of an automatic siphon.

Note: The dosing of effluents is recommended for all systems.

(3) SIZING—RESIDENTIAL. The bottom area of seepage trenches or beds, or the side wall area of seepage pits serving residential property shall be determined from the soil infiltration rate listed in Table 0 or soil percolation rate tested in Table 1 and the type of system construction.

Table 1

SIZING SOIL ABSORPTION SYSTEMS FOR PUBLIC BUILDINGS AND RESIDENTIAL BUILDINGS USING PERCOLATION TESTS RESULTS

Percolation Rate (minutes per inch)	Minimum Absorption Area in Square Feet			
	Public Buildings (per factor from Table 2)		Residential Property (per bedroom)	
	Seepage Trenches or Pits	Seepage Beds	Seepage Trenches or Pits	Seepage Beds
0 to less than 10	110	140	195	240
10 to less than 30	165	205	275	350
30 to less than 45	200	250	315	390
45 to 60	220	280	330	415

(4) SIZING—PUBLIC BUILDINGS. The soil absorption system area for seepage trenches or beds required for public buildings is dependent upon building usage, system design, the soil infiltration rate or determined from Table 0 or the percolation rate. If percolation tests are conducted,

Tables 1 and 2 and the following formula shall be used to calculate the required soil absorption area:

(Factor in Column 3, Table 2) x (Number of Units) x (Min. Absorption Area from Table 1).

Table 2

COLUMN 1	COLUMN 2	COLUMN 3
Building Classification	**Units**	**Factor**
Apartment building	1 per bedroom	1.5
Assembly hall—no kitchen	1 per person	0.02
Bar and cocktail lounge	1 per patron space	0.2
Beauty salon	1 per station	2.4
Bowling alley	1 per bowling lane	2.5
Bowling alley with bar	1 per bowling lane	4.5
Camp, day use only	1 per person	0.2
Camp, day and night	1 per person	0.45
Campground and camping resort	1 per camping space	0.9
Campground and sanitary dump station	1 per camping space	0.085
Car wash (automatic)	Subject to state approval	
Car wash (per car handwash)	1 per car	1.0
Catch basin—garages, service stations, etc.	1 per basin	2.0
Catch basin—truck wash	1 per truck	5.0
Church—no kitchen	1 per person	0.04
Church—with kitchen	1 per person	0.09
Condominium	1 per bedroom	1.5
Country club	Subject to state approval	
Dance hall	1 per person	0.06
Dining hall—kitchen and toilet	1 per meal served	0.2
Dining hall—kitchen only	1 per meal served	0.06
Dining hall—kitchen and toilet waste with dishwasher and/or food waste disposer	1 per meal served	0.25
Drive-in restaurant (all paper service)	1 per car space	0.3
Drive-in restaurant (inside seating)	1 per seat	0.3
Drive-in theater	1 per car space	0.1
Employes—in all buildings	1 per person	0.4
Hotel or motel and tourist rooming house	1 per room	0.9
Floor drain	1 per drain	1.0
Hospital	1 per bed space	2.0
Medical office buildings, clinics and dental offices		
Doctors, nurses and medical staff	1 per person	0.8
Office personnel	1 per person	0.25
Patients	1 per person	0.15
Migrant labor camp—central bathhouse	1 per employe	0.25
Mobile home (single installation)	(Use ILHR 83.12 (3))	
Mobile home park	1 per mobile home site	3.0
Nursing or rest homes	1 per bed space	1.0
Outdoor sports facility—toilet waste only	1 per person	0.085
Park—toilet waste only	1 per acre	4.0
Park—showers and toilets	1 per acre	8.0
Restaurant—kitchen waste only	1 per seating space	0.18
Restaurant—toilet waste only	1 per seating space	0.42
Restaurant—kitchen and toilet	1 per seating space	0.6
Restaurant—(24-hr) kitchen and toilet	1 per seating space	1.2
Restaurant—dishwasher and/or food waste disposer	1 per seating space	0.15

Table 2 (continued)

COLUMN 1 Building Classification	COLUMN 2 Units	COLUMN 3 Factor
Restaurant—(24-hr) with dishwasher/disposer	1 per seating space	1.5
Retail store	1 per customer	0.03
(Number of customers = 70% total area divided by 30 square feet/customer.)		
Self-service laundry—toilet wastes only	1 per machine	1.0
Auto washer (service bldgs., etc.)	1 per machine	6.0
Service station	1 per car served	0.15
Swimming pool bathhouse	1 per person	0.2
School—no meals, no showers	1 per classroom	5.0
School—meals served or showers	1 per classroom	6.7
School—meals and showers	1 per classroom	8.0
Showers—public	1 per shower	0.3

History: Cr. Register, December, 1980, No. 300, eff. 1-1-81; renum. from H 63.12, Register, June, 1983, No. 330, eff. 7-1-83; am. (3) and (4), Register, June, 1991, No. 426, eff. 7-1-91.

ILHR 83.125 Sizing using soil evaluation. The soil absorption system area based on soil evaluation shall be equal to the flow of wastewater in gallons per day divided by the design loading factor in gallons per square foot per day from Table 0. Wastewater flow shall be determined from Table 12 for public buildings, or be based on 150 gallons per day per bedroom for a residential property.

History: Cr. Register, June, 1991, No. 426, eff. 7-1-91.

ILHR 83.13 Installation—conventional soil absorption systems. (1) SEEPAGE TRENCH EXCAVATIONS. Seepage trench excavations shall be 1 to 5 feet in width. Trench excavations shall be spaced at least 6 feet apart. The absorption area of a seepage trench shall be computed by using the bottom area only. The bottom area of the distribution header excavation shall not be computed as absorption area. Individual seepage trenches should not be over 100 feet long.

(2) SEEPAGE BED EXCAVATIONS. Seepage bed excavations shall be more than 5 feet wide and have more than one distribution pipe. The absorption area of a seepage bed shall be computed by using the bottom area only. Distribution piping in a seepage bed shall be uniformly spaced, no more than 6 feet and no less than 3 feet apart, and no more than 3 feet or less than 1 foot from the sidewall.

(3) SEEPAGE PITS. A seepage pit shall have a minimum inside diameter of 5 feet and shall consist of a chamber walled-up with material such as perforated precast concrete ring, concrete block, brick or other material approved by the department which allows effluent to percolate into the surrounding soil. The pit bottom shall be left open to the soil. Aggregate of ½ to 2½inches in size shall be placed into a 6-inch minimum annular space separating the outside wall of the chamber and sidewall excavation. The depth of the annular space shall be measured from the inlet pipe to the bottom of the chamber. Each seepage pit shall be provided with a 24-inch manhole extending to within 6 inches of the ground surface and a 4-inch diameter fresh air inlet which shall meet the requirements of sub. (7). An observation pipe is not required. Seepage pits shall be located 6 feet or more apart. Excavation and scarifying shall be in accord with sub. (4). The effective area of a seepage pit shall be the vertical wall area of the walled-up chamber for the depth below the inlet for all strata for which the percolation rates are less than 30 minutes per inch. The 6 inches of annular opening outside the vertical wall area may be included for determination of effective area. Table 3 may be used for determining the effective sidewall area of circular seepage pits:

Table 3

EFFECTIVE ABSORPTION AREA FOR SEEPAGE PITS

Inside diameter of chamber in feet plus 1 foot for wall thickness plus one foot for annular space	Depth in feet of Permeable Strata Below Inlet					
.....	3	4	5	6	7	8
7	75	101	126	151	176	201
8	85	113	142	170	198	226
9	94	126	157	188	220	251
10	104	138	173	208	242	277
12	123	163	204	245	286	327

(4) EXCAVATION AND CONSTRUCTION. The bottom of a trench or bed excavation shall be level. Seepage trenches or beds shall not be excavated when the soil is so wet that soil material rolled between the hands will form a soil wire. All smeared or compacted soil surfaces in the side walls or bottom of the seepage trench or bed excavation shall be scarified to the depth of smearing or compaction and the loose material removed. If rain falls on an open excavation, the soil must be left until dry enough that a soil wire will not form when soil from the excavation bottom is rolled between the hands. The bottom area shall then be scarified and loose material removed.

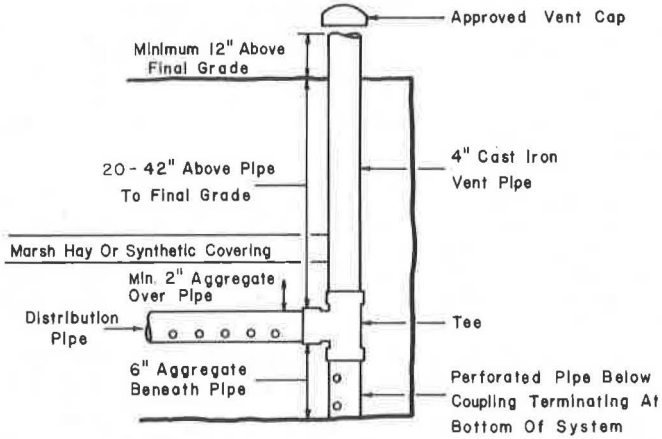
(5) AGGREGATE AND BACKFILL. A minimum of 6 inches of aggregate ranging in size from ½ to 2½ inches shall be laid into the trench or bed below the distribution pipe elevation. The aggregate shall be evenly distributed a minimum of 2 inches over the top of the distribution pipe. The aggregate shall be covered with synthetic materials approved by the department or with 9 inches of uncompacted marsh hay or straw. Building paper shall not be used to cover the aggregate. A minimum of 18 inches of soil back fill shall be provided above the covering.

(6) DISTRIBUTION PIPING. (a) *General.* Distribution piping for gravity systems shall be a minimum of 4 inch I.D. approved pipe. The distribution header shall be constructed of approved solid wall pipe. The top of the distribution piping shall be laid 8 to 42 inches below the original surface in continuous straight or curved lines. The slope of the distribution pipes shall be 2 to 4 inches per 100 feet.

(b) *Distribution of effluent.* Effluent should be distributed equally to all distribution pipes. Distribution of effluent to seepage trenches on sloping sites may be accomplished by utilizing a drop box design. Where dosing is required, the siphon or pump shall discharge a dose of minimum capacity equal to 75% of the combined volume of the distribution piping in the absorption system. See s. ILHR 83.12 (1) (b).

(7) FRESH AIR INLETS AND OBSERVATION PIPE. Fresh air observation inlets of cast iron shall be provided and connected to the perforated distribution pipe with an approved fitting or junction box and be placed so as to assure a free flow of air throughout the entire installation. The vent pipes shall be at least 4 inches in diameter and extend at least 12 inches above the final grade and terminate with an approved vent cap. The observation pipe shall be perforated and extend to the bottom of the aggregate. See following sketch. Fresh air inlets shall be located at least 25 feet from any window, door or air intake of any building used for human habitation. A maximum of 4 distribution pipe lines may be served by one common 4-inch vent when interconnected by a common header pipe.

Fresh Air Inlets And Observation Pipe



(8) WINTER INSTALLATION. (a) *General.* Installation of soil absorption systems during periods of adverse weather conditions is not recommended. A soil absorption system shall not be installed if the soil at the system elevation is frozen.

(b) *Removal of snow cover.* Snow cover must be removed from the soil absorption area before excavation begins. Snow must not be placed in a manner that will cause water to pond on the soil absorption system area during snowmelt.

(c) *Excavated and backfill material.* Excavated soil material may be used as backfill for the system if the following conditions are met: The excavated material must be protected from freezing. If the excavated material freezes solid, it shall not be used as backfill. The first 12 inches of backfill shall be loose, unfrozen soil. The protective covering over the bed or trench gravel shall be a synthetic material approved by the department or 9 inches of uncompacted marsh hay or straw.

(d) *System inspection.* Inspection of systems installed during winter conditions shall include inspection of the trench or bed excavation prior to placement of gravel and inspection of backfill material at the time of placement.

History: Cr. Register, December, 1980, No. 300, eff. 1-1-81; renum. from H 63.13, Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 83.14 Pressure distribution systems. (1) GENERAL. A pressure distribution system may be used on any site meeting the conventional private sewage system criteria listed in s. ILHR 83.10. A pressure distribution system may be approved as an alternative private sewage system under s. ILHR 83.22. There shall be a minimum depth to the top of the distribution piping of 6 inches from original grade for any pressure distribution system approved as an alternative private sewage system. The minimum required suitable soil depths from original grade for an alter-

native private sewage system using a pressure distribution network are as follows:

1 inch distribution pipe—49 inches suitable soil
2 inch distribution pipe—50 inches suitable soil
3 inch distribution pipe—52 inches suitable soil
4 inch distribution pipe—53 inches suitable soil

Department approval is required for use of a pressure distribution system.

(2) SOIL ABSORPTION AREA. (a) *Sizing.* The soil absorption area required based on percolation tests shall be computed by determining the estimated daily wastewater flow expressed in gallons per day and determining the design loading rate expressed in gallons per square foot per day. The required absorption area shall be determined by dividing the total wastewater flow by the design loading rate listed in Table 4.

(b) *Estimating wastewater flow.* 1. Residential. The estimated wastewater flow from a residence shall be 150 gallons per bedroom per day.

2. Public buildings. Daily wastewater flow rates for public buildings shall be based on the usage factors listed in s. ILHR 83.15 (3) (c) 2.

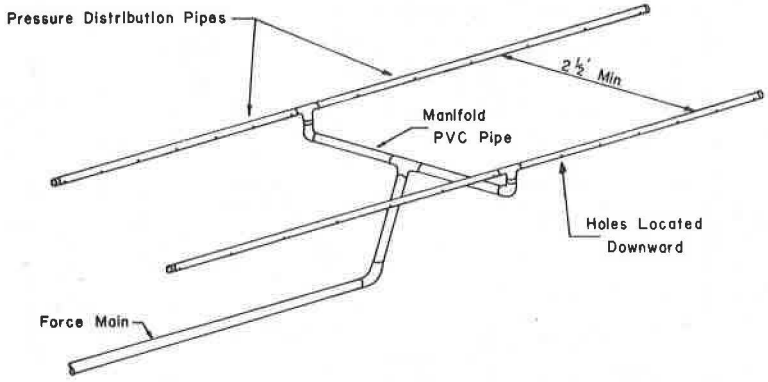
(c) *Design loading rate.* The design loading rate for a site based on the percolation test results shall be determined by Table 4.

Table 4

DETERMINING DESIGN LOADING RATE USING PERCOLATION TEST RESULTS

Percolation Rate (minutes per inch)	Design Loading Factor (gal/sq ft/day)
0 to less than 10	0.8
10 to less than 30	0.6
30 to less than 45	0.5
45 to 60	0.4

(3) PRESSURE DISTRIBUTION SYSTEM DESIGN. (a) *General.* Pressure distribution systems may discharge effluent into trenches or beds. Each pipe that is connected to an outlet of a manifold shall be counted as a separate distribution pipe. The horizontal spacing of distribution pipes shall be 30 to 72 inches. (See following sketch.) All distribution piping should be installed at the same elevation, or the plans and specifications shall provide for a design that insures equal flow through each of the perforations.



Bed Design Is Recommended Over Trenches

(b) *Design calculations.* Pressure distribution systems requiring less than 5,000 square feet of absorption area shall be designed using Tables 5 through 11. Systems requiring more than 5,000 square feet of absorption area shall be designed using design specifications and calculations other than those specified in Tables 5 through 11. Design specifications and calculations must be submitted and include perforation discharge rate, total headloss through the distribution piping, headloss through manifold piping, pump or siphon size and dosing volume. Formulas for these calculations may be obtained from the department.

(c) *Distribution pipe size.* Distribution pipe diameters may vary depending on the length of bed or trenches. Table 5 specifies maximum allowable distribution pipe lengths for various pipe and perforation sizes.

(d) *Manifolds.* 1. Size. The size of the manifold is based on the number, length and discharge rate of the distribution pipes. Table 6 shall be used for calculating distribution pipe discharge rate. Table 7 shall be used for calculating manifold diameter.

2. Distribution pipe connection. Distribution pipes should be connected to the manifold with tee's or 90° ells. Distribution pipes shall have the ends capped.

(e) *Force main.* The size of the force main between the pump and the manifold shall be based on the friction loss and velocity of effluent through the pipe. Force mains shall be constructed of approved pipe.

(4) BED AND TRENCH CONSTRUCTION. (a) *General.* The excavation and construction requirements for pressure distribution system trenches and beds shall meet the requirements specified in s. ILHR 83.13 (1), (2), (4), (5), (8).

(b) *Aggregate.* Aggregate shall be placed to a minimum depth of 6 inches beneath the distribution pipe with 2 inches spread evenly above the pipe. The aggregate shall be clean, non-deteriorating ½ to 2½ inch stone.

Table 5: Required Distribution Pipe Diameters For Various Hole Diameters, Hole Spacings And Distribution Pipe Lengths (for plastic pipe only)

Distribution Pipe Length (ft.)	Distribution Pipe Diameter (in.)																							
	Hole Diameter (in.) 1/4						Hole Diameter (in.) 5/16						Hole Diameter (in.) 3/8						Hole Diameter (in.) 7/16						Hole Diameter (in.) 1/2					
	Hole Spacing (ft.)						Hole Spacing (ft.)						Hole Spacing (ft.)						Hole Spacing (ft.)						Hole Spacing (ft.)					
	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7	2	3	4	5	6	7
10																														
15																														
20				1"						1"						1"			1 1/2"				1"		1 1/2"				1"	
25													1 1/2"						1 1/2"	1 1/2"		1 1/4"			1 1/2"	1 1/2"	1 1/4"			
30							1 1/2"												1 1/2"											
35	1 1/2"		1 1/4"						1 1/4"						1 1/4"													1 1/2"		
40								1 1/2"													2"		1 1/2"				2"			
45	2"	1 1/2"						2"						2"	1 1/2"				3"							3"					
50							3"			1 1/2"			3"																	

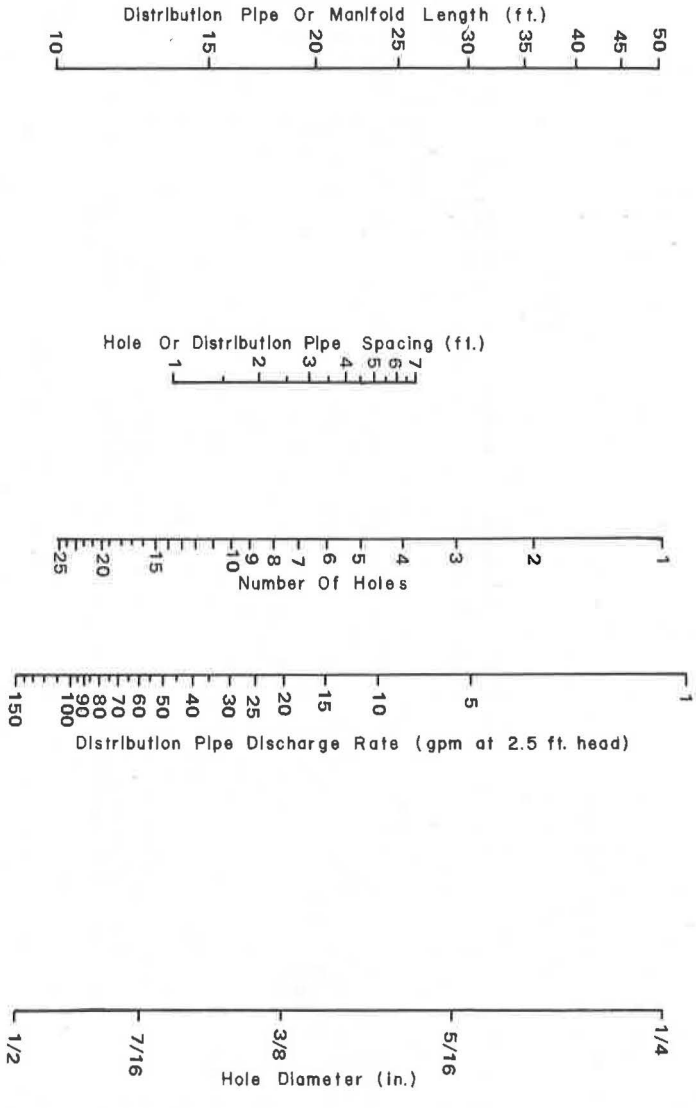
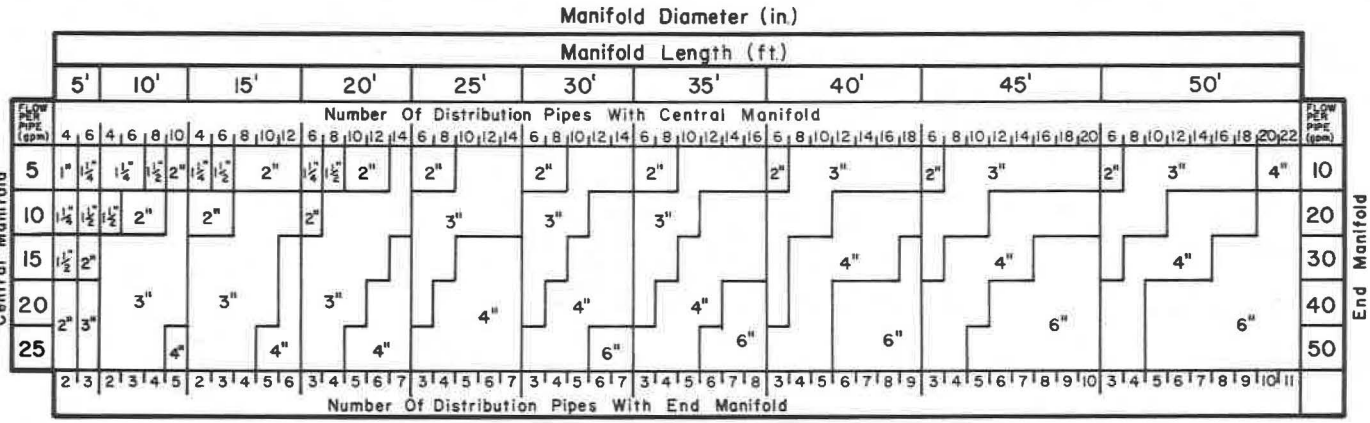

Distribution Pipe Or Manifold Length (ft.)
10
15
20
25
30
35
40
45
50
Hole Or Distribution Pipe Spacing (ft.)
1
2
3
4
5
6
7
25
20
15
10
9
8
7
6
5
4
3
2
1
Number Of Holes
150
100
90
80
70
60
50
40
30
25
20
15
10
5
1
Distribution Pipe Discharge Rate (gpm at 2.5 ft. head)
1/2
7/16
3/8
5/16
1/4
Hole Diameter (in.)

Table 6

Table 7: Recommended Manifold Diameters For Various Manifold Lengths, Number Of Distribution Pipes, And Distribution Pipe Discharge Rates (for plastic pipe only)



(c) *County inspection.* The county inspector shall inspect pressure systems at the time the aggregate is started to be placed and while the distribution piping is being installed.

(5) PUMPS AND PUMP CONTROLS. (a) *Pump selection.* Pump selection is to be based on the pump performance curve. The total dynamic head shall be equal to:

1. Elevation. The elevation difference between the pump and distribution pipe invert.

2. Friction loss. The friction loss in the pipe between the pump and the supply end of the distribution pipe.

3. Head. A head at the supply end of the distribution pipe of 2.5 feet.

4. Dynamic head. Total dynamic head equals elevation head plus friction loss plus 2.5 feet of supply end head.

(b) *Discharge rate.* Table 8 shall be used to determine pump dosing rate based on the distribution pipe discharge rate and number of distribution pipes.

(c) *Friction loss.* Table 9 is the friction loss chart for schedule 40 plastic pipe (C = 150). The diameter of the pipe shall be increased if the velocity falls in the excessive range based upon flow rates in Table 9.

(d) *Pump and alarm controls.* 1. General controls. The control system for the pumping chamber shall consist of a control for operating the pump and an alarm system to detect when the pump is malfunctioning. Pump controls should be selected which give flexibility in adjusting the on/off depth. All pump and alarm controls shall be approved by the department. Pressure diaphram switches shall not be used. The following types of controls may be used.

a. Mercury level control. Mercury level control switches consist of a mercury switch sealed inside a bulb. Strictly an on/off switch, 2 are required.

Table 8

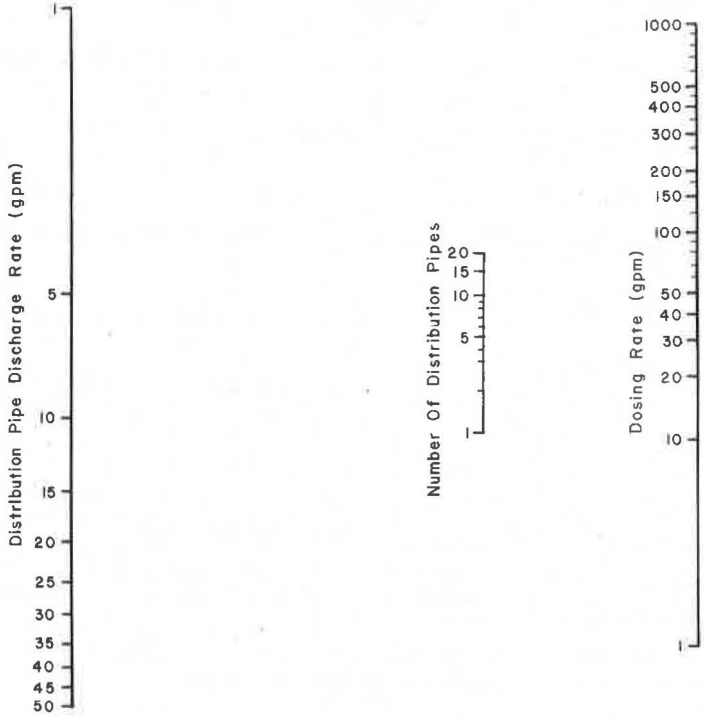

Distribution Pipe Discharge Rate (gpm)
1
5
10
15
20
25
30
35
40
45
50
Number Of Distribution Pipes
20
15
10
5
1
Dosing Rate (gpm)
1000
500
400
300
200
150
100
50
40
30
20
10
1

Table 9

FRICTION LOSS IN SCHEDULE 40 PLASTIC PIPE (C = 150)

Flow	Pipe Diameter (in)								
	1	1-1/4	1-1/2	2	3	4	6	8	10
gpm	ft/100 ft								
1	0.07								
2	0.28	0.07							
3	0.60	0.16	0.07						
4	1.01	0.25	0.12						
5	1.52	0.39	0.18						
6	2.14	0.55	0.25	0.07					
7	2.89	0.76	0.36	0.10					
8	3.63	0.97	0.46	0.14					
9	4.57	1.21	0.58	0.17					
10	5.50	1.46	0.70	0.21					
11		1.77	0.84	0.25					
12		2.09	1.01	0.30					
13		2.42	1.17	0.35					
14		2.74	1.33	0.39					
15		3.06	1.45	0.44	0.07				
16		3.49	1.65	0.50	0.08				
17		3.93	1.86	0.56	0.09				
18		4.37	2.07	0.62	0.10				
19		4.81	2.28	0.68	0.11				
20		5.23	2.46	0.74	0.12				
25			3.75	1.10	0.16				
30			5.22	1.54	0.23				
35				2.05	0.30	0.07			
40				2.62	0.39	0.09			
45				3.27	0.48	0.12			
50				3.98	0.58	0.16			
60					0.81	0.21			
70					1.08	0.28			
80					1.38	0.37			
90					1.73	0.46			
100					2.09	0.55	0.07		
125						0.85	0.12		
150						1.17	0.16		
175						1.56	0.21		
200							0.28	0.07	
250			Velocities in this area				0.41	0.11	
300			become too great for the				0.58	0.16	
350			various flow rates and				0.78	0.20	0.07
400			pipe diameter.				0.99	0.26	0.09
450							1.22	0.32	0.11
500								0.38	0.14
600								0.54	0.18
700								0.72	0.24
800									0.32
900									0.38
1000									0.46

b. Adjustable weight switch. Adjustable weight switches consist of a control located above the water level and 2 weights attached to a single cable which extends into the liquid.

2. Alarm system. The alarm system shall consist of a bell or light mounted in the structure and shall be located so it can be easily seen or heard. The high water warning device shall be installed 2 inches above the depth set for the on pump control. Alarm systems shall be installed on a separate circuit from the electrical service.

3. Electrical connections. Electrical connections shall be located outside the pumping chamber. All wiring to the pump chamber shall be installed in a conduit.

(6) DOSING. The dosing frequency shall be a maximum of 4 times daily. To establish the volume per dose, divide the daily wastewater flow by the dosing frequency. In addition, the dosing volume shall be at least 10 times the capacity of the distribution pipe volume. Table 10 provides the void volume for various pipe diameters. Table 11 shall be used to determine minimum dose volume based on distribution pipe diameter, length and number of distribution pipes.

Table 10

VOID VOLUME FOR VARIOUS DIAMETER PIPES

Diameter (inch)	Volume (gal/ft length)
1	0.041
1 ¼	0.064
1 ½	0.092
2	0.164
3	0.368
4	0.655
6	1.47

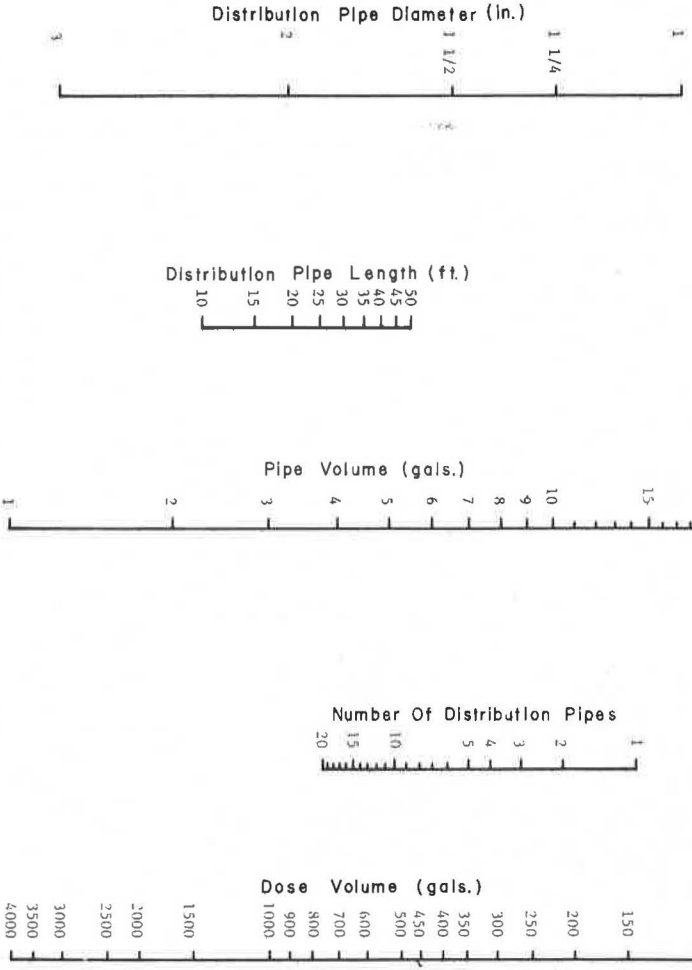


Table 11

History: Cr. Register, December, 1980, No. 300, eff. 1-1-81; renum. from H 63.14, Register, June, 1983, No. 330, eff. 7-1-83; am. (2) (a), r. and recr. (2) (c), Register, June, 1991, No. 426, eff. 7-1-91.

ILHR 83.15 Septic tanks and other treatment tanks. (1) GENERAL. Septic tanks shall be fabricated or constructed of welded steel, monolithic concrete, fiberglass or other materials approved by the department. All tanks shall be watertight and fabricated so as to constitute an individual structure. The design of prefabricated septic tanks shall be approved by the department. Plans for site-constructed concrete tanks shall be approved by the department prior to construction.

(2) DESIGN OF SEPTIC TANKS. (a) *Liquid depth.* The liquid depth shall not be less than 3 feet nor more than an average of 6 feet. The total depth shall be at least 8 inches greater than the liquid depth.

2. Installation evaluation. Department staff shall randomly check 10%, of all alternative private sewage system installations, and a minimum if possible of 5 per county per year to determine if the system was properly constructed.

3. Continuing inspection. Department staff shall visually check as many alternative private sewage systems as possible during the 5 year control period to check for surfacing of effluent.

(c) *County monitoring.* The county shall visually inspect each alternative private sewage system within their jurisdiction a minimum of once every 2 years. The inspection shall consist of checking for surfacing of effluent around the system, ponding of effluent in the bed or trenches and to check the pump, pumping chamber and septic tank.

History: Cr. Register, December, 1980, No. 300, eff. 1-1-81; renum. from H 63.22, Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 83.23 Mound systems. (1) SOIL AND SITE REQUIREMENTS. (a) *General.* The soil and site factors which effect the suitability of a site for the installation of a mound, on slowly permeable soils with or without high groundwater, shallow permeable soils over pervious bedrock or permeable soils with high groundwater are given in Table 14. The installation of a mound in a floodplain or filled area is prohibited. Removal of the fill material may not make the site suitable. A mound shall not be installed in a compacted area. A mound shall not be installed over a failing conventional system.

Table 14

SOIL AND SITE FACTORS THAT RESTRICT MOUND SYSTEM INSTALLATION

Restricting Factors	Soil Group		
	Slowly Permeable Soils	Permeable Soils With Pervious Bedrock	Permeable Soils With High Groundwater
Percolation rate	Greater than 60 to 120 min/in	3 to 60 min/in	0 to 60 min/in
Depth to pervious rock	24 in.	24 in.	24 in.
Depth to high groundwater	24 in.	24 in.	24 in.
Depth to impermeable rock strata	60 in.	60 in.	60 in.
Depth to 50% by volume rock fragments	24 in.	24 in.	24 in.

(b) *Soil boring and percolation tests.* A minimum of 3 soil borings shall be conducted in accord with s. ILHR 83.09 to determine depth to seasonal or permanent soil saturation or bedrock. Identification of a replacement system area is not required.

1. Slowly permeable soils with or without high groundwater. Mound sizing shall be based on soil evaluation or percolation test results. Where sizing is based on soil evaluation, the most limiting condition from Table 0 that occurs within the top 12 inches of the natural soil shall be used to determine the soil loading factor. Where sizing is based on percolation test results, percolation tests shall be conducted in the most restrictive

soil horizon within 24 inches measured vertically from the top of existing grade. A mound system is suitable for the site if the percolation rate is greater than 60 minutes per inch and less than or equal to 120 minutes per inch.

2. Shallow permeable soils over creviced bedrock. Mound sizing shall be based on soil evaluation or percolation test results. Where sizing is based on soil evaluation, the most limiting condition from Table 0 that occurs within the top 12 inches of the natural soil shall be used to determine the soil loading factor. Where sizing is based on percolation testing, percolation tests shall be conducted in the most restrictive soil horizon within 18 inches measured vertically from the top of existing grade. A mound system is suitable for this site condition if the percolation rate is greater than 3 minutes per inch and less than or equal to 60 minutes per inch.

3. Permeable soils with high groundwater. Mound sizing shall be based on soil evaluation or percolation test results. Where sizing is based on soil evaluation, the most limiting condition from Table 0 that occurs within the top 12 inches of the natural soil shall be used to determine the soil loading factor. Where sizing is based on percolation testing, percolation tests shall be conducted in the most restrictive soil horizon within 24 inches measured vertically from the top of existing grade. A mound system is suitable for this site condition if the percolation rate is greater than 0 minutes per inch and less than or equal to 60 minutes per inch.

(c) *Depth to pervious rock.* There shall be at least 24 inches of unsaturated natural soil over creviced or porous bedrock.

(d) *Depth to high groundwater.* There shall be at least 24 inches of unsaturated natural soil over high groundwater as indicated by soil mottling or direct observation of water in accord with s. ILHR 83.09 (4) (d) and (e).

(e) *Slopes.* 1. Maximum allowable slopes. A mound shall not be installed on a slope which is greater than 6% if the percolation rate is between 30 and 120 minutes per inch. If the percolation rate is 0 to less than 30 minutes per inch, the maximum allowable slope is 12%.

2. Location of mound on sloping sites. The mound shall be located so that the longest dimension of the mound and the distribution lines are perpendicular to the slope. The mound shall be placed upslope and not at the base of a slope. If there is a complex slope (2 directions), the mound should be situated so that the effluent is not concentrated in one direction. Surface water runoff shall be diverted around the mound.

(f) *Depth to rock strata or 50% by volume rock fragments.* There shall be at least 60 inches of soil over uncreviced, impermeable bedrock. If the soil contains 50% coarse fragments by volume in the upper 24 inches, a mound cannot be installed unless there is at least 24 inches of permeable, unsaturated soil that has less than 50% coarse fragments beneath this layer.

(2) MOUND DIMENSIONS AND DESIGN. For residential dwellings and public buildings with estimated wastewater flows less than 600 gallons per day, the mound dimensions in Tables 17 through 28 may be used. The dimensions and corresponding letter designations listed in the tables and referred to in this section are shown in figures 1 through 5. For all buildings with estimated wastewater flows exceeding 600 gallons per day,

the mound shall be designed in accord with the calculations specified in pars. (a) through (h).

(a) *Daily wastewater flow.* 1. Residential. The daily wastewater flow shall be estimated as 150 gallons per bedroom per day.

2. Public building. The total daily wastewater flow shall be determined in accord with s. ILHR 83.15 (3) (c) 2.

(b) *Design of the absorption area.* The size of the absorption area is dependent upon the infiltrative capacity of the medium sand texture fill material and the daily wastewater flow. The infiltration rate for the me-

Next page is numbered 317

shall be inspected and shall be pumped to remove any solids if present. Excess traffic in the mound area shall be avoided.

History: Cr. Register, December, 1980, No. 300, eff. 1-1-81; renum. from H 63.23, Register, June, 1983, No. 330, eff. 7-1-83; am. (1) (b) 1., 2. and 3., Register, June, 1991, No. 426, eff. 7-1-91.