ARTICLE 33.1-21
~~CESSPOOLS,~~ SEPTIC TANKS~~PRIVIES~~and ONSITE WASTEWATER TREATMENT SYSTEMS

CHAPTER 33.1-21-01
ONSITE WASTEWATER TREATMENT SYSTEMS ~~INSTALLER LICENSING~~

33.1-21-01-01. ~~Installers licensing~~Authority.

~~1. Onsite wastewater treatment system installers licenses issued by local public health units under North Dakota Century Code section 23-35-08 valid on July 31, 2025, do not expire and must remain in effect until December 31, 2026, or if the department of environmental quality adopts rules regarding licensing, whichever occurs first.~~

~~2. Until December 31, 2026, or if the department of environmental quality adopts rules regarding licensing, whichever occurs first, onsite wastewater treatment system installers that are not currently licensed may obtain a license from the department by submitting an application form prescribed by the department.~~

The department has been authorized to provide and administer this chapter relating to onsite wastewater treatment systems. The department has exclusive authority to adopt rules regarding licensing, permitting, and inspections of onsite wastewater treatment systems as provided by North Dakota Century Code chapter 23.1-07.1-02.

History: Effective August 1, 2025; amended effective January 1, 2026; amended effective _____.
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-02, ~~23.1-07.1-03~~23.1-07.1-04

33.1-21-01-02. Scope and Purpose.

This chapter establishes procedures governing the licensing, permitting, and installation of onsite wastewater treatment systems. To ensure the protection of the general public and waters of the state from contamination by wastewater, this chapter also establishes standards for training and installation of onsite wastewater treatment systems.

History: Effective _____.
General Authority: NDCC 23.1-07.1-02

Law Implemented: NDCC 23.1-07.1-04

33.1-21-01-03. Definitions.

The terms used throughout this chapter have the same meaning as in North Dakota Century Code chapters 23.1 and 61-28, except:

1. “At-grade system” means a pressurized soil treatment and dispersal system where wastewater effluent is dosed to an absorption bed that is constructed directly on original soil at the ground surface and covered by loamy soil materials.

2. “Baffle” means a device installed in a septic tank for proper operation of the tank and to provide maximum retention of solids, and includes vented sanitary tees and submerged pipes in addition to those devices that are normally called baffles

3. "Bedroom" is any room within a dwelling that may be reasonably used as a sleeping room and includes, but is not limited to, unfinished areas that have potential to become a bedroom(s).

4. "Capacity" is the liquid volume of a septic tank using inside dimensions below the outlet.

5. "Cesspool" (Seepage Pit) is an underground pit into which raw wastewater and/or other untreated liquid waste is discharged and from which the liquid seeps into the surrounding soil.

6. "Clean sand" means commercially processed, washed sand or naturally occurring sand which conforms to ASTM International Standard C-33.

7. "Distribution media" means the material used to provide void space in a dispersal component, through which effluent flows and is stored prior to infiltration. Distribution media includes, but is not limited to, drainfield rock, polystyrene beads, chambers, and pipe.

8. "Distribution pipes" means perforated pipes that distribute wastewater effluent within a distribution medium.

9. "Dosing device" means a commercially manufactured wastewater effluent pump, grinder pump, or siphon.

10. "Drainfield rock" means clean, commercially produced, washed, rock, crushed igneous rock or similar insoluble, durable, and decay-resistant material. The size must range from three-fourths inches [1.905 cm] minimum diameter to two and one half inches [6.35 cm] effective diameter.

11. "Dwelling" means any building or place used or intended to be used by human occupants as a single- family or multiple-family unit.

12. "Floodway" means the bed of a wetland or lake, the channel of a watercourse, or those portions of the adjoining floodplain that are reasonably required to carry the regional flood discharge.

13. "Holding Tank" means a water-tight tank, with a minimum capacity of one thousand gallons [3785.41 liters] used for the storage of wastewater until it can be transported to a point of approved disposal.

14. “Limiting factor” means any factor that adversely affects the soil’s ability to effectively treat wastewater effluent. This encompasses actual soil saturation, mottling features or active fluctuating seasonal soil water table, bedrock, layers or conditions of low permeability, or any physically identifiable condition that limits installation of a system.

15. “Mound system" means a soil treatment and dispersal system designed and installed such that all of the infiltrative surface is installed above grade, using clean sand between the bottom of the

infiltrative surface and the original ground elevation utilizing pressure distribution and capped with suitable material to stabilize the surface and encourage vegetative growth.

16. "Mottling" means spots or blotches of different color or shades of color interspersed with the dominant color of the soil that usually indicate that the soil is seasonally saturated.

17. "Parallel distribution" means the distribution of wastewater tank effluent by gravity which loads all sections of a system equally at the same time.

18. "Percolation rate" means the timed rate of drop of water infiltrating into a test hole. The percolation rate can be determined by the percolation test.

19. "Permeability" means the rate with which gases or liquids penetrate or pass through a bulk mass of soil or layer of soil.

20. "Permitting authority" means North Dakota local public health unit, other political subdivision, or their designees.

21. "Plastic limit" means the soil moisture content below which the soil may be manipulated for purposes of installing a soil treatment system and above which manipulation will cause compaction or smearing. If a fragment of soil can easily be rolled into a wire one-eighth inch [0.375 cm] diameter, the moisture content is above the limit and the soil may not be used. The standard method of determining the plastic limit is specified by the American Association of State Highway Officials (AASHO) Designation: #T 90-61.

22. “Redoximorphic Features” means soil property that reflects alternating reduction and oxidation conditions due to water table fluctuations.

23. “Seepage bed” means an absorption facility consisting of an area from which the entire earth contents have been removed and replaced with a network of effluent distribution material, filter aggregate and covered with suitable backfill material.

24. "Serial distribution" means the distribution of wastewater tank effluent by gravity that progressively loads one section of a system to a predetermined level before overflowing to the succeeding section.

25. "Septic tank" is a watertight tank with minimum capacity of one thousand gallons [3785.41 liters], meets the minimum requirements within this chapter, receives the discharge of wastewater from a building sewer or preceding tanks, stores liquid for a detention period that provides separation of solids from liquid and digestion of organic matter, and allows the wastewater effluent to discharge to a succeeding tank, treatment device or soil treatment area.

26. "Setback" means a separation distance measured horizontally.

27. "Slope" means the ratio of vertical rise or fall to horizontal distance.

28. "Soil boring" means any type of excavating capable of revealing in detail characteristics of soils penetrated.

29. "Soil treatment area" means an area where wastewater effluent is dispersed into the soil for treatment and absorption and filtration and includes, but is not limited to trenches, seepage beds, at-grade systems and mound systems.

30. "System" means an Onsite Wastewater Treatment System employing a septic tank and the soil treatment system commonly known as seepage bed, trenches, at grade, or mound systems.

31. “Trench” means an excavation with a width of three feet [0.9144 meters] or less containing distribution media and one lateral.

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-04

33.1-21-01-04. Installer Licensing Requirements.

1. License required. A person wishing to engage in the business of installing systems shall submit an application for a license to the department on a form provided by the department. A business employing more than one person is required to have at least one licensed individual.

2. Applicant information. All applicants shall provide the following information to the department:

   a. The full name and physical business address of the applicant;

   b. The mailing address of the applicant, if different from the physical address;

   c. A copy of a training certificate that meets the requirements of section 33.1-21-01-05;

   d. A list of counties in which the applicant conducts business; and

   e. The applicant's social security number in accordance with North Dakota Century Code chapter 43-50.

3. Installers may apply for a soil assessment endorsement by providing a certificate that meets the requirements of subsection 4 of section 33.1-21-01-05.

4. License Renewals. Licenses expire on December thirty-first of each year. Until the renewal license application is approved by the department, an installer is not licensed to operate.

5. Fees. An applicant shall pay the license fee of two hundred dollars to the department at the time the license application is submitted. An applicant shall pay an additional fee of fifty dollars for a soil assessment endorsement. A license may not be issued prior to payment of the appropriate fee.

6. Application Review. The department shall review each installer application. If additional information is required, the department shall notify the applicant within thirty days of the department receiving the application, and processing will be postponed until the application is complete. The department shall review the completed application and either issue or deny a license within thirty days after the completed application is received.

7. Exemption. An individual installing a system on the individual's premises is exempt from the requirements of this section. The individual will still need to obtain a permit for the system in accordance with section 33.1-21-01-07.

8. Installer licenses are not transferable.

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-03

33.1-21-01-05. Training Requirements.

1. Installers licensed prior to *rule implementation date* shall provide documentation of a minimum of six hours of training prior to renewing their license for the first time under the new rules.

2. New installers shall provide documentation of eighteen hours of training approved by the department prior to obtaining a license.

3. Installers renewing their license after December 31, 2027, shall provide documentation of ten hours of training approved by the department in a consecutive three-year period.

4. Installers applying for a soil assessment endorsement shall provide documentation of a minimum of six hours of training approved by the department as well as a certificate showing a passing evaluation.

History: Effective .
General Authority: NDCC 23.1-07
Law Implemented: NDCC 23.1-07.

33.1-21-01-06. Permits Required.

1. A person may not construct, alter, repair, or extend any system without first obtaining a permit from the permitting authority. Regular system maintenance does not require a permit.

2. The permit must be issued by the permitting authority within the jurisdictional limits where the work is being done. The fee for the permit must be set by the permitting authority. The permitting authority shall maintain records of all permits it has issued for the life of the system.

3. No permit will be issued without a valid installer license.

4. Any permit is valid for no more than twelve months from date of issuance.

5. The permitting authority may deny a permit for the construction of a system if a public sewer system is available within two hundred feet [60.96 meters] of the property line unless written documentation indicates denial of connection from the sewer authority.

6. For any system or facility with wastewater flows of two thousand five hundred gallons [9.46 cubic meters] per day or greater, plans and specifications must be prepared by a North Dakota registered professional engineer, as defined in century code ch. 43-19, and submitted to the department's Division of Municipal Facilities, for review and approval. Construction of such systems may not commence until approval is granted by the Division.

7. All systems using a Class V Underground Waste Disposal injection well (i.e. drainfield) serving twenty or more persons must complete a Shallow Disposal System Form and submit it to the department.

8. Permit approval, modification, denial, or revocation must be done in writing.

9. Permit conditions that vary from the provisions of this chapter must be related to a request for variance in accordance with Section 33.1-21-01-15.

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-04

33.1-21-01-07. General Requirements.

1. The property owner, building contractor, plumbing contractor, and installer are individually responsible for compliance with these regulations in addition to any other regulations that may be pertinent to their occupation.

2. The minimum lot size in which a new system can be installed must be one acre.

3. Water carried from bathrooms, kitchens, laundry fixtures, and other household plumbing must pass through a septic tank or higher level of treatment prior to its discharge into the soil. Where

underground dispersal for treatment is not feasible, the permitting authority may review alternative methods of collection and disposal.

4. Culinary wastewater from commercial kitchens must pass through a properly sized and serviced grease interceptor.

5. When a septic tank or cesspool is abandoned, the permitting authority must be notified, and the tank must be pumped by a septic system servicer, as defined in century code 61-28, and either:

   a. Crushed and backfilled with soil, sand, or gravel; or

   b. Filled with an inert flowable fill and capped.

6. Systems must be constructed of durable materials resistant to acid, corrosion, or decay.

7. Any materials utilized in a system must be installed in accordance with manufacturer requirements.

8. Materials other than specified in this chapter must be approved by the permitting authority.

9. Systems utilizing power must have an alarm system installed for pump failure.

10. Electrical components must be installed according to manufacturer specifications.

11. All proposed sites for the soil treatment area must include, at minimum, the following information:

   a. Depth to the seasonal high water table, bedrock, and other limiting conditions;

   b. Soil conditions, such as properties and permeability;

   c. Slope;

   d. The existence of lowlands, depressions, rock outcrops;

   e. Surface water drainage patterns; and

   f. All legal setback requirements in Table I must be described or drawn out.

12. Flood prone areas.

   a. No part of a system may be installed in the floodway.

   b. The soil treatment area should be located on the highest feasible area of the lot.

   c. The tank must be protected against flotation under high water table conditions. This must be achieved by weight of tank, earth anchors, or shallow bury depths.

   d. If a pumping station is used to move effluent from the septic tank to the soil treatment area, provisions must be made to prevent the pump from operating when inundated with flood waters.

   e. The sewer must be designed to prevent back flow of liquid into the building when the system is inundated.

   f. If the water level rises above the top of the septic tank, the tank must be pumped to remove all solids and liquids after the flood has receded before the use of the system is resumed.

13. Minimum Setback Distances are given in Table I.

Table I Minimum Setback Distances

Feature	Wastewater tanks, holding tank (feet)	Soil treatment area and distribution device (feet)
Well < 100 feet deep	100	100
Well > 100 feet deep	50	50
Any other water supply well or buried water suction pipe	50	50
Buried pipe distributing water under pressure	10	10
Surface Water bodies – from ordinary high-water mark	100	100
Buildings	10	20
Property lines	10	10

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-04

33.1-21-01-08. General Prohibitions.

1. A permit may not be issued for a system that exceeds the capacity to properly absorb effluent in the quantities and by the means provided herein. The permitting authority may review alternative disposal methods for a property that does not have the capacity to properly absorb effluent.

2. Floor drains in shops may not be connected to a system. Water from building footings, sump pumps, draintile, pools, hot tubs, backwash from water treatment devices, or pool filters may not enter the system. Other non-domestic wastewaters, such as industrial wastewater, may not enter the system.

3. Surface and stormwater may not be directed towards any soil treatment area.

4. Wastewater may not be disposed of in any manner that could create a nuisance or cause a system to malfunction or fail.

5. Cesspools may not be installed or utilized and are considered a public nuisance.

6. A soil treatment area may not be installed during wet conditions or other conditions by which the soil would become smeared during construction.

7. A system may not be installed when the ground is frozen. The ground is considered frozen when the frost penetrates the top six inches [15.24 centimeters] of soil.

8. No system, or parts thereof, may be located on any parcel of land other than the parcel of land where the dwelling or building serviced by the system is located, except where a permanent easement is recorded or a centralized treatment system is utilized.

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-04

33.1-21-01-09. Procedures for Soil Determination.

1. Soils must be assessed by either:

   a. A registered professional soil classifier, as defined in North Dakota Century Code chapter 43-36;

   b. A licensed installer with a soil assessment endorsement; or

   c. The permitting authority or authorized representative of the permitting authority in accordance with paragraph 3 of subdivision c of subsection 2 of North Dakota Century Code 23-35-02.

2. A minimum of one soil exploration pit or boring must be excavated in the location of the proposed soil treatment system to allow the evaluation of the soil.

   a. Each soil boring or excavation must be made to a sufficient depth to provide the required design information;

   b. A soil texture description must be recorded by depth and notations made where texture changes occur; and

   c. Measurements must be made to determine the depth to the limiting factor. This includes the highest notable water table by recording the first occurrence of mottling observed in the soil boring or excavation as well as identifying active redoximorphic features, if present.

3. A percolation test may not be performed while frost exists below the depth of the proposed soil treatment system. When a percolation test is determined necessary to obtain additional information regarding soil permeability, the following procedures must be followed:

   a. Test hole dimensions and locations. Each test hole must be six [15.24 centimeters] to eight inches [20.32 centimeters] in diameter, have vertical sides, and be bored or dug to the depth of the bottom of the proposed individual system;

   b. Test hole preparation. The bottom and sides of the hole must be carefully scratched to remove any smearing and to provide a natural soil surface into which water may penetrate. Remove all loose material from the bottom of the hole. Add two inches [5.08 centimeters] of clean rock or sand in a mesh bag to protect the bottom;

   c. Test soil saturation and swelling. The hole must be carefully filled with clear water to a minimum depth of twelve inches over the soil at the bottom of the test hole and maintained for no less than four hours and preferably overnight. The soil must then be allowed to swell for at least sixteen hours, but no more than thirty hours. In sandy soils, the saturation and swelling procedure is not required and the test may proceed if water in the hole has seeped away in less than ten minutes;

   d. Measure percolation rate:

      (1) In sandy soils, adjust the water depth to eight inches [20.32 centimeters] over the soil at the bottom of the test hole. From a fixed reference point, the drop in water level must be measured in inches to the nearest one-eighth inch [0.32 centimeters] at approximately ten minute intervals. A measurement can also be made by determining the time it takes for the water level to drop one inch [2.54 centimeters] from an eight inch [20.32 centimeter] reference point. If eight inches [20.32 centimeters] of water seeps away in less than ten minutes, a shorter interval between measurements must be used, but in no case may the water depth exceed eight inches [20.32 centimeters]. The test must continue until three consecutive percolation rate measurements vary by a range of no more than ten percent; or

(2) In other soils, adjust the water depth to eight inches [20.32 centimeters] over the soil at the bottom of the test hole. From a fixed reference point, the drop in water level must be measured in inches to the nearest one-eighth inch [0.32 centimeters] inch at approximately thirty-minute intervals, refilling between measurements to maintain an eight inch [20.32 centimeter] starting head. The test must continue until three consecutive percolation rate measurements vary by a range of no more than ten percent. The percolation rate can also be made by observing the time it takes the water level to drop one inch [2.54 centimeters] from an eight inch [20.32 centimeter] reference point if a constant water depth of at least eight inches [20.32 centimeters] has been maintained for at least four hours prior to the measurement.

e. Calculate the percolation rate:

(1) Divide the time interval by the drop in water level to obtain the percolation rate in minutes per inch; and

(2) Percolation rates determined for each test hole must be averaged to determine the final soil treatment system design.

f. Report the percolation rate. Worksheets showing all calculations and measurements must be submitted.

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-04

33.1-21-01-10. Design flows.

Estimates of wastewater flow are given in Table II. Design flows are additive based on all proposed types of occupancy at full capacity.

Table II Wastewater Flows

TYPE OF OCCUPANCY	**MINIMUM GALLONS PER DAY**
AIRPORTS	
Per employee	15
Per passenger	5
BOWLING ALLEYS	
Without bar/food, per lane	75
With bar only, per lane	125
With bar and food, per lane	200
CAMPS, CAMPGROUNDS, AND TRAVEL TRAILER/RV PARKS	
Without water hook-up, per space	75
With water and sewer hook-up, per space	100
With central comfort station, per person	35
With flush toilets – no showers, per person	25
Dump station facility, per site served by dump station	63
Day camp, per person (add flow for meals, showers, or pools)	15
Picnic Parks with toilets only, per parking space	20

TYPE OF OCCUPANCY	MINIMUM GALLONS PER DAY
Summer and seasonal camps, per person	50
Construction at semipermanent camps	50
CHURCH AND ASSEMBLY HALLS	
Per employee	15
Per seat	5
With kitchen waste, per seat	7
Country clubs, per member present	25
Dance halls, per person	5
DWELLINGS	
Boardinghouses, per person	50
Multiple family dwellings, per person (apartments/condominiums)	60
Rooming houses, per person	40
Single-family dwellings, per bedroom (minimum of 2 bedrooms)	150
Mobile Home Parks, per lot	300
FACTORY/MANUFACTURING PLANT	
Without showers, per employee	25
With showers, per employee	35
With cafeteria, per employee	5
FAIRGROUNDS	
Per employee	15
Per person	5
FOOD AND BEVERAGE SERVICE FACILITIES	
Per employee	15
Bar, per seat	5
Grocery Store, per square foot	0.4
Restaurants: toilet waste, per customer	6
Restaurants: with kitchen waste, per meal	2
Restaurants: with kitchen waste disposable service, per meal	1
Restaurants: with garbage disposal, per meal	2
Restaurants: with cocktail lounge, per customer	5
Restaurants: less than 24-hour operation, per seat	50
Restaurants: 24-hour operation or fast food, per seat	75
Restaurants: on interstate or major highway, per seat	100
HOTEL/MOTEL/BED AND BREAKFAST	
Per employee	15
Per unit, no food, no kitchen	125
Per unit, with food/kitchen in room	200
Bed and Breakfast, per bedroom	150

TYPE OF OCCUPANCY	MINIMUM GALLONS PER DAY
LAUNDRIES	
Per machine	500
MEDICAL/INSTITUTIONAL FACILITIES	
Per employee	15
Dental office: continuous water, per chair	250
Dental office: demand water, per chair	100
Doctors' office, per square foot	0.62
Hospitals, per bed	250
Hospitals: kitchen waste only per bed	40
Hospitals: laundry waste only per bed	60
Institutions, per person	125
Nursing home, per person	125
Prison/Jails, per person	125
Rest home, per person	500
REST AREAS/WELCOME CENTERS	
Per person	5
SCHOOLS	
Without food or showers, per student/employee	15
Add for food, per student/employee	5
Add for showers, per student/employee	10
Boarding, per student/employee	75
Day care without meals, per student/employee	15
SERVICE STATION	
With toilets for 1st bay	1000
With toilets for each additional bay	500
STORES	
Per employee	15
With public restrooms, per 10 square feet of floor space	1
SWIMMING POOLS	
Per employee	15
Per person	10
THEATERS AND AUDITORIUMS	
Per employee	15
Per seat	5
With drive-in, per space	10

TYPE OF OCCUPANCY	MINIMUM GALLONS PER DAY
VETERINARIAN/ANIMAL SHELTER/KENNEL	
Per employee	15
Per run, pen, cage, stall etc.	25
Per grooming station	250
Per practitioner or procedure room	250

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-04

33.1-21-01-11. Design and Construction Requirements for Septic Tanks.

The minimum design and construction requirements for septic tanks are as follows:

1. **General.** Septic tanks must:

   a. Be made from concrete, plastic or fiberglass, and regardless of material or method of construction, the tank must be watertight and structurally sound.

   b. Be designed and constructed as to withstand all lateral earth pressures under saturated soil conditions while the tank is empty.

   c. Be designed and constructed as to withstand the pressure of saturated earth cover above the tank top.

   d. Be insulated when soil cover is less than two feet [0.61 meters].

   e. Be accessible for the removal of liquids and accumulated solids.

   f. Be placed on firm and settled soil capable of bearing the weight of the tank and its contents.

   g. Meet setback requirements. See Table I in Section 33.1-21-01-07.

   h. Have an effluent filter installed on the outlet of the tank closest to the pump chamber or soil treatment area where an ejector pump, grinder pump, garbage disposal, or non-clog pump is proposed for use prior to the septic tank. For other establishments and for dwellings utilizing a pressurized soil treatment area, an effluent filter must be installed on the outlet of the last tank, closest to the pump chamber or soil treatment area.

2. **Capacity.**

   a. The liquid capacity of a septic tank must be determined by multiplying the design flow, see Section 33.1-21-01-10, by two, and must have a minimum of one thousand gallons [3.79 cubic meters].

   b. Pump chamber capacity may not be included in the sizing for septic tank liquid capacity.

   c. If wastewater is pumped from an ejector or grinder pump or a garbage disposal is anticipated or installed, the septic tank capacity for single-family dwellings must be at least fifty percent greater than that required in Section 33.1-21-01-10.

3. **Design configuration**.

a. The liquid depth of any septic tank, or compartment thereof, must be between thirty inches [76.2 centimeters]and six and a half feet [1.98 meters].

b. The minimum dimension or diameter of septic tanks must be four feet [1.22 meters]. The minimum dimension of any interior compartment must be two feet [0.61 meters].

c. The inlet and outlet on all tanks or tank compartments must be provided with open-ended sanitary tees or baffles and constructed to distribute flow and retain scum in the tank or compartments. Inlets may not restrict the movement of solids.

(1) Sanitary tees must be permanently affixed to the inlet or outlet pipes. Baffles must be integrally cast with the tank and permanently affixed.

(2) Sanitary tees used as baffles must be at least four inches [10.16 centimeters] in diameter. Inlet baffles must be no less than six inches [15.24 centimeters] or no more than twelve inches [30.48 centimeters] measured from the end of the inlet pipe to the nearest point on the baffle. Outlet baffles must be six inches [15.24 centimeters] measured from beginning of the outlet pipe to nearest point on the baffle.

(3) The space in the tank between the liquid surface and the top of the tees or baffles must be a minimum distance of six inches [15.24 centimeters] or one hundred gallons [0.38 cubic meters], whichever is greater.

(4) The inlet tees or baffles must extend below the liquid level at least six inches [15.24 centimeters], but not more than twenty percent of the total liquid depth below the liquid surface and at least one inch [2.54 centimeters] above the crown of the inlet sewer.

(5) The outlet tees or baffles must extend below the liquid surface, a distance equal to forty percent of the liquid depth, except horizontal cylindrical tanks penetration of tees or baffles must be thirty-five percent of the total liquid depth.

(6) There must be at least one inch [2.54 centimeters] between the underside of the top of the tank and the highest point of the inlet and outlet devices.

(7) The inlet invert may not be less than two inches [5.08 centimeters] above the outlet invert.

(8) The inlet and outlet must be located opposite each other along with the axis of maximum dimension. The horizontal distance between the nearest points of the inlet and outlet devices must be at least four feet [1.22 meters].

4. **Access to the septic tank must:**

a. Have one or more manholes, with a minimum dimension of twenty inches [50.8 centimeters] and located within six feet [1.83 meters] of all walls of the tank. All manhole covers must be a minimum of six inches [15.24 centimeters] above the finished grade.

b. Have an inspection pipe of at least four inches [10,16 centimeters] in diameter or a manhole over each inlet, outlet, and baffled wall. The inspection pipe must be accessible.

c. Have covers safely secured to prevent unauthorized access.

5. **Compartmentation of single tanks.**

a. Septic tanks larger than three thousand gallons [11.36 cubic meters] and fabricated as a single unit must be divided into two or more compartments.

b. If a septic tank is divided into two compartments, not less than one-half nor more than two-thirds of the total volume must be in the first compartment.

c. If a septic tank is divided into three or more compartments, one-half of the total volume must be in the first compartment and the other half equally divided in the other compartments.

d. Connections between compartments must be installed in a manner to effectively retain scum and sludge. Tees or baffles between compartments must extend below the liquid surface, a distance equal to forty percent of the liquid depth, except horizontal cylindrical tanks penetration of tees or baffles must be thirty-five percent of the total liquid depth.

e. Adequate venting must be provided between compartments by baffles or by an opening of at least fifty square inches [322.58 square centimeters] near the top of the compartment walls.

f. Adequate access to each compartment must be provided by one or more manholes.

6. **Multiple tanks**. If more than one tank is used to obtain the required liquid volume, the tanks must:

a. Be connected in series.

b. Comply with all other provisions of these regulations.

c. Obtain the required liquid volume with a maximum of four tanks.

d. Be of equal or lesser size than the first tank in the series.

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-04

33.1-21-01-12. Piping, Distribution, and Dosing of Wastewater Effluent.

1. **Supply Pipe.**

a. The supply pipe extending from the building to septic tank(s) to the undisturbed soil beyond the tank excavation must:

(1) Meet the strength requirements of Schedule 40 Pipe, contained in the ASTM International Standard D1785;

(2) Be made from materials resistant to breakdown from wastewater and soil;

(3) Be watertight, including all joints;

(4) Be durable throughout the design life;

(5) Be protected from deflecting, buckling, crushing or longitudinally bending by ensuring the soil is sufficiently compacted underneath the pipe or placed on undisturbed soil;

(6) Be resistant to pressures, fatigue, and strain for the application;

(7) Be installed according to ASTM International Standard D2321;

(8) Be designed, installed, and protected to minimize the danger of freezing in the pipe; and

(9) Be more than six inches [20.32 centimeters] from final grade. Pipes susceptible to freezing must be insulated and meet setback requirements, see Section 33.1-21-01-13 -Soil Treatment Area - Design and Construction.

b. Gravity supply pipes must have minimum slope of one percent. Pipe restraints must be used for slopes greater than twenty percent or where fluid velocities in the pipe exceed fifteen feet per second [4.572 meters per second].

c. Pressure supply pipes must have a minimum slope of one percent for drainback, or other frost protection must be employed.

2. **Outlet piping from septic tank.**

a. The outlet pipe extending from the septic tank to the undisturbed soil beyond the tank must:

(1) Meet the strength requirements of Schedule 40 Pipe, contained in the ASTM International Standard D1785; and

(2) Be supported in a manner not allowing deflection during the backfilling and subsequent settling of the soil between the edge of the septic tank and the edge of the excavation.

b. The soil around the pipe extending from the septic tank must be compacted to original density for a distance of three feet [91.44 centimeters] beyond the edge of the tank excavation.

3. **Gravity Distribution.**

a. Serial distribution must be used to distribute wastewater effluent to individual trenches in a soil treatment area. If the necessary elevation differences between trenches for serial distribution is unachievable, parallel distribution must be used. Serial distribution must not create a pressure head on trenches at lower elevations.

b. Drop boxes used for serial distribution must:

(1) Be watertight.

(2) Be covered by a minimum of six inches [15.24 centimeters] of soil and be accessible.

(3) Have the invert of the inlet supply pipe at least one inch [2.54 centimeters] higher than the invert of the outlet supply pipe to the next drop box.

(4) Have the invert of the outlet supply pipe to the next drop box no greater than two inches [5.08 centimeters] higher than the crown of the distribution pipe serving the trench in which the box is located.

(5) Have a discharge rate into the drop box allowing wastewater to enter the system without surfacing. When wastewater effluent is delivered to the drop box by pump, the pump discharge must 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. The supply pipe must drain after the pump shuts off.

(6) Be placed on firm and settled soil.

c. Distribution boxes must:

(1) Be watertight.

(2) Be covered by a minimum of six inches [15.24 centimeters] of soil and be accessible.

(3) Have the invert and all outlets set and maintained at the same elevation.

(4) Have the inlet invert either

(a) one inch [2.54 centimeters] above the outlet invert; or

(b) Sloped such that an equivalent elevation above the outlet invert is obtained within the last eight feet [2.44 meters] of the inlet pipe.

(5) Have each trench line 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) Have a baffle wall installed or the pump discharge directed against a wall, baffle, other energy dissipater, or side of the box on which there is no outlet. The baffle must be secured to the box and extend at least one inch [2.54 centimeters] above the crown of the inlet pipe. The discharge rate into the drop box may not result in surfacing of wastewater from the box. Pressure may not build up in the box during pump discharge.

d. Nonpressurized distribution pipes must:

(1) Be at least four inches [10.16 centimeters] in diameter.

(2) Have at least one row of holes of no less than one-half inch [1.27 centimeters] in diameter spaced no more than thirty-six inches [91.44 centimeters] apart.

(3) Be laid level and orientated away from the distribution device.

(4) Have a load bearing capacity of not less than one thousand pounds per lineal foot.

(5) Have uniformly spaced distribution pipes in beds no more than five feet [1.52 meters] apart and not more than thirty inches [76.2 centimeters] from the side walls of the bed.

4. **Pressure Distribution.**

a. Pressure distribution pipes and associated fittings must be properly joined together and withstand a pressure of at least forty pounds per square inch [2.76 bars].

b. The distribution network must be designed so there is less than ten percent variance in flow for all perforations. Perforations must be no smaller than one-eighth inch [0.32 centimeters] diameter and no larger than one-fourth inch [0.64 centimeters] diameter.

c. Perforations holes must be drilled straight into the pipe and not at an angle. Pressurized distribution laterals must be installed level. Perforation holes must be free of burrs. The pipes must drain after the pump turns off.

d. The pressure distribution pipes in beds must be uniformly spaced no more than thirty-six inches [91.44 centimeters] apart and not more than twenty-four inches [60.96 centimeters] from the outside edge of the bed or mound.

e. Pressure distribution pipes must be connected to a header or manifold pipe that is of a diameter of 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.

f. Perforated pressure distribution pipes must not be installed closer than twelve inches [30.48 centimeters] from the edge of the absorption bed and must terminate no closer than twelve inches [30.48 centimeters] from the ends of the absorption bed.

g. Pressure distribution pipe cleanouts must be provided to check the system for proper operation and cleaning of plugged perforations. Cleanouts must be accessible from final grade.

5. **Dosing of Wastewater Effluent.**

a. The pump controls and pump discharge line must be installed to allow access for servicing or replacement without entering the dosing chamber.

b. The dosing chamber must:

(1) Be watertight and constructed of concrete, plastic or fiberglass.

(2) Have one or more manholes, with a minimum diameter of twenty inches [50.8 centimeters]. Manhole covers must be brought six inches [15.24 centimeters] above the finished grade.

(3) Have covers safely secured to prevent unauthorized access.

(4) Have a minimum total capacity of one-hundred percent of the design flow or include an alternating two-pump system.

(5) Have a net capacity to dose sixty to seventy five percent of the total volume of the absorption lines at one time and have a working capacity or dose volume of a minimum of seventy-five gallons [0.28 cubic meters].

c. Pumps for gravity distribution must:

(1) Have a discharge rate between ten gallons [0.04 cubic meters] and forty-five gallons [0.17 cubic meters] per minute.

(2) Have sufficient dynamic head for both the elevation difference and friction loss.

d. Pumps for pressure distribution must:

(1) Have a discharge capacity based on perforation discharges for a minimum average head of:

(a) For dwellings: one foot [0.30 meters] for three-sixteenth inch [0.48 centimeters] to one-fourth inch [0.64 centimeters] perforations and two feet [0.61 meters] for one-eighth inch [0.32 centimeters] perforations

(b) For other establishments: two feet [0.61 meters] for three-sixteenth inch [0.48 centimeters] to one-fourth inch [0.32 centimeters] perforations and five feet [1.52 meters] for one-eighth inch [0.32 centimeters] perforations.

Perforation discharge is determined by the following formula:

$Q=19.65cd^2h^{1/2}$
Where Q= discharge in gallons per minute
c= 0.60 = coefficient of discharge
d = perforation diameter in inches
h = head in feet

(2) Have discharge head at least five feet [1.52 meters] greater than the head required to overcome pipe friction losses and the elevation difference between the pump and the distribution device.

(3) Maintain a quantity of wastewater effluent for each pump cycle at a minimum of four times the volume of the distribution pipes plus the volume of the supply pipe but no greater than twenty-five percent of the design flow.

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-04

33.1-21-01-13. Soil Treatment Area.

1. **Sizing.**

a. The size of the soil treatment area must be determined using the design wastewater flow rates from Section 33.1-21-01-10 and soil conditions. Soil treatment area is calculated by dividing the daily design flow by the soil loading rate.

b. The systems absorption area and mound absorption ratio must be sized in accordance with Table III:

TABLE III Loading Rates

Percolation rate of original soil (minutes per inch)	Soil Texture	Loading Rate (gallons per day/ square foot)	Absorption Ratio (square feet per gallon/day)
< 0.1*	Coarse sand	*	*
0.1 - 5	Medium sand Loamy sand	1.20	1.00
0.1 – 5	Fine sand Loamy fine sand	0.6	2.0
6 – 15	Sandy loam	0.78	1.50
16 - 30	Loam	0.60	2.00
31 – 45	Silt loam, silt	0.50	2.40
46 – 60	Clay loam, silty or sandy clay loam	0.45	2.67
61 – 120**	Silty or Sandy Clay or Clay	0.24**	5**
> 120***	***	***	***

*Soil is unsuitable for a system if percolation rate is less than 0.1 minutes per inch.

** Consider at-grade or mound for soils with this percolation range.

***Soil is unsuitable for a system if percolation rate is greater than 120 minutes per inch.

2. **General.**

a. The soil and limiting factors must determine the type of soil treatment area. See 33.1-21-01-09. for soil assessment and percolation test procedures.

b. The soil loading rate must be determined by the soil between the bottom of the soil treatment area and the limiting factor, using the most restrictive layer as the soil loading rate.

c. The vertical separation between the bottom of the soil treatment area and the limiting factor must be at least twenty-four inches.

d. When installed in sand, loamy sand, or soils with a percolation rate of one-tenth of a minute to five minutes per inch, trenches and seepage beds must employ one or more of the following measures:

(1) Pressure distribution;

(2) Divide the total dispersal area into multiple units that employ serial distribution, with each dispersal unit having no greater than fifteen percent of the required bottom absorption area; or

(3) Vrtical separation distance of at least five feet.

e. Excessive overland surface flow must be diverted from the soil treatment area.

f. The soil profile on slopes in excess of twelve percent must also be assessed down slope of the proposed soil treatment system to identify the presence of layers with different permeability that may cause side hill seepage.

g. A soil treatment system may not be located within fifteen feet [4.572 meters] of layers surfacing on the downslope identified in e.

h. The bottom of the soil treatment system excavation must be level and along the contour. Sidewalls must be as vertical as practical.

i. The bottom and sides of the trench, seepage bed, or at-grade system to the top of the distribution media must be excavated in such a manner as to leave the soil in a natural, un-smeared, and uncompacted condition. Excavation must occur when the soil moisture content is less than or equal to the plastic limit.

j. Soil treatment systems may not have a depth greater than four feet [1.22 meters].

k. Laterals for gravity distribution may not be more than one hundred ten feet [33.53 meters] in length.

l. In slower draining loam to clay soil, excavation must be by backhoe or other means that allow the equipment wheels or tracks to remain on the surface soil. Excavation equipment or other vehicles may not be driven on the soil treatment area.

m. Drainfield rock in trench, seepage bed, and at-grade systems must:

(1) Have a minimum of six inches [15.24 centimeters] on the bottom of the soil treatment area.

(2) Completely encase the distribution pipes; see Section 33.1-21-01-11 -Distribution and Dosing of Wastewater Effluent, to a depth of at least two inches [5.08 centimeters].

(3) Be covered with a durable nonwoven geotextile fabric.

n. The depth of cover over the crown of distribution pipes must be between twelve inches [30.48 centimeters] and thirty-six inches [91.44 centimeters] of soil.

o. Each soil treatment area must have an inspection pipe. Inspection pipes must:

(1) Be four inches [10.16 centimeters] in diameter.

(2) Be installed at the terminal end of each lateral in a trench system and at each corner of a bed system and allow for monitoring of current water level. If an additional inspection pipe is installed in the trench, it must be located at the entrance of the trench.

(3) Have perforations located below the fabric, if used.

(4) Extend to the bottom of the infiltrative surface and not be connected to the end of the distribution pipe.

(5) Be secured and capped six inches [15.24 centimeters] above finished grade, or accessible below grade.

p. A minimum of six inches [15.24 centimeters] of soils suitable to grow vegetative cover must be placed over the system.

q. A close-growing vegetative cover must be established over the soil treatment and dispersal system and other vegetatively disturbed areas. Trees, shrubs, deep-rooted plants, or hydrophytic plants may not be planted on the system. The sodding, seeding, or other vegetation establishment must be initiated immediately after the placement of the topsoil borrow. If the climatic season does not allow immediate establishment of vegetation, the soil treatment and dispersal system must be protected from erosion and excessive frost and a vegetative cover must be established as soon as favorable climatic conditions exist. The vegetative cover established may not interfere with the hydraulic performance of the system and must provide adequate frost and erosion protection.

3. **Trenches.**

a. Must be between eighteen inches [45.72 centimeters] and thirty-six inches [91.44 centimeters] wide with a minimum sidewall absorption height of six inches [15.24 centimeters] of natural soil. Trenches wider than thirty-six inches [91.44 centimeters] are considered a bed.

b. Should have a minimum spacing of six feet [1.83 meters] on center, unless located on a slope of more than six percent then a minimum of ten feet [3.048 meters] of undisturbed earth is required between trenches.

c. Must be backfilled and crowned above finished grade to allow for settling.

4. **Seepage Beds.** Seepage beds must:

a. Be sized with fifty percent more square feet than trenches if utilizing gravity distribution.

b. Be limited to areas having natural slopes of less than six percent.

c. Have a maximum width of twelve feet [3.66 meters] for a gravity bed or twenty-five feet [7.62 meters] for a pressurized bed.

d. Have a space of one-half the bed width between multiple beds.

5. **At-grade System.**

a. At-grade systems must:

(1) Be installed in areas with slopes less than or equal to twenty-five percent.

(2) Have maximum absorption width of fifteen feet [4.572 meters] for beds. The bed absorption width for slopes one percent and greater does not include any width of media necessary to support the upslope side of the pipe.

(3) Be installed along the natural contour of the upslope edge of the trench or bed.

(4) Be installed using construction techniques that minimize compaction.

(5) Have twelve inches [30.48 centimeters] of soil suitable to grow vegetative cover installed over the distribution media.

(6) Extend cover at least five feet from the ends of the media bed and be sloped no steeper than four to one, to divert surface water. Side slopes may not be steeper than four to one.

b. The sizing of the soil treatment area must be determined in accordance with Table III by using the loading rate for the upper twelve inches [30.48 centimeters] of soil.

c. The ground surface where the system is to be placed must be plowed, scarified, or trenched less than 12 inches in depth.

d. Distribution of wastewater effluent over the distribution media must be by distribution pipe under pressure, see Section 33.1-21-01-12.

e. At-grade systems located on one percent slope or greater require only one distribution pipe located on the upslope edge, with the bed width being measured from the distribution pipe to the downslope edge. Multiple distribution pipes may be allowed for use to provide even distribution if necessary, based upon site conditions.

6. **Mound.**

a. Mounds may not be located:

(1) On natural slopes exceeding twelve percent.

(2) On slopes of three percent or greater, and where the original soil is a clay, sandy clay or silty clay soil, where the ground surface contour lines that lie directly below the long axis of the distribution bed represent a swale or draw, unless contour lines have a radius of curvature greater than one hundred feet [30.48 meters].

(3) In swales or draws where the radius of curvature of the contour lines is less than fifty feet [15.24 meters].

b. Mounds must be constructed on original soil and meet the separation requirement between the bottom of the distribution medium and limiting factor.

c. There must be at least twelve inches [30.48 centimeters] of original soil with a percolation rate faster than one hundred twenty minutes per inch [47.24 minutes per centimeter] above the limiting factor.

d. The sizing of the soil treatment area must be determined in accordance with Table III by using the percolation rate of the twelve inches [30.48 centimeters] of original soil immediately under the clean sand layer.

(1) The distribution media bed area consists of bottom area only and must be calculated by dividing the design flow by 1.2 gallons per square foot [48.9 liters per square meter] per day.

(2) The soil mound absorption area is determined by multiplying the soil mound absorption length by the soil mound absorption width. The soil mound absorption width is calculated by multiplying the mound distribution media bed width by the mound absorption ratio.

e. The required absorption width of mounds constructed on ground sloping from:

(1) Zero to one percent must include the width of the distribution bed plus a distance measured between the outer edges of the upslope and the downslope banks.

(2) One percent to twelve percent must include the width under the distribution media layer plus a portion of the width of the downslope bank.

f. Surface preparation must include:

(1) Removing all vegetation in excess of four inches [10.16 centimeters] in length and dead organic debris from the surface of the total area selected for the mound, including the area under the banks. The total area must be roughened by plowing to a depth of at least eight inches [20.32 centimeters] or the sod layer broken and roughened by backhoe teeth. This must be achieved by removing a portion of the topsoil with the plow throwing the soil up slope to provide a proper interface between the fill and natural soils.

(2) Soil plowed or roughened when the moisture content of a fragment eight inches [20.32 centimeters] below the surface is below the plastic limit. The soil under a mound including the area under the banks may not be roughened by rototilling or pulverizing. In soils that are sandy in the top eight inch [20.32 centimeters] depth, discing may be used for surface preparation as a substitute for plowing. Mound construction must proceed immediately after surface preparation is completed.

g. A rubber-tired tractor may be used for plowing or discing but may not be driven on the absorption area after the surface preparation is completed. A crawler or track type tractor must be used for mound construction.

h. The side slopes on the mound may not be steeper than four to one.

i. The supply pipe from the pump to the mound area must be installed before soil surface preparation. The trench must be backfilled and compacted to prevent seepage of wastewater effluent.

j. Distribution media for mound system.

(1) A minimum of twelve inches [30.48 centimeters] clean sand must be placed in contact with the bottom area of the distribution media layer area and must be uniformly tapered to cover the entire original soil absorption area.

(2) The clean sand must be placed by using a construction technique that minimizes compaction. At least six inches [15.24 centimeters] of clean sand must be kept beneath equipment to minimize compaction of the plowed layer.

(3) The clean sand layer upon which the distribution media is placed must be level.

(4) A depth of at least nine inches [22.86 centimeters] of distribution media must be placed over the bed area below the distribution pipe.

(5) Wastewater effluent over the rock layer must be by distribution pipe under pressure. See Section 33.1-21-01-12 Piping, Distribution and Dosing of Effluent.

(6) The width of the distribution media layer in a single mound may not exceed ten feet [3.05 meters].

(7) Construction vehicles may not be allowed on the distribution media until back fill is placed.

(8) On slopes of three percent or greater, the long axis of the level distribution media layer may not diverge up or down the slope by more than twelve inches [30.48 centimeters] of elevation from the natural contour line. The depth of the clean sand layer along the upper edge of the level distribution media layer may not vary by more than twelve inches [30.48 centimeters].

(9) If the original soil is sandy loam, loam, silt loam, silt, clay loam, sandy clay or silty clay, a maximum of two 10-foot [3.05 meters] wide rock layers may be installed side by side in a single mound to a depth of at least twenty-four inches [60.96 centimeters] below the clean sand layer. The rock layers must be separated by four feet [1.22 meters] of clean sand. When two rock layers are installed side by side, the sandy loam fill must be eighteen inches [45.72 centimeters] deep at the center of the mound and six inches [15.24 centimeters] deep at the sides

(10) Soils suitable to grow vegetative cover must be placed on the soil treatment area to a depth of twelve inches [30.48 centimeters] in the center of the mound and to a depth of six inches [15.24 centimeters] at the sides.

k. When located on slopes, a diversion must be constructed immediately upslope from the mound to intercept and direct runoff.

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-04

33.1-21-01-14. Inspection.

1. Inspection of the installation of a system must be conducted by the permitting authority or an authorized representative of the permitting authority in accordance with paragraph 3 of subdivision c of subsection 2 North Dakota Century Code section 23-35-02, which requires the inspection to be conducted within one business day of receiving the request for inspection.

2. The permitting authority shall notify installers of noted deficiencies for correction for the installation of a system at the time of inspection.

3. Inspection of existing equipment and operation of a system may be made at a reasonable time by the permitting authority or an authorized representative of the permitting authority.

History: Effective .
General Authority: NDCC
Law Implemented: NDCC

33.1-21-01-15. Variance.

1. Applicants for a system permit may request a variance from the design standards in these rules by submitting a request to the relevant permitting authority.

2. The permitting authority may grant a variance to requirements of this chapter if adequate documentation is provided to justify the need for the deviation and conditions are such that it will not cause a violation of any existing water quality standard, cause a health hazard, or create a nuisance.

3. Any variance granted for any existing nonconforming or nonfunctional system will need to be in accordance with subsection 2 of North Dakota Century Code section 23.1-07.1-04.

4. The permitting authority shall prepare a written decision to grant or deny a request for variance.

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-04

33.1-21-01-16. Appeals.

1. All appeals and department recommendations regarding permitting authority decisions denying, modifying, or revoking a permit to install a system must be made in accordance with North Dakota Century Code section 23.1-07.1-05.

2. Appeals must be submitted on a form provided by the department, or contain the following information:

   a. Licensed installer or homeowner

   b. Permitting Authority

   c. Date and description decision

   d. Copy of decision

3. The department will respond within ten business days of receipt of an appeal.

History: Effective .
General Authority: NDCC 23.1-07.1-02
Law Implemented: NDCC 23.1-07.1-05