COMMISSIONER'S ORDER NO. 336-01
Natural Resources

A Commissioner's Order establishing regulation governing minimum standards and criteria for individual sewage treatment systems by the Mille Lacs Band of Ojibwe.

WHEREAS: Band Statute 1062-MLC-50, Section 3 directs the Commissioner of Natural Resources to protect all natural resources of the Mille Lacs Band of Ojibwe, and

WHEREAS: Band Statute 1163-MLC-21 provides for the establishment of minimum requirements for air , water, land and natural resource pollution control within territorial jurisdiction.

WHEREAS: The regulation of individual sewage treatment systems is important in the protection of surface and ground water quality and the environment.

WHEREAS: The Mille Lacs Band DNR/ENVwill issue an individual sewage treatment system permit for any system installed on Trust Lands.

WHEREAS: Prior to permit issuance on an individual sewage treatment system design, must be approved by the Mille Lacs Band DNR/ENV and inspection of the respective system must be conducted by the Mille Lacs Band DNR/ENV to verify the system was installed according to approved design plans and codes.

NOW THEREFORE, by the authority vested in me by the Mille Lacs Band of Ojibwe, under Band law, I, Curt Kalk, Commissioner of Natural Resources for the Mille Lacs Band of Ojibwe, hereby establish regulations governing the design, installation, permitting, minimum standards and criteria for individual sewage treatment within the jurisdiction of the Mille Lacs Band of Ojibwe Indians.

SITE EVALUATION.
Site evaluations consisting of preliminary and field evaluations shall be conducted for all proposed individual sewage treatment systems. **The written site evaluation report shall include results of the preliminary and field evaluations and will be completed prior to any construction.**
A) Preliminary evaluation shall include:
(1) Flow determination for the dwelling or other establishment;
(2) Location of proposed or existing:
a. Water supply wells within 100 feet
b. Non-community transient public water supply wells within 200ft
(3) Buildings or improvements on the lot; and
(4) Buried water pipes within 50 feet of the proposed system;
(5) Easements on the lot, legal description, lot dimensions and property lines
(6) Ordinary high water level of public waters;
(7) Floodplain designation according to FEMA maps, verified by engineer if necessary
(8) Soil classifications as determined by the soil survey
(9) Names of property owners or leasee
(10) Inner wellhead management zone or wellhead protection area.

B) A field evaluation shall include:
(1) Identifying lot lines, lot improvements, required setbacks, and easements.
(2) Describing the following surface features:
a. Percent and direction of the slope.
b. Predominant vegetation and landscape position.
c. Disturbances and evidence of soil compaction.
(3) Soil observations. The number of soil observations required is based on the professional judgment of the individual conducting the site evaluation with a minimum of one observation per soil treatment area. Soil observations shall be performed in an exposed pit, or by hand augering, or by probing. Soil observations shall be conducted prior to any required percolation tests to determine whether the soils are suitable to warrant percolation tests and, if suitable, at what depths percolation tests shall be conducted. Depth of the soil boring shall be to the seasonally saturated layer, the bedrock, or three feet below the proposed depth of the system, whichever is less.
(4) Soil description. Each soil observed at the proposed soil treatment area shall be evaluated under adequate light conditions with the soil in a moist state for:
a. The depth of each soil horizon measured from the ground surface.
The soil matrix and mottled color described per horizon by the Munsell Soil Color Charts, 1992 or later edition.
b. A description of soil texture and consistence using the USDA soil classification system as specified in the Soil Survey Manual.
d. Depth to the bedrock.
e. Depth to the seasonally saturated soil defined by:
(a) In subsoils redoximorphic features include:
i. Distinct iron accumulations or distinct iron depletions;
ii. Soil colors having a chroma of two or less; or
iii. Soil colors having a hue of 5Y and a chroma <3;
(b) In lower topsoils, immediately followed by saturated subsoils, redoximorphic features include:
i. Soil colors with a chroma of two or less; or
ii. Redoximorphic accumulations or depletions;
(c) In upper topsoils immediately followed by saturated lower topsoil, redoximorphic features include:
i. Soil colors with a chroma of zero;
ii. Accumulation of high levels of organic material;
iii. Dominance of hydrophilic vegetation; or
iv. The soil treatment area at or near the elevation of the ordinary high water level of a surface water.
(5) Depth of standing water in the hole measured from the soil surface if present.
(6) Description of site protection from compaction and disturbance.

(7) The access route for tank maintenance;
(8) Proposed elevation of the bottom of the soil treatment system;
(9) Final soil sizing factor;
(10) Name, address, telephone number, and certified statement of the individual conducting the site evaluation.

DESIGN PHASE.
A completed design report shall be considered the second phase for an individual sewage treatment system design. Phase II design reports shall include drawings, design flows, system component sizing and calculations, hydraulic and organic loading rates, setbacks, construction considerations, and, as applicable, maintenance contracts, operational requirements, monitoring, and mitigation plans.

SEWAGE FLOW DETERMINATION FOR DWELLINGS.
System sizing. If construction of additional bedrooms, the installation of water-using devices, or other factors likely to affect the operation of the system can be reasonably anticipated, the system shall be designed to accommodate this additional capacity.
Design flow. The estimated average design flow for any dwelling shall provide for at least two bedrooms per unit.

	Average Design Flow (gpd)*		
Classification Based on Number of Bedrooms	I	II	III
2 or less	300	225	180
3	450	300	218
4	600	375	256
5	750	450	294
6	900	525	332

*Type I sizing required on all new construction, new construction will be defined as new septic dependent structures.

* Flows for Classification IV dwellings shall be 60 percent of the values as determined for Classification I, II, or III systems.

Classification I: Those with more than 800 square feet per bedroom, when the dwelling's total floor area is divided by the number of bedrooms, or more than two of the following water-use appliances are installed or anticipated: automatic washer, dishwasher, water conditioning unit, whirlpool bath, garbage disposal, or self-cleaning humidifier in furnace.

Classification II: Those with 500 to 800 square feet per bedroom, when the dwelling's total floor area is divided by the number of bedrooms, and no more than two of the water-use appliances are expected as listed in Classification I.

Classification III: Those with less than 500 square feet per bedroom, when the dwelling's total floor area is divided by the number of bedrooms, and no more than two of the water-use appliances are expected as listed in Classification I.

SEWAGE TANKS.
All tanks, regardless of material or method of construction, must:

A. Be watertight, including all tank and riser joints, riser connections, and pipe connections;

B. Be designed and constructed to withstand all lateral earth pressures under saturated soil conditions when empty, including risers;

C. Be designed and constructed with adequate tensile and compressive strength to withstand a minimum of seven feet of saturated earth cover above the tank top and maintenance hole cover;

D. Not be subject to corrosion or decay;

E. have the manufacturer's name, model number, and tank capacity in gallons permanently displayed on the tank above the outlet pipe;

F. not be constructed on site when saturated soil conditions during construction are closer than three inches to the bottom of the excavation;

G. be protected against flotation under high water table conditions;

H. have a written and graphic label affixed to maintenance hole covers of sewage tanks warning of the hazardous conditions inside the tanks;

I. The liquid depth of any septic tank or compartment must be at least 30 inches.

J. No tank or compartment shall have an inside horizontal dimension less than 24 inches.

K. Baffles shall be installed at each inlet and outlet of the tank and each compartment.

L. The space in the tank between the liquid surface and the top of the inlet and outlet baffles shall be not less than 20 percent of the total required liquid capacity, except that in horizontal cylindrical tanks this space shall be not less than 15 percent of the total required liquid capacity.

M. Inlet and outlet baffles shall be constructed of acid resistant concrete, acid resistant fiberglass, or plastic not subject to corrosion or decay. Baffles must be integrally cast with the tank, affixed with a permanent waterproof adhesive, or affixed at the top and bottom with connectors that are not subject to corrosion or decay. Sanitary tees used as baffles shall be affixed to the inlet or outlet pipes with a permanent waterproof adhesive. The inlet baffle shall extend at least six inches but not more than 20 percent of the total liquid depth below the liquid surface and at least one inch above the crown of the inlet sewer.

P. The outlet baffle and the baffles between compartments shall extend below the liquid surface a distance equal to 40 percent of the liquid depth except that the penetration of the indicated baffles or sanitary tees for horizontal cylindrical tanks shall be 35 percent of the total liquid depth. In no case shall these baffles extend less than six inches above the liquid surface.

Q. There shall be at least one inch between the underside of the top of the tank and the highest point of the inlet and outlet devices.

R. In a single compartmented tank, the inlet invert shall be at least two inches above the outlet invert.

S. The inlet and outlet shall be located opposite each other along the axis of maximum dimension. The horizontal distance between the nearest points of the inlet and outlet baffles shall be at least four feet.

T. The nearest point on the inlet baffles other than sanitary tees, shall be no less than six inches and no more than 12 inches from the end of the inlet pipe. The nearest point on the outlet baffle, other than sanitary tees, shall be no closer than six inches and no more than 12 inches from the beginning of the outlet pipe to the baffle. Sanitary tees used as inlet or outlet baffles shall be at least four inches in diameter.

U. There shall be one or more maintenance holes, at a minimum of 20 inches (least dimension), and placed so access can be gained within six feet of all walls. All maintenance holes shall extend through the tank cover to a point within 12 inches of finished grade. If maintenance holes are covered with less than six inches of soil, the cover must be secured to prevent unauthorized access.

V. There shall be an inspection pipe of at least four inches in diameter over both the inlet and outlet baffles. The inspection pipe shall extend through the tank cover or the maintenance hole cover, be secured, and be capped flush with or above finished grade. A downward projection of the centerline of the inspection pipe shall be directly in line with the centerline of the inlet or outlet device.

W. An inspection pipe at least four inches in diameter must be located between the inlet and outlet baffles for the purpose of evaluating scum and sludge accumulations. The inspection pipe must extend through either the tank cover or maintenance hole cover and must be capped flush with or above finished grade.

X. Maintenance holes extending to grade or above and located over the inlet baffle, outlet baffle, or located between the baffles shall be considered an inspection pipe.

Y. When a septic tank is divided into two compartments, the volume of the first compartment shall be between one-half and two-thirds of the total tank volume.

Z When a septic tank is divided into three or more compartments, one-half of the total volume shall be in the first compartment and the other half equally divided between the other compartments.

AA. Connections between compartments shall be baffled to obtain effective retention of scum and sludge.

BB. Adequate venting shall be provided between compartments by baffles or by an opening of at least 50 square inches near the top of the compartment wall.

CC. Adequate access to each compartment shall be provided by one or more maintenance holes, at least 20 inches, with the maintenance hole or holes placed so access can be gained within six feet of all walls. The maintenance hole shall extend through the top of the tank compartment cover to a point between zero and 12 inches below finished grade. If the maintenance hole is between zero and six inches below finished grade, the maintenance hole cover must be secured to prevent unauthorized access.

DD. Multiple tanks:
(1) Where more than one tank is used, the tanks shall be connected in series.
(2) No tank in the series shall have a capacity of less than one-fourth of the required total liquid capacity.
(3) For new construction, the first tank shall be equal to or larger than any subsequent tank in the series.

EE. Outlet pipe from septic tank:
(1) The design, construction, and location shall comply with appropriate plumbing codes.
(2) The outlet pipe extending from the septic tank to the undisturbed soil beyond the tank must meet the strength requirements of American Society for Testing and Materials (ASTM), schedule 40 plastic pipe and must be supported so there is no deflection during the backfilling and subsequent settling of the soil between the edge of the septic tank and the edge of the excavation.
(3) The soil around the pipe extending from the septic tank must be compacted to at least original density for a distance of three feet beyond the edge of the tank excavation.

Liquid capacity of septic tanks. Any liquid depth that is greater than 78 inches shall not be used when calculating the septic tank liquid capacity. Liquid capacity of septic tanks is described in items A to D.
A.

Septic Tank Capacities by Number of Bedrooms	
2 or less	750*
3 or 4	1,000
5 or 6	1,500
7, 8 or 9	2,000

*Tank size minimum 1,000 gallons on all new construction

B. Garbage disposals. If a garbage disposal unit is anticipated or installed in a dwelling, the septic tank capacity must be at least 50 percent greater than that required and must include multiple compartments or multiple tanks.

C. Pumping of sewage. If sewage is pumped from the dwelling to a septic tank, either sub item (1) or (2) must be used.
(1) If the liquid capacity is determined by item A, the dosing volume to the tank shall not exceed one percent of the liquid volume capacity of the tank. If multiple tanks or compartments are used, the dose volume shall not exceed one percent of the first compartment or tank.
(2) A dosing volume up to five percent of the liquid capacity of the first tank or compartment is allowed if multiple tanks or compartments are used with the total liquid capacity being twice that required under item A.

D. Garbage disposal and pumping of sewage. ISTS designed for dwellings with garbage disposals and that pump sewage from the dwelling must:
(1) provide for multiple tanks or install an effluent screen at the outlet end of the last septic tank;
(2) have twice the liquid capacity required under item A; and meet the requirements of item C.

Location of sewage tanks. A sewage tank shall be placed so that it is easily accessible for the removal of liquids and accumulated solids. A sewage tank shall;
(1) be placed on firm and settled soil capable of bearing the weight of the tank and its contents.
(2) be crowned or sloped to shed surface water. Sewage tanks shall not be placed in floodways.

Aerobic tanks.
A. Aerobic tanks shall comply with the 1999 National Sanitation Foundation International Standard, No. 40.

B. No additional reduction in trench or bed bottom area or absorption area shall be allowed with an aerobic tank

C. Aerobic tanks constructed with the top of the tank at or above grade must be designed and constructed with adequate tensile and compressive strength to withstand the pressure encountered during operation and maintenance.

D. Owners of an aerobic tank shall maintain an effective maintenance service contract.

DISTRIBUTION OF EFFLUENT.
A. Supply pipes must be designed, installed, and protected so that effluent will not freeze in the pipe.

B. Supply pipes and distribution pipes must meet the strength requirements of American Society for Testing and Materials schedule 40 plastic pipe, and be supported in a manner so that there is no deflection or longitudinal bending during the backfilling and subsequent settling of the soil.

Gravity distribution.
A. Serial distribution must be used to distribute effluent to individual trenches in a soil treatment system. If the necessary elevation differences between trenches for serial distribution cannot be achieved by natural topography or by varying the excavation depths, parallel distribution may be used. Serial distribution shall not create a pressure head on trenches at lower elevations.

B. If drop boxes or valve boxes are used for serial distribution:
(1) They shall be watertight and constructed of durable materials not subject to corrosion or decay.
(2) The invert of the inlet pipe shall be at least one inch higher than the invert of the outlet pipe to the next box.
(3) The invert of the outlet pipe to the next drop box shall be no greater than two inches higher than the crown of the outlet pipe of the trench in which the box is located.
(4) When sewage tank effluent is delivered to the drop box by a pump, the pump discharge shall be directed against a wall or side of the box on which there is no outlet or directed against a deflection wall, baffle, or other energy dissipater.
(5) The drop box shall be covered by a minimum of six inches of soil. If the top of the box is deeper than six inches, access must be provided above, at, or within six inches of finished grade.
(6) The drop box shall be placed on firm and settled soil.

D. Distribution boxes must comply with items 1 through 6.
(1) Be watertight and must be constructed of durable materials not subject to corrosion or decay.
(2) Be covered by a minimum of six inches of soil. If the top of the box is deeper than six inches, access must be provided above, at, or within six inches of the finished grade.
(3) The inverts of all outlets must be set and maintained at the same elevation.
(4) The inlet invert must be either at least one inch above the outlet inverts or sloped such that an equivalent elevation above the outlet invert is obtained within the last eight feet of the inlet pipe.
(5) Each trench line must be connected separately to the distribution box and must not be subdivided. Distribution boxes must not be connected to one another if each box has distribution pipes.
(6) When sewage tank effluent is delivered by pump, either a baffle wall must be installed in the distribution box or the pump discharge must be directed against a wall, baffle, side of the box on which there is no outlet, or directed against a deflection wall, baffle, or other energy dissipater. The baffle must be secured to the box and must extend at least one inch above the crown of the inlet pipe.

E. Distribution pipes.
(1) Distribution pipes used in trenches or beds for gravity distribution must be at least four inches in diameter and must be constructed of sound and durable material not subject to corrosion or decay or to loss of strength under continuously wet conditions. Distribution pipes must have a load-bearing capacity of not less than 1,000 pounds per lineal foot.
(2) Distribution pipes used for gravity distribution must have one or more rows of holes of no less than one-half inch in diameter spaced no more than 40 inches apart. Holes must be spaced to prevent failure due to loads.
(3) The distribution pipes for gravity distribution must be laid level or on a uniform slope away from the distribution device of no more than four inches per 100 feet.
(4) Gravity distribution pipes in seepage beds must be uniformly spaced no more than five feet apart and not more than 30 inches from the sidewalls of the seepage bed.

Pressure distribution.
A. Pressure distribution must be used for:
(1) Mound systems;
(2) At-grade systems;
B. All seepage beds where the soil percolation rate is 0.1 to five minutes per inch or where the soil has a medium sand texture or coarser, and all trench systems if the trenches are at the same elevation and placed in soils where the percolation rate is 0.1 to five minutes per inch or where the soil has a medium sand texture or coarser; and
(4) Soil treatment systems that will not create a biological clogging mat.

B. Distribution pipes used for pressure distribution must be constructed of durable, corrosion resistant material.

C. All pipes and associated fittings used for pressure distribution must be properly joined together. The pipe and connections must be able to withstand a pressure of at least 40 pounds per square inch.

D. Perforations must be no smaller than 3/16-inch diameter and no larger than one-quarter inch diameter. The number of perforations, perforation spacing, and pipe size for pressure distribution laterals must be as shown in Table III. The friction loss in any individual perforated lateral must not exceed 20 percent of the average pressure head on the perforations.

Maximum Allowable Number of One-Fourth Inch Diameter or Smaller Perforations Per Later Pipe Diameter				
Perforation	1"	1-1/4"	1-1/2"	2"
Spacing in feet	1.049	1.380	1.610	2.067
2.5	8	14	18	28
3	8	13	17	27
3.3	7	12	16	26
4	7	11	15	25
5	6	10	14	24

E. Perforation holes must be drilled straight into the pipe and not at an angle. The perforated pipe laterals must be installed level with the perforations downward. Perforation holes must be free of burrs. Holes shall be spaced no more than five feet apart. A method to introduce air into the pipe after dosing must be provided.

F. Laterals must be spaced no further than 60 inches apart in seepage beds and mound rock beds and no further than 30 inches from the outside edge of a drainfield rock layer.

G. Laterals must be connected to a header or manifold pipe that is of a diameter such that the friction loss in the header or manifold will be no greater than five percent of the average head at the perforations. The header or manifold pipe must be connected to the supply pipe from the pump.

H. Perforated laterals must not be installed closer than 12 inches from the edges of the rock bed and perforations must not be installed closer than 12 inches from the ends of the drainfield rock.

DOSING OF EFFLUENT.
A. The dosing chamber shall be vented and there shall be one or more maintenance holes, at least 20 inches in dimension and located directly above the dosing device. The maintenance hole shall extend through the dosing chamber cover to final grade and shall be constructed to prevent unauthorized entry.

C. The dosing chamber shall either include an alternating two-pump system or have a minimum total capacity of 500 gallons or 100 percent of the average design flow, whichever is greater.

D. A dosing device must employ an alarm device to warn of failure.

E. The inlet of pumps shall be elevated at least four inches from the bottom of the dosing chamber or protected in some other manner to prevent the pump from drawing excessive settled solids. The pump, pump controls, and pump discharge line shall be installed to allow access for servicing without entering the dosing chamber.

F. Electrical installations shall comply with applicable laws and codes.

G. Pumps shall be elevated a minimum of 3" from the bottom of the dosing chamber to protect the pump from settled solids.

Dosing devices for gravity distribution.
A. Where a dosing device is employed, a pump or siphon shall deliver the dose to the soil treatment system.

B. For dwellings, the dosing device shall discharge at least ten gallons per minute but no more than 45 gallons per minute.

C. If the dosing device is a siphon, a maintenance inspection shall be made every six months by the owner or the owner's agent.

D. If the dosing device is a pump, it shall be constructed and fitted with durable and corrosion-resistant materials.

E. Where the soil treatment system is at a higher elevation than the pump, sufficient dynamic head shall be provided for both the elevation difference and friction loss.

Dosing devices for pressure distribution:
A. Pumps shall be constructed and fitted with durable, and corrosion-resistant materials.

B. The pump discharge capacity shall be based upon the perforation discharges for a minimum average head of 1.0 foot. Perforation discharge will be determined by the following formula:
Q = 19.65 cd2h1/2 where: Q = discharge in gallons per minute, c = 0.60 = coefficient of discharge d = perforation diameter in inches h = head in feet.

C. The pump discharge head shall be at least five feet greater than the head required to overcome pipe friction losses and the elevation difference between the pump and the distribution device.

D. The quantity of effluent delivered for each pump cycle shall be no greater than 25 percent of the average design flow and siphon will not be allowed as a dosing device to pressurize a system.

FINAL TREATMENT AND DISPOSAL.
A. Final treatment and disposal of all sewage tank effluent shall be by discharge into the soil treatment system.

B. Soil treatment systems shall not be placed in floodways. Soil treatment systems should not be placed in areas subject to excessive run-on. All soil treatment systems located on slopes greater than one percent must have a diversion constructed immediately upslope from the system to intercept and direct runoff.

C. Before discharge to a soil treatment system designed under this part, the pretreated effluent shall have a biochemical oxygen demand of 220 or less and a total suspended solids concentration of 65 mg/1 or less and an oil and grease concentration of 30 mg/1 or less.

D. A durable non-woven geotextile fabric must be used to cover distribution rock medium. In addition, the fabric must permit passage of water without passage of overlying soil material into the rock medium.

E. Individual sewage treatment systems setbacks (feet).

Feature	Septic & Holding tank or sealed privy	Absorption Area, Unsealed Privy and Drainfield
Water Supply Lines	50	50
Buried Water Lines	100	100
Buildings	10	20
Property Lines	10	10
Road Right of Way	10	10
Archaeology Site	Site visit by DNR&E staff required	
Wetlands	Site visit by DNR&E staff required	
Ordinary High Water	100	100
Deep Well	50	50
Shallow Well	100	100

Trenches and seepage beds.
A. Seepage bed construction shall be limited to areas having natural slopes less than six percent. Seepage beds shall not be placed in soils with percolation rates slower than 60 minutes per inch or in floodplains.

B. Distribution medium for trenches and seepage beds shall consist of drainfield rock, gravelless drainfield pipe, or a chambered system.
(1) Drainfield rock.

(a) Drainfield rock used as a distribution medium shall be igneous rock, or similar insoluble, durable, and decay-resistant material between three-fourths inch and 2-1/2 inches in size, with no more than five percent by weight passing a three-fourths inch sieve and no more than one percent by weight passing *a No. 200* sieve. Materials greater than 2-1/2 inches in size shall not exceed five percent by weight.

(b) There shall be a layer of at least six but no more than 24 inches of drainfield rock below the distribution pipe. The drainfield rock shall completely encase the top and sides of the distribution pipes to a depth of at least two inches. The total thickness of rock-filled trenches shall not exceed 30 inches.

(2) Gravelless drainfield pipe including appurtenances shall be:

(a) of commercially fabricated corrugated pipe completely encased by the manufacturer in a geotextile wrap specific to this purpose;

(b) an eight-inch or ten-inch nominal ID pipe that conforms to subunits i and ii and meets the requirements of American Society of Testing Materials (ASTM) F667, which is incorporated by reference.

i. The pipes must be marked with an alignment stripe visible through the geotextile wrap and installed with this stripe at top center.

ii. The pipes shall contain a row or rows of cleanly cut three-eighths inch to one-half inch diameter holes located in such a manner to provide storage of solids. Each row shall contain a hole in every other corrugation valley, staggered such that every corrugation valley contains one hole.

(c) the pipes must be wrapped in geotextile fabric specifically designed and tested for use with gravelless pipe and for installation and use in individual sewage treatment systems and designed to transmit sewage at a long-term acceptance rate that corresponds to the sizing factor prescribed; and

(d) protected from heat and ultraviolet rays prior to installation.

(3) Chambered systems. Chamber media including all piping and appurtenances shall be constructed:

(a) of commercially fabricated materials specific to this purpose;

(b) of materials resistant to sewage with an open bottom to support the load of overburden and sidewall soil;

(c) with slotted or perforated sides to allow sewage to move laterally into the soil and prevent soil penetration into the chamber;

(d) no greater than three feet in width with vertical outside dimensions less than 30 inches.

C. Sizing of trenches and seepage beds.

(1) Drainfield rock media.

(a) Table V and Table Va specify the soil sizing factors used to calculate trench bottom area assuming six inches of drainfield rock below the distribution pipe. Incorporation by reference of this chapter does not include adoption of Table Va. If a local unit of government chooses to adopt Table Va, it must do so expressly. The local unit of government may use the following format: "Minnesota Rules, Table Va, is incorporated by reference into Ordinance ....." If there is a discrepancy between the soil texture and the percolation rate in Table V, the larger soil-sizing factor should be used, or a justification for a smaller sizing shall be submitted in the design report. Soil sizing determined using Table Va must be based on an undisturbed soil sample from which an evaluation of the soil structure can be made. The trench bottom area is calculated by multiplying the average design flow by the appropriate soil-sizing factor. If gravity distribution is used in seepage beds, the seepage bed bottom area is calculated by multiplying the average design flow by the soil-sizing factor (Table V or Va) multiplied by 1.5. If pressure distribution is used in seepage beds, the seepage bed bottom area is determined by multiplying the soil-sizing factor in Table V or Va by the average design flow.

(b) The bottom area may be reduced, for trenches only, by 20 percent for 12 inches of drainfield rock below the distribution pipe; 34 percent for 18 inches; and 40 percent for 24 inches. Reductions may be interpolated for other depths of rock.

Soil Sizing Factors for Determining Bottom Area for

Table V

Percolation Rate	Soil Texture	Square feet of trench bottom per gallon of average design flow per day
Faster than 0.1	Coarse sand	0.83
0.1 to 5	Medium Sand, Loamy Sand	0.83
0.1 to 5	Fine Sand	1.67
6 to 15	Sandy Loam	1.27
16 to 30	Loam	1.67
31 to 45	Silt Loam, Silt	2.0
46 to 60	Sandy Clay Loam, Silty Clay Loam, Clay Loam	2.2
61 to 120	Silty Clay, Sandy Clay, Clay	4.2
Slower than 120	Non-standard systems	

Soil Sizing Factors for Determining Bottom Area for Trenches and Seepage Beds Using Detailed Soil Descriptions

Table Va

Soil Texture	Soil Structure	Square Feet of Trench or seepage Bed Bottom per gallon of Average Design	Absorption Ratio for Mounds
coarse sand	single grain	.83	1.0
medium sand, loamy sand	single grain	.83	1.0
fine sand, loamy fine sand	single grain	1.67	1.0
sandy loam	weak to strong	1.27	1.5
sandy loam	massive or platy	1.67	2.0

Loam	Moderate to strong	1.67	2.0
Loam	Weak or platy	2.0	2.4
Loam	Massive	2.5	3.0
silt loam	Moderate to strong	2.0	2.4
silt loam	Weak or platy	2.5	3.0
Silt loam	Massive	3.0	3.6
sandy clay, loam, clay loam silty clay loam	Moderate to strong	2.2	2.6
sandy clay loam, clay loam, silty clay loam	Weak or platy	3.2	3.8
Sandy clay loam, clay loam, silty clay loam	Massive		
Sandy clay, clay, silty clay	Strong	4.2	5.0
Sandy clay, clay, silty clay	Weak to moderate, massive or platy		

(2) An eight-inch inside diameter pipe shall be equivalent to a two-foot wide rock filled trench with six inches of drainfield rock below the distribution pipe and a ten-inch inside diameter pipe shall be equivalent to a three-foot wide rock filled trench with six inches of drainfield rock below the distribution pipe.
(3) Chambered media. The depth of slatted sidewalls being equivalent to the corresponding depth of rock below the distribution pipe.

D. Design and construction of trenches and seepage beds:
(1) The absorption area of trenches and seepage beds shall be in original soils and designed and constructed with at least three feet of vertical separation above saturated soil or bedrock. In no case shall the bottom of the distribution medium be deeper than 48 inches from the final grade. If effluent is distributed by gravity it shall not be loaded above the natural ground surface and must meet the following requirements:

(a) for drainfield rock trenches, the rock below the pipe must be in contact with original soil and gravity distribution must be designed to load effluent the entire depth of the rock below the pipe;
(b) for gravelless drainfield pipe, the entire pipe must be below the original grade and gravelless drainfield pipe with gravity distribution must be designed to fill the entire pipe; and
(c) for chambered media, the entire slatted sidewall must be below the original grade, and effluent must be loaded the entire depth of the slatted sidewall.

(2) Trenches shall not be less than 18 inches and no more,than 36 inches wide. Any excavation wider than 36 inches shall be considered a seepage bed. No seepage bed may be wider than 25 feet and parallel beds must be at least ten feet apart. The width of the excavation for gravelless drainfield pipe and chambered systems shall be constructed in accordance with manufacturer's recommendation.
(3) Drainfield rock must be used as the distribution medium in seepage beds.
(4) The bottom and sides of the soil treatment system to the top of the distribution medium shall be excavated in such a manner as to expose the original soil structure in an unsmeared and uncompacted condition. Excavation into the absorption area is only allowed when the soil moisture content is at or less than the plastic limit.
(5) Excavation equipment or other vehicles must not be driven on the excavated trench or seepage bed bottom. Once the trench or seepage bed is excavated, it shall not be exposed to rainfall prior to placement of the final backfill.
(6) A vertical inspection pipe at least 1-1/2 inches in diameter shall be installed and secured in the distribution medium of every trench or seepage bed. The inspection pipe must be located at an end opposite from where the sewage tank effluent enters the medium. The inspection pipe must have three-eighths inch or larger perforations spaced vertically no more than six inches apart. At least two perforations must be located in the distribution medium. No perforations shall be located above the geotextile cover or wrap. The inspection pipe must extend to the bottom of the distribution medium and must be capped flush with or above finished grade.
(7) The top and bottom of the distribution medium shall be level in all directions.
(8) Drainfield rock must be covered with a durable non-woven geotextile.
(9) The minimum depth of cover over the distribution medium shall be at least six inches.
(10) The trenches or seepage beds shall be backfilled and crowned above finished grade to allow for settling. The top six inches of soil shall have the same texture as the adjacent soil.
(11) A vegetative cover shall be established over the soil treatment system. The soil treatment system shall be protected until a vegetative cover is established.
(12) All joints for gravelless drainfield pipes or chambered systems must be secured as recommended by the manufacturer.
(13) Backfilling for gravelless drainfield pipe and chambered systems shall not crush or damage the medium.

Dual field systems.
A. Dual field systems shall be used only where the soil-sizing factor is greater than 0.83 square feet per gallon per day.

B. Dual field systems shall be designed, and constructed as set forth above for standard systems except as follows:
(1) The soil treatment area shall be divided into two or more parts.
(2) Alternating soil treatment areas shall each be connected to a valve box outlet.

C. No part of a soil treatment area shall be used more than one year unless the effluent level indicates that a longer duration is feasible.

Rapidly permeable soils.
A. Three feet of soil with a texture of medium sand or finer must exist below the distribution medium. Soil absorption areas with a soil percolation rate of 0.1 to five minutes per inch that is not a fine sand (Table V) or soil absorption areas with a soil texture of medium sand or loamy sand (Table Va) must use at least one of the following treatment techniques:
(1) Distribute the sewage tank effluent by pressure flow over the absorption area or;
(2) Divide the total soil treatment system into at least four parts with no part larger than 25 percent of the area.

B. Soil treatment systems placed in soils with percolation rates of less than one-tenth minute per inch or in a soil texture of coarse sand must provide at least one of the following treatment techniques:
(1) A mound system or a trench system with at least one foot of clean sand placed between the distribution medium and the coarse soil along the excavation bottom and sidewalls.

Mounds.
A. Location of mounds.
(1) Mounds must be constructed on original soils and provide at least 36 inches of vertical separation between the bottom of the drainfield rock bed and saturated soil or bedrock.
(2) There must be at least 12 inches of original soil with a percolation rate faster than 120 minutes per inch or have a numerical absorption ratio listed in Table Va below the absorption area.
(3) Setbacks shall be measured from the absorption area.
(4) On slopes of one percent or greater, and where the percolation rate in the top foot of original soil is in the 61 to 120 minutes per inch range, mounds must not be located where the ground surface contour lines directly below the long axis of the rock bed represent a swale or draw, unless the contour lines have a radius of curvature greater than 100 feet. Mounds must never be located in swales or draws where the radius of curvature of the contour lines is less than 50 feet.

B. Mound design and construction.
(1) Drainfield rock must be used as the distribution medium in mounds. The bottom area of the rock bed shall be calculated by multiplying the average design flow by 0.83 square feet per gallon per day.
(2) The rock bed width shall be calculated by multiplying the linear loading rate by 0.83. The linear loading rate shall not exceed 12 gallons per lineal foot per day. The linear loading rate shall be determined by the relationship between the vertical and horizontal water movement in the original soil of the absorption area.
(3) Clean sand shall consist of sound, durable material that conforms to the following requirements: Sieve Size Percent Passing No. 4 95-100 No. 8 80-100 No. 10 0-100 No. 40 0-100 No. 60 0-40 No. 200 0-5
Clean sand shall also contain less than three percent deleterious substances and be free of organic impurities.
(4) The absorption area is determined by multiplying the rock bed length by the absorption width. The absorption width is calculated by multiplying the rock bed width by the absorption ratio. The absorption ratio shall be determined according to Table VI using the percolation rate or Table Va if using soil characteristics of the upper 12 inches of soil in the proposed absorption area.
(5) The side slopes on the mound must not be steeper than three horizontal units to one vertical unit and shall extend beyond the required absorption area, if necessary.
(6) Distribution of effluent over the rock bed must be by level perforate pipe.
(7) The supply pipe from the pump to the mound area must be installed fore mound soil surface preparation. The trench excavated for the supply pipe must be carefully backfilled and compacted to prevent seepage of effluent.
(8) Vegetation in excess of two inches in length and all dead organic debris must be removed from the absorption area.
(9) All surface preparation must take place when the upper 12 inches of soil has a moisture content of less than the plastic limit and soil conditions allow field testing of soil properties and properties are maintained throughout installation.
(10) The absorption area must be roughened by backhoe teeth or moldboard chisel plowed to a depth of eight inches. Disking is allowed if the upper eight inches of soil has a texture of loam or coarser. If plowed, furrows must be thrown uphill and there must not be a dead furrow in the absorption area. A rubber-tired tractor may be used for plowing or disking. Rototilling or pulverizing the soil is not allowed. Soil must not be excavated or moved more than one foot from its original location during soil surface preparation of six inches of clean sand, no vehicle shall be driven on the prepared surface, the site is completed. If rainfall occurs on the prepared surface, the soil must be allowed to dry below the plastic limit and roughened.
(11) Prior to placement of the absorption area after the surface preparation is completed.
(12) The required absorption width for mounds constructed on slopes from percent shall be centered under the rock bed width. The required absorption width for mounds constructed er than one percent shall be

measured downslope from the upslope edge of the rock bed width and measured in the direction of the original land slope and perpendicular to the original contours.
(13) The clean sand must be placed by using a construction technique that minimizes compaction. If the clean sand is driven on for construction, a crawler or track-type tractor must be used. At least six inches of sand must be kept beneath equipment to minimize compaction of the prepared surface.
(14) A minimum of 12 inches of clean sand must be placed where the rock bed is to be located and must cover the entire absorption area.
(15) The sand layer upon which the rock bed is placed must be level in all directions.
(16) A vertical inspection pipe at least 1-1/2 inches in diameter shall be installed and secured at each rock bed/sand interface of every mound. The inspection pipe must have three-eighths inch or larger perforations spaced vertically no more than six inches apart. At least two perforations must be located in the rock bed. No perforation shall be located above the permeable synthetic fabric. The inspection pipe must extend to the bottom of the rock bed and must be capped flush with or above finished grade.
(17) On slopes of one percent or greater, the upslope edge of the level drainfield rock bed must be placed on the contour.
(18) The rock bed shall completely encase the top and sides of the distribution pipes to a depth of at least two inches above the pipe. The rock bed shall extend nine inches below the pipe.
(19) The top of the rock bed must be level in all directions.
(20) Construction vehicles must not be allowed on the rock bed until backfill is placed.
(21) The rock bed must be covered with a durable non-woven geotextile fabric designed for this purpose. The fabric must be of sufficient strength to undergo installation without rupture. In addition, the fabric must permit passage of water without passage of overlying soil material into the drainfield rock bed.
(22) Sandy to loamy soil material must be placed on the rock bed to a depth of one foot in the center of the mound and to a depth of six inches at the sides.
(23) Six inches of topsoil borrow must be placed over the entire mound.
(24) A vegetative cover must be established over the entire area of the mound. The mound shall be protected against erosion and freezing until a vegetative cover is established. The vegetative cover shall not interfere with the hydraulic performance of the system and shall provide adequate frost and erosion protection.
(25) Shrubs, deep-rooted plants, or hydrophilic plants must not be planted on the top or side slopes of the mound.

At-grade systems.
A. Location of at-grade systems.
(1) At-grade systems must be constructed on original soils with at least 36 inches of vertical separation.
(2) There must be at least 12 inches of original soil with a percolation rate faster than 61 minutes per inch below the absorption area or have a soil sizing factor of 2.2 square feet per gallon per day or less as shown in Table Va.
(3) At-grade systems shall not be installed in areas with slopes greater than 25 percent.
(4) Setbacks shall be measured from the edge of the absorption area.

B. Design of at-grade systems.
(1) Rock bed absorption width shall be calculated by multiplying the linear loading rate by the soil-sizing factor identified in Table V or Table Va of the upper 12 inches of soil in the proposed absorption area. The linear loading rate shall be as determined by the relationship between vertical and horizontal water movement in the soil and shall not exceed a linear loading rate of 12 gallons per foot per day. The total rock bed width for sloping ground shall consist of the rock bed absorption width plus enough rock on the upslope side to provide stability.
(2) Rock bed length shall be calculated by multiplying the soil-sizing factor by the average design flow and dividing by the rock bed width.
(3) At-grade systems shall be pressurized and distribution pipes shall be installed in the center of the rock bed on slopes less than one percent and on the upslope edge at the rock bed absorption width on slopes one percent or greater.

C. Construction of at-grade systems.
(1) Drainfield rock must be used as the distribution medium in at-grade systems.
(2) The upslope edge of an at-grade system shall be installed along the natural contour.
(3) The rock bed shall completely encase the top and sides of the distribution pipe to a depth of at least two inches above the pipe. There shall be at least nine inches of rock below the distribution pipe.
(4) The entire rock bed shall be covered with a durable non-woven geotextile cover.
(5) One foot of loamy or sandy cover material shall be installed over the rock bed. Cover shall extend at least five feet from the ends of the rock bed and be sloped to divert surface water. Side slopes shall not be steeper than four horizontal units to one vertical unit. The upper six inches of the loamy soil cover must be topsoil. Topsoil borrow must be of a quality that provides a good vegetative cover on the at-grade system and excludes peaty material.
(6) Three vertical inspection pipes of at least 1.5 inches in diameter shall be installed and secured along the downslope portion of the rock bed. These pipes shall be located within three feet of the downslope edge of the rock bed at the middle and one-sixth of the total rock bed length and placed as measured from the ends of the rock bed. The inspection pipes shall have three-eighths inch or larger perforations spaced vertically no more than six inches apart. No

perforations shall exist above the permeable synthetic fabric. The inspection pipes must extend to the rock bed/soil interface and must be stabilized and capped flush with or above finished grade.
(7) A vegetative cover must be established over the entire area of the at-grade system. The soil treatment at-grade system shall be protected until a vegetative cover is established. The vegetative cover shall not interfere with the hydraulic performance of the system and shall provide adequate frost and erosion protection.

Greywater systems.
A. A toilet waste treatment device shall be used in conjunction with a greywater system. Greywater or garbage shall not be discharged to any toilet waste treatment device except as specifically recommended by a manufacturer.

B. Greywater system plumbing. The drainage system in a dwelling or other establishments served by a greywater system shall be based on a pipe diameter of two inches to prevent installation of a water flush toilet. There shall be no openings or connections to the drainage system, including floor drains, larger than two inches in diameter. The existing drainage system may be used if a greywater system is to be installed for an existing dwelling. Garbage disposals shall not be connected to the greywater system.

C. Sewage tank. Greywater septic tanks shall meet all requirements of part 7080.0130, subparts 1 to 4, except that the liquid capacity of a greywater septic tank serving a dwelling shall be based on the number of bedrooms existing and anticipated in the dwelling served and shall be at least as large as the capacities given in Table Vb.

D. Final treatment and disposal. A greywater soil treatment system shall meet all requirements of this part.

FINAL TREATMENT AND DISPOSAL.
A. Final treatment and disposal of all sewage tank effluent shall be by discharge into the soil treatment system.

B. Soil treatment systems shall not be placed in floodways. Soil treatment systems should not be placed in areas subject to excessive run-on. All soil treatment systems located on slopes greater than one percent must have a diversion constructed immediately upslope from the system to intercept and direct runoff.

C. Before discharge to a soil treatment system designed under this part, the pretreated effluent shall have a biochemical oxygen demand of 220 or less and a total suspended solids concentration of 65 mg/l or less and an oil and grease concentration of 30 mg/l or less.

D. A durable non-woven geotextile fabric must be used to cover distribution rock medium.

Trenches and seepage beds.

A. Location of trenches and seepage beds. Seepage bed construction shall be limited to areas having natural slopes less than six percent. Seepage beds shall not be placed in soils with percolation rates slower than 60 minutes per inch or in floodplains.

B. Distribution medium for trenches and seepage beds.
(1) General. Distribution medium shall consist of drainfield rock, gravelless drainfield pipe, or a chambered system.
(2) Drainfield rock;
(a) Drainfield rock used as a distribution medium shall be igneous rock, or similar insoluble, durable, and decay-resistant material between three-fourths inch and 2-1/2 inches in size, with no more than five percent by weight passing a three-fourths inch sieve and no more than one percent by weight passing a No. 200 sieve. Materials greater than 2-1/2 inches in size shall not exceed five percent by weight.
(b) There shall be a layer of at least six but no more than 24 inches of drainfield rock below the distribution pipe. The drainfield rock shall completely encase the top and sides of the distribution pipes to a depth of at least two inches. The total thickness of rock-filled trenches shall not exceed 30 inches.
(3) Gravelless drainfield pipe. Gravelless drainfield pipe including appurtenances shall be:
(a) of commercially fabricated corrugated pipe completely encased by the manufacturer in a geotextile wrap specific to this purpose;
(b) an eight-inch or ten-inch nominal ID pipe that conforms to subunits i and ii and meets the requirements of American Society of Testing Materials (ASTM) F667.
i. The pipes must be marked with an alignment stripe visible through the geotextile wrap and installed with this stripe at top center.
ii. The pipes shall contain a row or rows of cleanly cut three-eighths inch to one-half inch diameter holes located in such a manner to provide storage of solids. Each row shall contain a hole in every other corrugation valley, staggered such that every corrugation valley contains one hole.

(c) the pipes must be wrapped in geotextile fabric specifically designed and tested for use with gravelless pipe and for installation and use in individual sewage treatment systems and designed to transmit sewage at a long-term acceptance rate that corresponds to the sizing factor prescribed in item C, subitem (2); and
(d) protected from heat and ultraviolet rays prior to installation.

(4) Chambered systems. Chamber media including all piping and appurtenances shall be constructed:
(a) of commercially fabricated materials specific to this purpose;
(b) of materials resistant to sewage or with an open bottom to support the load;
(d) with slotted or perforated sides to allow sewage to move laterally into the soil;
(e) no greater than three feet in width; and
(f) with vertical outside dimensions less than 30 inches.

C. Sizing of trenches and seepage beds.

(1) Drainfield rock media.
(a) Table V and Table Va specify the soil sizing factors used to calculate trench bottom area assuming six inches of drainfield rock below the distribution pipe.
(b) The bottom area may be reduced, for trenches only, by 20 percent for 12 inches of drainfield rock below the distribution pipe; 34 percent for 18 inches; and 40 percent for 24 inches. Reductions may be interpolated for other depths of rock.

(2) Gravelless drainfield pipe media. Sizing shall be based on table 5. An eight-inch inside diameter pipe shall be equivalent to a two-foot wide rock filled trench with six inches of drainfield rock below the distribution pipe and a ten-inch inside diameter pipe shall be equivalent to a three-foot wide rock filled trench with six inches of drainfield rock below the distribution pipe.

(3) Chambered media. Sizing shall be based on table 5, with the depth of slatted sidewalls being equivalent to the corresponding depth of rock below the distribution pipe.

D. Design and construction of trenches and seepage beds:

(1) The absorption area of trenches and seepage beds shall be in original soils and designed and constructed with at least three feet of vertical separation above saturated soil or bedrock. In no case shall the bottom of the distribution medium be deeper than 48 inches from the final grade. If effluent is distributed by gravity it shall not be loaded above the natural ground surface and must meet the following requirements:
(a) for drainfield rock trenches, the rock below the pipe must be in contact with original soil and gravity distribution must be designed to load effluent the entire depth of the rock below the pipe;
(b) for gravelless drainfield pipe, the entire pipe must be below the original grade and gravelless drainfield pipe with gravity distribution must be designed to fill the entire pipe; and
(c) for chambered media, the entire slatted sidewall must be below the original grade, and effluent must be loaded the entire depth of the slatted sidewall.

(2) Trenches shall not be less than 18 inches and no more than 36 inches wide. Any excavation wider than 36 inches shall be considered a seepage bed. No seepage bed may be wider than 25 feet and parallel beds must be at least ten feet apart. The width of the excavation for gravelless drainfield pipe and chambered systems shall be constructed in accordance with manufacturer's recommendation.

(3) Drainfield rock must be used as the distribution medium in seepage beds.

(4) The bottom and sides of the soil treatment system to the top of the distribution medium shall be excavated in such a manner as to expose the original soil structure in an unsmeared and uncompacted condition. Excavation into the absorption area is only allowed when the soil moisture content is at or less than the plastic limit.

(5) Excavation equipment or other vehicles must not be driven on the excavated trench or seepage bed bottom. Once the trench or seepage bed is excavated, it shall not be exposed to rainfall prior to placement of the final backfill.

(6) A vertical inspection pipe at least 1-1/2 inches in diameter shall be installed and secured in the distribution medium of every trench or seepage bed. The inspection pipe must be located at an end opposite from where the sewage tank effluent enters the medium. The inspection pipe must have three-eighths inch or larger perforations spaced vertically no more than six inches apart. At least two perforations must be located in the distribution medium. No perforations shall be located above the geotextile cover or wrap. The inspection pipe must extend to the bottom of the distribution medium and must be capped flush with or above finished grade.

(7) The top and bottom of the distribution medium shall be level in all directions.

(8) Drainfield rock must be covered with a durable non-woven geotextile.

(9) The minimum depth of cover over the distribution medium shall be at least six inches.

(10) The trenches or seepage beds shall be backfilled and crowned above finished grade to allow for settling. The top six inches of soil shall have the same texture as the adjacent soil.

(11) A vegetative cover shall be established over the soil treatment system. The soil treatment system shall be protected until a vegetative cover is established. The vegetative cover established shall not interfere with the hydraulic performance of the system and shall provide adequate frost and erosion protection.

(12) All joints for gravelless drainfield pipes or chambered systems must be secured as recommended by the manufacturer.

(13) Backfilling for gravelless drainfield pipe and chambered systems shall not crush or damage the medium.

Dual field systems.
A. Dual field systems shall be used only where the soil-sizing factor is greater than 0.83 square feet per gallon per day.

B. Dual field systems shall be sized, designed, and constructed as set forth above for standard systems except as follows:
(1) The soil treatment area shall be divided into two or more parts.
(2) Alternating soil treatment areas shall each be connected to a valve box outlet.

C. No part of a soil treatment area shall be used more than one year unless the effluent level indicates that a longer duration is feasible.

Rapidly permeable soils.
A. Three feet of soil with a texture of medium sand or finer must exist below the distribution medium. Soil absorption areas with a soil percolation rate of 0.1 to five minutes per inch that is not a fine sand (Table V) or soil absorption areas with a soil texture of medium sand or loamy sand (Table Va) must use at least one of the following treatment techniques:
(1) Divide the total soil treatment system into at least four parts with no part larger than 25 percent of the area and the parts constructed for serial application.

B. Soil treatment systems placed in soils with percolation rates of less than one-tenth minute per inch or in a soil texture of coarse sand must provide at least one of the following treatment techniques:
(1) A mound system; or
(2) A trench system with at least one foot of clean sand placed between the distribution medium and the coarse soil along the excavation bottom and sidewalls.

MAINTENANCE.
The individual sewage treatment system and all components must be maintained in compliance with manufacturer requirements and in accordance with state, federal, or local requirements. The owner of an individual sewage treatment system or the owner's agent shall regularly, but in no case less frequently than every three years:

A. Assess whether the sewage tank leaks below the designed operating depth and whether sewage tank tops, riser joints, and riser connections leak through visual evidence of major defects; and

B. Measure or remove the accumulations of scum, which includes grease and other floating materials at the top of each septic tank and compartment along with the sludge, which includes the solids denser than water.

C. A clean out at or above finished grade shall be installed between the dwelling and the septic tank at intervals not more than 100 feet.

Removal of material.
A. Septage shall be removed by pumping of septage from all tanks or compartments in which the top of the sludge layer is less than 12 inches below the bottom of the outlet baffle or whenever the bottom of the scum layer is less than three inches above the bottom of the outlet baffle.

B. Removal of accumulated sludge, scum, and liquids must be through the maintenance hole.

C. If no maintenance hole exists on a sewage tank, the owner or the owner's agent shall install maintenance holes in sewage tanks, to allow for maintenance to take place through the maintenance hole. If the owner or owner's agent refuses to allow the removal through a maintenance hole, the licensed pumper must obtain a signed statement from the owner or owner's agent that the owner or agent was informed of correct removal procedures and the reason for refusal.

Toilet waste treatment devices. The owner or owner's agent shall operate a toilet waste treatment device in accordance with manufacturer's requirements. For primitive dwellings and dwellings using toilet waste treatment devices *in low* density areas, septage disposal must not be to surface waters, drainageways, or in a manner or volume harmful to the environment or public health or that creates a nuisance if allowed under local ordinance.

Additives. Individual sewage treatment system additives must not be used as a means to reduce the frequency of proper maintenance and removal of septage from the septic tank as specified in this part. Individual sewage treatment system additives that contain hazardous substances must not be used in individual sewage treatment systems.

Use of soil treatment site. Activities on the soil treatment system or the additional soil treatment area that may impair the treatment abilities or hydraulic performance of the soil treatment system are prohibited.

Any maintenance activity used to increase the acceptance of effluent to a soil treatment system must:

A. Not be used on failing systems;

B. Not decrease the required vertical separation;

C. Not cause preferential flow from the system bottom to the saturated soil or bedrock; and

D. Be conducted by an appropriately registered qualified employee or an appropriately licensed ISTS professional.

SYSTEM ABANDONMENT.
Tank abandonment procedures for sewage tanks, cesspools, leaching pits, drywells, seepage pits, vault privies, pit privies not serving primitive dwellings, and distribution devices are as follows:

A. All solids and liquids shall be removed and disposed of;

B. Abandoned chambers shall be removed or be filled with soil material, rock, or other inert material; and

C. Tanks buried close to the ground surface must be removed or crushed to permit drainage through the tank.

Access for future discharge to the system shall be permanently denied. If soil treatment systems are removed, contaminated materials shall be properly handled to prevent human contact.
Performance systems.
A. No Warrantied system will be permitted, except as an experimental septic system.
B. Reasonable assurance of performance of the system must be submitted to the local unit of government. The engineering design of the system must be submitted and approved by the local unit of government.

C. Systems designed, constructed, and operated under this part shall meet or exceed the following requirements:
(1) Only sewage may be discharged into the system;
(2) Treatment processes and devices shall not allow bodily contact with sewage or sewage effluent;
(3) Disposal of sewage effluent shall be below grade, with the effluent remaining below grade until reaching a groundwater discharge area. The below grade discharge shall not result in creation of a new surface discharge;
(4) The treatment and disposal of sewage or sewage effluent shall be in a safe manner that adequately protects the public, including protection from physical injury and harm;
(5) All methods and devices used to treat and dispose of sewage shall conform to all applicable federal, state, and local requirements; and
(6) All devices shall be operated and maintained in accordance with manufacturer's requirements.

D. Groundwater and surface water protection.
(1) Soil treatment systems must be designed with a vertical separation appropriate for the sewage treatment system design, including effluent quality, loading rates, loading methods, soil conditions, and other site-specific considerations as established in the operating permit. An unsaturated zone must be maintained between the bottom of the soil treatment system and the seasonally saturated soil or bedrock during loading of effluent.
(2) The sewage effluent/groundwater plume shall contain no viable fecal organisms 25 feet horizontally from the soil treatment area. This limit shall not be exceeded during typical periods of climatic stress and/or under typical maximum designed flow volumes.
(3) If the system is located on a lot which adjoins a lake, the sewage effluent/groundwater plume shall:
(a) Have a total phosphorus concentration of 1 mg/l or less 50 feet or greater from the soil treatment area; or
(b) Have concentrations of total phosphorus less than 1 mg/l above background concentrations 50 feet or greater from the soil treatment area.
(4) Local units of government may enact nitrogen standards for sewage effluent/groundwater plumes from an ISTS. Local units of government may also require additional standards for local resource protection.

E. Long-term performance.
(1) Designers of systems designed under this part shall provide to the local unit of government and the property owner the following:
(a) Estimated costs for construction, operation, monitoring, service, component replacement, and management;
(b) Anticipated system life; and
(c) Hydraulic and organic loading rates to all components of the system.

INSPECTION PROGRAM FOR INDIVIDUAL SEWAGE TREATMENT SYSTEMS.
Local units of government must have an inspection program to enforce requirements, and must specify the frequency and times of inspections, the requirements of an inspection, an inspection protocol if an inspection cannot be completed in a timely manner, and, at a minimum, the requirements for a compliance inspection under subparts 2 and 3.

A. To ensure compliance before issuance of a permit or variance for the addition of a bedroom on property served by a system, if the local unit of government issues permits for the addition of a bedroom.

B. For all new construction or replacement;

C. By a qualified employee or under a licensee authorized by the local unit of government who is independent of the owner and the installer;

D. For any evaluation, investigation, inspection, recommendation, or other process used to prepare a disclosure if conducted by a party who is not the property owner. This disclosure action shall constitute a compliance inspection and must be conducted in accordance with this chapter.

Certificate of compliance; notice of noncompliance.
(1) All certificates of compliance and notices of noncompliance must include property and property owner identification, the party or parties requesting the inspection, reason for the inspection, date of inspection, system components, methodology used to determine compliance, system location (dimensioned or drawn to scale), SWF designations as applicable, and Class V designation as applicable.
(2) A certificate of compliance or notice of noncompliance must be signed by a licensed inspector or designer I, or a qualified employee registered as an inspector or designer I, and submitted to the local unit of government with jurisdiction and the property owner within 30 days after any compliance inspection. The certificate of compliance or notice of noncompliance must also be submitted to the owner's agent, if applicable.
(3) A certificate of compliance or notice of noncompliance must include a certified statement from the licensee or qualified employee who conducted the compliance inspection. The certificate or notice shall identify the type of system inspected, and indicate whether the individual sewage treatment system is in compliance.
(4) If a compliance inspection indicates that the system is not in compliance or presents an imminent threat to public health or safety, the notice must also contain a statement to this effect and specify why the owner must upgrade, replace, or discontinue use of the system.

B. New construction or replacement.
(1) A certificate of compliance for new construction or replacement shall include documentation showing that the individual sewage treatment system complies with applicable requirements. The inspection requirement may be satisfied by a review by the designated local official of video, electronic, photographic, or other evidence to show compliance as provided by the installer.
(2) Certificates of compliance for new construction or replacement system compliance inspections remain valid for five years from the date of issuance unless the local unit of government finds evidence of an imminent threat to public health and safety.

C. Existing systems.
(1) An inspection report for existing systems shall include the methodology used to determine vertical separation, tank leakage, and whether an imminent threat to public health or safety exists. If the original installation took place under a local unit of government permit process that included the following verification procedure, then there is no further need to verify the vertical separation for the life of the system. Under the local permit process, this verification must be made by in-field measurements of the redoximorphic features determined and documented during the original soil testing, governmental review and as-builts, or by documentation of in-field measurements of the redoximorphic features and the in-place systems determined during a construction inspection.
(2) Certificates of compliance for existing systems remain valid for three years from the date of issuance unless the local unit of government finds evidence of an imminent threat to public health or safety.

WARRANTIED INDIVIDUAL SEWAGE TREATMENT SYSTEMS.
Warrantied individual sewage treatment systems meeting the requirements under this part may be employed unless specifically prohibited in local ordinance.

The manufacturer or designer must submit satisfactory information to the commissioner as follows to qualify for placement on the warrantied systems list:

A. How the system must be used and installed, how it is expected to perform under those conditions, the anticipated design life, and the period to be warrantied;

B. Pertinent existing data, including in-field testing data, that the system will perform as expected;

C. A commonly accepted financial assurance document or documentation of the manufacturer's or designer's financial ability to cover potential replacement and upgrades necessitated by failure of the system to meet the performance expectations for the duration of the warranty period;

D. A full warranty effective for the designated warranty period, which must be at least five years from the time of installation, covering design, labor, and material costs to remedy failure to meet performance expectations for systems used and installed in accordance with the manufacturer's or designer's instructions; and

E. Additional information requested by the commissioner to ensure compliance with this part.

Administrative requirements.

A. Individual sewage treatment systems meeting the requirements of subpart 2 shall be placed on a warrantied systems list maintained by the commissioner.

B. Changes made to a warrantied individual sewage treatment system that are not included in the original warranty submittal require resubmittal to be placed on the warrantied systems list.

C. The commissioner may remove a warrantied individual sewage treatment system from the warrantied systems list upon a finding of fraud, system failure, failure to meet warranty conditions, or failure to meet the requirements of this part or other matters that fail to meet with the intent and purpose of this chapter. Removal of a technology from the warrantied systems list by the commissioner does not alter or end warranty obligations for systems installed under the previously approved warranty.

D. A copy of the warranty must be provided to the owner and included with the design records.

OTHER ESTABLISHMENTS.
A. Systems designed under this part may require additional design requirements pursuant to Code of Federal Regulations, title 40, parts 144 and 146.

B. Administrative requirements for other establishments. The owner or owner's agent of an other establishment served by an ISTS shall submit to the commissioner and the United States Environmental Protection Agency the inventory information specified in Code of Federal Regulations, title 40, section 144.26, subpart (a), including, as appropriate, items A to J.

C. Facility name and location to include a map showing the location of the system, property lines, adjacent surface waters, wellhead protection areas, and existing and proposed water supply wells within 100 feet of the system.

D. Name and address of facility owner or owner's agent and contact person.

E. Type of facility and chemicals and processes used.

F. Facility average and maximum design flow in gallons per day.

G. Chemical composition of waste stream and operating status of the system.

H. Certification by the owner or owner's agent that the submitted information is correct.

I. Additional information as required by the commissioner or the United States Environmental Protection Agency.

Flow Measurement
A. Design flows.
(1) For multifamily dwellings, the average design flow shall consist of the sum of the average design flows for each individual unit. Flow determination for systems designed to serve more than ten dwellings may consider classification I dwellings as classification II dwellings.
(2) For other establishments, average design flow shall be used to size soil treatment systems. Maximum design flow shall be used to size sewage tanks. Design flows shall be calculated using estimated or measured values for other establishments according to units (a) and (b).

(a) Estimated average and estimated maximum design flows shall be determined from the best available data provided by the agency.
(b) Measured average and maximum design flows:

i. The measured average design flow shall be determined by averaging the measured daily flows for a consecutive seven-day period in which the establishment is at maximum capacity or use; and
ii. The measured maximum design flow shall be the measured peak daily flow.

(3) Estimated or measured average concentrations of biochemical oxygen demand, total suspended solids, and oil and grease shall be determined.

Septic tanks and holding tanks.

(1) A septic tank larger than 3,000 gallons shall be divided into two or more compartments or multiple tanks shall be used.

(2) Septic tank liquid capacity must be in accordance with units (a) and (b).

(a) Sufficient capacity shall provide a septic tank detention period of not less than 36 hours in the tank for maximum design flow of less than 1,500 gallons per day, but in no instance shall the liquid capacity be less than 750 gallons.

(b) For maximum design flows greater than 1,500 gallons per day, the minimum liquid capacity shall equal 1,125 gallons plus 75 percent of the maximum design flow.

(c) Sufficient detention time or pretreatment must be provided to produce an effluent quality suitable for discharge to a soil treatment system as defined.

(3) For laundromats, the outlet baffle of all septic tanks and baffles between compartments must be submerged to a depth of 50 percent of the liquid depth of the tank.

D. Dosing devices, dosing chambers, pump pits, wet wells, or lift stations.

(1) Shall meet all requirements with the pump discharge capacity based upon the perforation discharges for a minimum average head of 2.0 feet.

(2) A dosing device must discharge at a rate at least ten percent greater than the water supply flow rate but no faster than the rate at which effluent will flow out of the distribution device.

(3) Dosing chambers shall include a separate alarm device for each dosing device to warn of dosing device failure, overflow, or other malfunction.

E. Conventional collector system design.

(1) Collector system design and testing shall be based on standard engineering practices.

(2) Collection systems shall be designed based on the sum of all flows for dwellings and other establishments as described in item B. Flows shall be increased to allow for 200 gallons of infiltration per inch of pipe diameter per mile per day. If the system is designed with each dwelling having a sewage tank, or designed with a common sewage tank serving ten bedrooms or more or serving another establishment, the liquid capacity of the tanks shall be in accordance with item C.

(3) The conventional sewer for systems with common sewage tanks shall be constructed to give mean velocities, when flowing full, of not less than two feet per second. The sewer for systems with individual sewage tanks shall be constructed and designed to hydraulically conduct the flow for which they were designed.

(4) In no case shall a gravity sewer be less than four inches in diameter. The diameter and grade line should be based on a flow equal to 50 percent of the average design flow occurring in a one-hour period.

(5) Infiltration or exfiltration shall not exceed 200 gallons per inch of pipe diameter per mile per day. Hydrostatic water testing, air testing, or other appropriate methods shall be used to verify non-exceedance.

(6) Cleanouts, brought flush with or above finished grade, or maintenance hole access, shall be provided wherever a common sewer joins an individual building sewer or piping from an individual sewer tank, or every 100 feet, whichever is less, unless maintenance methods can be provided.

(7) There shall be no physical connection between sewers and water supply systems. Sewers shall be set back from water supply systems and piping as required for building sewers.

(8) Pipes and pipe joints shall be designed and installed to be watertight.

(9) Pumps and dosing chambers shall be sized to handle 50 percent of the average design flow in a one-hour period. Common pump tanks shall have a pumpout capacity of ten percent of average design flow and two alternating pumps.

(10) For systems with individual septic tanks, a stilling tank of at least 1,500 gallons liquid capacity or ten percent of the average design flow, whichever is greater, must be installed before the soil treatment system.

(11) All persons using a common system shall ensure, by contract with maintenance personnel or other equivalent means, that the system will be maintained throughout its useful life. The system so maintained includes common soil treatment systems, common sewage tanks, common pumps, common pump stations, common sewers, and all individual tanks connected to the common system. Flow measurements must be taken and recorded according to a monitoring plan.

SEEPAGE PITS, DRYWELLS, AND LEACHING PITS

Seepage pits, drywells, and leaching pits do not comply and are considered failing systems.

Dated at Vineland, Minnesota, this 15th day in March in the year two thousand and one.

Curt Kalk,
Commissioner of Natural Resources

APPROVED AND NUMBER AS TO FORM AND EXECUTION

Mary Al Balber,
Solicitor General

OFFICIAL SEAL OF THE BAND