LCB File No. R129-98

PROPOSED REGULATION OF THE HEALTH DIVISION

NOTE: Diagrams and illustrations that accompanied this regulation were not available to place on the Internet. Please contact Joe Pollock of the Health Division at (702) 687-4754 ext. 226 if you wish to receive a copy of a specific diagram or illustration.

(The attached amendments to chapter 444 of NAC were brought before the public during workshops in Elko, Pahrump, Carson City and Las Vegas during the week of June 8th, 1998. It is planned they will come before the State Board of Health at its October 9, 1998, meeting.)

SECTION	ASSIGNED #	DESCRIPTION
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3		"Administrative authority" defined.
4		"Aerobic wastewater treatment units" defined.
5		"Alternative absorption system" defined.
6		"Alternative treatment system" defined.
7		"Approved method of sewage disposal" defined.
8		"Approved water source" defined.
9		"Backflow" defined.
10		"Basal area" defined.
11		"Building drain" defined.
12		"Building sewer" defined.
13	754	"Cesspool" defined.
14		"Commercial system" defined.
15		"Cross connection" defined.
16	756	["Deep system" defined.]
17	758	"Distribution box" defined.
18		"Domestic sewage" defined.
19	760	"Dosing tank" defined.
20		"Dry well" defined.
21		"Effluent" defined.
22		"Engineer" defined.
23		"Failure" defined.
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25	762	"Health authority" defined.
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28	764	"Individual sewage disposal system" defined.
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30		"Lot" defined.
31		"Mound system" defined.
32		"Multiple dwelling units" defined.
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Authority for adopting these regulations: NRS 439.200, nrs 444.650

General Provisions

Section 1 **444.750 Definitions.** As used in Section 1 to Section 134, inclusive, unless the context otherwise requires, the words and terms defined in Section 1 to Section 134, inclusive, have the meanings ascribed to them in those actions.

(Supplied in codification)

Section 2 **444.XXX "Absorption trench" defined.** "Absorption trench" means a trench excavated into and utilizing the native soil for the subsequent absorption and treatment of effluent from a primary treatment unit.

Section 3 **444.XXX "Administrative authority" defined**. "Administrative authority" means the individual official, board, department, or agency established and authorized by the state, county, city, or other political subdivision created by law to administer and enforce the regulations governing individual sewage disposal systems.

Section 4 **444.XXX "Aerobic wastewater treatment units" defined.** "Aerobic waste water treatment units" means a chamber which receives sewage and through the use of oxidation in the decomposition of the sewage by the introduction of air into the wastewater reduces total suspended solids and biological oxygen demand (BOD) to less than 30 mg/L each.

Section 5 **444.XXX "Alternative absorption system" defined.** "Alternative absorption system" means a system other than an absorption trench that utilizes the native soil for subsequent absorption and treatment of the primary treatment unit effluent. Such systems include, but are not

limited to, capping fill trenches, stepped relief distribution trenches, leaching beds, sand filters and elevated mounds.

Section 6 **444.XXX "Alternative treatment system" defined.** "Alternative treatment system" means a system or receptacle other than a septic tank designed and constructed to receive the discharge of sewage from a building sewer, partially or completely treat the sewage and discharge effluent for final disposal.

Section 7 **444.XXX "Approved method of sewage disposal" defined.** "Approved method of sewage disposal" means a permitted method of sewage treatment and disposal approved by the administrative authority.

Section 8 **444.XXX "Approved water source" defined.** "Approved water source" means an adequate supply of potable running water piped in an approved manner.

Section 9 **444.XXX "Backflow" defined.** "Backflow" means the flow of liquid mixtures or substances into the distributing pipes of a potable supply of water from any source other than its intended source.

Section 10 **444.XXX "Basal area" defined.** "Basal area" means the area of natural ground covered by the fill material of a mound system.

Section 11 **444.XXX "Building drain" defined.** "Building drain" means piping that conveys sewage within a building or structure.

Section 12 **444.XXX "Building sewer" defined.** "Building sewer" means piping that extends from the end of the building drain and conveys sewage to a public sewer, private sewer, individual sewage disposal system or other point of disposal.

Section 13 **444.754 "Cesspool" defined.** "Cesspool" means a [lined and] covered excavation in the ground which receives the discharge of domestic sewage or other organic wastes

from a drainage system so designed as to retain the organic matter and solids but permitting the liquids to seep through the bottom and sides.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.2, eff. 11-23-72]

Section 14 **444.XXX "Commercial system" defined.** "Commercial system" means an individual sewage disposal system that serves one or more buildings that are not used as single family dwellings. Commercial systems include, but are not limited to, those systems serving offices, watchmen's quarters, bunkhouses, labor camps, R.V. parks, factories, multi-unit residences, hotels and shopping centers.

Section 15 **444.XXX "Cross connection" defined.** "Cross connection" means any connection or arrangement between a potable water supply system and plumbing fixture, tank, receptacle, equipment, or device through which it may be possible for non-potable water or substances to enter into any part of such potable water system under any condition.

Section 16 **[444.756 "Deep system" defined.** "Deep system" means an absorption trench developed to a depth of more than 36 inches below the final grade.]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.11.2, eff. 11-23-72]

Section 17 **444.758 "Distribution box" defined.** "Distribution box" means a watertight structure which receives sewage from a septic tank and distributes such sewage in equal portions to two or more pipelines leading to the disposal area.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.3, eff. 11-23-72]

Section 18 **444.XXX "Domestic sewage" defined.** "Domestic sewage" means the liquid and water-borne wastes derived from the ordinary living process, free from industrial wastes, and of such character as to permit satisfactory disposal, without special treatment, into the public sewer or by means of a private sewage disposal system.

Section 19 **444.760 "Dosing tank" defined.** "Dosing tank" means a watertight receptacle located between a septic tank and a disposal area equipped with an automatic siphon device or pumps designed to discharge sewage intermittently in the distribution lines in amounts proportioned to the capacity of such lines and to provide adequate rest periods between such discharges.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.4, eff. 11-23-72]

Section 20 **444.XXX "Dry well" defined.** "Dry well" means a covered excavation in the ground which receives the discharge of clear rain water, surface water or ground water collected in footing, basement and floor drains and similar places.

Section 21 **444.XXX "Effluent" defined.** "Effluent" means partially or completely treated sewage that flows out of a septic tank or alternative treatment system.

Section 22 **444.XXX "Engineer" defined.** "Engineer" means a person who by reason of his professional education and practical experience is granted a certificate of registration by the State Board of Professional Engineers and Land Surveyors to practice professional engineering.

Section 23 **444.XXX "Failure" defined.** "Failure" means a condition of an individual sewage disposal system that threatens the public health by inadequately treating sewage or by creating a potential for direct or indirect contact between sewage and the public and may include, but not be limited to:

1. Sewage on the ground;

2. Sewage backup into a structure caused by slow soil absorption of effluent;

3. Sewage leaking from a septic tank, dosing tank, holding tank or collection system;

4. Effluent contaminating ground water or surface water.

5. Noncompliance with permit requirements.

Section 24 **444.XXX "Graywater" defined.** "Graywater" means untreated household wastewater which has not come in contact with toilet waste. Graywater includes used water from bathtubs, showers, bathroom wash basins, and water from clotheswashing machines and laundry tubs. It shall not include wastewater from kitchen sinks and dishwashers.

Section 25 **444.762 "Health authority" defined.** "Health authority" means the officers and agents of the health division, or of the local boards of health.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.5, eff. 11-23-72]

Section 26 **444.XXX "Holding tank" defined.** "Holding tank" means a watertight, covered receptacle designed and constructed to receive the discharge of sewage from a building sewer and to store sewage until removed by a septic tank pumping contractor.

Section 27 **444.XXX "Impervious soil" defined.** "Impervious soil" means a layer of earth that demonstrates a percolation rate of greater than 120 minutes per inch.

Section 28 **444.764 "Individual sewage disposal system" defined.** "Individual sewage disposal system" means a single system of sewage treatment tanks and effluent disposal facilities [serving only a single-family dwelling or other building].

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.6, eff. 11-23-72]

Section 29 **444.XXX "Irrigation ditch" defined.** "Irrigation ditch" means a channel used to supply water to ranch or farm land and shall not include channels that contribute to a water course.

Section 30 **444.XXX "Lot" defined.** "Lot" means a single or individual parcel of land legally recorded on which is the site of any work governed by this regulation.

Section 31 **444.XXX "Mound system" defined.** "Mound system" means a soil absorption system that is elevated above the natural soil surface in a suitable fill material.

Section 32 **444.XXX "Multiple dwelling units" defined.** "Multiple dwelling units" means a structure or structures, located on one lot, that have separate units to be used as living quarters. Multiple dwelling units include, but are not limited to, duplexes, triplexes, condominiums and apartments.

Section 33 **444.XXX "Nitrate removal wastewater treatment unit" defined.** "Nitrate removal wastewater treatment unit" means a system which receives sewage and, through biological denitrification, chemical reduction or ion exchange, reduces nitrate levels in sewage effluent to less than 10 mg/L, measured as total nitrogen.

Section 34 **444.XXX "Non-sewered toilet" defined.** "Non-sewered toilet" means toilets that are not connected to a sewage disposal system and shall include free standing portable toilets, recreational vehicles and trailers equipped with holding tanks.

Section 35 **444.XXX "Percolation rate" defined.** "Percolation rate" means the relatively constant rate, in minutes per inch, at which clear water maintained at a constant depth will seep out of a standard size test hole that has been previously saturated.

Section 36 **444.XXX "Percolation test" defined.** "Percolation test" means a procedure to measure the relatively constant rate at which clear water maintained at a constant depth will seep out of a standard size test hole that has been previously saturated.

Section 37 **444.766 "Person" defined.** "Person" includes governmental agencies.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.7, eff. 11-23-72]

Section 38 **444.XXX "Potable water" defined.** "Potable water" means water which is satisfactory for drinking, culinary, and domestic purposes and meets the requirements of the health authority.

Section 39 **444.XXX "Primary treatment unit" defined.** "Primary treatment unit" means a system or receptacle designed and constructed to receive the discharge of sewage from a building sewer, partially or completely treat the sewage and discharge effluent for final disposal and may include, but not be limited to:

1. Septic tanks;

2. Aerobic treatment units;

3. Nitrate removal wastewater treatment units;

4. Other alternative treatment systems.

Section 40 **444.XXX "Pressure distribution system" defined.** "Pressure distribution system" means a piped system that utilizes a pump or siphon to equally distribute effluent to the disposal field where the volume of effluent delivered to the disposal field is greater than the volume of the distribution piping.

Section 41 **444.XXX "Residential system" defined.** "Residential system" means an individual sewage disposal system that serves a single-family dwelling.

Section 42 **444.XXX "Seepage pit" defined.** "Seepage pit" means a covered pit with open-jointed lining through which effluent from a wastewater treatment unit may seep or leach into the surrounding ground.

Section 43 **444.768 "Septic tank" defined.** "Septic tank" means a watertight, covered receptacle designed and constructed to receive the discharge of sewage from a building

sewer, to separate solids from the liquid, to digest organic matter and to store digested solids through a period of detention and to allow the clarified liquids to discharge for final disposal.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.8, eff. 11-23-72]

Section 44 **444.770 "Septic tank pumping contractor" defined.** "Septic tank pumping contractor" means any person engaged in the operation of removing and disposing of the solid and liquid contents of septic tanks, holding tanks, grease traps, grease interceptors, non-sewered toilets, or other sewage treatment or disposal facilities.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.9, eff. 11-23-72]

Section 45 **444.772 "Sewage" defined.** "Sewage" means a combination of the liquid or water-carried wastes piped from residences, business buildings, institutions and industrial establishments[, together with such ground water, surface water and storm water as may be present]. Residential [wastes] sewage shall include human excreta and liquid waste from kitchens, and water closets[, lavatories and laundries].

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.10, eff. 11-23-72]

Section 46 [**444.774 "Shallow system" defined.** "Shallow system" means an absorption trench having a depth of 36 inches or less below final grade.]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.11.1, eff. 11-23-72]

Section 47 **444.XXX "Single family dwelling" defined.** "Single family dwelling" means a building or buildings designed to be used as a home by the occupant(s) of such building which is served by an individual sewage disposal system and includes detached accessory structures.

Section 48 **444.XXX "Special events" defined.** "Special events" means any public gathering which is:

(1) Temporary; and

(2) For a specific purpose; and

(3) Includes the serving of food or a temporary food establishment as part of the event or, due to the nature of the event, requires that restroom facilities be provided.

Section 49 **444.776 "Soil absorption system" defined.** "Soil absorption system" means any system that utilizes the soil for subsequent absorption of treated wastewater effluent.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1.11, eff. 11-23-72]

Section 50 **444.XXX "Water course" defined.** "Water course" means the bed or channel of a water way and shall include rivers, creeks, ponds and lakes but shall not include drainage channels which experience intermittent flow from storms and snow-melt runoff.

Section 51 **444.XXX "Water table" defined.** "Water table" means the level in saturated soil where the hydraulic pressure is zero.

Section 52 **444.778 Purpose.**

1. The purpose of Section 1 to Section 134, inclusive, is to protect the health of the individual family and the community and to prevent the occurrence of nuisances by safely disposing of all human and domestic wastes.

2. To accomplish satisfactory results, these wastes must be disposed of so that they will not:

(a) Contaminate any drinking water supply.

(b) Create [Give rise to] a public health hazard by being accessible to insects, rodents or other possible carriers which may come in contact with food or drinking water.

(c) Create [Give rise to] a nuisance due to odor or unsightly appearance.

(d) Contaminate any body of water.

(e) Violate laws or regulations governing sewage disposal.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. Purpose, eff. 1962; A 11-23-72]

Section 53 **444.780 Interpretation.** If more than one interpretation exists for a provision of Section 1 to Section 134, inclusive, the more restrictive interpretation must be followed.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 2.2 , eff. 11-23-72]

Section 54 **444.782 Severability.** If any of the provisions of Section 1 to Section 134, inclusive, or any application thereof to any person, thing or circumstance is held invalid, it is intended that such invalidity not affect the remaining provisions, or their application, that can be given effect without the invalid provision or application.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 3.1, eff. 11-23-72]

Section 55 **444.XXX Adoption of standards and publications by reference.** The following provisions and publications are hereby adopted by reference:

1. Standards 40 and 41 and Criteria C-9 of NSF International. Those standards and criteria are available by mail from NSF International, 3475 Plymouth Road, Ann Arbor, Michigan 48105, or by telephone at (313) 769-8010. The prices are $70.00 for Standard 40, $60.00 for Standard 41 and $50.00 for Criteria C-9.

2. Standard Specifications for Public Works Construction, 1996 edition, as sponsored and distributed by the Regional Transportation Commission of Washoe County, Washoe County, the City of Sparks, the City of Reno, Carson City and the City of Yerington. This publication

may be obtained by mail from the Regional Transportation Commission of Washoe County, 2050 Villanova Drive, Reno, Nevada 89502, or by telephone at (702) 348-0171, at a price of $35.00.

3. The Uniform Plumbing Code, the most recent edition as adopted by the International Association of Plumbing and Mechanical Officials. This publication is available by mail from the International Association of Plumbing and Mechanical Officials, 20001 Walnut Drive South, Walnut, California 91789-2825, or by telephone at (909) 595-8449, at a price of $52.89.

4. The EPA Design Manual Onsite Wastewater Treatment and Disposal Systems from the National Technical Information Service at 5285 Port Royal Road, Springfield, VA 22161 or by telephone 1-800-553-6847 at a price of $81.50, plus $5.00 handling. Reference document number PB83-219907.

Section 56 444.784 Permits: i[I]nformation required.

1. Approval must be obtained from the administrative [health] authority to construct, alter or extend an individual sewage disposal system. This approval for new construction is required before any building permit can be issued for any structure which requires an individual sewage disposal system.

2. The request for approval must include:

(a) Name, address and current phone number of the applicant.

(b) [Lot and block number of] Legal description of the property including the lot and block number; township, range, and section; and assessors parcel number on which construction, alteration or extension is proposed.

(c) The following items shall be shown on the plot plan: [(a sample plot plan is given in subsection 4):]

(1) Plan's title and date and [owner's] signature of the owner or owner's representative.

(2) A vicinity map showing the location with respect [Location as] to roads and streets.

(3) Location and distance to well and sewage systems on surrounding lots. If [(if] vacant, so indicate[)].

(4) Direction of north clearly indicated.

(5) The distance within 500 feet to any watercourse (pond, lagoon or stream) indicated. If none, so indicate.

(6) The location of the percolation test holes and boring test holes must be shown on the plan.

(7) The well location and depth, proposed or actual. Indicate the depth of casing or surface grout seal.

(8) All [septic tank] individual sewage disposal system components must be properly marked and located at specified distances.

(9) The distance to city sewers. If none, so indicate.

(10) Distances of well and soil absorption system to the property line.

(11) Plans must be drawn to scale (1 inch = 30 feet, 40 feet, 50 feet, 60 feet, etc.).

(12) The number of bedrooms in the [trailer] single family dwelling or sizing calculations for commercial systems.

(13) The capacity of the septic tank.

(14) The maximum slope across the absorption system area.

(15) Lot dimensions.

(16) Depth, [and] length, width and spacing of [tile] absorption trenches [and width and spacing of trenches].

(17) Water supply lines, [and] building sewer lines and other underground utilities indicated.

(18) Locate structures, [and] paved areas, driveways, trees, and patios on the plot plan.

(19) Source of water indicated. Water must be from a well or other source as approved by the administrative authority.

(20) Replacement area for the soil absorption system indicated. The area reserved for the replacement system must be equal to at least 100% of the area of the proposed system.

(d) Soil characteristics, depth to water table and bedrock, and percolation test results must accompany the plot plan. [Sample percolation test results are given in subsection 5.]

(e) Design calculations and specifications must accompany the plot plan. [Sample calculations are given in subsection 6.]

3. Permits issued under Section 1 to Section 134, inclusive, must be considered as a temporary permit to operate an individual sewage disposal system. The operating permit is valid until:

(a) The disposal system fails; or

(b) A community sewage system is installed to service the area.

[4. Sample Plot.]

[5. Sample percolation test results.]

[Soil Composition]

[1 1/2" Top Soil]

[Test hole saturate-overnight
Depth of test hole-42" =
Test hole filled to-34" =
Every 30-minute interval]

[8"]	[Clay]
[2']	[Gravelly clay]
[3']	[Sandy loam]
[1 ½']	[Sand]

[Water below 7']

[Time]	[Interval]	[Depth to water]	[Inches drop]
[11:00]		[34.0]	
[11:30]	[30]	[39.3]	[5.3]
[11:30]		[34.0]	
[12:00]	[30]	[39.2]	[5.2]
[12:00]			
[12:30]	[30]	[39.2]	[5.2]

[Rate of fall]

[5.2 in. ÷ 30 min. - 1 in./5.8 min.]

[5.8 minutes per inch]

[6. Calculations.]

[Given:3 Bedrooms]

[1,000 gallon septic tank]

[5.8 minutes per inch percolation rate]

[Using the equation from 14.2]

[$Q = 5 \div \sqrt{t}$ Q = Rate of sewage application]

[$= 5 \div \sqrt{5.8}$ t = Percolation rate]

[= 2.08 gallons/sq.ft./day]

[Septic tank capacity = 1,000 gallons]

[1,000 ÷ 2.08 = 480 sq.ft. absorption area required]

[OR]

[Using the graph in subsection 4 of NAC 444.816 with a percolation rate of 5.8 minutes per inch, read to the curve for a 1,000 gallon septic tank which projects to give the required absorption area of 480 sq.ft.]

[Therefore, using a shallow trench 2 feet deep with 1 foot of trench side wall below the distribution pipe on each side of the trench.]

[480 sq.ft. - 2 ft. = 240 linear feet required]

[Proposed: 3 trenches 80 feet long = 240 feet]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. §§ 4.1-4.2 + Figures 7-9, eff. 11-23-72]

Section 57 444.786 Permits: [D]denials; procedure for review of actions taken by health division[; appeals]. (NRS 439.200, 444,650)

1. The permit must be denied in writing and the reasons specified therefor if:

(a) The health authority determines that the proposed installation will not comply with NAC 444.[750] Section 1 to 444.[828] Section 134, inclusive; or

(b) Public or community sewage systems are available within 400 feet of the nearest property line.

(c) The proposed project is within the sewer service area of a public utility as defined by the Public Utility Commission or jurisdictional entity. A permit may be granted by the

administrative authority if the public utility provides written approval to allow construction of an individual sewage disposal system within their service area.

2. [Any] A person who has reason to believe that an action taken by the health division pursuant to NAC 444.[750] Section 1 to 444.[828] Section 134, inclusive is incorrect or based on inadequate knowledge may, within 10 business days after receiving notice of the action, request an informal discussion with the employee responsible for the action and the immediate supervisor of the employee.

3. If the informal discussion does not resolve the problem, the aggrieved person may, not later than 10 business days after the date scheduled for the informal discussion, submit a written request to the bureau for an informal conference. The informal conference must be scheduled for a date, place and time mutually agreed upon by the aggrieved person and the bureau, except that the informal conference must be held no later than 60 days after the date on which the bureau received the written request.

4. Except as otherwise provided in subsection 5, the determination of the bureau resulting from the informal conference cannot be appealed and is the final remedy available to the aggrieved person.

5. An applicant for or holder of a permit issued pursuant to NAC 444.[750] Section 1 to 444.[828] Section 87, inclusive, who is aggrieved by an action of the health division relating to the denial of an application for or the suspension or revocation of such a permit may appeal that action in accordance with NAC 439.300 to 439.440, inclusive, after exhausting the informal procedures set forth in this section, except that the bureau may waive the informal procedures, or any portion thereof, by giving written notice to the aggrieved person.

6. Permits are null and void after 12 months from the date of issuance if the proposed construction, alteration or extension of the sewage disposal system is not completed within this time period. An extension may be given in one year increments at the owner's request if the appropriate review fees are paid and the proposed plans meet all requirements of Sections 1 to Section , inclusive.

7. As used in subsection 3, "bureau" means the bureau of health protection services of the health division of the department of human resources or its successor.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. §§ 4.3-4.5, eff. 11-23-72]

Section 58 444.XXX Special exceptions to provisions. The health authority may grant an owner of an individual sewage disposal system a special exception from any of the provisions of Section 1 to Section 134, inclusive, if the special exception:

1. Is justified by an engineer;

2. Involves an advance in technology, improvement in materials, or alternative method of construction or operation that will not be detrimental to the public health; and

3. Will not conflict with the provisions of Section 52, subsection 1 and subsections a-d of subsection 2.

Section 59 444.788 Inspections of construction.

1. Inspections may be required of the system materials and the trench prior to filling with aggregate or rock. Inspections by the [health] administrative authority [are] may be required prior to covering of the sewer line, septic tank and soil absorption system. Inspections of alternative systems are required at intervals as specified in sections 101 to 134, inclusive. If an engineer verifies that the project was constructed according to the plans approved by the administrative authority, an inspection of the system by the administrative authority may be waived.

2. Until the sewage disposal system has passed inspection by the [health] administrative authority and an occupancy permit issued, there must be no occupancy of the building and no permanent electrical power connection to the property.

3. Design review and [I]inspections may be performed by city, district or county building inspectors [provided these inspectors have been certified]as authorized by the health [division] authority.

[Building inspectors are not certified in those areas served by a local health department.]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. Notice, eff. 1962; A and numbered as §§ 6.1-6.3, 11-23-72]

Section 60 444.790 Lot size.

1. A minimum area of 1 acre (43,560 square feet), including public streets and alleys or other public rights of way, lands or any portion thereof abutting on, running through or within a building site, is required for the installation of an individual sewage disposal system on a lot served by a well[, except as provided by NAC 444.794].

2. For a lot that is part of a tentative map that has been approved prior to January 1, 2000, a [A] minimum area of 1/4 acre (10,890 square feet), including public streets or alleys or other public rights of way, lands or any portions thereof abutting on, running through or within a building site, is required for the installation of an individual sewage disposal system on a lot served by a community water supply[, except as provided by NAC 444.794].

3. For a lot that is not part of a tentative map that has been approved prior to January 1, 2000, a minimum area of 1/2 acre (21,780 square feet), including public streets or alleys or other public rights of way, lands or any portions thereof abutting on, running through or within a

building site, is required for the installation of an individual sewage disposal system on a lot served by a community water supply.

4. Available pertinent land for construction of other than single-family dwellings must have a minimum net available area in the amount of 22 square feet per gallon of estimated daily sewage capacity as computed per Section 97 to 100, inclusive.[from the fixture unit values established by the current issue of the Uniform Plumbing Code and each fixture unit must be rated at not less than 25 gallons per day.] One-half of this pertinent land area must be available for sewage disposal.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. Note, eff. 1962; A and numbered as §§ 7.1-7.3, 11-23-72]

Section 61 444.792 Location of [septic tank] individual sewage disposal systems.

[1. The septic tank must not be located within 8 feet of any building or structure.]

[2. The soil absorption system must not be located:

(a) Within 10 feet of any property line;

(b) Within 8 feet from a building or structure;

(c) Within 100 feet from any well or other source of water supply, stream or watercourse, or 150 feet of any spring or well not sealed the first 50 feet;

(d) Within 150 feet from any well or other sources of water supply if it is a deep system.]

[3. Location of individual sewage disposal systems:]

1. An individual sewage disposal system shall be located on the same lot as the building it serves except as provided for in this section. All or part of an abutting lot may be used to provide additional space for an individual sewage disposal system or part thereof, when proper cause, transfer of ownership, or change of boundary not in violation of other

requirements has first been established and approved by the administrative authority. Minimum horizontal separations shall be maintained from the perimeter of the components of the disposal system and the following features:

Minimum horizontal distance in clear required from:	Building Sewer Drain	Septic tank	Disposal field [(shallow)]	[Disposal field (deep)]
Building or structure	[100' max]	8'	8'	[20']
Property lines	10'	10'	10'	[10']
Water supply wells (sealed to 50 feet)	50'	100'	100' *	[150']
Water supply wells (not sealed to 50 feet)	50'	100'	150' *	
Public water supply wells	50'	100'	200' *	
Streams or watercourses	50'	100'	100'	[150']
Drainage channels	25'	25'	25'	
Large trees or shrubs	-	10'	10'	
Disposal fields	-	5'	-	[ ]
Community water main line	10'	10'	25'	[25']
Individual water service line	[6'] 10'	10'	25'	[25']
Dry wells	-	6'	20'	[20']

*The required distance between a well and the components of an individual sewage disposal system may be increased by the administrative authority depending on depth to the water table, soil profile and site characteristics.

[4. Lot plan:]

[Bd. of Health, Indiv. Sewage Disposal System Reg. §§ 8.1-8.2.4 & Table 4, 11-23-72 + Lot plan, eff. 1962; A and renumbered as Figure 1, 11-23-72]

Section 62 444.794 Slope requirements.

1. [To take precautions to prevent slides or downhill surfacing of effluent, the minimum lot size must be increased in proportion to the slope of the lot.]

[2. Based upon the slope of the absorption system area, the following factors must be applied to increase the minimum required lot sizes:

Drainfield Area Slope Percent	Minimum Net Lot Size actor for
Less than 5	1.0
5 to 10	1.25
10 to 20	1.5
Over 20	2.0]

[3.] For lots with slopes in excess of 20 percent soil absorption trenches must be a minimum of 20 feet horizontally from the face of the slope, or ground surface, at the level of the distribution pipe as in subsection [5]4.

[4]2. Additional restrictions [must]may be imposed where conditions relating to percolation and slope so indicate.

3. Dropped or stepped relief trenches following the contours of the slope may be used when allowed by the health authority. Stepped relief trench design criteria is referenced in Section 124 to 126, inclusive.

[5]4. Diagram of slope:]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. §§ 9.1-9.3 + Figure 10, eff. 11-23-72]

Section 63 444.796 Percolation test procedure[: Test data].

1. Percolation test data from a minimum of two test holes in the area of the proposed soil absorption system is required. Performance of these tests is the responsibility of the property owner:

(a) The hole must be dug or bored to the proposed depth of the absorption trench. It must have vertical sides and have a horizontal dimension of 4 to 12 inches.

(b) The bottom and sides of the hole must be carefully scratched with a sharp pointed instrument to expose the natural soil interface. All loose material must be removed from the bottom of the hole which must then be covered with 2 inches of coarse sand or gravel when necessary to prevent scouring.

2.[(c)] For tests in sandy soils containing little or no clay, the hole must be carefully filled with clear water to a minimum depth of 12 inches over the gravel and the time for this amount of water to seep away must be determined. The procedure must be repeated and if the water from the second filling of the hole at least 12 inches above the gravel seeps away in 10 minutes or less, the test may proceed immediately as follows:

(a[1]) Water must be added at a point not more than 6 inches above the gravel.

(b[2]) Thereupon, from a fixed reference point, water levels must be measured at 10-minute intervals for a period of 1 hour.

(c[3]) If 6 inches of water seeps away in less than 10 minutes a shorter interval between measurements must be used, but in no case may the water depth exceed 6 inches.

(d[4]) The final water level drop must be used to calculate the percolation rate.

(e[5]) Soils not meeting the above requirements must be tested as in subsection 3.

3[2]. For [other]soils other than sandy soils, the hole must be carefully filled with clear water and a minimum depth of 12 inches must be maintained above the gravel for a 4-hour period by refilling whenever necessary or by use of an automatic siphon. Water remaining in the hole after 4 hours must not be removed. The soil must be allowed to swell not less than 16 hours or more than 30 hours. Immediately following the soil swelling period, the percolation rate measurements must be made as follows:

(a) Any soil which has sloughed into the hole must be removed and water must be adjusted to 6 inches over the gravel.

(b) Thereupon, from a fixed reference point, the water level must be measured at 30-minute intervals for a period of 4 hours unless two successive water level drops do not vary more than 1/16 of an inch.

(c) The hole must be filled with clear water to a point not more than 6 inches above the gravel whenever it becomes nearly empty.

(d) Adjustments of the water level must not be made during the last three measurement periods except to the limits of the last measured water level drop.

(e) When the first 6 inches of water seeps away in less than 30 minutes, the time interval between measurements must be 10 minutes and the test run for 1 hour.

(f) The water depth must not exceed 6 inches at any time during the measurement period.

(g) The drop that occurs during the final measurement period must be used in calculating the percolation rate.

3. Depth to high ground water and bedrock, areas subject or susceptible to flooding, ground slope, and percolation tests results are subject to an engineer's verification as required by the health authority. Verification of maximum high ground water must include, but is not limited

to, a morphological study of soil conditions with particular reference to soil color and sequence of horizons.

4. Where the natural soil condition has been altered by filling or other attempts to improve wet areas, verification may require observation of high ground water levels under saturated soil conditions.

5. Where the natural soil condition has been altered by filling or other attempts to improve the percolation rate of the soil, verification by an engineer may be required to determine if the fill material is suitable for an individual sewage disposal system.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. §§ 1-4, eff. 1962; A and renumbered as §§ 10.1-10.2.2., 11-23-72]

Section 64 **444.XXX Percolation test flow chart.**

(Use the following to determine which test procedure to follow)

Section 65 **444.XXX Fast percolation test flow chart.**

Section 66 **444.XXX Pre-soaking flow chart for slow percolation test.**

(Water did not seep away in 10 minutes)

Section 67 **444.XXX Slow percolation test flowchart.**

Section 68 **444.XXX Sample percolation test form.**

Hole #	Percolation Rate: Minutes/Inches
Depth from native ground surface that percolation test was conducted:	
Pre-soak Start Time:	Pre-soak End Time:
Hours soil has been presoaked:	
Notes:	

TIME	DEPTH TO WATER	INTERVAL	INCHES DROP	MIN/INCHES

NOTE: TWO (2) PERCOLATION TESTS ARE REQUIRED PER ABSORPTION FIELD.

THE LAST READING IS TO BE USED TO DETERMINE PERCOLATION RATE.

Section 69 **444.XXX Sample test pit soil log.**

SAMPLE SOIL PROFILE LOG:

PROJECT	
TEST SPECIFICATIONS	
TECHNICIAN	DATE

DEPTH FEET	**SOIL DESCRIPTION**

0 3 6 9 12	

TEST PIT INFORMATION REQUIRED:

DEPTH TO WATER	
SEASONAL HIGH WATER	

WAS BEDROCK ENCOUNTERED?	
IF SO, DEPTH TO BEDROCK	
TOTAL DEPTH OF TEST PIT	

NOTE: A MINIMUM OF TWO TEST PITS SHALL BE EXCAVATED AND LOGGED. THE SOIL PROFILE FROM THE TEST PITS SHALL BE SUBMITTED WITH PERCOLATION RESULTS AS PART OF THE PLAN SUBMITTAL.

PROVIDE A SOIL PROFILE TO A DEPTH AT LEAST 5 FEET BELOW THE BOTTOM OF THE ABSORPTION TRENCH IN THE SPACE PROVIDED IN THE SOIL PROFILE LOG.

Section 70 444.798 Building s[S]ewer [line].

1. An approved cleanout must be installed between the building drain and the building sewer line. The cleanout shall be located within 3 feet of the structure or as close as practicable to the structure. Additional cleanouts shall be spaced at not less than 100 foot increments and for each aggregate change in direction of the sewer line in excess of 90 degrees.

2. The building sewer [line] between the house and the septic tank must be approved pipe of cast-iron,[vitrified-clay,] concrete, cement-asbestos or [plastic] pvc, with watertight joints. [and on a slope of not less than 1/8 inch per foot for the 8 feet of line immediately preceding the septic tank and laid on undisturbed earth or well-compacted material.]

3. The building sewer, when practical, shall be run at a uniform slope of not less than one-fourth (1/4) inch per foot toward the point of disposal. When approved by the administrative

authority, building sewers four (4) to six (6) inches in diameter may have a slope of not less than one-eighth (1/8) inch per foot and building sewer eight (8) inches in diameter or larger may have a slope of not less than one-sixteenth (1/16) inch per foot unless approved by the administrative authority.

4. Building sewers shall be laid on undisturbed earth or well-compacted material. The top of the building sewer shall be at least 12 inches below final grade.

5[2]. [SEWER LINE DIAGRAM] Individual sewage disposal system diagram.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 11.1 + Figure 6, eff. 11-23-72]

Section 71 [**444.800 Septic tanks: General specifications.**]

1. [Minimum capacity and recommended sizes are listed in subsection 4. An additional volume capacity equal to about 20 percent of the liquid volume must be provided in the tank above the liquid surface to provide storage space for the scum.]

[2. The smallest plan dimensions must be 2 feet. Liquid depth may range between 30 and 60 inches.]

[3.]

[4. Recommended Inside Dimensions:

Number of Bedrooms	Liquid Capacity Of Tanks (Gallons)	Width W	Length L	Liquid Depth	Total Depth
4 or less	1,000	4'0"	7'6"	4'6"	5'6"
5	1,250	4'3"	8'9"	4'6"	5'6"
6	1,500	4'6"	10'0"	4'6"	5'6"]

[5. If a two-compartment tank is used the first compartment must equal one-half to two-thirds of the total volume, and the outlet of each compartment must comply with the tank outlet requirements.]

[6. Adequate access to the tank must be provided to facilitate inspection and cleaning (subsection 3). Both inlet and outlet of the tank must be accessible. On tanks close to the ground

surface, a removable cover or manhole must be used. On tanks over 18 inches below the ground surface, manholes at least 24 inches in diameter that extend to about 18 inches below the ground surface must be used.]

[7. (a) The inlet invert must enter the septic tank at least 3 inches above the liquid level. A vented inlet tee or baffle must penetrate at least 6 inches below the liquid level, but not greater than that allowed for the outlet device.

(b) The vented outlet tee or baffle must extend a distance below the liquid level equal to 40 percent of the liquid depth.

(c) The vented inlet and outlet device must extend above the liquid line to approximately 2 inches from the top of the septic tank, or provide a vent opening of 12 square inches.

(d) The inlet and outlet pipes where they pass through the septic tank walls must be sealed.]

[8. Back-filling, particularly around steel tanks, must be carefully done to protect damage to the tank. Before backfilling, each septic tank must be adequately supported and may be required to be filled with water to determine that it is watertight. The tank must be level after setting.]

[9. The requirements of NAC 444.800 to 444.812, inclusive, do not preclude the use of treatment devices other than septic tanks as may be approved by the health authority. The treatment devices must bear the approval of the National Sanitation Foundation.]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 5 of Note + Table on Tank Dimensions + Figure, eff. 1962; A and renumbered as §§ 12.2, 12.4 & Figure 2, 11-23-72 & renumbered as §§ 12.1, 12.3, 12.5, 12.5.4, part 12.7 & part 12.8, 11-23-72]

Section 72 **[444.802 Diagrams of septic tank and seepage pit.]**

[1.]

[2.]

[NOTE:]

[Effective area of a seepage pit is the vertical wall area of the pervious strata below the inlet. No allowance is to be made for impervious strata or bottom area.]

[Whatever material is used to construct the pit lining, the walls below the inlet level should be laid close with no conscious attempt to provide openings between the units.]

[Portion of pit lining above the inlet level should be watertight and a water-proof membrane should be placed on the gravel backfill at the sides of the pit.]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. Diagrams eff. 1962]

Section 73 444.804 Septic tank construction[generally].

1. [Plans for all septic tanks must be submitted to the health authority for approval. The plans must show all dimensions, reinforcing, structural calculations and other pertinent data as may be required. Independent laboratory tests and calibrations may be required on prefabricated septic tanks.] Unless previously approved by the health authority, plans for all septic tanks shall be submitted to the health authority for approval. Such plans shall show all dimensions, reinforcing, structural calculations, and such other pertinent data as may be required in accordance with Section 73 to 76, inclusive. Septic tanks shall be constructed of solid durable materials, and not subject to excessive corrosion or decay. Acceptable materials include concrete, coated steel, polyethelene and fiberglass. Other materials may be approved by the health authority.

2. [Septic tanks must be constructed of sound durable materials, not subject to excessive corrosion or decay and be watertight.]Septic tanks shall have a minimum of two compartments. The inlet compartment shall be not less than two-thirds the total capacity of the tank and shall be at least three feet in width and five feet in length. Liquid depth shall be not less than thirty inches nor more than seventy-two inches. The secondary compartment shall have a minimum capacity of three hundred (300) gallons and a maximum capacity of one-third (1/3) the total capacity. In septic tanks over 1,500 gallons capacity, the secondary compartment may be not less than five (5) feet in length. [Each tank must be structurally designed to withstand all anticipated earth or other loads and be installed level and on a solid bed.]

3. [Watertight materials must be used. Acceptable materials which are not subject to excessive corrosion are concrete, coated metal, vitrified clay, heavy weight concrete blocks or hard burned bricks. Other construction materials may be approved.]Adequate access to the tank must be provided to facilitate inspection and cleaning. Access shall be provided by at least two (2)

manholes with a mimimum diameter of twenty (20) inches. One manhole shall be placed over the inlet compartment and one manhole shall be placed over the secondary compartment. Whenever a first compartment exceeds twelve (12) feet in length, an additional manhole shall be provided over the baffle wall.

4. [All septic tanks must conform to the design on the drawings and all buildings must be done under strict controlled supervision by the manufacturer. Any changes in design must be submitted to the health authority for approval.]The inlet and outlet pipes shall be at least four (4) inches in diameter. The vented inlet tee or baffle and the vented outlet tee or baffle shall extend four (4) inches above and at least twelve (12) inches below the water surface. The invert of the inlet pipe shall be at least two (2) inches above the invert of the outlet pipe. Refer to the drawing in subsection 16.

5. The side walls shall extend at least nine (9) inches above the liquid surface. The interior ceiling of the septic tank shall be at least two (2) inches above the vented inlet tee or baffle and the vented outlet tee or baffle.

6. [Tanks must be so designed as to support an earth load of not less than 300 pounds per square foot or 4 feet of earth cover plus 200 pounds per square foot surcharge plus any other anticipated loads.]Partitions or baffles between compartments shall be of solid durable material and shall extend at least four (4) inches above the liquid level and shall be vented to allow free passage of gas between compartments. A down-turned ninety degree inverted fitting, at least four (4) inches in diameter, shall be installed in the inlet compartment side of the baffle. The bottom of the fitting shall be placed at a level no higher than 75%, and no lower than 50%, of the height of the liquid level in the tank. Wooden baffles are prohibited. Refer to the drawing in subsection 16.

[7. All concrete septic tanks must be protected from corrosion by coating the inside with an approved bituminous coating or by other acceptable means. The coating must extend to at least 4 inches below the water line and cover all of the internal area above that point.]

7. Each tank must be structurally designed to withstand all anticipated earth or other loads and be installed level and on a solid bed. All septic tank covers shall be capable of supporting an earth load of not less than three-hundred (300) pounds per square foot when the maximum coverage does not exceed three (3) feet.

[5]8. Any manufactured septic tank [manufactured anywhere but in its permanent location] must be permanently and legibly marked as to manufacturer, total tank capacity, liquid capacity and general location of manufacturing firm.

[8]9. All aggregates fine and coarse, other than lightweight aggregate, must conform to specifications outlined by [ASTM C-33. Lightweight aggregates, fine and coarse, must conform to the specifications outlined by ASTM C-330] the Standard Specifications for Public Works Construction.

[9]10. Aggregates must be free of deleterious substances [causing reactivity] which may react with oxidized hydrogen sulfide. [Both types of a] Aggregate must be graded in a manner to produce a homogeneous concrete mix. All materials are to be accurately weighed at a central batching facility for mixing.

[10]11. All cement must be Portland cement conforming to [ASTM C-150 Type II] the Standard Specifications for Public works Construction. Cement content must be sufficient to produce a minimum compressive strength of 4,000 [PSI] pounds per square inch, or other design strengths required.

[11]12. All concrete must be handled from the mixer or transport vehicle to the place of final deposit in a continuous manner, as rapidly as practicable, and without segregation or loss of ingredients, until the approved [unit of operation] method of construction is completed. Each pour must be compacted by mechanical internal or external vibrating equipment. Duration of the vibration cycle must be limited to the time necessary to produce satisfactory consolidation without causing objectionable segregation.

[12]13. All reinforcing steel, including welded wire mesh, must be of the size and in the location as shown on the plans. All reinforcing must be sufficiently tied to withstand any displacement during the pouring operation. All bars must be intermediate or hard graded billet steel [conforming to ASTM-315-grade 40. Bars must be deformed in accordance with ASTM A-305]. Inspection by the health authority may be required of the tank reinforcing steel before any concrete is poured.

14. [Back-filling, particularly around steel tanks, must be carefully done to prevent damage to the tank. Before back-filling, each septic tank must be adequately supported and may be required to be filled with water to determine that it is watertight. The tank must be level after setting.] All septic tanks shall be watertight. Septic tank manufacturers shall test septic tanks for water tightness by one of the following methods:

(a.) Water testing by sealing the outlets and filling the septic tank to it's operational level and allowing the tank to stand for 8-10 hours. If there is a measurable loss, refill the tank and let stand for another 8-10 hours. If there is again a measurable loss, the tank shall be rejected. Septic tanks shall not be rejected for damp spots on the exterior. Rejected tanks shall be repaired and retested prior to use in an individual sewage disposal system.

(b.) Vacuum testing by sealing all inlets, outlets and accesses and introducing a vacuum of 4 inches of mercury. If the vacuum drops in the first 5 minutes, it shall be brought back to 4 inches of mercury. If the septic tank fails to hold the vacuum at 4 inches of mercury for 5 minutes, it shall be rejected. Rejected tanks shall be repaired and retested prior to use in an individual sewage disposal system.

(c.) An alternate test procedure as approved by the health authority.

15. The health authority may require septic tank manufacturers to demonstrate the watertight integrity of any septic tank.

16. All septic tanks must meet the septic tank construction requirements of the Uniform Plumbing Code.

17. Septic Tank Diagram

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. § 1 of Note, eff. 1962; A and renumbered as § 12.6.2, 11-23-72 & renumbered as §§ 12.6.1, 12.6.3-12.6.11, part 12.7, & part 12.8, eff. 11-23-72]

Section 74 **444.806 Precast septic tanks.** For precast septic tanks:

1. All forms used in placing concrete must be smooth, sufficiently designed and braced to maintain their alignment under pressure of the concrete during placing.

2. Precast sections must be set evenly in a full bed of sealant. Excessively mortared joints must be trimmed flush. Sealants used between the joints are at the manufacturer's discretion, unless otherwise specified by the health authority. If grout is used, it must consist of two parts [plaster] sand to one part cement with sufficient water added to make the grout flow under its own weight. The grout must be poured into a water-soaked groove, and filled to the top of the groove in the previously set section. If mastic joint compound is used, it must be placed along the walls of the groove unless a double amount of mastic joint compound is to be used as a further precaution against leakage. In this case, the mastic sealant must be placed on the two shoulders of the groove. If polyurethane [or approved equal] is used it must be mixed as directed [on the label] by the polyurethane manufacturer and placed in the groove. The next section must be placed while the foaming reaction is still in process.

3. For the purpose of early reuse of forms, the concrete may be steam cured. Other curing by means of water spraying or a membrane curing compound may be used [and must comply to best acceptable method outlined by the American Concrete Institute].

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. §§ 12.6.12- 12.6.12.3., eff. 11-23-72]

Section 75 **444.808 Built-in-place septic tanks.** [For built-in place septic tanks:]

1. [The walls and floor of each poured-in-place, concrete septic tank must be of monolithic or keyed construction; the maximum length of any section of unreinforced concrete septic tank wall must be 6 feet, and no cross section of any such unreinforced concrete wall or floor may be less than 5 inches in thickness. The minimum compressive strength of any concrete

septic tank wall, top and covers, or floor must be 3,000 pounds per square inch.]All built-in-place septic tanks shall be designed by an engineer. Requirements for septic tank construction shall conform to Section 73 to 76, inclusive. Plans for built-in-place tanks shall be submitted to the health authority for review and approval before construction begins. The design engineer shall submit written verification to the health authority that the septic tank was constructed according to the approved plans.

[2. When blocks or bricks are used, they must be cemented to a concrete base. Joints and cells must be well filled and the interior of the tank surfaced with two 1/4-inch coats of Portland cement-sand plaster.]

[3. Minimum reinforcement must consist of number 3 bars on 24-inch centers vertically and number 9 wire (minimum) K mesh at 16-inch center horizontally.]

[4. Concrete septic tank covers must be reinforced and have a minimum compressive strength of 3,000 pounds per square inch.]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. §§ 12.6.13- 12.6.13.3, 11-23-72]

Section 76 444.810 Coated [metal] steel septic tanks.

1. Coated [metal] steel septic tanks must be made of commercial grade sheet steel of good welding quality and have a bituminous coating as required [below] in subsection 2. Only new materials may be used and the thickness of the sheet must be Number 12 manufacturer's standard gage (.109 inches) or heavier. The tanks must be so constructed as to withstand all anticipated earth or other loads.

2. The coating must be composed of bituminous-base materials that are impervious to water and resistant to sulfuric and sulfurous acids of concentrations encountered in the normal operation of septic tanks. Two coating systems are acceptable[.]:

(a) [The] [h]Hot-dipped asphalt coating must be applied to the bare metal or over an asphalt primer, followed by a coal-tar-base emulsion coating applied to [the critical area. The critical area is] all interior surfaces of the tank above a level at least 8 inches below the [overflow level] invert of the outlet pipe.

(b) [The c]Cold-application, coal-tar-base coating must be applied to the bare metal or over a coal-tar-primer, followed by a second application of coating to [the critical area. The coating materials and procedures must meet the requirements of Underwriter's Laboratories and Commercial Standards 177-62 of the United States Department of Commerce. Each steel tank must be provided with a pint of touch-up material] all interior surfaces of the tank above a level at least 8 inches below the invert of the outlet pipe..

[3. The requirements of Underwriter's Laboratories described in subsection 2 are: "Requirements for Bituminous Coatings for Metal Septic Tanks, Subject 70," by Underwriter's Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois.]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. §§ 12.6.14- 12.6.14.2, eff. 11-23-72]

Section 77 [**444.812 Homeowner constructed septic tank.** For homeowner constructed septic tanks:]

[1. Tank bottoms must be 4 inches thick with 3/8-inch steel rods on 18-inch centers both ways or plain poured concrete 6 inches thick.]

[2. Concrete tank walls must be a minimum of 3 inches thick and reinforced with 3/8-inch steel rods on 18-inch centers both ways. Walls without reinforcing must be 5 inches thick. Welded wire mesh may be used in the walls and bottom. The welded wire mesh required is 6 inches X 6 inches/.1 x .1 and supported horizontally by 3/8-inch steel rods on 20-inch centers.]

[3. All concrete tank tops must be a minimum of 3 inches thick and reinforced with 3/8-inch steel rods on 6-inch centers on the short span and 18-inch centers on the long span.]

[4. Inspections by the health authority may be required of the tank reinforcing steel before any concrete is poured.]

[5. Precast sections must be set evenly in a full bed of sealing mortar or equivalent. Excessively mortared joints must be trimmed flush. The inside and outside of each mortar joint must be sealed with a bituminous sealing compound. For greater resistance to corrosion, an air-entrained concrete should be used. Six sacks of cement per cubic yard of concrete and 5 1/2 gallons of water per sack are recommended.]

[6. Other types of septic tanks must be constructed to conform to the provisions of NAC 444.800 to 444.812, inclusive.]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. §§ 12.6.15- 12.6.15.6, eff. 11-23-72]

Section 78 **[444.814 Dosing tanks.]**

[1. Dosing tanks must be provided where there are over 500 lineal feet of distribution lines in the absorption system.]

[2. Dosing tanks must have sufficient capacity to distribute sewage equally to all parts of the absorption system at 3- to 4-hour intervals. Sufficient capacity is equivalent to 60 to 75 percent of the interior volume of the tile in the system.]

[3. Siphons must be automatic and must be of an alternating type when the length of the distribution lines is over 1,000 feet. Alternating siphons must discharge to separate disposal areas.]

[4. Construction and materials must conform to the provisions of NAC 444.800 to 444.812, inclusive.]

[5. Dosing tanks must be constructed in a manner that will permit venting the absorption system.]

[6. Each dosing tank or compartment must be provided with an access opening located so as to facilitate repair or adjustment of the siphon. The openings must be over the siphon or siphons and conform to the provisions of subsection 6 of NAC 444.800.]

[7. Dosing tank:]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. §§ 13.1-13.6 & Figure 5, eff. 11-23-72]

Section 79 **[444.816 Soil absorption system.]**

[1. The effluent from septic tanks must be disposed of by soil absorption systems, or by such other manner as may be approved, through a minimum 5-foot section of approved solid watertight pipe.]

[2. The area required for a soil absorption system serving a single-family residence must be determined from subsection 3 or 4. The absorption trench area must be determined by the effective side wall area (both sides of the wall trench) beneath the distribution pipe.]

[3. Table:

Number of Bedrooms	Minimum Liquid Capacity of Tank in Gallons	Required Absorption Area of Trench Side Walls in Square Feet				
		Gravel & Coarse Sand	Fine Sand	Sandy Loam	Clayey Sand	Sandy Clay
4 or less	1,000	200	350	630	1000	1340
5	1,250	250	430	780	1250	1610

6	1,500	300	520	940	1500	2000]

[Percolation Rate (Time in minutes required for water to fall 1 inch) | 1 or less | 3 | 10 | 25 | 45]

[4. Graph:]

[5. For larger systems determine the rate of sewage application by the equation:

$$Q = \frac{5}{\sqrt{t}}$$

Q = Rate of sewage application, gallons per square foot per day.

t = Percolation rate in minutes per inch.]

[6. The septic tank and soil absorption system must be separated by a dike of undisturbed soil at least 2 feet thick. See subsection 2 of NAC 444.798.]

[7. A distribution box may be used when more than one distribution line is used in an absorption system.]

[(a)]

[(b) The box is to be constructed of sound, durable material (concrete, coated metal, concrete blocks, hard-burned bricks, etc.) to assure its being watertight.]

[(c) Each distribution line must be connected separately to the distribution box. The outlet lines must be set at the same level and 4 to 6 inches above the bottom of the box. The inlet must be at least 1 inch above the outlets.]

[(d) The size of the distribution box must be sufficient to accommodate the required number of distribution lines. The box must be of watertight construction. A masonry baffle at least 6 inches high and 12 inches long must be placed traversely to the distribution box inlet and 6 inches in front of it. The box must be provided with a satisfactory masonry or steel cover.]

[8. Shallow system:]

[(a) The bottom of the trench must be level and 1 to 2 feet in width. Trench excavations must be spaced at least 6 feet

centerline to centerline apart. The individual laterals must not be over 100 feet long.]

[(b) Trenches must not be excavated when the soil is extremely wet.]

[(c) All smeared or compacted surfaces in the absorption trench must be scarified to the depth of the compaction and the loose material must be removed.]

[(d) Distribution piping must be perforated clay tile, plastic, bituminous fiber, cement asbestos or short lengths of clay or concrete drain pipe. The bottom of the distribution piping must be laid 12 to 24 inches below the ground surface in continuous straight or curved lines. A slope of 2 to 4 inches per 100 feet must be maintained. Drain pipe must be spaced approximately 1/4 inch apart and blinded at the top with tar paper.]

[(e) A minimum of 12 inches of clean, graded rock or similar aggregate ranging in size from 3/4 to 1 1/2 inches must be laid into the trench below the distribution pipe and such aggregate must extend at least 2 inches over the top of the distribution pipe. The aggregate must be covered with untreated building paper or equal, and the top of the trench must be overfilled with 4 to 6 inches of earth.]

[9. Deep system:]

[(a) The bottom of the distribution line must be laid 12 to 48 inches below the ground surface in continuous straight or curved lines.]

[(b) The bottom of the absorption trench must be level and 1 or 2 feet in width. Trenches must be spaced a distance equal to twice the trench depth. The length of each trench must not exceed 100 feet.]

[(c) Clean, graded rock or similar aggregate ranging in size from 1 to 2 1/2 inches must be laid into the trench below the distribution pipe and such aggregate must extend at least 2 inches over the top of the distribution pipe. The aggregate must be covered with untreated building paper or equal. The first 4 to 6 inches of soil backfill must be hand tamped, and the top of the trench must be overfilled with 4 to 6 inches of earth.]

[(d) Paragraphs (b) to (d), inclusive, of subsection 8 apply to deep absorption systems.]

[10. Other types of absorption systems may be used only upon written approval of the health authority.]

[11. Disposal trench:]

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. Table 1 + Figures of Distribution Box, Disposal Trench, eff. 1962; A and renumbered as Table 3, Figures 3 & 4, 11-23-72; & §§ 14.1-14.3.4, 11-23-72]

Section 80 444.818 Limitations and site requirements.

1. Cesspools are prohibited.

2. The discharge of surface, rain and other clear water into an individual sewage disposal system is prohibited.

3. [A soil absorption system must not be installed in a non-compacted filled area without specific approval of the health authority.]Absorption systems requiring special design due to

limiting site characteristics shall be designed by an engineer in accordance with design criteria provided in the alternative absorption system Section 123 to 134, inclusive or as approved by the health authority.

[4. There must be at least 4 feet of soil between the bottom of the soil absorption system and the maximum seasonal elevation of the ground water table, rock formations or other impervious strata on any lot or parcel with a net area less than 5 acres, or at least 2 feet of soil between the bottom of the soil absorption system and the maximum seasonal elevation of the ground water table, rock formations or other impervious strata on any lot or parcel with a net area greater than 5 acres.]

[5]4. An individual sewage disposal system is prohibited in any area subject to vehicular traffic or any area to be paved.

[6]5. Sewage or any waste must not be discharged into any well, deep pit, [or] mine shaft or onto the ground surface.

[7]6. Approved plans and specifications must not be revised except with written approval of the [health] administrative authority.

[8]7. [Where rapid percolation rates are encountered in sand, gravel or fractured stone, the required distance from any water supply or watercourse may be increased, requiring special design of the absorption system.] Soils with rapid percolation rates may require special design as determined by the administrative authority depending on the soil and site characteristics. Increased set backs from wells and/or water courses may also be required.

[9]8. [Only one single-family dwelling is permitted per individual sewage disposal system.] All systems shall be operated and maintained so as not to create a public health hazard, nuisance or cause water pollution.

[10]9. Abandoned septic tanks must be filled with earth or sand after being pumped. Abandoned tanks may also be pumped, removed, and disposed of at a site approved by the administrative authority. Excavations created by septic tank removal shall be backfilled with suitable material compatible to the intended future use of the site as approved by the administrative authority.

[11. Soils with a percolation rate over 60 minutes per inch must not be used for an absorption system.]

[12]10. To facilitate cleaning and maintenance operations, the [contractor] sewage disposal system installer must provide the owner with a diagram of the [septic tank] system. It must include the location of the house, the septic tank, the [access holes and the drainage] cleanouts, and the absorption system. This information must be kept [always] on the premises regardless of changes in occupancy.

[13]11. Any necessary bends in the sewage disposal system prior to entering the septic tank must be accomplished by the use of 45 degree or less pipe fittings.

[14]12. Every dwelling or habitation, including occupied trailers, must have an approved method of sewage disposal. The health authority may allow the temporary use of holding tanks at locations (labor camps for construction or drilling projects) where an approved method of sewage disposal is not available. A contract with a licensed septic tank pumper and a "will serve letter" from an approved sewage disposal treatment facility is required. The use of a temporary holding tank permit shall be subject to monthly renewal as approved by the health authority.

13[15]. The disposal of sewage must be through an approved sewage disposal system.

14[16]. Provisions not covered by NAC 444.[750]XXX Section 1 to 444.[828]XXX Section 134, inclusive, must meet the most restrictive requirements found in the current publication of the

Uniform Plumbing Code [or the United States Public Health Service Manual of Septic Tank Practice].

[17. Absorption area for standard trenches is figured as trench bottom area.]

[18. Absorption area for seepage pits is figured as effective side-wall area beneath the inlet.]

[19]15. Disposal fields must be located in unshaded unobstructed areas.

16. Only one single family dwelling per acre served by an individual sewage disposal system and a well shall be allowed. Obtaining the Division of Water Resources approval to serve two dwellings will not be considered acceptable as a "public water supply" and the administrative authority shall not allow additional septic systems to be installed on the lot. Commercial individual sewage disposal systems on one lot may be allowed to serve two or more structures upon approval by the health authority providing the structures and disposal system remain under single ownership.

17. Transfer or selling of a commercial property served by an individual sewage disposal system shall require a new plan review to determine the suitability of the proposed new business with the existing individual sewage disposal system unless the use of the building or buildings remains the same. A review of the system is required regardless of use if the system has been dormant in excess of one year. Incompatibility of the proposed new business and the existing disposal system shall require system modification or project denial.

18. Unattached structures, apart from a single family dwelling served by an approved individual sewage disposal system, may be allowed to plumb into the sewage disposal systems if all of the following conditions are met:

(a) The unattached structure is to be used in conjunction with the single family dwelling.

(b) The septic tank has sufficient capacity to accommodate the total number of fixtures in the single family dwelling and those in the unattached structure as defined in Section 100 (3), inclusive. The fixtures shall be rated as 25 gallons each for the purposes of this section.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. Note & unmarked paragraph, eff. 1962; A and renumbered as §§ 15.3 & 15.12, 11-23-72; renumbered as §§ 15.1, 15.2, 15.4-15.11, 15.13-15.17, 11-23-72]-(NAC A 10-22-93)

Section 81 **444.XXX Records: logging of removal and disposal of solid and liquid wastes; cleaning of vehicle tanks and portable receptacles; maintenance of records; availability to health authority.**

1. A record of each removal and disposal of solid or liquid waste must be logged by the septic tank pumping contractor. The record must include the following:

(a) Type of solid or liquid waste.

(b) License number of vehicle removing solid or liquid waste.

(c) Name of the employee removing the solid or liquid waste.

(d) Date of removal of solid or liquid waste.

(e) Time of removal of solid or liquid waste.

(f) Location from which solid or liquid waste was removed.

(g) Date of disposal of solid or liquid waste.

(h) Time of disposal of solid or liquid waste.

(i) Location of disposal of solid or liquid waste.

(j) Receipt from the operating authority of the solid or liquid waste disposal site. Other provisions available to dispose of solid or liquid waste must be reviewed and approved by the health authority.

2. A record of each interior cleaning of the tank of a vehicle or of a portable receptacle used for the purposes of removing or disposing of solid or liquid wastes must be logged by the septic tank pumping contractor. The record must include the following:

(a) Name of the employee cleaning the tank or portable receptacle.

(b) Date of the cleaning of the tank or portable receptacle.

(c) Time of the cleaning of the tank or portable receptacle.

(d) Location of the cleaning of the tank or portable receptacle.

3. Records of the removal and disposal of solid or liquid wastes and the interior cleaning of the tank of a vehicle or portable receptacle used for removing or disposing of solid or liquid wastes must be retained by the septic tank pumping contractor for at least three years.

4. Records of the daily removal and disposal of solid or liquid wastes and the interior cleaning of the tank of a vehicle or portable receptacle used for removing or disposing of solid or liquid wastes must be maintained in each vehicle used for septic tank pumping contractor purposes.

5. Records of the removal and disposal of solid or liquid wastes and the interior cleaning of the tank or a vehicle or portable receptacle used for removing or disposing of solid or liquid wastes must be made available to the health authority upon its request.

Section 82 444.XXX Permit application.

1. Each permit issued by the health authority shall contain:

(a) The name of the business, if any, and the name of the person authorized to operate as a septic tank pumping contractor;

(b) The mailing address and physical address of the person authorized to operate as a septic tank pumping contractor; and

(c) The number of vehicles and/or tanks authorized to be used by the septic tank pumping contractor in removing and disposing of the solid and liquid contents of septic tanks, holding tanks, grease traps and grease interceptors, portable toilets or other sewage treatment or disposal facilities. The vehicles and/or tanks listed on the permit must be specifically identified in the permit application according to the requirements set forth in Section 84 of this regulation.

2. A permit applies only to the person to whom it is issued, is valid only for the vehicles and/or tanks described in the application and is not transferable.

Section 83 444.XXX Permit: amendment required.

A permittee must obtain the approval of the health authority to amend his permit to operate as a septic tank pumping contractor before using any vehicles and/or tanks which are not listed in his application and which are to be used in removing and disposing of the solid and liquid contents of septic tanks, holding tanks, grease traps and grease interceptors, portable toilets or other sewage treatment or disposal facilities.

Section 84 444.820 Permit required for septic tank pumping contractor.

1. [Persons]No person may engage[d] in the operation of removing and disposing of the solid and liquid contents of septic tanks, holding tanks, grease traps and grease interceptors, portable toilets, or other sewage treatment or disposal facilities [must obtain]unless he has first obtained an annual permit from the health authority. Any person desiring an annual permit under the provision of Section 84 to 87, inclusive and Section 1 of this regulation, must file with the health authority an application on a form prescribed, prepared and furnished by the health authority. A written application must be made annually, prior to adding a vehicle to the operation and prior to changing a point of discharge.

2. The application for this permit [should]must contain the following information:

(a) The [A]area to be served.

(b) The [T]type of waste to be hauled.

(c) The exact [L]location of all discharge [points] sites and type of waste to be discharged at each location. "Will serve" letters from the operating authority of the discharge sites must be submitted at the time that application is made.

(d) License number, vehicle identification number, make, model, year and color of each vehicle and state of registration of each [truck]vehicle which the permittee intends to use to remove or dispose of solid and liquid contents of septic tanks, holding tanks, grease traps and grease interceptors, portable toilets or other sewage treatment or disposal facilities. An original or certified copy of each state registration and/or bill of sale must be submitted to the health authority upon request.

(e) Capacity of each [truck]vehicle to be listed on the permit.

(f) The location where each vehicle will be stored.

(g) The names and addresses of all employees who will be removing or disposing of solid and liquid contents of septic tanks, holding tanks, grease traps and grease interceptors, portable toilets or other sewage treatment or disposal facilities. This list must be updated by submitting written notification to the health authority within 2 weeks of any personnel changes.

(h) A description of each tank which is not physically affixed to a vehicle and which will be used to remove, dispose of or store solid and liquid contents of septic tanks, holding tanks, grease traps and grease interceptors, portable toilets or other sewage treatment or disposal facilities. The description must include the dimensions, size, capacity, and color of each tank.

[(f)](i) A statement signed by the applicant that all waste material collected will be disposed of in accordance with the provisions of NAC 444.[750]XXX Section 81 to 444.[820]XXX Section 84, inclusive, and that such waste will not be discharged to any waterway or sewer nor deposited on any land, including privately owned land, without prior approval of the health authority or Nevada division of Environmental Protection.

(j) Evidence satisfactory to the health authority that the applicant is of reputable and responsible character. If the applicant is a firm, association, organization, partnership, business

trust, corporation or company, similar evidence must be submitted as to the members thereof, and the person in charge of the business for which the application is made.

(k) A copy of the Motor Vehicle registration for all vehicles to be used by the septic tank pumping contractor in removing and disposing of the solid and liquid contents of septic tanks, holding tanks, grease traps, grease interceptors, portable toilets or other sewage treatment or disposal facilities. If the applicant is not the registered owner of a vehicle, he must submit documentation of his authority to use the vehicle for the purposes described above. The applicant shall inform the health authority of any and all changes to the ownership of the vehicles while the application is pending and, after a permit has been issued, the permittee shall inform the health authority within two weeks of the change in ownership of a vehicle and supply the documentation required in this section.

(l) Such other information as may be required by the health authority.

3. The name, address and phone number of the septic tank pumping contractor [or]and his permit number [or both] must be permanently and legibly lettered on all tanks which are not physically affixed to a vehicle, and on both sides and the rear of each vehicle used for septic tank pumping purposes. Lettering must be at least four (4) inches in height and contrasting to the color of the tank and vehicle.

4. Every tank and portable receptacle used for transporting liquid or solid wastes must be permanently and legibly labeled "SEWAGE SLUDGE" or "RAW SEWAGE" on both sides and the rear in letters at least four (4) inches in height and contrasting to the color of the tank.

[4]5. Every vehicle used for septic tank pumping purposes must be equipped with a watertight tank [or body]. Every tank and portable receptacle used for transporting liquid or solid wastes shall [and] be maintained in a clean and sanitary condition. Water used to clean portable

receptacles must be disposed of to an approved sewage disposal system or sewage treatment facility. Liquid or solid wastes must not be transported in an open body vehicle unless contained within suitable portable receptacles. All pumps and hose lines must be maintained so as to prevent leakage.

[5. All portable receptacles used for transporting liquid or solid wastes must be watertight, equipped with tight-fitting lids, and must be cleaned daily.]

6. Prior approval in writing must be obtained from the health authority and the operating authority of the discharge site for every pre-approved location [site] at which a septic tank pumping contractor plans to discharge a specific volume of waste material collected [and]. [n]No waste material may be discharged on a site without prior approval. Waste material collected by the septic tank pumping contractor must not be discharged into ditches, watercourses, lakes, ponds or any point where it can pollute any watercourse, water supply source, or bathing area. It must not be deposited within 600 feet of any highway or residence.

[7. All septic tank pumping contractor truck pumping and discharge hoses must be fitted with automatic shutoff valves.]

8. Vehicles or portable receptacles used for removing or disposing of solid or liquid wastes must not be used for any other purpose.

[8]9. The health authority may deny an application for a permit if the applicant:

(a) Engaged in the operation of removing and disposing of solid and liquid contents of septic tanks, holding tanks, grease traps and grease interceptors or other sewage treatment or disposal facilities before obtaining a permit from the health authority.

(b) Failed to comply with any of the provisions of [this] Sections 81 to 84A, inclusive.

[9]10. The health authority may refuse to renew a permit or suspend or revoke a permit

[for any violation of this section or for violating the terms of the permit.] if the permittee:

(a) violates any provision of chapter 444 of the NRS or NAC;

(b) violates any of the terms of the permit; or

(c) uses any vehicles and/or tanks which are not listed in the permit.

[Bd. of Health, Indiv. Sewage Disposal Systems Reg. §§ 16.1-16.7, eff. 11-23-72]-(NAC A 10-30-97)

Section 84A 444.XXX Permits issued by the health authority. Each permit issued by the health authority shall be for a period not to exceed 1 calendar year from the date of issuance. A permittee who wishes to renew his permit must submit a complete application for renewal to the health authority not less than 45 days before the date at which the permit expires. The health authority may require an inspection of the vehicles to ensure the vehicles meet the requirements of this chapter before deciding whether to renew a license. Such an inspection shall not be scheduled until the complete application and fees are received by the health authority.

Section 85 444.XXX Non-sewered toilets – facilities for special events

1. The operator of a special event shall provide toilet facilities. Special event toilet facilities may include non-sewered (portable) toilets. Non-sewered toilets may not be used for permanent sewage disposal.

2. Toilet facilities shall be kept clean, and in good repair. A supply of toilet tissue must be provide at each toilet at all times.

3. Toilet facilities shall be provided for workers as well as patrons attending the special event.

4. Hand washing facilities shall be provided for persons performing food preparation at a special event.

5. The applicant is responsible for determining the number of toilet facilities required for a special event. If requested by the applicant the health authority shall review the number of toilet facilities required for a special event based on the following table:

NUMBER OF TOILET UNITS REQUIRED										
PEAK HOURLY ATTENDANCE	AVERAGE TIME AT THE EVENT (HOURS)									
	1	2	3	4	5	6	7	8	9	10
500	2	4	4	5	6	7	9	9	10	12
1000	4	6	8	8	9	9	11	12	13	13
2000	5	6	9	12	14	16	18	20	23	25
3000	6	9	12	16	20	24	26	30	34	38
4000	8	13	16	22	25	30	35	40	45	50
5000	12	15	20	25	31	38	44	50	56	63
10000	15	25	38	50	63	75	88	100	113	125
15000	20	38	56	75	94	113	131	150	169	188
20000	25	50	75	100	125	150	175	200	225	250

Section 86 **444.XXX Non-sewered toilets – requirements**

1. Any person operating a non-sewered toilet service must obtain a permit in accordance with Section 84 to 87, inclusive.

2. The health authority may inspect the non-sewered toilet service operation area to ensure cleaning and disposal requirements are met.

3. The person operating the service must provide an area suitable for the storage and maintenance of all equipment utilized in the operation. This area must be maintained in a neat, clean condition at all times.

4. When a non-sewered toilet is removed from service, it must be thoroughly cleaned by steam, pressurized hot water or other approved means prior to being placed back in service. Water used to clean non-sewered toilets must be disposed of to an approved sewage disposal system or sewage treatment facility.

5. Holding tanks of non-sewered toilets must be empty of all material during transport with the exception of those that are designed to transport material in the holding tank and are permanently affixed to a trailer, or other mobile structure.

6. A non-sewered toilet must be constructed of smooth, durable, non-absorbent, easily cleanable material. The interior must be light in color and capable of withstanding repeated cleaning.

7. A non-sewered toilet must be designed to prevent entry of rodents and insects. All vent and window openings to the outside must be covered with metal or plastic mosquito screening. The door must be self-closing. A vent or window must be provided for light.

8. Non-sewered toilets specially designed for use with high-rise construction may be exempted from non-attainable portions of this section with approval from the health authority.

9. The storage tank must be enclosed within the structure, properly vented, watertight and maintained in good repair. The holding tank must be accessible for cleaning and maintenance.

10. The toilet seat must be smooth, impervious, and installed so as to be easily cleaned or replaced.

11. The interior of a non-sewered toilet must be cleaned at least once every 7 days while the toilet is in use and as needed to maintain a clean, odor-free condition.

12. Toilet paper must be provided at all times.

13. The non-sewered toilet structure must be clearly and legibly marked with the name and telephone number of the operator.

Section 87 444.828 Fees. The health division shall charge and collect fees for its services in accordance with the following schedule, except in areas where the laws and regulations governing individual sewage disposal systems and septic tank pumping contractors are administered by another administrative authority [local health authorities]:

(a) For a permit to construct an individual sewage disposal system for a single family dwelling, including a review of the plan for the system and for the initial inspection of the system.....$100

(b) For a permit to construct a residential individual sewage disposal system utilizing an alternative treatment or disposal system design, including a review of the plan for the system and for the initial inspection of the system.....$200

(c) For a permit to construct a commercial individual sewage disposal system, including a review of the plan for the system and for the initial inspection of the system.....$200

(d) For each plan resubmittal of (a), (b), or (c) above designed by an engineer.....$50

(e) For a reinspection of an individual sewage disposal system.....$50

(f) For a review of an application to obtain a loan for property [on which an individual sewage disposal system has been constructed] which contains a system described in (a), (b) or (c) above……$50

(g) For [a license] an annual permit for a septic tank pumping company……$50

Plus $50 per pumping unit per year.

(h) To extend a permit to construct an individual sewage disposal system for a period of one year from the expiration date ……$50.

(i) For an annual permit to operate a nitrate removal wastewater treatment unit……$50.00

(j) For an annual permit to operate an aerobic wastewater treatment unit……$50.00

(Added to NAC by Bd. of Health, eff. 7-20-82; A 7-22-87; A 5-26-89)

[Variances]

Section 88 [**444.830 Filing of request for variance.** Any person requesting a variance under NAC 444.830 to 444.840, inclusive, for the purpose of installing an individual sewage disposal system on land situated in either Clark County or Washoe County must file the request with the district board of health of the respective county in which the land is located.]

[Bd. of Health, Variance Procedure for Indiv. Septic Tanks Reg. § 1, eff. 8-19-73]

Section 89 [**444.832 Public hearing by district board.** The district board of health or its designated hearing board shall, within 60 days of receipt of a request for a variance, hold a

public hearing pursuant to chapter 233B of NRS after giving at least 30 days' prior public notice of the date, place and subject of the hearing in a newspaper of general circulation in the county.]

[Bd. of Health, Variance Procedure For Indiv. Septic Tanks Reg. § 2, eff. 8-19-73]

Section 90 [**444.834 Decision by district board. (NRS 439-200, 444.650)**

1. The district board of health or its designated hearing board shall, after receiving evidence from all interested persons at the hearing on the request for a variance, make written findings of fact based on the evidence as to whether or not the variance, if granted, would cause human and domestic waste to be disposed of in a manner:

(a) That would cause any drinking water supply to be contaminated;

(b) That would give rise to a public health hazard by being accessible to insects, rodents or other possible carriers which may come in contact with food or drinking water;

(c) That would give rise to a nuisance due to odors or unsightly appearance;

(d) That would contaminate any body of water; and

(e) That would violate any other laws or regulations governing sewage disposal.

2. Based on its findings of fact, the district board of health or its designated hearing board shall make a written recommendation of denial or approval of the variance to the board.

3. The record of hearing by the district board of health or its designated hearing board must include:

(a) Written findings of fact;

(b) Written recommendation

(c) Verbatim evidence received or considered by the district board of health or its designated hearing board; and

(d) The application for the variance.

4. The district board of health shall submit the record of the variance request hearing to the bureau of environmental health within 14 days of such hearing and simultaneously forward a copy of the findings of fact and recommendation to the applicant for a variance.]

[Bd. of Health, Variance Procedure for Indiv. Septic Tanks Reg. § 3, eff. 8-19-73]-(NAC A 10-30-97)

Section 91 [**444.836 Review by bureau of health protection services. (NRS 439.200, 444.650)**

1. The bureau of health protection services of the health division of the department of human resources or its successor shall, within 14 days of receipt of the district board of health's record of the hearing on the request for a variance, review the record, enter a written recommendation either to deny or grant the requested variance and forward the written recommendation accompanied with the district board of health's variance request hearing record to the secretary of the board. The bureau shall send a copy of its written recommendation to the applicant for a variance simultaneously with sending it to the secretary of the board.

2. The basis for the written recommendation of the bureau persuant to subsection 1 is not limited to the record of the district board of health's variance hearing, but may include engineering and sanitation studies conducted by the bureau with regard to the criteria established in subsection 1 of NAC 444.834 as a basis for the district board of health's findings of fact and recommendation.

3. The bureau shall include in its recommendation under subsection 1 any findings of fact in addition to those of the district board of health and the source of the information relied on to arrive at such additional findings of fact.]

[Bd. of Health, Variance Procedure for Indiv. Septic Tanks Reg. § 4, eff. 8-19-73]

Section 92 [**444.838 Hearings by state board. (NRS 439.200, 444.650)**

1. If the recommendations of the district board of health and the bureau of health protection services of the health division of the department of human resources or its successor are in conflict or a recommended denial of a variance is concurred in by both the district and the

bureau, a hearing on the request for the variance will be held by the state board of health, if requested by the applicant.

2. If the recommendation of the bureau is entered at least 30 days before the next regularly scheduled meeting of the state board of health, the hearing referred to in subsection 1 will be held at the meeting, otherwise it will be scheduled for the following regularly scheduled meeting.

3. Evidence presented at the hearing of the state board of health referred to in subsection 1 will be limited to that evidence concerning those issues not raised at the district board of health's hearing, newly discovered evidence, additional material evidence concerning issues presented at the hearing of the district board of health or evidence in support of or in rebuttal to the findings of fact of the bureau as a result of its own engineering and sanitation studies.

4. At the conclusion of the evidence referred to in subsection 3, the request for a variance stands submitted and the state board of health will enter a written decision, including findings of fact, within 2 weeks of the hearing date.]

[Bd. of Health, Variance Procedure for Indiv. Septic Tanks Reg. § 6, eff. 8-19-73]

Section 93 [**444.840 Grant of variance. (NRS 439.200, 444.650)** If the district board of health and the bureau of health protection servcies of the health division of the department of human resources or its successor concur in their recommendations that a variance should be granted, the state board of health will grant the variance at its next regularly scheduled meeting, upon review and approval.]

[Bd. of Health, Variance Procedure for Indiv. Septic Tanks Reg. § 5, eff. 8-19-73]

SEWAGE DISPOSAL

Primary Treatment

Section 94 444.XXX Primary treatment.

1. All liquid waste and wastewater shall discharge into a septic tank or other approved primary treatment unit. Graywater may be discharged separately as described in Section 121 to 122, inclusive. Roof, footing, garage and surface water drainage and process water is prohibited from entering the individual sewage disposal system.

2. The primary treatment unit shall be of sufficient size as to provide adequate treatment during a worst case (maximum loading) situation. Alternative systems shall have a minimum capacity equal to the required minimum septic tank capacity as calculated in Sections 95 to 100, inclusive.

3. Alternative methods of primary treatment, other than those listed in Section 101 to 106, inclusive, may be used as approved by the health authority.

4. Primary treatment units shall be accessible. On primary treatment units over 18 inches below the ground surface, manhole extensions at least 24 inches in diameter that extend to within 18 inches of the ground surface shall be used for each access.

5. To prevent differential settling, primary treatment units shall be placed on undisturbed earth or on at least 4 inches of sand overlying a firm and uniform base.

Section 95 444.XXX Septic tanks.

1. Septic tanks used as primary treatment units or in conjunction with an alternative primary treatment unit must meet the requirements of Sections 73 to 76, inclusive.

Section 96 444.XXX Septic tank sizing for systems serving single family dwellings.

1. The minimum septic tank capacities for single family dwellings are based on the number of bedrooms at the residence and are as follows:

Number of Bedrooms	Liquid Capacity of Tank (Gallons)
3 or less	1,000
4	1,200
5 or 6	1,500

Extra bedroom(s), 150 gallons each.

2. Single family dwellings served by a septic tank that is larger than required to provide additional storage capacity may have the absorption system designed using the minimum required septic tank size.

Section 97 444.XXX Septic tank sizing for commercial/industrial systems.

1. Individual sewage disposal systems designed for commercial use with design capacities of up to and including 5000 gallons per day shall be reviewed by the respective health authority for the county in which the system is proposed. Systems exceeding design flow capacities of 5000 gallons per day shall be submitted to the Nevada Division of Environmental Protection Bureau of Water Pollution Control for review.

2. Commercial and industrial systems shall be designed by an engineer.

3. Individual sewage disposal systems with design flow capacities equal to or under 5000 gallons per day shall meet all the minimum set back requirements and design criteria as specified in Section 1 to 134, inclusive, except as otherwise specified.

Section 98 444.XXX Septic tank sizing for multiple dwelling units or apartments.

1. Septic tanks used to serve multiple dwelling units or apartments shall be sized by the number of units as follows:

Multiple Dwelling Units or Apartments One Bedroom Each	Minimum Septic Tank Capacity
2	1,200
3	1,500
4	2,000
5	2,250
6	2,500
7	2,750
8	3,000
9	3,250
10	3,500

Extra dwelling units over 10, 250 gallons each.

Extra bedroom, 150 gallons each.

Section 99 **444.XXX Septic tank sizing for hotels and motels.**

1. Septic tanks used to serve hotels and motels shall be sized by the estimated sewage flow method. Estimated flow shall be calculated as 60 gallons per day per bed (2 person) unit. The minimum septic tank size shall be determined as follows:

(a) For sewage flows up to and including 1,500 gallons per day: flow x 1.5 = septic tank size.

(b) For sewage flows over 1,500 gallons per day: flow x .75 + 1125 = septic tank size.

Section 100 **444.XXX Septic tank sizing for other commercial structures.**

1. Septic tanks used to serve all other commercial structures not addressed in Section 97 to 99, inclusive shall be sized by the estimated sewage flow method and the fixture unit count method. The method which requires the greater septic tank capacity shall be used in the system design.

2. Estimated sewage flow method:

Calculate the estimated flow rate from the following table associated with the type of occupancy:

TYPE OF OCCUPANCY	ESTIMATED FLOW (GALLONS PER DAY)
Airports	15 per employee/5 per customer
Auto washers	5 per passenger vehicle (check with equipment manufacturer)
Bowling alleys	75 per lane(snack bar only)
Camps:	
Campground with central comfort station	35 per person
with flush toilets, no showers	25 per person
Day camps (no meals served)	15 per person
Summer and seasonal	50 per person
Churches (Sanctuary)	5 per seat
with kitchen waste	7 per seat
Dance halls	5 per person
TYPE OF OCCUPANCY	ESTIMATED FLOW (GALLONS PER DAY)
Factories:	

No showers	25 per employee
with showers	35 per employee
Cafeteria, add	5 per employee
Hospitals	250 per bed
Kitchen waste only	25 per bed
Laundry waste only	40 per bed
Institutions (Resident)	75 per person
Nursing home	125 per person
Rest home	125 per person
Laundries, self-service (minimum 10 hours per day)	50 per wash cycle
Commercial	Per manufacturer's specifications
Offices	20 per employee
Parks, mobile homes	250 per space
Picnic parks (toilets only)	20 per parking space
Recreational vehicles:	
Without water hook-up	75 per space
with water and sewer hook-up	100 per space
Restaurants – cafeterias	20 per employee

TYPE OF OCCUPANCY	ESTIMATED FLOW (GALLONS PER DAY)
Toilet	7 per customer
Kitchen waste	6 per meal
add for garbage disposal	1 per meal
add for cocktail lounge	2 per meal
Kitchen waste- disposable service	2 per meal
Schools - Staff and office	20 per person
Elementary students	15 per person
Intermediate and high	20 per student
with gym and showers, add	5 per student
with cafeteria, add	3 per student
Boarding, total waste	100 per person
Service station, toilets	1000 for 1st bay
Each additional bay, add	500
Stores	20 per employee
Public restrooms, add	1 per 10 sq.ft. floor space
Swimming pools, public	10 per person
Theaters, auditoriums	5 per seat
drive-in	10 per space

(a) For estimated sewage flows up to and including 1,500 gallons per day: estimated flow x 1.5 = minimum septic tank size.

(b) For estimated sewage flows over 1,500 gallons per day: estimated flow x .75 + 1125 = minimum septic tank size.

3. Fixture unit count method:

Calculate the number of fixture units to be served by the individual sewage disposal system from the following table:

KIND OF FIXTURE	MINIMUM TRAP & TRAP ARM SIZE (inches)	FIXTURE UNITS
Bathtubs	1-1/2	2
Bidets	1-1/2	2
Dental units or cuspidors	1-1/4	1
Drinking fountains	1-1/4	1
Floor drains	2	2
*Interceptors for grease, oil, solids, etc	2	3
*Interceptors for sand, auto wash, etc	3	6
Laundry tubs	1-1/2	2
Clotheswashers	2	2
KIND OF FIXTURE	MINIMUM TRAP & TRAP ARM SIZE (inches)	FIXTURE UNITS

*Receptors (floor sink), indirect waste receptors for refrigerators, coffee urns water stations, etc	1-1/2	1
*Receptors, indirect waste receptors for commercial sinks, dishwashers, air washers, etc	2	3
Shower, single stalls	2	2
*Showers, gang, (one unit per head)	2	
Sinks, bar, private (1 1/2" (38.1mm) min. waste)	1-1/2	1
Sinks, bar, commercial (2" (50.8mm) min. waste)	1-1/2	2
Sinks, commercial or industrial, schools, etc. including dishwashers, wash up sinks, and wash fountains (2"50.8mm) min. waste)	1-1/2	3
Sinks, flushing rim, clinic	3	6
KIND OF FIXTURE	MINIMUM TRAP & TRAP ARM SIZE (inches)	FIXTURE UNITS
Sinks, and/or dishwasher (residential) (2" (50.8mm) min. waste)	1-1/2	2
Sinks, service	2	3
Mobile home park traps (one (1) for each trailer)	3	6
Urinals, pedestal, trap arm only	3	6

Urinals, stall, separate trap	2	2
Urinals, wall (2" (50.8mm) min. waste) mounted, washout, separate trap	1-1/2	2
Urinals, wall mounted, washdown or siphon jet, integral trap, trap arm only	2	2
Urinals, wall mounted, blowout, integral trap, trap army only	3	6
Wash basins (lavatories) single	1-1/4	1
Wash basins, in sets	1-1/2	2
Water closet, public installation, trap arm only	3	6

(a.) The minimum septic tank capacity shall be determined as follows:

MAXIMUM FIXTURE UNITS SERVED	SEPTIC TANK CAPACITY (GALLONS)
20	1,000
25	1,200
33	1,500
45	2,000
55	2,250
60	2,500
70	2,750
80	3,000
90	3,250
100	3,500

Add 25 gallons per fixture unit for each fixture unit over 100.

Section 101 444.XXX Aerobic wastewater treatment units.

1. Aerobic wastewater treatment units normally require routine maintenance. A maintenance agreement with a service provider covering the life span of the system shall be submitted to the administrative authority with the plan design.

2. The maintenance agreement shall include, but not be limited to:

(a.) A yearly inspection of the system and system components .

(b) Verification that the system is functioning correctly.

(c) Verification that the system is producing effluent with BOD levels not exceeding 30 mg/L and total suspended solids not exceeding 30 mg/L.

(d) A written yearly report shall be submitted to the administrative authority for review confirming (a.) through (c.), above has occurred.

3. Aerobic wastewater treatment units with effluent levels of BOD or total suspended solids exceeding 30 mg/L shall be repaired or replaced in accordance with Section 101 to 103, inclusive.

4. The administrative authority may require the use of an aerobic wastewater treatment unit where degradation of groundwater or site constraints warrant the need for higher quality effluent than provided by a septic tank.

5. When the use of an aerobic wastewater treatment unit is required by the administrative authority, the owner shall apply to the administrative authority for an annual permit to operate an aerobic wastewater treatment unit. The owner shall include with the application:

(a) The required fee.

(b) A current copy of the maintenance agreement for the aerobic wastewater treatment unit.

6. The administrative authority shall issue an annual permit if all of the following conditions are met:

(a) The required fee has been paid.

(b) The yearly report submitted by the service provider confirms that the system is functioning correctly and that BOD and total suspended solids levels have not exceeded 30 mg/L

or, in the case of new construction, the system has been approved and inspected by the administrative authority.

(c) There is a current maintenance agreement with a service provider for the aerobic wastewater treatment unit.

7. Any person electing to use an aerobic wastewater treatment unit that is not required by the administrative authority is exempt from the annual permit requirement described in subsections 5 and 6 above.

Section 102 444.XXX Aerobic wastewater treatment units - design considerations:

1. All aerobic wastewater treatment units shall be approved by NSF International, Standard 40, or other equivalent nationally recognized testing laboratories or as approved by the health authority. Applications for review by the health authority shall include test procedures and results submitted by an engineer. Such systems use shall be consistent with approved design application and intended use.

2. All aerobic wastewater treatment units shall conform with applicable Nevada Administrative Code regulations and shall be subject to any other design requirements as determined by the health authority.

3. A reduction in the absorption area may be allowed by the administrative authority when the use of an aerobic treatment unit is required by the administrative authority. Any reduction in absorption field size shall be justified by an engineer based on soil conditions and site constraints. No direct surface discharge shall be permitted.

4. Aerobic wastewater treatment units shall not be allowed where electrical service is unreliable, dependable maintenance is not available, or intermittent use will adversely effect the

functioning of the system. A schematic detailing a 24 hour operating alarm system shall be submitted to the health authority with the design plans.

5. An operation and maintenance manual shall be submitted to the health authority with the plan design. Aerobic wastewater treatment units shall not be approved without an approved operation and maintenance manual.

Section 103 444.XXX Aerobic wastewater treatment units – inspections.

1. The construction of an aerobic wastewater treatment unit shall be inspected and verified by an engineer, or home owner if designed by the home owner, at the following intervals:

(a) When the absorption trenches have been excavated or; if a mound is to be utilized, when the mound basal area has been scarified.

(b) When the distribution piping has been placed in the gravel absorption media.

(c) When the system has been covered with soil.

(d) When all the pumps, switches, alarms, aeration units and other components associated with the system have been installed. An engineer, or home owner on home owner designed systems, shall also verify that the design operational liquid levels are set as specified by the plan designs.

2. The home owner is required to contact the administrative authority for an inspection prior to covering the system. On home owner designed systems, the administrative authority shall inspect the construction for compliance with the approved plans.

3. On engineer designed systems, a letter from an engineer, stating the project was constructed in accordance with the approved plans, shall be submitted to the health authority within 30 days of completion of the project.

Section 104 444.XXX Nitrate removal wastewater treatment units.

1. Nitrate removal wastewater treatment units normally require routine maintenance. A maintenance agreement with a service provider covering the life span of the system shall be submitted to the administrative authority with the plan design.

2. The maintenance agreement shall include, but not be limited to:

(a.) A yearly inspection of the system and system components.

(b.) Verification that the system is functioning correctly.

(c.) Verification that the system is producing effluent with nitrate levels not exceeding 10 mg/L, measured as total nitrogen.

(d.) A written yearly report shall be submitted to the administrative authority for review confirming (a.) through (c.), above has occured.

3. Nitrate removal wastewater treatment units with effluent levels of nitrate exceeding 10 mg/L, measured as total nitrogen, shall be repaired or replaced in accordance with Sections 104 to 106, inclusive.

4. The administrative authority may require the use of a nitrate removal wastewater treatment unit where degradation of groundwater or site constraints warrant the need for higher quality effluent than provided by a septic tank.

5. When the use of a nitrate removal wastewater treatment unit is required by the administrative authority, the owner shall apply to the administrative authority for an annual permit to operate a nitrate removal wastewater treatment unit. The owner shall include with the application:

(a.) The required fee.

(b.) A current copy of the maintenance agreement for the nitrate removal wastewater treatment unit.

6. The administrative authority shall issue an annual permit if all of the following conditions are met:

(a.) The required fee has been paid.

(b.) The yearly report submitted by the service provider confirms that the system is functioning correctly and that nitrate levels have not exceeded 10 mg/L or, in the case of new construction, the system has been approved and inspected by the administrative authority.

(c.) There is a current maintenance agreement with a service provider for the nitrate removal wastewater treatment unit.

7. Any person electing to use a nitrate removal wastewater treatment unit that is not required by the administrative authority is exempt from the annual permit requirement described in subsections 5 and 6 above.

Section 105 444.XXX Nitrate removal wastewater treatment units - design considerations.

1. All nitrate removal wastewater treatment units shall be approved by NSF International, Standard 40, or other equivalent nationally recognized testing laboratories or as approved by the health authority. Applications for approval by the health authority shall include test procedures and monitoring schedules submitted by an engineer. Such systems use shall be consistent with approved design application and intended use.

2. All nitrate removal wastewater treatment units shall conform with applicable Nevada Administrative Code regulations and shall be subject to any other design requirements as determined by the health authority.

3. A reduction in the absorption area may be allowed by the administrative authority when the use of a nitrate removal treatment unit is required by the administrative authority. Any

reduction in absorption field size shall be justified by an engineer based on soil conditions and site constraints. No direct surface discharge shall be permitted.

4. Nitrate removal wastewater treatment units shall not be allowed where electrical service is unreliable, dependable maintenance is not available, or intermittent use will adversely effect the functioning of the system. A schematic detailing a 24 hour operating alarm system shall be submitted to the health authority with the design plans.

5. An operation and maintenance manual shall be submitted to the health authority with the plan design. Nitrate removal wastewater treatment units shall not be approved without an approved operation and maintenance manual.

Section 106 444.XXX Nitrate removal wastewater treatment units – inspections.

1. The construction of a nitrate removal wastewater treatment unit shall be inspected and verified by an engineer, or home owner if designed by the home owner, at the following intervals:

(a) When the absorption trenches have been excavated or; if a mound is to be utilized, when the mound basal area has been scarified.

(b) When the distribution piping has been placed in the gravel absorption media.

(c) When the system has been covered with soil.

(d) When all the pumps, switches, alarms, aeration units and other components associated with the system have been installed. An engineer shall also verify that the design operational liquid levels are set as specified by the plan designs.

2. The home owner is required to contact the administrative authority for an inspection prior to covering the system. On home owner designed systems, the administrative authority shall inspect the construction for compliance with the approved plans.

3. On engineer designed systems, a letter from an engineer, stating the project was constructed in accordance with the approved plans, shall be submitted to the health authority within 30 days of completion of the project.

Section 107 444.XXX Dosing tanks.

1. Dosing tanks are to be used where it is necessary to raise the elevation of the wastewater for further treatment or disposal, where intermittent dosing of the disposal field is desired, or where pressure distribution networks are used. Dosing tanks shall be required when more than 500 lineal feet of absorption trench is required.

2. A dosing tank consists of a tank and siphon or tank, pump, pump controls, and alarm system.

3. A sewage disposal system proposing the use of a dosing tank shall be designed by an engineer.

Section 108 444.XXX Dosing tanks – design considerations.

1. The tank shall have sufficient volume to provide the desired dosing volume, plus a reserve volume. The reserve volume is the volume of the tank between the high water alarm switch and the invert of the inlet pipe. A reserve volume capacity shall be sufficient to allow the system owner to respond to a high level alarm prior to the level of effluent in the dosing tank reaching the invert of the inlet pipe.

2. Electric Pumps:

(a) The pump shall be sized using performance curves provided by the manufacturer. Selection is based on the flow rate needed and the pumping head as calculated by an engineer.

(b) The pumping head is to be calculated by adding the elevation difference between the highest elevation of the discharge pipe and the low effluent level in the dosing chamber to the friction losses incurred in the discharge pipe. The velocity head can be neglected in most applications.

(c) The control system for the pumping chamber is to consist of a "pump off" switch, a "pump on" switch, and a high effluent level alarm switch. The high effluent level alarm switch is set several inches above the pump off switch to alert the owner of a pump malfunction by activating a visual and audible alarm. This switch must be on a circuit separate from the pump switches. Switches should be selected which can stand the humid and corrosive atmosphere inside the tank. Production information sheets on hardware (pumps, switches, alarms) proposed for use in the system shall be submitted with the plan design.

(d) All electrical contacts and relays must be mounted outside the dosing tank to protect them from corrosion. Provisions should be made to prevent gases from following the electrical conduit into the control box.

(e) Typical dosing tank with pump:

3. Siphons:

(a) Siphons may be used in place of pumps if the point of discharge is at a lower elevation than the primary treatment unit.

(b) The size of the siphon is determined by the average flow rate desired. The drawing depth (distance from the the bottom of the siphon bell to high water level necessary to activate the siphon) is determined by the manufacturer of the siphon. The length and width of the dosing tank determines the dosing volume.

(c) Typical dosing tank with siphon:

4. All dosing tanks shall be vented. Vents shall be located a minimum of 3 feet from the electrical control box and as far away as practical.

5. Dosing frequencies may vary depending on the soil texture at the sand/native soil interface at the base of the mound. Suggested dosing frequencies are listed as follows:

SOIL TEXTURE	DOSING FREQUENCY
Sand	4 doses/day
Sandy Loam	1-2 doses/day
Silty Clay Loam	1 dose/day

6. Dosing volume shall be of sufficient capacity to distribute effluent evenly to all parts of the distribution system. Dosing volume shall be approximately 10 times the volume of the distribution piping for pressure distribution systems and approximately 60-75 percent of the volume of the distribution piping for non-pressure distribution systems.

Section 109 444.XXX Distribution box.

1. With the exception of pressure distribution systems, a distribution box shall be used when more than one distribution line is used in an absorption system.

2. The distribution box shall be watertight and constructed of a durable, corrosion resistant material such as concrete, polyethylene, fiberglass, or other approved material. The box shall be provided with a cover of the same material.

3. Each distribution line shall be connected separately to the distribution box. The invert of the outlet lines must be set at the same level above the bottom of the box. The invert of the

inlet shall be at least 1 inch above the invert of the outlets. Distribution boxes shall be designed to ensure equal flow and shall be installed on a minimum of six inches of gravel or level concrete slab which shall extend six inches beyond the perimeter of the distribution box or on undisturbed earth.

4. The size of the distribution box must be sufficient to accommodate the required number of distribution lines.

5. Distribution box diagram:

Soil Absorption System Design

Section 110 444.XXX Soil absorption system - general requirements.

1. The effluent from septic tanks and other primary treatment units shall be disposed of by soil absorption trenches, or by an absorption system approved by the administrative authority.

2. The absorption area required for effluent disposal shall be determined by the results from the percolation testing and septic tank sizing requirements; however, the minimum design percolation rate shall be 10 minutes per inch.

3. Soils must have an acceptable percolation rate without interference from groundwater or impervious strata below the level of the absorption system. The soil profile shall be logged to a minimum depth of 5 feet below the bottom of the proposed absorption area. Impervious barriers, bedrock, fractures, open solution channels, clay, caliche or other limiting factors which may affect the effluent disposal area shall be indicated on the soil log.

4. Soil absorption systems intended for use on soils with percolation rates slower than 60 minutes/inch or intended for commercial use must be designed by an engineer.

5. Depth to seasonal high groundwater, as observed as a free water surface, or as indicated by mottling or historical documentation, shall be indicated on the soil log.

6. A minimum of 4 feet shall be maintained between the bottom of the disposal trench or absorption area and seasonal high ground water, impervious barriers or other limiting soil characteristics unless otherwise approved by the administrative authority.

7. Soils with percolation rates of less than 2 minutes per inch may require special design, as determined by the administrative authority, depending on the soil and site characteristics. Increased sets backs from well or water courses may also be required.

8. Effluent from a wastewater treatment tank shall be disposed of through a minimum 5-foot section of approved solid watertight pipe placed prior to the absorption system.

9. The wastewater treatment tank and soil absorption system must be separated by at least 5 feet of undisturbed soil.

10. Distribution lines shall be of equivalent length unless otherwise allowed by the administrative authority.

11. If percolation test results differ, the slower percolation rate shall be used when sizing the absorption system.

12. All individual sewage disposal systems shall be designed with a reserve leach field equal in size to at least 100 percent of the required original system. The reserve leach field shall not be paved or subject to vehicular traffic and shall be subject to the same setback requirements as the primary absorption field as listed in Section .

Section 111 444.XXX Trench systems.

1. An individual sewage disposal system utilizing absorption trenches may be used wherever practical. Whenever limiting conditions such as high groundwater, sloping terrain,

semi-impervious layers of soil, or bedrock are encountered, alternative systems shall be used as allowed or required by the health authority.

2. The design criteria provided in Section 111 to 114, inclusive shall be complied with when submitting a trench individual sewage disposal system for review.

3. A homeowner or contractor may design a trench individual sewage disposal system for use at a single family dwelling if the percolation rate is 60 minutes per inch or faster and the site is free of limiting conditions as described in subsection 1.

4. Section 113 provides an example of how to design an individual sewage disposal systems utilizing absorption trenches.

Section 112 444.XXX Trench systems - design considerations.

1. The bottom of the trench must be level and 1 to 3 feet in width.

2. Trench excavations shall be spaced, centerline to centerline, a minimum of 4 feet plus 2 feet for each foot of depth below the bottom of the distribution piping.

3. The individual laterals shall not be over 110 feet long.

4. Trenches must not be excavated when the soil is extremely wet. All smeared or compacted surfaces in the absorption trench must be scarified to the depth of the compaction and the loose material must be removed.

5. Distribution piping shall be perforated P.V.C. drain pipe unless otherwise approved by the administrative authority. The bottom of the distribution piping must be laid 12 to 48 inches below the ground surface in continuous straight or curved lines. A slope of 2 to 4 inches per 100 feet must be maintained. Distribution piping shall be equipped with end caps or vented to the surface at the end of the line or lines.

6. A minimum of 12 inches of clean, graded rock or similar aggregate ranging in size from 3/4 to 2 1/2 inches shall be placed into the trench below the distribution pipe and such aggregate must extend at least 2 inches over the top of the distribution pipe.

7. Disposal trenches exceeding 6 feet in depth below the finished grade shall have aggregate extending to within 12 inches of the ground surface to avoid an anaerobic condition in the trench.

8. The aggregate must be covered with straw, untreated building paper, geotextile fabric or equal, and the top of the trench must be overfilled with a minimum of 4 to 6 inches of earth.

9. The percolation rate shall be used to determine the design application rate in accordance with the following table:

Percolation Rate (min/in)	Design Application Rate(gallons/square feet)
2-10	1.6
11-15	1.3
16-20	1.1
21-25	1.0
26-30	.9
31-40	.8
41-50	.7
51-60	.6

Percolation rates greater than 60 minutes/inch requires design by an engineer.

10. The required septic tank size and the design application rate shall be used to determine the minimum required absorption area. The minimum required absorption area shall be determined as follows:

required septic tank size (gallons)*design application rate (gallons/square feet) = minimum required absorption area (square feet)

11. The absorption trench area shall be determined by the effective sidewall area beneath the distribution pipe. A maximum of 4 feet of drain rock below the distribution pipe may be used to calculate the effective sidewall area. Drain rock in excess of 4 feet below the distribution pipe cannot be used to calculate effective sidewall area unless approved by the administrative authority. The required length of leach line shall be determined as follows:

minimum required absorption area (square feet)*(2 x depth of gravel below the distribution pipe (feet)) = required length of leach line (feet)

12. Disposal Trench Diagram

Section 113 444.XXX Trench systems - design example.

A homeowner plans to build a 4 bedroom house. Percolation testing yielded percolation rates of 15 min/inch in test hole 1 and 23 min/inch in test hole 2. What capacity wastewater treatment tank is required, how many square feet of disposal area is required, and how many lineal feet of absorption trench are needed?

Step 1 - From the table in subsection 1 of Section 96 septic tank capacities a 1200 gallon capacity septic tank is required for a 4 bedroom house.

Step 2 - The slower 23 min/inch percolation is required for sizing the disposal area. From the table in subsection 9 of Section 112, Soil Absorption System Design, the application design rate is 1.0 gallon/sq.ft.

Step 3 - The disposal area required is the determined by dividing the wastewater treatment tank capacity by the application design rate as follows: 1200 (gal) / 1.0 (gal/sq.ft.) = 1200 (sq.ft.)

Step 4 - The absorption area is based on the effective sidewall area beneath the disposal line. The effective sidewall area is calculated by multiplying the feet of gravel beneath the distribution pipe by 2 (to utilize absorption area on each side of the trench). Up to 4 feet of sidewall area may be utilized on each trench wall per each lineal foot as follows:

2 X 4 sq. ft. = 8 sq. ft. per each lineal foot of trench

Step 5 - The required trench length is now determined by dividing the required absorption area by the selected effective sidewall area as follows:

1200 (sq. ft.) / 8 (sq. ft./ft) = 150 (ft.)

Since maximum disposal length line that may be used is 110 feet, a minimum of two trenches are required. The use of two disposal lines 75 feet long with 4 feet of gravel beneath the disposal lines would be acceptable.

Section 114 444.XXX Trench systems **– inspections.**

1. The homeowner is required to contact the administrative authority for an inspection prior to covering the system.

2. On home owner designed systems, the administrative authority shall inspect the construction for compliance with the approved plans.

3. On engineer designed systems, a letter from an engineer, stating the project was constructed in accordance with the approved plans, shall be submitted to the health authority within 30 days of completion of the project.

Section 115 444.XXX Absorption beds.

1. The absorption bed represents a viable alternative to the standard disposal trench when the installation of an absorption trench system is not practical. The bed bottom area, rather than the sidewall area, serves as the primary absorptive medium.

2. A homeowner may design an absorption bed system for use at his/her residence.

Section 116 444.XXX Absorption beds - design considerations.

1. The absorptive area of each absorption bed shall be at least 50 percent greater than the calculated requirements for a standard trench.

2. The percolation rate of the soil at the bed bottom area shall be no slower than 60 minutes/inch.

3. The effective perimeter sidewall area beneath the distribution piping (depth of gravel) shall not be less than 12 inches nor more than 36 inches. This sidewall area may be added to the bottom area when sizing the total absorptive area of the system.

4. Beds shall not be permitted on slopes greater than 8 percent. The bed bottom shall be level.

5. The invert of the drain field piping shall be 12 to 48 inches below finished grade. The top of the bed must be a minimum of 6 inches below the natural soil surface with a capping fill. The capping fill shall extend a minimum of 10 feet beyond the perimeter of the leaching area of the bed and shall be placed to a minimum depth of 12 inches above finished grade.

6. Each absorption bed shall have a minimum of two distribution lines separated by a distance not exceeding 6 feet nor less than 4 feet. Disposal lines shall not be less than 4 inches in diameter for gravity discharge systems. The distribution lines shall be level, 3 to 6 feet from the sidewall of the bed. Pressurized disposal lines shall follow design guidelines for pressure distribution systems as described in Section 133 to 134, inclusive.

7. The distribution lines shall be no longer than 110 feet and shall be placed on at least 12 inches of 3/4" to 2 1/2" clean aggregate. A minimum of 2 inches of aggregate shall cover the top of the distribution pipe. Untreated building paper, straw, geotextile fabric or equal, shall cover the gravel before the soil backfill is placed.

8. Care shall be taken to avoid compacting the bed bottom. Any loose or smeared soil shall be raked and removed. Vehicular traffic shall not be permitted on the bed area after excavation.

9. Dosing shall be required when more than five hundred (500) linear feet of distribution piping is required.

10. Absorption bed diagram:

Section 117 444.XXX Absorption beds – inspections.

1. The absorption bed shall be inspected and verified by the design engineer, or home owner if designed by the home owner, at the following intervals:

a. Following excavation, the bed bottom shall be examined to ensure no loose soil or smearing conditions exist.

b. When the installation of the distribution pipes in the absorption bed is completed.

2. The home owner is required to contact the administrative authority for an inspection prior to covering the system. On home owner designed systems, the administrative authority shall inspect the construction for compliance with the approved plans.

3. On engineer designed systems, a letter from an engineer, stating the project was constructed in accordance with the approved plans, shall be submitted to the health authority within 30 days of completion of the project.

Section 118 444.XXX Chamber systems.

1. The chamber system represents a viable alternative to the standard disposal trench when the installation of an absorption trench system is not practical. The chamber system bottom area, rather than the sidewall area, serves as the primary absorption medium.

2. Chamber systems must be reviewed and approved by the health authority as a sewage disposal system component. It is the responsibility of the manufacturer to apply to the health authority for approval.

3. A homeowner may design a chamber system for use at his residence.

Section 119 444.XXX Chamber systems - design considerations.

1. The health authority shall provide a sizing chart for each chamber system that has been approved. The sizing chart shall list the number of chamber units required for a given septic tank size and percolation rate.

2. The percolation rate of the soil on which the chambers are placed shall be no slower than 60 minutes/inch.

3. The invert of the drain piping entering the first chamber shall be 12 to 48 inches below finished grade. The top of the chambers must be a minimum of 6 inches below the natural soil surface with a capping fill.

4. The absorption trenches shall be no longer than 110 feet.

5. Absorption trench excavations must be spaced at least 6 feet centerline to centerline.

6. The bottom of the trench excavation shall be level. Care shall be taken to avoid compacting the trench bottom. Any loose or smeared soil shall be raked and removed. Vehicular traffic shall not be permitted on the trench area after excavation.

7. Dosing shall be required when more than five hundred (500) linear feet of absorption trench is required.

8. Chamber systems used in a bed configuration shall meet the sizing requirement for absorption beds as described in Section 115 to 116, inclusive. The sizing chart shall not be used to size an absorption bed system that utilizes chambers.

Section 120 444.XXX Chamber systems – inspections.

1. The chamber system shall be inspected and verified by the design engineer, or home owner if designed by the home owner, at the following intervals:

(a) Following excavation, the trench bottoms shall be examined to ensure no loose soil or smearing conditions exist.

(b) When the installation of the chambers in the trenches is completed.

2. The home owner is required to contact the administrative authority for an inspection prior to covering the system. On home owner designed systems, the administrative authority shall inspect the construction of the system for compliance with the approved plans.

3. On engineer designed systems, a letter from the engineer, stating the project was constructed in accordance with the approved plans, shall be submitted to the administrative authority within 30 days of completion of the project.

Section 121 444.XXX Graywater systems.

1. Graywater, as defined by Section 24, may be used for underground irrigation as approved by the administrative authority. A permit to construct, alter or install a graywater system must be obtained from the administrative authority.

2. Graywater systems shall be allowed in single family dwellings only.

3. Graywater systems consist of a 3-way diversion valve, a graywater holding tank and an irrigation system. Graywater systems may be equipped with a pump or siphon, or may have gravity flow to the irrigation system.

4. The system shall not be connected to any potable water system and shall not result in any surfacing of graywater.

5. No graywater system, or part therof, shall be located on any lot other than the lot which is the site of the single family dwelling which discharges the graywater.

Section 122 444.XXX Graywater systems - design considerations.

1. A detailed plan of the graywater system shall be submitted with the application to construct, alter or install a graywater system. Detailed plans of the sewage disposal system (existing or proposed) must be included with the application. Percolation test data, as described in Section 63, shall also be included.

2. Graywater systems shall not be allowed in soils with percolation rates greater than 120 minutes per inch.

3. Holding tanks shall be constructed of solid durable materials, not subject to excessive corrosion or decay, and shall be watertight. A minimum capacity of 50 gallons is required.

4. An overflow and emergency drain shall be provided on the tank. The three-way diversion valve, emergency drain and overflow shall be permanently connected to the building drain or building sewer upstream of septic tanks, if any. The overflow drain shall not be equipped with a shutoff valve. No reduction in the required size of an individual sewage disposal system shall be given when used in conjunction with a graywater system.

5. Graywater piping which discharges into the holding tank or having a direct connection to the building sewer, shall be downstream of a vented trap to protect the building from possible sewer gasses.

6. The estimated graywater discharge shall be based on the number of bedrooms in the building. The first bedroom shall be estimated at 80 gallons per day with each additional bedroom estimated at 40 gallons per day.

7. The absorption area for the irrigation system shall be calculated as follows:

Percolation Rate(min/inch)	Minimum Square Feet Per 100 Gallons Discharge Per Day
0-20	20
21-40	40
41-60	60

8. Graywater system diagram

Section 123 444.XXX Alternative absorption systems.

1. The trench system as detailed in Section 111 to 114, inclusive, should be used whenever practical. However, when limiting conditions such as high groundwater, a highly permeable stratum, sloping terrain, bedrock, or a semi-impervious soil layer with a percolation rate slower than 60 min/inch are encountered, other types of absorption systems may be approved and utilized provided that they are designed and inspected during construction by an engineer.

2. Design guidelines for some commonly used alternative systems are found in the following sections: Section 123 to 134, inclusive.

3. All regulations which pertain to the standard disposal trench shall apply to alternative systems except as design modifications indicate.

4. All connecting fixtures must be low flow design for systems with percolation rates greater than 60 min/inch and must be specified on the plans by an engineer.

5. It is recommended that engineers who wish to submit designs for alternative systems, not listed in the following section, should consult the EPA Design Manual "On Site Wastewater Treatment & Disposal Systems" and contact the health authority for design parameters prior to submittal of the plans.

Section 124 444.XXX Stepped relief line distribution.

1. On sloping terrain where a conventional individual sewage disposal system cannot be installed or is impractical, a stepped network of trenches utilizing relief lines between the trenches may be used.

2. Stepped or relief line distribution systems allow effluent overflow from a completely filled trench into a trench of lower elevation. (Refer to the diagram in subsection 5.)

3. A stepped or relief line trench disposal system shall be designed by an engineer.

Section 125 444.XXX Stepped relief line distribution - design considerations.

1. The required absorption area shall be based on percolation testing and shall conform with the requirements of standard trench sizing. Percolation testing shall be conducted at the location of each stepped trench. The system shall be sized to the slowest percolation rate.

2. The invert of the overflow section shall be located

one to two inches above the top of the disposal trench distribution line. The leaching aggregate shall extend a minimum of 4 inches above the disposal distribution line (refer to subsection 5).

3. To minimize the possibility of slope failure or surfacing of effluent downslope, the disposal field design shall be compatible with the slope requirements specified in Section 62.

4. Trenches shall be spaced a minimum of 10 feet apart.

5. Stepped Relief Line Distribution Diagram.

Section 126 444.XXX Stepped relief line distribution – inspections.

1. Inspections shall be performed prior to covering the trenches. The engineer shall also verify that all disposal lines elevations and invert elevations for overflow conform with the approved plans.

2. A letter from the engineer, stating the project was constructed in accordance with the approved plans, shall be submitted to the health authority within 30 days of completion of the project.

Section 127 444.XXX Capping fill trench.

1. A capping fill trench is a standard drainfield trench where the invert of the disposal drain pipe is at or slightly below the natural grade of the existing soil and is used to reduce the total trench depth. A selected soil cap fill material covers the trench. (Refer to the diagram in subsection 10.)

2. A capping fill trench shall be allowed where high groundwater conditions preclude the installation of a standard absorption trench. A minimum separation of 4 feet from the bottom of the capping fill trench to the seasonal high ground water elevation shall be maintained.

3. A capping fill trench shall be designed by an engineer.

Section 128 444.XXX Capping fill trenches - design considerations.

1. Soils surrounding the system and beneath the trench bottom shall have percolation rates greater than 2 min/inch and equal to or less than 120 min/inch. The required absorption trench area shall be determined by the effective sidewall referenced in subsection 11 of Section 112.

2. A minimum depth of 4 feet shall be maintained between the bottom of the trench and the seasonal high groundwater, impermeable barrier, or other limiting features.

3. Capping fill trenches shall not be installed in a slope which exceeds 10 percent.

4. The invert of the disposal drain pipe shall be placed at or less than 12 inches below the existing grade of the native soil. A minimum of 2 inches of drainrock shall be placed above the disposal drainpipe. Straw, untreated building paper, geotextile fabric or equal, shall be placed above the drainrock before placement of the soil cap fill.

5. The absorption trenches shall be constructed prior to the construction of the capping fill.

6. The capping fill shall extend at least 10 feet beyond the absorption trench sidewall. The vegetative mat in the fill area shall be disrupted by scarification or plowing. Care shall be taken to prevent compaction of the scarified area. Vehicular traffic shall not be permitted on the capping fill.

7. The native soil and the applied fill shall be mixed at the contact interface. The soil to be used as fill shall be of the similar texture as the native topsoil. The fill shall be placed to a minimum depth of 16 inches over the drainrock.

8. The fill shall be evenly graded to provide positive drainage away from the absorption trenches and towards the perimeter of the capping fill. The fill material shall be placed in a manner such that compaction of the scarified soil at the native soil and fill interface is prevented. Plant vegetation shall be established to reduce the erosion potential of the capping fill.

9. The construction of capping fills is prohibited when soils exhibit saturated conditions when worked.

10. Capping Fill Trench Diagram

Section 129 444.XXX Capping fill trenches – inspections.

1. The construction of the capping fill shall be inspected by the design engineer at the following intervals:

(a) When the installation of the distribution pipes in the absorption trenches is completed.

(b) When the fill area has been scarified. Fill and native soils at this time shall be inspected to ensure they are not excessively moist and are of similar texture.

(c) When the capping fill has been placed to ensure adequate interfacing of fill and surface soils and to verify the capping fill dimensions.

2. A letter from an engineer, stating the project was constructed in accordance with the approved plans, shall be submitted to the health authority within 30 days of completion of the project.

Section 130 444.XXX Elevated mound systems.

1. An elevated mound system is a soil absorption system that is elevated above the natural soil surface in a suitable fill material. The elevated mound system consists of:

(a) A suitable fill material.

(b) An absorption area and distribution network.

(c) A soil cap.

2. The effluent is gravity fed, pumped or siphoned into the absorption area and through a distribution network located in the upper part of the coarse aggregate absorption bed. It passes through the aggregate and infiltrates the fill material. Treatment of the wastewater occurs as it passes through the fill material and the unsaturated zone of the natural soil.

3. Plans proposing the use of an elevated mound shall be designed by an engineer.

Section 131 444.XXX Elevated mound systems - design considerations.

1. Elevated mounds shall not be constructed on slopes greater than 6 percent for soils with percolation rates slower than or equal to 60 minutes/inch and not on slopes greater than 12 percent for soils with percolation rates faster than 60 minutes/inch.

2. A depth of 4 feet of unsaturated soil and fill material shall exist between the top of the fill material and the seasonal high ground water table or impervious barrier such as bedrock. On sloping sites, this depth will increase to maintain a level bed.

3. Percolation tests shall be conducted at the depth of the anticipated native soil/sand fill interface and at 20 inches below the native soil surface. The required basal area of the elevated mound area shall be sized to the slower percolation rate.

4. The fill material for the mound shall meet the following criteria:

Sieve Sizes	**Percent by Weight Passing Sieve**
3/8 inch	100
No. 4	95-100
No. 8	80-100
No. 16	45-85
No. 30	15-60
No. 50	3-15
No. 100	0-4

5. A rectangular bed with the long axis parallel to the slope contour is preferred to minimize the possibility of seepage from the base of the elevated mound. If the natural soil has a percolation rate slower than 60 minute/inch, the bed should be made narrow and extend along the contour as far as possible. The gravel bed shall be filled with at least nine inches of clean drainrock (3/4" to 2 1/2").

6. The basal area of the elevated mound must be sufficiently large to absorb the wastewater before it reaches the perimeter of the elevated mound to avoid surfacing of the effluent. The infiltration rates for determining the basal area of the elevated mound are as follows:

Percolation Rate Minutes/Inches	**Infiltration Rate GPD/Sq. Feet**

0-30	1.2
31-45	.75
46-60	.5
61-120	.25

8. On level sites, the entire basal area (L X W) is used to determine area (A) (refer to subsection 11). On sloping sites, only the area below and down slope from the absorption bed is considered [W X (A+I)].

9. The side slopes of the elevated mound shall extend at a minimum of 3 horizontal to 1 vertical. A minimum of 1 foot of topsoil shall cover the entire absorption bed. The topsoil cap at the center of the mound shall maintain a minimum slope of 2 percent away from the crown. A geotextile fabric, straw, untreated building paper, or equal must be placed over the drainrock in the absorption bed before the topsoil is placed. (Refer to the diagram in subsection 11.)

10. At least one observation standpipe, extending down to the fill sand, shall be installed in the absorption bed.

11. Elevated mound system diagram.

Section 132 444.XXX Elevated mound systems – inspections.

1. The construction of an elevated mound system shall be inspected and verified by an engineer at the following intervals:

(a) When the basal area of the elevated mound has been scarified.

(b) When the distribution piping has been placed in the gravel absorption bed.

(c) When the topsoil cap has been placed.

(d) When all the pumps, switches, and alarms associated with the dosing system have been installed. Additionally, the engineer shall verify the design operational liquid levels in the dosing tank are set as specified by the plan designs.

2. An Operation and Maintenance Manual shall be developed by an engineer and submitted for review prior to issuance of an occupancy permit.

3. A letter from an engineer, stating the project was constructed in accordance with the approved plans, shall be submitted to the health authority within 30 days of completion of the project.

Section 133 444.XXX Pressure distribution systems.

1. A pressure distribution system is a soil absorption system that distributes the effluent evenly to all parts of the distribution system through the use of a dosing pump or, where sufficient elevation head is available, a siphon.

2. Pressure distribution systems may be used in conjunction with elevated mound, bed or trench systems.

3. Plans proposing the use of a pressure distribution system shall be designed by an engineer.

Section 134 444.XXX Pressure distribution systems - design considerations.

1. Pumps shall be used to pressurize the distribution network. Siphons may also be allowed as an alternative to pumping if adequate elevation head is available. The active dosing volume should be approximately 10 times the total distribution pipe volume.

2. The solid delivery pipe from the dosing holding tank to perforated distribution piping shall be placed below the frost line. The delivery pipe shall maintain a downward slope from the distribution piping to the dosing tank to ensure the line will drain between discharges. Check

valves or other devices preventing backflow through the pump shall be eliminated to allow effluent to drain back to the dosing tank to protect the pipe from freezing.

3. To reduce the potential for plugging and clogging of the distribution lines, discharge hole diameters shall not be less than 3/8 of an inch in diameter. Discharge rates for various sized holes at various pressures are listed in the following table:

DISCHARGE RATES AT VARIOUS PRESSURES (gpm)

Pressure		Hole Diameter (inches)		
Ft	Psi	3/8	7/16	½
1	0.43	1.66	2.26	2.95
2	0.87	2.34	3.19	4.17
3	1.30	2.87	3.91	5.10
4	1.73	3.31	4.51	5.89
5	2.17	3.71	5.04	6.59

4. Approximately 75 to 85% of the total head loss is incurred across the hole in the lateral, while the remaining 15 to 25% is incurred in the network delivering the liquid to each hole. Friction losses in schedule 40 plastic pipe are listed in the following table:

FRICTION LOSS IN SCHEDULE PLASTIC PIPE C = 150 (ft/100 ft)

	Pipe Diameter (in)								
Flow gpm	1	1 ¼	1 ½	2	3	4	6	8	10

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				

Flow gpm	1	1 ¼	1 ½	2	3	4	6	8	10
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		
150						1.17	0.16		
200							0.28	0.07	
250							0.41	0.11	
300							0.58	0.16	
350							0.78	0.20	0.07
400							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
Flow gpm	1	1 ¼	1 ½	2	3	4	6	8	10
900									0.38
1000									0.46

5. Lateral spacing shall not be less than 4 feet nor more than 6 feet. Outside laterals should be placed at a distance from the bed perimeter equal to 1/2 the selected lateral spacing distance. In no case shall the spacing between the outside lateral and the bed perimeter be less than 3 feet.

6. Distribution piping in the pressure distribution system shall be looped.

7. Required lateral pipe diameters for various diameters, hole spacings, and lateral lengths for plastic pipe are shown in the following figure:

8. Manifold diameters for various manifold lengths, number of laterals, and lateral discharge rate for plastic pipe are shown in the following figure: