ORANGE COUNTY
HEALTH DEPARTMENT
*Improving health. Inspiring change.*

# ORANGE COUNTY REGULATIONS FOR WASTEWATER TREATMENT AND DISPOSAL SYSTEMS

**Effective February 26, 2015**

## ADOPTED AND APPROVED BY THE ORANGE COUNTY BOARD OF HEALTH

Resolution for Adoption Approved February 25, 2015

### SECTION .1900 - SEWAGE TREATMENT AND DISPOSAL SYSTEMS AS AMENDED BY THE ORANGE COUNTY BOARD OF HEALTH

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**.1934 SCOPE**

The rules contained in this Section shall govern the treatment, disposal, operation, and maintenance of domestic strength wastewater from wastewater systems, privies, incinerating toilets, mechanical toilets, composting toilets, recycling toilets, or other such systems serving single or multiple-family residences, places of business, or places of public assembly, the effluent from which is designed not to discharge to the land surface, surface waters, or directly to the groundwater.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. December 1, 1990
Amended Eff. August 28, 2013.
Amended Eff. February 26, 2015.

**.1935 DEFINITIONS**

The following definitions shall apply throughout this Section:

(1) "Alluvial Soils" means stratified soils without distinct horizons, deposited by flood waters.

(2) "Alternative System" means any approved ground absorption sewage treatment and disposal system other than an approved privy or an approved septic tank system.

(3) "Approved" means that which is in accordance with this Section and Article 11 of Chapter 130A of the General Statutes of North Carolina.

(4) "Approved Privy" means a fly-tight structure consisting of a pit, floor slab, and seat riser constructed in accordance with Rule .1959 of this Section.

(5) "Areas subject to frequent flooding" means those areas inundated at a 10-year or less frequency and includes alluvial soils and areas subject to tidal or storm overwash.

(6) "Certified Operator" means a person authorized to operate a wastewater system in accordance with G.S. 90A, Article 3 and applicable rules of the Water Pollution Control System Operators Certification Commission.

(6a) "Bedroom" means any room in a residence which is subject to present or future use as a private sleeping area, meets minimum building code criteria for a bedroom, and which:

(a) has at least one window,
(b) has at least one interior method of entry and exit, excluding closets and bathrooms,
(c) can be closed off from the remainder of the residence.
(d) has proximate access to a full bathroom without going through a public room.

A bedroom shall also mean any room within the facility that actually serves as sleeping quarters.

(7) "Collection sewer" means gravity flow pipelines, force mains, effluent supply lines, and appliances appurtenant thereto, used for conducting wastes from building drains to a treatment system or to a wastewater system.

(7a) "Design Daily Flow" means the peak quantity of wastewater a facility is projected to generate on a daily basis upon which wastewater system sizing is based. The design daily flow allows for a safety margin and reserve capacity for the system during periods of peak flow.

(8) "Designated wetland" means an area on the land surface established under the provisions of the Coastal Area Management Act or the Federal Clean Water Act.

(9) "Design unit" means one or more dwelling units, places of business, or places of public assembly on:

(a) a single lot or tract of land;
(b) multiple lots or tracts of land served by a common ground absorption sewage treatment and disposal system; or
(c) a single lot or tract of land or multiple lots or tracts of land where the dwelling units, places of business or places of public assembly are under multiple ownership (e.g. condominiums) and are served by a ground absorption system or multiple ground absorption systems which are under common or joint ownership or control.

(9a) "Director" means the Orange County Health Director or designee.

(9b) "Drip Line" means the line directly beneath the outer perimeter edge of any deck, shed or similar structure supported by piers, poles or cantilever methods.

(10) "Dwelling unit" means any room or group of rooms located within a structure and forming a single, habitable unit with facilities which are used or intended to be used for living, sleeping, bathing, toilet usage, cooking, and eating.

(11) "Effluent" means the liquid discharge of a septic tank or other wastewater treatment device.

(12) "Estimated saturated hydraulic conductivity" - means a saturated hydraulic conductivity value based upon the soil profile evaluation and description of the soil texture, soil structure, soil consistency, soil pores, and roots following the procedures in Field Book for Describing and Sampling of Soils, NRCS, USDA and comparison to soil profile saturated hydraulic conductivity data for soil input files for similar soils. The Field Book is hereby incorporated by reference, including any subsequent amendments and editions, in accordance with G.S. 150B-21.6. Copies of the Field Book may be inspected at the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642, and copies may be downloaded at no cost from the internet at http://soils.usda.gov/procedures/field_bk/main.htm#intro, or obtained from the National Soil Survey Center, MS 34, Room 152,100 Centennial Mall North, Lincoln, NE 68508-3866.

(12a) "Facility" means one or more dwelling units, places of business, or places of public assembly on:

(a) a single lot or tract of land;

(b) multiple lots or tracts of land served by a common ground absorption sewage treatment and disposal system; or

(c) a single lot or tract of land or multiple lots or tracts of land where the dwelling units, places of business or places of public assembly are under multiple ownership (e.g. condominiums) and are served by a ground absorption system or multiple ground absorption systems which are under common or joint ownership or control.

(12b) "Fixed media filter" means an approved component of the wastewater system designed to provide biological and mechanical treatment to the effluent through contact with a stable material including, but not limited to sand or peat.

(13) "Gravity distribution" means an approved drainfield utilizing gravity and not pressure to distribute effluent from the inlet to the distal end of each nitrification line.

(14) "Ground absorption wastewater system" means a system that utilizes the soil for the subsurface disposal of partially treated or treated sewage effluent. The system includes septic tanks, nitrification fields, reserve areas, pretreatment systems and appurtenances for wastewater collection, treatment and subsurface disposal.

(15) "Horizon" means a layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil forming processes.

(16) "Horizon subdivision" - means a portion of a horizon, approximately parallel to the surface that has distinct characteristics produced by soil forming processes.

(17) "Lateral water movement" - means the movement of water down slope on sites of at least a four percent slope and above a less permeable horizon, and as observed periodically in bore holes, excavations, or monitoring wells.

(18) "Long Term Acceptance Rate (LTAR)" means the rate of wastewater effluent absorption by the soil in a ground absorption system after long-term use. The LTAR, in units of gallons per day per square foot (gpd/ft$^2$), is assigned based upon soil textural class and system type, and is used to determine the required length of nitrification trenches and size of drainfield area when designing a ground absorption system, pursuant to applicable rules of this Section.

(19) "Local health department" means any county, district, or other health department authorized to be organized under the General Statutes of North Carolina.

(19a) "Interceptor drain", or "Subsurface drain" means a groundwater interceptor that is installed as a trench that intercepts groundwater and diverts it around the wastewater system area.

(19b) "Invert" means the lowest portion of the internal cross-section of a pipe or fitting.

(20) "Matrix" - means a volume equivalent to 50 percent or greater of the total volume of a horizon or horizon subdivision.

(21) "Mean high water mark" means, for coastal waters having six inches or more lunar tidal influence, the average height of the high water over a 19 year period as may be ascertained from National Ocean Survey or U.S. Army Corps of Engineers tide stations data or as otherwise determined under the provisions of the Coastal Area Management Act.

(22) "Mottle" - means a feature(s) which occupies less than 50 percent of the total volume of a horizon or horizon subdivision.

(23) "NEMA 4X" means an enclosure for an electrical control panel or junction box that meets standards for protection of equipment due to the ingress of water (including rain and hose-directed water) and an additional level of protection again corrosion, as set forth in Standard 250 of the National Electrical Manufacturers Association. NEMA Standard 250 is hereby incorporated by reference, including any subsequent amendments and editions. Copies may be inspected at the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642, and copies may be downloaded from the internet at http://www.nema.org/stds/250.cfm, or obtained from HIS/Global, 15 Inverness Way East, Englewood, CO 80112, at a cost of sixty-one dollars ($61.00).

(24) "NSF-40 Systems" means individual residential wastewater treatment systems (RWTS) that are approved and listed in accordance with the standards adopted by NSF International for Class I residential wastewater treatment systems under NSF/ANSI Standard 40, and approved for use pursuant to G.S. 130A-342 and the rules in this Section.

(25) "Naturally occurring soil" means soil formed in place due to natural weathering processes and being unaltered by filling, removal, or other man-induced changes other than tillage.

(26) "Nitrification field" means the area in which the nitrification trenches are located.

(27) "Nitrification lines" means approved pipe or other approved materials for distribution of effluent through the nitrification trench.

(28) "Nitrification trench", means a ditch into which a single nitrification line is placed and covered by soil.

(29) "Non-ground absorption sewage treatment system" means a facility for waste treatment designed not to discharge to the soil, land surface, or surface waters, including but not limited to, approved vault privies, incinerating toilets, mechanical toilets, composting toilets, chemical toilets, and recycling systems.

(29a) "OCHD" means the Environmental Health Division of the Orange County Health Department.

(30) "Operator in Responsible Charge ('ORC')" means the individual designated by the person owning or controlling the system as the certified operator of record of the system who has primary responsibility for the operation of such system as defined in G.S. 90A-46 and applicable rules of the Water Pollution Control System Operators Certification Commission.

(31) "Organic soils" means those organic mucks and peats consisting of more than 20 percent organic matter (by dry weight) and 18 inches or greater in thickness.

(31a) "Owner or Owner's representative" means a person who holds legal title to the property or a person who is authorized to represent the legal interests of the owner. For the purposes of signing an application for a permit, the representative shall also mean a person who holds a professional license or certification and who is under contract to the owner. Examples include engineers, architects, real estate agents, building contractors, and attorneys.

(32) "Parent material" means the mineral matter that is in its present position through deposition by water, wind, gravity or by decomposition of rock and exposed at the land surface or overlain by soil or saprolite.

(32a) "Parallel distribution" means the distribution of effluent to a set of nitrification trenches in which each trench receives effluent in equivalent or proportional volumes.

(33) "Ped" means a unit of soil structure, such as an aggregate, crumb prism, block, or granule formed by natural processes.

(34) "Perched water table" means a saturated zone, generally above the natural water table, as identified by drainage mottles caused by a restrictive horizon.

(35) "Person" means any individual, firm, association, organization, partnership, business trust, corporation, company, or unit of local government.

(36) "Place of business" means any store, warehouse, manufacturing establishment, place of amusement or recreation, service station, foodhandling establishment, or any other place where people work or are served.

(37) "Place of public assembly" means any fairground, auditorium, stadium, church, campground, theater, school, or any other place where people gather or congregate.

(38) "Pressure dispersal" means an effluent pump or siphon is used to deliver effluent throughout the drainfield in a network of pipes, examples are low pressure pipe and drip.

(38a) "Pressure distribution" means an effluent pump or siphon is used to deliver effluent to more than one nitrification trench using parallel distribution, an example is a pressure manifold.

(38b) "Pressure dosed" means an effluent pump or siphon is used to deliver effluent to nitrification trenches.

(39) "Privy building" means and includes any and all buildings which are used for privacy in the acts of urination and defecation which are constructed over pit privies and are not connected to a ground absorption sewage treatment and disposal system or a public or community sewage system.

(40) "Public management entity" means a city (G.S. 160A, Article 16), county (G.S. 153A, Article 15), interlocal contract (G.S. 153A, Article 16), joint management agency (G.S. 160A-461 -462), county service district (G.S. 153A, Article 16), county water and sewer district (G.S. 162A, Article 6), sanitary district (G.S. 130A, Article 2), water and sewer authority (G.S. 162A, Article 1), metropolitan water district (G.S. 162A, Article 4), metropolitan sewerage district (G.S. 162A, Article 5), public utility [G.S. 62-3(23)], county or district health department (G.S. 130A, Article 2), or other public entity legally authorized to operate and maintain on-site sewage systems.

(41) "Redoximorphic features" - means a color pattern of a horizon or horizon subdivision due to a loss (depletion) or gain (concentration) of pigment compared to the matrix color, formed by oxidation/reduction of iron (Fe) coupled with its removal, translocation, or accrual; or a soil matrix color controlled by the presence of Fe+2 (see Field Book for Describing and Sampling of Soils, NRCS, USDA which is hereby incorporated by reference, including any subsequent amendments and editions, in accordance with G.S. 150B-21.6).

(42) "Relocation" means the displacement of a residence, place of business, or place of public assembly from one location to another.

(43) "Repair area" or "reserve area" means a designated area that has been classified Suitable or Provisionally Suitable in accordance with these Rules and is reserved for the replacement of a wastewater system and is not covered with structures or impervious materials.

(44) "Residence" means any home, hotel, motel, summer camp, labor work camp, mobile home, dwelling unit in a multiple-family structure, or any other place where people reside.

(45) "Residential Wastewater Treatment Systems (RWTS)" means approved individual advanced pretreatment systems which are covered under standards of NSF International, in accordance with G.S. 130A-342 and applicable rules in this Section.

(46) "Restrictive horizon" means a soil horizon that is capable of perching ground water or sewage effluent and that is brittle and strongly compacted or strongly cemented with iron, aluminum, silica, organic matter, or other compounds. Restrictive horizons may occur as fragipans, iron pans or organic pans, and are recognized by their resistance in excavation or in using a soil auger.

(47) "Rock" means the body of consolidated or partially consolidated material composed of minerals at or below the land surface. Rock includes bedrock and partially weathered rock that is relatively hard and cannot be dug with hand tools. The upper boundary of rock is "saprolite", "soil", or the land surface.

(48) "Sanitary system of sewage treatment and disposal" means a complete system of sewage collection, treatment and disposal, including approved privies, septic tank systems, connection to public or community sewage systems, incinerators, mechanical toilets, composting toilets, recycling toilets, mechanical aeration systems, or other such systems.

(49) "Saprolite" means the body of porous material formed in place by weathering of igneous or metamorphic rocks. Saprolite has a massive, rock-controlled structure, and retains the fabric (arrangement of minerals) of its parent rock in at least 50 percent of its volume. Saprolite can be dug with hand tools. The lower limit of saprolite is "rock" and its upper limit is "soil" or the land surface. The term "saprolite" does not include sedimentary parent materials.

(50) "Saturated soils" - means a horizon or horizon subdivision with a free water surface at the corresponding depth and observed in a bore hole or monitoring well.

(51) "Septic tank" means a water-tight, covered receptacle designed for primary treatment of sewage and constructed to:

- (a) Receive the discharge of sewage from a building
- (b) Separate settleable and floating solids from the liquid
- (c) Digest organic matter by anaerobic bacterial action;
- (d) Store digested solids through a period of detention; and
- (e) Allow effluent to discharge for additional treatment and final disposal.

(52) "Septic tank system" means a subsurface sanitary sewage system consisting of a septic tank and a subsurface disposal field.

(52a) "Serial Distribution" means the distribution of effluent to one level nitrification trench or a set of level nitrification trenches constructed at different elevations, separated by dropboxes or stepdowns in which one trench at a time receives effluent.

(53) "Sewage" means the liquid and solid human waste and liquid waste generated by water-using fixtures and appliances, including those associated with food handling. The term does not include industrial process wastewater or sewage that is combined with industrial process wastewater.

(54) "Site" means the area in which the wastewater system is to be located and the area required to accommodate repairs and replacement of nitrification field and permit proper functioning, maintenance, and operation of the system.

(55) "Soil" means the naturally occurring body of porous mineral and organic materials on the land surface. Soil is composed of sand-, silt-, and clay-sized particles that are mixed with varying amounts of larger fragments and some organic material. Soil contains less than 50 percent of its volume as rock, saprolite, or coarse-earth fraction (mineral particles greater than 2.0 millimeters). The upper limit of the soil is the land surface, and its lower limit is "rock", "saprolite", or other parent materials.

(56) "Soil series" - means an official series name established by NRCS, USDA and confirmed to be present on the site by detailed on-site soil profile descriptions and taxonomic classification, and not necessarily the soil series mapped on the county soil survey.

(57) "Soil structure" means the arrangement of primary soil particles into compound particles, peds, or clusters that are separated by natural planes of weakness from adjoining aggregates.

(58) "Soil textural classes" means soil classification based upon size distribution of mineral particles in the fine-earth fraction less than two millimeters in diameter. The fine-earth fraction includes sand (2.0 - 0.05 mm in size), silt (less than 0.05 mm - 0.002 mm or greater in size), and clay (less than 0.002 mm in size) particles. The specific textural classes are defined as follows and as shown in the Field Book for Describing and Sampling Soils, NRCS, USDA. The Field Book is hereby incorporated by reference, including any subsequent amendments and editions. Copies of the Field Book may be inspected at the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642, and copies may be downloaded at no cost from the internet at http://soils.usda.gov/technical/fieldbook, or obtained from the US Government Printing office at http://bookstore.gpo.gov/ at a cost of twenty-four dollars ($24.00):

a) "Sand" means soil material that contains 85 percent or more of sand; the percentage of silt plus 1.5 times the percentage of clay shall not exceed 15.

b) "Loamy sand" means soil material that contains at the upper limit 85 to 90 percent sand, and the percentage silt plus 1.5 times the percentage of clay is not less than 15; at the lower limit it contains not less than 70 to 85 percent sand, and the percentage of silt plus twice the percentage of clay does not exceed 30.

c) "Sandy loam" means soil material that contains either 20 percent clay or less, and the percentage of silt plus twice the percentage of clay exceeds 30, and contains 52 percent or more sand; or less than seven percent clay, less than 50 percent silt, and between 43 and 52 percent sand.

d) "Loam" means soil material that contains seven to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

e) "Silt loam" means soil material that contains 50 percent or more silt and 12 to 27 percent clay; or contains 50 to 80 percent silt and less than 12 percent clay.

f) "Silt" means soil material that contains 80 percent or more silt and less than 12 percent clay.

g) "Sandy clay loam" means soil material that contains 20 to 35 percent clay, less than 28 percent silt, and 45 percent or more sand.

h) "Clay loam" means soil material that contains 27 to 40 percent clay and 20 to 45 percent sand.

i) "Silty clay loam" means soil material that contains 27 to 40 percent clay and less than 20 percent sand.

j) "Sandy clay" means soil material that contains 35 percent or more clay and 45 percent or more sand.

k) "Silty clay" means soil material that contains 40 percent or more clay and 40 percent or more silt.

l) "Clay" means soil material that contains 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

(59) "State" means the Department of Health and Human Services, Division of Public Health.

(60) "Stream" means a natural or manmade channel, including groundwater lowering ditches and devices, in which water flows or stands most of the year.

(61) "Subsurface disposal" means the application of sewage effluent beneath the surface of the ground by distribution through approved nitrification lines.

(62) "TS-I Systems" means advanced pretreatment systems which are approved in accordance with TS-I effluent quality standards in Table VII of Rule .1970.

(63) "TS-II Systems" means advanced pretreatment systems which are approved in accordance with TS-II effluent quality standards in Table VII of Rule .1970.

(64) "Third-Party" means a person or body that is independent of the parties involved which does not gain financially or otherwise benefit from the outcome of the testing, and which has a knowledge of the subject area based upon relevant training and experience.

(64a) "Usable soil depth" means the depth of naturally occurring Suitable or Provisionally Suitable soil above an unsuitable horizon or material.

(64b) "Wastewater System Contractor" means the person who is registered with the OCHD to install and repair wastewater or septic tank systems.

(64c) "Wastewater System" or "system" means a system of wastewater collection, treatment, and disposal as defined in GS 130A-334. .

History Note: Authority G.S. 130A-335(e) and (f);
Eff. July 1, 1982;
Amended Eff. July 1, 1995; January 1, 1990; August 1, 1988; April 1, 1985.
Temporary Amendment Eff. June 24, 2003;
Amended Eff. June 1, 2006; May 1, 2004,
Amended Eff. August 28, 2013,
Amended Eff. February 26, 2015.

**.1936 REQUIREMENTS FOR SEWAGE TREATMENT AND DISPOSAL**

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Repealed Eff. January 1, 1990.

**.1937 PERMITS**

(a) Any person owning or controlling a facility containing water-using fixtures connected to a water supply source shall discharge all wastewater directly to an approved wastewater system permitted for that specific use.

(b) An Improvement Permit, Authorization for Wastewater System Construction (Construction Authorization) and Operation Permit, shall be required in accordance with G.S. 130A-336, G.S. 130A-337 and G.S. 130A-338. Rule .1949 and .1950 of this Section shall be used to determine whether subsequent additions, modifications, or change in the type of facility increase wastewater flow, alter wastewater characteristics, or encroach on the wastewater system.

(c) An application for an Improvement Permit, Construction Authorization, or Existing System Authorization as applicable, shall be submitted to the OCHD for each site on which a wastewater system is proposed to be installed, expanded, or used. OCHD shall issue an Improvement Permit, Construction Authorization, or Existing System Authorization prior to the construction, location, or relocation of a residence, place of business, or place of public assembly. Applications for systems required to be designed by a professional engineer and applications for industrial process wastewater systems shall meet the provisions of Rule .1938 of this Section.

(d) The application for an Improvement Permit shall contain at least the following information: Applicant and owner's names, mailing addresses, and phone numbers; location of property; plat of property or site plan; description of existing and proposed facilities or structures; number of bedrooms or number of persons served or other factors required to determine wastewater system design flow or wastewater characteristics; type of water supply including the location of proposed or existing well(s); and signature of owner or owner's legal representative. The applicant shall identify property lines and fixed reference points in the field including: proposed structures and appurtenances, rights of way, easements, buffers, and other areas

that affect wastewater system placement. The applicant shall make the site accessible for an evaluation as required in Rule .1939 of this Section. The applicant shall notify the local health department on the application if:

(1) the property contains previously identified jurisdictional wetlands:
(2) wastewater other than sewage will be generated;
(3) the site is subject to approval by other public agencies, and
(4) the property contains existing or proposed easements, buffers, rights of way, encroachments, or other areas that affect the placement of wastewater systems.

(e) The application for a Construction Authorization or Existing System Authorization shall contain:

(1) the information required in Paragraph (d) of this Rule; however, a plat or site plan shall not be required with the application for a Construction Authorization to repair a previously permitted system when the repairs will be accomplished on property owned and controlled by the applicant and for which the property lines are readily identifiable in the field;
(2) the locations of the proposed facility, appurtenances, and the site for the system showing setbacks to property line(s) or other fixed reference point(s), a floor plan of the proposed structure, and;
(3) the proposed system type as specified by the owner or owner's legal representative and that meets the conditions of the Improvement Permit, the provisions of these Rules, and G.S. 130A, Article 11.

(f) An authorized agent of the Department shall issue an Improvement Permit after determining that the site is suitable or provisionally suitable and that a system can be installed so as to meet the provisions of these Rules. When the site evaluation can not be completed during the initial visit to the site due to the need for site clearing, property line identification, pit excavation, or other accessibility problems, or if the application requires amending due to site constraints, the owner and applicant shall be notified in writing of the requirements needed to complete the evaluation. The applicant shall provide OCHD with the required items within 60 days of the notification or the application shall become null and void and the permit shall not be issued. When the site is classified Suitable or Provisionally Suitable the authorized agent shall issue an Improvement Permit. The Improvement Permit shall include those items required in G.S. 130A-336(a). An Improvement Permit for which a plat is provided shall be valid without expiration and an Improvement Permit for which a site plan is provided shall be valid for 60 months from the date of issue as provided in G.S. 130A-335(f) and G.S. 130A-336(a). The Improvement Permit is transferable to subsequent owners except as provided in G.S. 130A-335(f) and G.S. 130A-336(a).

(g) The Construction Authorization as provided in G.S. 130A-335(f) and G.S. 130A-336(b) shall be valid for a period equal to the period of validity of the Improvement Permit, and is not transferable. When a Construction Authorization is greater than 5 years old, a preconstruction conference pursuant to G.S. 130A-335 (f1) shall be required. Site modifications in accordance with .1956(2) or .1957(b) required as conditions of an Improvement Permit shall be completed prior to the issuance of a Construction Authorization. The Construction Authorization shall be issued by an authorized agent for the installation of a wastewater system when it is found that the Improvement Permit conditions and rules of this Section are met. The Construction Authorization shall contain conditions regarding system type, system layout, location, and installation requirements. The property owner shall ensure that a Construction Authorization is obtained and is valid prior to the construction or repair of a system. The property owner shall obtain a Construction Authorization prior to the construction, location, or relocation of a residence, place of business, or place of public assembly. An Improvement Permit, as applicable, and Construction Authorization shall become invalid and may be suspended or revoked if:

(1) the installation has not been completed during the period of validity of the Construction Authorization,
(2) the information submitted in the application for an Improvement Permit or Construction Authorization is found to have been incorrect, falsified or changed,
(3) or the site is altered.

(g1) The Director may suspend or revoke a permit issued under these Rules upon a finding that a violation of the applicable provisions of the rules of the Board of Health or a condition of the permit has occurred. A permit may also be suspended or revoked upon a finding that the permit issuance was based upon incorrect or inadequate information that materially affected the decision to issue the permit. A person shall be given notice that there has been a tentative decision to suspend or revoke the permit and that an administrative hearing will be held in accordance with .1965 of these Rules, at which time the person may challenge the decision. If a violation of the regulation or the rules presents an imminent hazard, a permit may be

suspended or revoked immediately. The Director shall give immediate notice of the revocation and that an administrative hearing will be held in accordance with .1965 of these rules, at which time the person may challenge the decision. When an Improvement Permit or Construction Authorization has become invalid, expired, suspended, or revoked, the installation shall not be commenced or completed until a new Improvement Permit or Construction Authorization has been issued. Revised Construction Authorizations shall be issued for sites where Improvement Permits are valid without expiration in compliance with G.S. 130A-335(f1). A request to change the system type specified on a Construction Authorization shall be submitted in writing by the owner or the original applicant, however no prior written submittal is required of the owner nor applicant for substitution of an accepted system as specified in .1969(i) of this rule.

(h) Prior to the issuance of a Construction Authorization for a wastewater system to serve a condominium or other multiple-ownership development where the system or site will be under common or joint control, a draft tri-party agreement among the OCHD, developer, and a proposed non-profit, incorporated owners association shall be submitted to the OCHD for approval. Prior to the issuance of an Operation Permit for a system requiring a tri-party agreement, the agreement shall be executed among the OCHD, developer, and a non-profit, incorporated owners association and filed with the local register of deeds. The tri-party agreement shall address ownership, transfer of ownership, maintenance, repairs, operation, and the necessary funds for the continued satisfactory performance of the wastewater system, including collection, treatment, disposal, and other appurtenances.

(i) No residence, place of business, or place of public assembly shall be occupied nor shall any wastewater system be covered or placed into use until an authorized agent issues an Operation Permit. The Operation Permit shall not be issued or reissued until the authorized agent finds that the system is in compliance with Article 11 of G.S. Chapter 130A, these Rules, and all conditions prescribed by the Improvement Permit, and Construction Authorization. The Operation Permit shall specify the system type in accordance with Table V(a) of Rule .1961 of this Section, and shall include conditions for system performance, operation, maintenance, monitoring and reporting. At the review frequency specified in Rule .1961, Table V(a) of this Section, an authorized agent shall determine whether a system is in compliance with the conditions of the Operation Permit, these Rules, and Article 11 of G.S. Chapter 130A. An authorized agent may modify, suspend or revoke the Operation Permit or seek other remedies under Article 2, Chapter 130A, if the system is not in compliance with Article 11 of G.S. Chapter 130A, these Rules, and all conditions imposed by the Operation Permit.

(j) For a Type V or VI system as specified in Rule .1961, Table V(a) of Paragraph (b)(9) of this Section, the Operation Permit shall expire:

(1) 60 months after the Operation Permit is issued for any system installed on or after the effective date of these Rules, or

(2) 60 months after the effective date of these Rules for any system with a valid Operation Permit issued prior to the effective date of these Rules.

(k) Upon determining that an existing wastewater system including all subsystems and system components in a manufactured home park has a valid Operation Permit and is in compliance with Article 11 of G.S. Chapter 130A, these Rules, and permit conditions, an authorized agent shall issue a written authorization for a manufactured home to be connected to the existing system.

(l) Any person who engages in the business of constructing, installing, or repairing wastewater systems shall register annually with the Orange County Health Department (OCHD) before constructing, installing, or repairing wastewater systems.

(m) An authorized agent shall prepare a written report with reference to the site and soil conditions required to be evaluated pursuant to this Section. When a permit is denied, the report shall be provided to the applicant. If modifications or alternatives are available, information shall be provided to the applicant. The report shall be signed and dated by an authorized agent of the State.

(n) The wastewater system contractor shall contact the OCHD for required inspections during the installation or repair of a wastewater system and for the final inspection in accordance with the policies and procedures issued by the OCHD. No final inspection for a wastewater system shall be made unless a representative of the contractor installing the system is present . It shall be the responsibility of the contractor to aid in the inspection and to make corrections as required by the OCHD. The wastewater system shall be covered by the contractor within a reasonable time after final approval and shall be in the same condition when covered as when it was approved.

(o) Upon determining that an existing wastewater system, including all subsystems has a valid Operation Permit and is in compliance with Article 11 of NCGS Chapter 130A, these Rules, and permit conditions, and that a proposed change of use, location, relocation, or addition to the facility, or connection to the system is in

compliance with the Operation Permit, the authorized agent shall issue a written authorization for the existing system. An authorization shall be valid for 6 months.

History Note: Authority G.S. 130A-335(e),(f);
Eff. July 1, 1982;
Amended Eff. August 1, 1991; January 1, 1990; January 1, 1984;
Temporary Amendment Eff. January 20, 1997;
Amended Eff. August 1, 1998,
Amended Eff. February 26, 2015.

**.1938 RESPONSIBILITIES**

(a) The permitting of a wastewater system shall be the responsibility of agents authorized by the State in accordance with G.S. 130A-40, 130A-50, and registered with the State of North Carolina Board of Sanitarian Examiners if required in G.S. 90A Article 4.

(b) The person owning or controlling the system shall be responsible for assuring compliance with the laws, rules, and permit conditions regarding system location, installation, operation, maintenance, monitoring, reporting, and repair.

(c) Prior to the issuance of an Improvement Permit or Construction Authorization, plans and specifications may be required by the local health department where there is an unsuitable soil or unsuitable characteristic and shall be required for drainage systems serving two or more lots. These plans and specifications shall be required to be prepared by a person or persons who are licensed or registered to consult, investigate, evaluate, plan or design wastewater systems, soil and rock characteristics, ground water hydrology, or drainage systems if required in G.S. 89C, 89E, 89F, and 90A Article 4.

(d) Any wastewater system which meets one or more of the following conditions shall be designed by a registered professional engineer if required by G.S. 89C:

(1) The system is designed to treat or dispose of over 3,000 gallons per day, as determined in Rule .1949(a) or (b) of this Section, except where the system is limited to an individual septic tank system serving an individual dwelling unit or several individual septic tank systems, each serving an individual dwelling unit.

(2) The system requires pretreatment before disposal, other than by a conventional septic or other system approved under Rule .1957 or .1969 of this Section.

(3) The system requires use of sewage pumps prior to the septic tank or other pretreatment system, except for systems subject to the North Carolina Plumbing code or which consist of grinder pumps and associated pump basins that are approved and listed in accordance with standards adopted by the National Sanitation Foundation.

(4) The individual system is required by Rule .1952 of this Section to use more than one pump or siphon in a single pump tank.

(5) The system includes a collection sewer, prior to the septic tank or other pretreatment system, which serves two or more buildings, except for systems subject to the North Carolina Plumbing Code.

(6) The system includes structures which have not been pre-engineered.

(7) The system is designed for the collection, treatment and disposal of industrial process wastewater, except under the following circumstances:

(A) the State has determined that the wastewater generated by the proposed facility has a pollutant strength which is lower than or equal to domestic sewage, and does not require specialized pretreatment or management, or

(B) the State has pre-approved a predesigned pretreatment system or process and management method proposed by the facility owner which shall enable the industrial process wastewater to have a pollutant strength which is lower than or equal to domestic sewage.

(8) Any other system serving a business or multi-family dwelling so specified by the local health department.

(e) The State shall review and approve the system layout on a site plan or plat, plans and specifications for all systems serving a design unit with a design flow greater than 3,000 gallons per day, as determined in Rule .1949(a) or (b) of this Section, except:

(1) where the system is limited to an individual septic tank system serving an individual dwelling unit or several individual septic tank systems, each serving an individual dwelling unit, or

(2) where the system consists of individual wastewater systems, each serving an individual facility, and which meets all of the following criteria;

(A) each individual system's design flow does not exceed 1500 gallons per day, as determined in Rule .1949(a) or (b) of this Section,

(B) the site for the nitrification field and repair area for each individual system is at least 20 feet from any other individual system site, and

(C) the design wastewater loading on the lot or tract of land containing the design unit is less than 1,500 gallons per day per acre for new or expanded systems and 3,000 gallons per day/acre for malfunctioning systems.

(f) The state shall also review and approve plans and specifications for any industrial process wastewater system required by this Section to be designed by a registered professional engineer and any other system so specified by the local health department.

(g) For systems that require State review and approval, an improvement permit shall not be issued unless the site plan or plat and system layout, including details for any proposed site modifications, are approved. A Construction Authorization shall not be issued unless plans and specifications, including methods of operation and maintenance, are approved.

(h) Prior to issuance of the operation permit for a system required to be designed by a registered professional engineer, the owner shall submit to the local health department a statement signed by a registered professional engineer stating that construction is complete and in accordance with approved plans and specifications and approved modifications. Periodic observations of construction at stages specified by the OCHD and a final inspection for design compliance by the certifying registered professional engineer or his representative who is not the installer shall be required for this statement. The statement shall be affixed with the registered professional engineer's seal.

(i) Plans and specifications required to be prepared by a registered professional engineer shall contain the information necessary for construction of the system in accordance with applicable rules and laws and shall include any of the following, determined to be applicable by the local health department or the State:

(1) the seal, signature, and the date on all plans and the first sheet of specifications; specifications and reports prepared by the design engineer and licensed or registered professionals who contributed to the plans, specifications, or reports;

(2) a description of the facilities served and the calculations and basis for the design flow proposed;

(3) a site plan based on a surveyed plat showing all system components, public water supply sources within 500 feet, private water supplies and surface water supplies within 200 feet, water lines serving the project and within 10 feet of all components, building foundations, basements, property lines, embankments or cuts of two feet or more in vertical height, swimming pools, storm sewers, interceptor drains, surface drainage ditches, and adjacent nitrification fields;

(4) specifications describing all materials to be used, methods of construction, means for assuring the quality and integrity of the finished product, and operation and maintenance procedures addressing requirements for the system operator, inspection schedules, residuals management provisions, process and performance monitoring schedules, and provisions for maintaining mechanical components and nitrification field vegetative cover;

(5) plan and profile drawings for collection sewers, force mains and supply lines, showing pipe diameter, depth of cover, cleanout and manhole locations, invert and ground surface elevations, valves and other appurtenances, lateral connections, proximity to utilities and pertinent features such as wells, water lines, storm drains, surface waters, structures, roads, and other trafficked areas;

(6) plans for all tanks, showing capacity, invert and ground elevations, access manholes, inlet and outlet details, and plans for built-in-place or nonstate-approved, precast tanks, also showing dimensions, reinforcement details, liquid depth, and other pertinent construction features;

(7) calculations for pump or siphon sizing, pump curves, and plan and profile drawings for lift stations and effluent dosing tanks, showing anti-buoyancy provisions, pump or siphon locations, discharge piping, valves, vents, pump controls, pump removal system, electrical connection details, and activation levels for pumps or siphons and high-water alarms;

(8) plan and profile drawings for wastewater treatment plants and other pretreatment systems, including cross-section views of all relevant system components, and data and contact lists from comparable facilities for any non-standard systems;

(9) plans for nitrification field and repair area, based on an evaluation and report prepared by a person licensed or registered to practice soil science, if required in G.S. 89F showing the following:

(A) field locations with existing and final relative contour lines based on field measurements at intervals not exceeding two feet or spot elevations if field areas are essentially flat or of uniform grade;

(B) field layout, pipe sizes, length, spacing, connection and clean out details, invert elevations of flow distribution devices and laterals, valves, and appurtenances;

(C) trench plan and profile drawings and flow distribution device details; and

(D) location and design of associated surface and groundwater drainage systems; and

(10) any other information required by the local health department or the State.

(j) The entire wastewater sewage system shall be on property owned or controlled by the person owning or controlling the system. Necessary easements, declarations, rights of way, or encroachment agreements, as applicable, shall be obtained and recorded prior to the issuance of a Construction Authorization for the system installation or repair. Terms of the easement, right-of-way or encroachment agreement shall provide that the easement, right-of-way, or encroachment agreement:

(1) is appurtenant to specifically described property and runs with the land and is not affected by change of ownership or control;

(2) is valid for as long as the wastewater system is required for the facility that it is designed to serve;

(3) describes and specifies the uses being granted and shall include ingress and egress, system installation, operation, maintenance, monitoring, and repairs:

(4) specifies by metes and bounds description and attached plat prepared by a registered land surveyor or professional engineer, the area or site required for the wastewater system and appurtenances including a site for any required system replacement; and

(5) shall be reviewed and approved by the OCHD and the County Attorney and recorded with the register of deeds in the county where the system and facility is located.

(k) Before an Operation Permit is issued for a sanitary sewage system sized according to .1949(d), a declaration shall be filed with the Orange County Register of Deeds detailing the type, waste flow capacity and if necessary, any management entity requirements for the system. The declaration shall meet the following requirements:

(1) The declaration of restrictions shall describe the property restricted in a manner sufficient to pass title, provide that its restriction are covenants that run with the land and, in form, be approved by the Orange County Health Department. The declaration shall, upon its recording, be in the place of a first lien on the property (excepting current year ad valorem property taxes) and shall remain so unless, with the approval of the Orange County Health Department, it is canceled of record or its terms modified. The Orange County Health Department shall require the priority of the declaration of restrictions to be certified by an attorney at law, licensed to practice law in the State of North Carolina and approved to certify title to real property by a lending institution doing business in Orange County.

(2) Orange County Health Department approval of an instrument of cancellation or modification of the declaration of restrictions shall appear on the instrument and shall be signed by an authorized representative of the Orange County Health Department. No such instrument shall be effective to cancel or modify the declaration of restriction until it is filed for registration with the Register of Deeds of Orange County.

(l) Fees for administration of these rules shall be paid by the applicants or system owners according to a fee schedule recommended by the Orange County Health Director and approved by the Orange County Board of Health and the Orange County Board of Commissioners pursuant to North Carolina General Statute 130A-39.

History Note: Authority G.S. 89C; 89E; 89F; 90A; 130A-335(e),(f);
Eff. July 1, 1982;
Amended Eff. January 1, 1990; April 1, 1985;
Temporary Amendment Eff. January 20, 1997;
Amended Eff. November 1, 1999; August 1, 1998.

**.1939 SITE EVALUATION**

(a) The local health department shall investigate each proposed site. The investigation shall include the evaluation of the following factors:

(1) topography, slope, and landscape position;

(2) soil profile descriptions(morphology) including:

(A) Soil horizons, color, texture, structure, and consistence:

(B) Soil wetness;

(C) Soil depth;
(D) Restrictive horizons
(3) available space, and
(4) Suitability and long term acceptance rate of each soil boring or pit.

(b) Soil profiles shall be evaluated at the site by borings or other means of excavation to at least 48 inches or to an UNSUITABLE characteristic and a determination shall be made as to the suitability of the soil to treat and absorb septic tank effluent. For major subdivision evaluations, flows in excess of 600 gpd, and as otherwise specified by OCHD, applicants shall be required to provide pits for evaluation of the soil at the site. The applicant shall be responsible for identifying property lines, buffers, and easements, clearing the necessary underbrush, and for making the site accessible to the OCHD for the evaluation.

(c) Site evaluations shall be made in accordance with Rules .1940 through .1948 of this Section. Based on this evaluation, each of the factors listed in Paragraph (a) of this Rule shall be classified as SUITABLE (S), PROVISIONALLY SUITABLE (PS), or UNSUITABLE (U).

(d) The local health department shall determine the long-term acceptance rate to be used for sites classified SUITABLE OR PROVISIONALLY SUITABLE in accordance with these rules.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. January 1, 1990.

**.1940 TOPOGRAPHY AND LANDSCAPE POSITION**

(a) Uniform slopes under 15 percent shall be considered SUITABLE with respect to topography.

(b) Uniform slopes between 15 percent and 30 percent shall be considered PROVISIONALLY SUITABLE with respect to topography.

(c) Slopes greater than 30 percent shall be considered UNSUITABLE as to topography. Slopes greater than 30 percent may be reclassified as PROVISIONALLY SUITABLE after an investigation indicates that
(1) a modified system may be installed in accordance with Rule .1956 of this Section;
(2) Soil characteristics are classified SUITABLE or PROVISIONALLY SUITABLE to a depth of at least one foot below the proposed nitrification trench bottom; and
(3) Surface water runoff can be diverted around the nitrification field to prevent scouring or erosion.

Slopes greater than 65 percent shall not be reclassified as PROVISIONALLY SUITABLE.

(d) Slope patterns (topography) that interfere with the design, installation, or operation of the system shall be considered UNSUITABLE with respect to topography.

(e) Depressions shall be considered UNSUITABLE with respect to landscape position except when the surface water can be diverted away from the depression or the depression can be drained and the site complies with the requirements of this section and is specifically approved by the local health department.

(f) The surface area on or around a ground absorption sewage treatment and disposal system shall be landscaped to provide adequate drainage if directed by the local health department. The interception of perched or lateral ground-water movement shall be provided where necessary to prevent soil saturation on or around the ground absorption sewage treatment and disposal system.

(g) A designated wetland shall be considered UNSUITABLE with respect to landscape position, unless the proposed use is specifically approved in writing by the U.S. Army Corps of Engineers or the North Carolina Division of Coastal Management.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. January 1, 1990.

**.1941 SOIL CHARACTERISTICS (MORPHOLOGY)**

(a) The soil characteristics which shall be evaluated by the local health department are as follows:
(1) Texture - The relative proportions of sand, silt, and clay sized mineral particles in the fine-earth fraction of the soil are referred to as soil texture. The texture of the different horizons of soils shall be classified into four general groups and 12 soil textural classes based upon the relative proportions of sand, silt, and clay sized mineral particles.

(A) SOIL GROUP I - SANDY TEXTURE SOILS. The sandy group includes the sand and loamy sand soil textural classes and shall be considered SUITABLE with respect to texture.

(B) SOIL GROUP II - COARSE LOAMY TEXTURE SOILS. The coarse loamy group includes sandy loam and loam soil textural classes and shall be considered SUITABLE with respect to texture.

(C) SOIL GROUP III - FINE LOAMY TEXTURE SOILS. The fine loamy group includes silt, silt loam, sandy clay loam, clay loam, and silty clay loam textural classes and shall be considered PROVISIONALLY SUITABLE with respect to texture.

(D) SOIL GROUP IV - CLAYEY TEXTURE SOILS. The clayey group includes sandy clay, silty clay, and clay textural classes and shall be considered PROVISIONALLY SUITABLE with respect to texture.

(E) The soil textural class shall be determined in the field by hand texturing samples of each soil horizon in the soil profile using the following criteria:

(i) Sand: Sand has a gritty feel, does not stain the fingers, and does not form a ribbon or ball when wet or moist.

(ii) Loamy Sand: Loamy sand has a gritty feel, stains the fingers (silt and clay), forms a weak ball, and cannot be handled without breaking.

(iii) Sandy Loam: Sandy loam has a gritty feel and forms a ball that can be picked up with the fingers and handled with care without breaking.

(iv) Loam: Loam may have a slightly gritty feel but does not show a fingerprint and forms only short ribbons of from 0.25 inch to 0.50 inch in length. Loam will form a ball that can be handled without breaking.

(v) Silt Loam: Silt loam has a floury feel when moist and will show a fingerprint but will not ribbon and forms only a weak ball.

(vi) Silt: Silt has a floury feel when moist and sticky when wet but will not ribbon and forms a ball that will tolerate some handling.

(vii) Sandy Clay Loam: Sandy clay loam has a gritty feel but contains enough clay to form a firm ball and may ribbon to form 0.75-inch to one-inch long pieces.

(viii) Silty Clay Loam: Silty clay loam is sticky when moist and will ribbon from one to two inches. Rubbing silty clay loam with the thumbnail produces a moderate sheen. Silty clay loam produces a distinct fingerprint.

(ix) Clay Loam: Clay loam is sticky when moist. Clay loam forms a thin ribbon of one to two inches in length and produces a slight sheen when rubbed with the thumbnail. Clay loam produces a nondistinct fingerprint.

(x) Sandy Clay: Sandy clay is plastic, gritty, and sticky when moist and forms a firm ball and produces a thin ribbon to over two inches in length.

(xi) Silty Clay: Silty clay is both plastic and sticky when moist and lacks any gritty feeling. Silty clay forms a firm ball and readily ribbons to over two inches in length.

(xii) Clay: Clay is both sticky and plastic when moist, produces a thin ribbon over two inches in length, produces a high sheen when rubbed with the thumbnail, and forms a strong ball resistant to breaking.

(F) The Department may substitute laboratory determination of the soil textural class as defined in these Rules by particle-size analysis of the fine-earth fraction (less than 2.0 mm in size) using the sand, silt, and clay particle sizes as defined in these Rules for field testing when conducted in accordance with ASTM (American Society for Testing and Materials) D-422 procedures for sieve and hydrometer analyses which are hereby adopted by reference in accordance with G.S. 150B-14(c). For fine loamy and clayey soils (Groups III and IV), the dispersion time shall be increased to 12 hours. Copies may be inspected in and copies obtained from the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642.

(2) Soil Structure - The following types of soil structure shall be evaluated:

(A) CRUMB AND GRANULAR SOIL STRUCTURE - Soils which have crumb or granular structure shall be considered SUITABLE as to structure.

(B) BLOCK-LIKE SOIL STRUCTURE - Block-Like Soil Structure with peds 2.5 cm (1 inch) or less in size shall be considered PROVISIONALLY SUITABLE as to structure. Block-

like soil structure with peds greater than 2.5 cm (1 inch) in size within 36 inches of the naturally occurring soil surface shall be considered UNSUITABLE as to structure.

(C) PLATY SOIL STRUCTURE - soils which have platy soil structure within 36 inches of the naturally occurring soil surface shall be considered UNSUITABLE as to structure.

(D) PRISMATIC SOIL STRUCTURE - Soils which have prismatic soil structure within 36 inches of the naturally occurring soil surface shall be considered UNSUITABLE as to structure.

(E) ABSENCE OF SOIL STRUCTURE - Soils which are single grained and exhibit no structural aggregates shall be considered SUITABLE as to structure. Soils which are massive and exhibit no structural peds within 36 inches of the naturally occurring soil surface shall be considered UNSUITABLE as to structure.

(F) Structure shall be evaluated using Soil Taxonomy, Appendix I, which is hereby adopted by reference in accordance with G.S. 150B-14(c). Copies may be inspected in, and copies obtained from, the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642.

(3) Clay Mineralogy - Along with soil texture, the mineralogy of the clay-sized fraction determines the degree to which some soils swell when wetted and thereby affects the size and number of pores available for movement of sewage effluent through the soil. There are two major types of clays, including the 1:1 clays, such as Kaolinite, which do not shrink or swell extensively when dried or wetted; and the 2:1 clays, including mixed mineralogy clays, such as clays containing both Kaolinite and Montmorillonite that will shrink and swell when dried and wetted. The type of clay minerals in the clay-sized fraction shall be determined by a field evaluation of moist soil consistence or of wet soil consistence using Soil Taxonomy, Appendix I, which is hereby adopted by reference in accordance with G.S. 150B-14(c). The Department may substitute laboratory determination of the expansive clay mineralogy as defined in these Rules for field testing when conducted in accordance with ASTM D-4318, procedures A and B, for the determination of liquid limit, plastic limit, and plasticity index of soils. These procedures are hereby adopted by reference in accordance with G.S. 150B-14(c). If the liquid limit exceeds 50 percent and the plasticity index exceeds 30, the soil shall be considered as having an expansive clay mineralogy. Copies may be inspected in, and copies obtained from, the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642.

(A) SLIGHTLY EXPANSIVE CLAY MINERALOGY - Soils which have loose, very friable, friable or firm moist soil consistence, or have slightly sticky to sticky or nonplastic, slightly plastic to plastic wet soil consistence, are considered to have predominantly 1:1 clay minerals and shall be considered SUITABLE as to clay mineralogy.

(B) EXPANSIVE CLAY MINERALOGY - Soils which have either very firm or extremely firm moist soil consistence, or have either very sticky or very plastic wet soil consistence, are considered to have predominantly 2:1 clay minerals (including mixed mineralogy clays) and shall be considered UNSUITABLE as to clay mineralogy.

(4) Organic Soils - Organic soils shall be considered UNSUITABLE.

(b) Where the site is UNSUITABLE with respect to structure or clay mineralogy, it may be reclassified PROVISIONALLY SUITABLE after an investigation indicates that a modified or alternative system may be installed in accordance with Rule .1956 or Rule .1957 of this Section.

History Note: Authority G.S. 130A-335(e); Eff. July 1, 1982;
Amended Eff. January 1, 1990.

**.1942 SOIL WETNESS CONDITIONS**

(a) Soil wetness conditions caused by seasonal high-water table, perched water table, tidal water, seasonally saturated soils or by lateral water movement shall be determined by field evaluation for soil wetness colors and field observations, and may be assessed by well monitoring, computer modeling, or a combination of monitoring and modeling as required by this Rule. All sites shall be evaluated by an Authorized Agent of the Department using Basic Field Evaluation Procedures pursuant to Paragraph (b) of this Rule.

(b) Basic Field Evaluation Procedures:

(1) A soil wetness condition shall be determined by the indication of colors of chroma 2 or less (Munsell Color Charts) at ≥2% of soil volume in mottles or matrix of a horizon or horizon

subdivision. However, colors of chroma 2 or less which are relic from minerals of the parent material shall not be considered indicative of a soil wetness condition.

(2) A Soil wetness condition shall also be determined by the periodic direct observation or indication of saturated soils or a perched water table, or lateral water movement flowing into a bore hole, monitoring well, or open excavation above a less permeable horizon or horizon subdivision, that may occur without the presence of colors of chroma 2 or less. A soil wetness condition caused by saturated soils or a perched water table shall be confirmed to extend for at least three consecutive days. The shallowest depth to soil wetness condition determined by Subparagraph (b)(1) or (b)(2) of this Rule shall take precedence.

(c) Site Suitability as to Soil Wetness: Initial suitability of the site as to soil wetness shall be determined based upon the findings of the Basic Field Evaluation Procedures made pursuant to Paragraph (b) of this Rule. Sites where soil wetness conditions are greater than 48 inches below the naturally occurring soil surface shall be considered SUITABLE with respect to soil wetness. Sites where soil wetness conditions are between 36 inches and 48 inches below the naturally occurring soil surface shall be considered PROVISIONALLY SUITABLE with respect to soil wetness. Sites where soil wetness conditions are less than 36 inches below the naturally occurring soil surface shall be considered UNSUITABLE with respect to soil wetness. Sites where a soil wetness condition is determined based upon the observation or indication of lateral water movement within 48 inches of the naturally occurring soil surface shall be considered UNSUITABLE, except when such water can be intercepted in accordance with .1956(4).

(d) Alternative Procedures for Soil Wetness Determination: The Owner or the Owner's Legal Representative (Applicant) shall have the opportunity to submit documentation that the soil wetness condition and resultant site classification be alternately determined and reclassified by direct monitoring, computer modeling, or a combination of monitoring and modeling, in accordance with a Direct Monitoring Procedure, Monitoring and Modeling Procedure, or Modeling Procedure made pursuant to Paragraphs (e), (f), or (g) of this Rule. This determination shall take precedence over the determination made pursuant to the Basic Field Evaluation Procedures [Paragraph (b) of this Rule], when the conditions of Paragraphs (e), (f), or (g) of this Rule are met. Determination by one of these Monitoring or Modeling procedures shall also be required when:

(1) the Owner proposes to use a wastewater system requiring a deeper depth to a soil wetness condition than the depth determined by the Basic Field Evaluation Procedures pursuant to Paragraph (b) of this Rule; or

(2) the Owner proposes to use sites with Group III or IV soil within 36 inches of the surface and where drainage modifications are proposed to be made, including the installation of subsurface drain tile, open drainage ditches, or surface landscape modifications, or on such sites when fill is proposed to be used in conjunction with existing or proposed drainage modifications. Final determination of soil wetness condition for these sites shall be made pursuant to the Modeling Procedure in Paragraph (g) of this Rule

(e) Direct Monitoring Procedure. Soil wetness conditions may be determined by direct observation of the water surface in wells during periods of typically high water elevations utilizing the following monitoring procedures and interpretation method.

(1) The applicant shall notify the local health department of the intent to monitor water surface elevations by submitting a proposal that includes a site plan, well and soil profile at each monitoring location, and a monitoring plan no later than 30 days prior to the monitoring period. An applicant other than the property owner shall have written authorization from the owner to be the owner's legal representative. Soil wetness and rainfall monitoring shall be conducted under the responsible charge of a third-party consultant or by the property owner or the owner's agent. A third party consultant is qualified when licensed or registered in accordance with G.S. 89C (Engineers), G.S. 89E (Geologists), G.S. 89F (Soil Scientists), or G.S. 90A Article 4 (Registered Sanitarians), if required. The Owner shall submit the name(s) of the consultant(s) performing any monitoring on their behalf to the local health department.

(2) The applicant shall submit a site plan showing proposed sites for wastewater system, shall provide the longitude and latitude of the site, location of monitoring wells, and all drainage features that may influence the soil wetness conditions, and specify any proposed fill and drainage modifications.

(3) The applicant shall submit a monitoring plan indicating the proposed number, installation depth, screening depth, soil and well profile, materials and installation procedures for each monitoring well, and proposed method of analysis. A minimum of three water level monitoring wells shall be

installed for water surface observation at each site. Additional wells shall be required for sites handling systems with a design flow greater than 600 gallons per day (minimum of one additional well per 600 gallons per day increment).

(4) The local health department shall be given the opportunity to conduct a site visit and verify the appropriateness of the proposed plan. Well locations shall include portions of the initial and replacement drainfield site(s) containing the most limiting soil/site conditions. Prior to installation of the wells the local health department shall approve the plan. If the plan is disapproved, the local health department shall include specific changes necessary for approval of the monitoring plan.

(5) Wells shall extend at least five feet below the natural soil surface, or existing soil surface for fill installed prior to July 1, 1977 meeting the requirements for consideration of a site with existing fill of G.S. 130A-341 and the rules adopted pursuant thereto. However, a well or wells which extend(s) down only 40 inches may be used if they provide a continuous record of the water table for at least half of the monitoring period, and one or more shallower wells may be required on sites where shallow lateral water movement or perched soil wetness conditions are anticipated.

(6) Water surface in the monitoring wells shall be recorded at least daily from January 1 to April 30, taken at the same time during the day (plus or minus three hours). A rain (precipitation) gauge is required within one-half mile of the site. At least daily rainfall shall be recorded beginning no later than December 1 through April 30 (the end of the well monitoring period).

(7) Interpretation Method for Direct Monitoring Procedure: The following method of determining depth to soil wetness condition from water surface observations in wells shall be used when the 60-day weighted rainfall index for the January through April monitoring period equals or exceeds the site's long-term (historic) 60-day weighted rainfall index for January to April rainfall with a 30 percent recurrence frequency (wetter than the 9th driest year of 30, on average). The 60-day weighted rainfall index for the monitoring period and historic rainfall record shall be computed as:

$$WRI_{60} = 0.5P_D + P_J + P_F + P_M + 0.5P_A$$

Where $WRI_{60}$ = 60-day weighted rainfall index for January to April

$P_D$ = Total December rainfall

$P_J$ = Total January rainfall

$P_F$ = Total February rainfall

$P_M$ = Total March rainfall

$P_A$ = Total April rainfall

The Department shall prepare contour maps for each county where this interpretation procedure is proposed. Contours shall be prepared following standard interpolation procedures using normalized data collected from all National Weather Service Stations, or equivalent, from which appropriate data are available, at least prior to February 1 of the monitoring season. Data from each station shall be normalized by fitting a 2-parameter gamma distribution to the 60-day weighted rainfall index computed for at least the most recent three decades of historic data, in accordance with procedures outlined in Chapter 18 of the National Engineering Handbook, NRCS, USDA. From this fitted distribution, the 60-day weighted rainfall index for January through April rainfall with a 30%, 50%, 70% and 80% recurrence frequency shall be computed for each Station, to provide the raw data points from which the contour maps shall be prepared. From these maps, the site's 60-day weighted rainfall index for the January through April monitoring period shall be compared to the long-term (historic) January to April 60-day weighted rainfall index at different expected recurrence frequencies. The soil wetness condition shall be determined as the highest level that is continuously saturated for the number of consecutive days during the January through April monitoring period shown in the following table:

| Recurrence Frequency Range January to April 60-Day Weighted Rainfall Index | Number of Consecutive Days of Continuous Saturation for Soil Wetness Condition |
|---|---|
| 30% to 49.9% | 3 days or 72 hours |
| 50% to 69.9% | 6 days or 144 hours |
| 70% to 79.9% | 9 days or 216 hours |
| 80% to 100% | 14 days or 336 hours |

(8) If monitoring well data is collected during monitoring periods that span multiple years, the year which yields the highest (shallowest) soil wetness condition shall be applicable.

(f) Monitoring and Modeling Procedure: A combination of monitoring and modeling may be used to determine a soil wetness condition utilizing the following monitoring procedures and interpretation method.

(1) The procedures described for the Direct Monitoring Procedure in Subparagraphs (e)(1), (2), (3), (4), (5), and (6) of this Rule shall be used to monitor water surface elevation and precipitation for determining soil wetness conditions by a combination of direct observation and modeling, except that the rainfall gauge and each monitoring well shall use a recording device and a data file (DRAINMOD-compatible) shall be submitted with the report to the local health department (devices shall record rainfall at least hourly and well water level at least daily).

(2) The ground water simulation model DRAINMOD shall be used to predict daily water levels over at least a 30 year historic time period after the model is calibrated using the water surface and rainfall observations made on-site during the monitoring period. The soil wetness condition shall be determined as the highest level predicted by the model to be saturated for a 14-day continuous period between January 1 and April 30 with a recurrence frequency of 30 percent (an average of at least 9 years in 30).

(A) Weather input files, required to run the DRAINMOD, shall be developed from hourly rainfall gauge data taken within a half-mile of the site and from daily temperature and hourly or daily rainfall data collected over a minimum 30-year period from the closest available National Weather Service, or equivalent, measuring station to the site. DRAINMOD weather data files on file with the Department shall be made available upon request to the applicant or applicant's consultants. Daily maximum and minimum temperature data for the January 1 through April 30 monitoring period, plus for at least 30 days prior to this period, shall be obtained from the closest available weather station.

(B) Soil and Site inputs for DRAINMOD, including a soils data file closest to the soil series identified, depths of soil horizons, estimated saturated hydraulic conductivity of each horizon, depth and spacing of drainage features and depression storage, shall be selected in accordance with procedures outlined in the DRAINMOD Users Guide, and guidance is also available in Reports 333 and 342 of the University of North Carolinas Water Resources Research Institute. DRAINMOD soils data files on file with the Department shall be made available upon request to the applicant or applicant's consultants.

(C) Inputs shall be based upon site specific soil profile descriptions Soil and site input factors shall be adjusted during the model calibration process to achieve a best fit by least squares analysis of the daily observations over the whole monitoring period (mean absolute deviation between measured and predicted values no greater than eight inches), and to achieve the best possible match between the highest water table depth during the monitoring period (measured-vs-predicted) that is saturated for 14 consecutive days.

(D) For sites intended to receive over 1500 gallons per day, the soil wetness determination using DRAINMOD shall take into consideration the impact of wastewater application on the projected water table surface.

(E) The ground water simulation analysis shall be prepared and submitted to the local health department by individuals qualified to use DRAINMOD by training and experience and who are licensed or registered in North Carolina if required in G.S. 89C (Engineers), G.S. 89E (Geologists), and G.S. 89F (Soil Scientists). The local health department or Owner may request a technical review by the Department prior to approval of the soil wetness condition determination.

(g) Modeling Procedure: A soil wetness condition may be determined by application of DRAINMOD to predict daily water levels over at least a 30 year historic time period after all site-specific input parameters have been obtained, as outlined in the DRAINMOD Users Guide. This modeling procedure shall be used when a ground water lowering system is proposed for a site with Group III or IV soils within 36 inches of the naturally occurring soil surface. This procedure shall also be used to evaluate sites with Group III or IV soils within 36 inches of the naturally occurring soil surface, where the soil wetness condition was initially determined using a procedure described in Paragraphs (e) or (f) of this Rule and where drainage modifications are proposed or when fill is proposed to be used in conjunction with existing or proposed drainage modifications. The soil wetness condition shall be determined as the highest level predicted by the model to be saturated for a 14-day continuous period between January 1 and April 30 with a recurrence frequency of 30 percent (an average of at least 9 years in 30).

(1) Weather input files, required to run DRAINMOD, shall consist of hourly rainfall and daily temperature data collected over the entire period of record but for at least a 30-year period from the closest available National Weather Service, or equivalent, measuring station to the site. DRAINMOD weather data files on file with the Department shall be made available upon request to the applicant or applicant's consultants.

(2) Soil and Site inputs for DRAINMOD, including a soils data file closest to the soil series identified, depths of soil horizons, hydraulic conductivity of each horizon, depth and spacing of proposed drainage features and surface storage and drainage parameters, shall be selected in accordance with procedures outlined in the DRAINMOD User's Guide. DRAINMOD soils data files on file with the Department shall be made available upon request to the applicant or applicant's consultants. Inputs shall include:

(A Soil input file with the soil moisture characteristic curve and data for the soil profile that is closest to the described soil profile that is present on the site;

(B) Soil horizon depths determined on site;

(C) Site measured or proposed drain depth and spacing, and drain outlet elevation;

(D) In-situ saturated hydraulic conductivity measurements for at least three representative locations on the site and at each location for at least three most representative soil horizons within five feet of the surface. Conductivity measurements shall be for one representative soil horizon at or above redoximorphic depletion features and two representative soil horizons at and below redoximorphic concentration features at each location on the site;

(E) All other model parameters based upon the DRAINMOD User's Guide, or other accepted values consistent with the simulation model; and

(F) A sensitivity analysis shall be conducted for the following model parameters:

(i) Soil input files for at least two other most closely related soil profiles;

(ii) Saturated hydraulic conductivity of each of horizons measured on-site;

(iii) Drain depth and spacing; and

(iv) Surface storage and depth of surface flow inputs.

The sensitivity analysis shall be used to evaluate the range of soil and site characteristics for choosing input parameters related to the soil profiles, hydraulic conductivity input values based upon the range of hydraulic conductivity values measured on the site, and inputs for surface and subsurface drainage features based upon the range of possible elevations and distances that occur or may occur after installation of improvements. The sensitivity analysis shall establish which parameters are most critical for determination of the depth to soil wetness condition. Conservative values for the most critical parameters shall be used in applying the model to the site.

(3) For sites designed to receive over 600 gallons per day, the soil wetness determination using DRAINMOD shall take into consideration the impact of wastewater application on the projected water table surface.

(4 The ground water simulation analysis shall be prepared and submitted to the local health department by individuals qualified to use DRAINMOD by training and experience and who are licensed or registered in North Carolina if required in G.S. 89C (Engineers), G.S. 89E (Geologists), and G.S. 89F (Soil Scientists). The local health department shall submit the ground water simulation analysis to the Department for technical review prior to approval of the soil wetness condition determination.

(h) A report of the investigations made for the Direct Monitoring Procedure, Monitoring and Modeling Procedure or Modeling Procedure pursuant to Paragraphs (e), (f), or (g) of this Rule shall be prepared prior to approval of the soil wetness condition determination. Reports prepared by a licensed or registered professional shall bear the professional seal of the person(s) whom conducted the investigation (Engineer, Geologist, Soil Scientist or Registered Sanitarian). A request for technical review of the report by the Department shall include digital copies of monitoring data and digital copies of model inputs, output data, and graphic results, as applicable.

(j) Where the site is UNSUITABLE with respect to soil wetness conditions, it may be reclassified PROVISIONALLY SUITABLE if a modified, alternative or innovative system can be installed in accordance with .1956, .1957, or .1969.

History Note: Authority G.S. 130A-335(e):

Eff. July 1, 1982;
Amended Eff. January 1, 1990;
Temporary Amendment Eff. June 24, 2003; April 17, 2002;
Amended Eff. May 1, 2004.

**.1943 SOIL DEPTH**

(a) Soil depths to saprolite, rock, or parent material greater than 48 inches shall be considered SUITABLE as to soil depth. Soil depths to saprolite, rock, or parent material between 36 inches and 48 inches shall be considered PROVISIONALLY SUITABLE as to soil depth. Soil depths to saprolite, rock, or parent material less than 36 inches shall be classified UNSUITABLE as to soil depth.

(b) Where the site is UNSUITABLE with respect to depth, it may be reclassified PROVISIONALLY SUITABLE after a special investigation indicates that a modified or alternative system can be installed in accordance with Rule .1956 or Rule .1957 of this Section.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. August 1, 1988.

**.1944 RESTRICTIVE HORIZONS**

(a) Soils in which restrictive horizons are three inches or more in thickness and at depths greater than 48 inches below the naturally occurring soil surface shall be considered SUITABLE as to depth to restrictive horizons. Soils in which restrictive horizons are three inches or more in thickness and at depths between 36 inches and 48 inches shall be considered PROVISIONALLY SUITABLE as to depth to restrictive horizons. Soils in which restrictive horizons are three inches or more in thickness and at depths less than 36 inches shall be considered UNSUITABLE as to depth to restrictive horizons.

(b) Where the site is UNSUITABLE with respect to restrictive horizons, it may be reclassified PROVISIONALLY SUITABLE after an investigation indicates that a modified or alternative system can be installed in accordance with Rules .1956 or .1957 of this Section.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. January 1, 1990; October 1, 1983.

**.1945 AVAILABLE SPACE**

(a) Sites shall have sufficient available space to permit the installation and proper functioning of ground absorption wastewater treatment and disposal systems, based upon the square footage of nitrification field required for the long-term acceptance rate determined in accordance with these Rules.

(b) Sites shall have sufficient available space for a repair area separate from the area determined in Paragraph (a) of this Rule. The repair area shall be based upon the area of the nitrification field required to accommodate the installation of a replacement system as specified in Rule .1955, .1956, or .1957 of this Section. Prior to issuance of the initial Improvement Permit for a site, the local health department shall designate on the permit the type of original system and system layout, the repair area, and the type of replacement system.

(c) The repair area requirement of Paragraph (b) of this Rule shall not apply to a lot or tract of land:
- (1) which is specifically described in a document on file with the local health department on July 1, 1982, or which is specifically described in a recorded deed or a recorded plat on January 1, 1983; and
- (2) which is of insufficient size to satisfy the repair area requirement of Paragraph (b) of this Rule, as determined by the local health department; and
- (3) on which the design daily flow from the facility is:
  - (A) no more than 480 gallons; or
  - (B) more than 480 gallons if an application for an improvement permit which meets the requirements of Rule .1937(c) of this Subchapter is received by the local health department on or before April 1, 1983.

(d) Although a lot or tract of land is exempted under Paragraph (c) from the repair area requirement of Paragraph (b), the maximum available area, as determined by the local health department, shall be allocated for a repair area.

History Note: Authority G.S. 130A-335(e) and (f);
Eff. July 1, 1982;
February 1, 1992; July 1, 1983; January 1, 1983.

**.1946 OTHER APPLICABLE FACTORS**

The site evaluation shall include consideration of any other applicable factors involving accepted public health principles, such as, but need not be limited to:

(1) The proximity of a large-capacity water-supply well, the cone of influence of which would dictate a larger separation distance than the minimum distance specified in Rule .1950 of this Section;

(2) The potential public health hazard due to possible failures of soil absorption systems when specifically identified, would dictate larger separation distances than the minimums specified in Rule .1950 and Rule .1955(m) of this Section;

(3) The potential public health hazard of possible massive failures of soil absorption systems proposed to serve large numbers of residences, as in residential subdivisions or mobile home parks;

(4) For sites serving systems designed to handle over 3,000 gallons per day, as determined in Rule .1949 (a) or (b) of this Section, which include one or more nitrification fields with a design flow of greater than 1500 gallons per day, the applicant shall submit sufficient site-specific data to predict the height of the water table mound that will develop beneath the field (level sites) and the rate of lateral and vertical flow away from the nitrification trenches (sloping sites). The data submitted may include soil borings to depths greater than 48 inches, permeability and hydraulic conductivity measurements, water level readings, and other information determined to be necessary by the local health department or the State. The site shall be considered UNSUITABLE if the data indicate that the groundwater mound which will develop beneath the site cannot be maintained two feet or more below the bottom of the nitrification trenches or it is determined that effluent is likely to become exposed on the ground surface within, or adjacent to, the nitrification field.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. January 1, 1990.
Amended Eff. February 25, 2009

**.1947 DETERMINATION OF OVERALL SITE SUITABILITY**

All of the criteria in Rules .1940 through .1946 of this Section shall be determined to be SUITABLE, PROVISIONALLY SUITABLE, or UNSUITABLE, as indicated. If all criteria are classified the same, that classification will prevail. Where there is a variation in classification of the several criteria, the most limiting uncorrectable characteristics shall be used to determine the overall site classification.

History Note: Statutory Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. January 1, 1990.

**.1948 SITE CLASSIFICATION**

(a) Sites classified as SUITABLE may be utilized for a ground absorption sewage treatment and disposal system consistent with these Rules. A suitable classification generally indicates soil and site conditions favorable for the operation of a ground absorption sewage treatment and disposal system or have slight limitations that are readily overcome by proper design and installation.

(b) Sites classified as PROVISIONALLY SUITABLE may be utilized for a ground absorption sewage treatment and disposal system consistent with these Rules but have moderate limitations. Sites classified Provisionally Suitable require some modifications and careful planning, design, and installation in order for a ground absorption sewage treatment and disposal system to function satisfactorily.

(c) Sites classified UNSUITABLE have severe limitations for the installation and use of a properly functioning ground absorption sewage treatment and disposal system. An improvement permit shall not be issued for a site which is classified as UNSUITABLE. However, where a site is UNSUITABLE, it may be reclassified PROVISIONALLY SUITABLE if a special investigation indicates that a modified or alternative system can be installed in accordance with Rules .1956 or .1957 of this Section.

(d) A site classified as UNSUITABLE may be used for a ground absorption sewage treatment and disposal system specifically identified in Rules .1955, .1956, or .1957 of this Section or a system approved under Rule

.1969 if written documentation, including engineering, hydrogeologic, geologic or soil studies, demonstrates to the local health department that the proposed system can be expected to function satisfactorily. Written documentation shall include a diagram of the system and repair area drawn to scale on a site plan which is based on an on-site layout, and the system design. Such sites shall be reclassified as PROVISIONALLY SUITABLE if the local health department determines that the substantiating data indicate that:

(1) a ground absorption system can be installed so that the effluent will be non-pathogenic, non-infectious, non-toxic, and non-hazardous;
(2) the effluent will not contaminate groundwater or surface water; and
(3) the effluent will not be exposed on the ground surface or be discharged to surface waters where it could come in contact with people, animals, or vectors.

The State shall review the substantiating data if requested by the local health department.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. April 1, 1993; January 1, 1990.

**.1949 SEWAGE FLOW RATES FOR DESIGN UNITS**

(a) In determining the volume of sewage from dwelling units, the flow rate shall be 120 gallons per day per bedroom as defined in this Rule. The minimum volume of sewage from each dwelling unit shall be 240 gallons per day and each additional bedroom above two bedrooms shall increase the volume of sewage by 120 gallons per day. In determining the number of bedrooms in a dwelling unit, each bedroom and any other room or addition that can reasonably be expected to function as a bedroom shall be considered a bedroom for design purposes. When the occupancy of a dwelling unit exceeds two persons per bedroom, the volume of sewage shall be determined by the maximum occupancy at a rate of 60 gallons per person per day.

(b) Table No. I shall be used to determine the minimum design daily flow of sewage required in calculating the design volume of sanitary sewage systems to serve selected types of establishments. The minimum design volume of sewage from any establishment shall be 100 gallons per day. Design of sewage treatment and disposal systems for establishments not identified in this Rule shall be determined using available flow data, water-using fixtures, occupancy or operation patterns, and other measured data.

TABLE NO. I

| TYPE OF ESTABLISHMENT | DAILY FLOW FOR DESIGN |
|---|---|
| Airports | 5 gal/passenger |
| (Also R.R. stations, bus terminals--not including food service facilities) | |
| Barber Shops | 50 gal/chair |
| Bars, Cocktail Lounges (Not including food service) | 20 gal/seat |
| Beauty Shops (Style Shops) | 125 gal/chair |
| Bowling Lanes | 50 gal/lane |
| Businesses (other than those listed elsewhere in this table) | 25 gal/employee |
| Camps | |
| Construction or Work Camps | 60 gal/person |
| (with chemical toilets) | 40 gal/person |
| Summer Camps | 60 gal/person |
| Campgrounds -- With Comfort Station | |
| (Without water and sewer hookups) | 100 gal/campsite |
| Travel Trailer/Recreational Vehicle Park | |
| (With water and sewer hookups) | 120 gal/space |
| Churches (Not including a Kitchen, Food Service Facility, Day Care or Camp) | 3 gal/seat |
| Churches (With a Kitchen but, not including a Food Service Facility, Day Care, or Camp) | 5 gal/seat |
| Country Clubs | 20 gal/member |
| Day Care Facilities | 15 gal/person |
| Factories | 25 gal/person/shift |
| (Exclusive of industrial waste) | |
| Add for showers | 10 gal/person/shift |

Food Service Facilities

Restaurants.....40 gal/seat or 40 gal/15 $ft^2$ of dining area, whichever is greater

24-hour Restaurant.....75 gal/seat

Food Stands

(1) Per 100 square feet of food stand floor space.....50 gal

(2) Add per food employee.....25 gal

Other Food Service Facilities.....5 gal/meal

Hospitals.....300 gal/bed

Marinas .....10 gal/boat slip

With bathhouse.....30 gal/boat slip

Meat Markets

(1) Per 100 square feet of market floor space.....50 gal

(2) Add per market employee.....25 gal

Motels/Hotels.....120 gal/room

With cooking facilities.....175 gal/room

Offices (per shift).....25 gal/person

Residential Care Facilities.....60 gal/person

Rest Homes and Nursing Homes

With laundry.....120 gal/bed

Without laundry.....60 gal/bed

Schools

Day Schools

With cafeteria, gym, and showers.....15 gal/student

With cafeteria only.....12 gal/student

With neither cafeteria nor showers.....10 gal/student

Boarding Schools.....60 gal/person

Service Stations.....250 gal/water closet or urinal

24-hour Service Stations.....325 gal/water closet

Stores, Shopping Centers, and Malls

(Exclusive of food service and meat markets).....120 gal/1000 $ft^2$ of retail sales area

Stadium, Auditorium, Theater, Drive-in.....5 gal/seat or space

Swimming Pools, Spas, and Bathhouses.....10 gal/person

(c) An adjusted design daily sewage flow may be granted by the local health department upon a showing as specified in Subparagraphs (c)(1) through (c)(2) that a sewage system is adequate to meet actual daily water consumption from a facility included in Paragraph (b) of this Rule. An adjusted design daily sewage flow may be granted for a dwelling unit in Paragraph (a) upon by a showing specified in Subparagraph (c)(2) provided that the flow reduction proposal is prepared, signed, and sealed by a licensed Professional Engineer.

(1) Documented data from that facility or a comparable facility justifying a flow rate reduction shall be submitted to the local health department and the State. The submitted data shall consist of at least 12 previous consecutive monthly total water consumption readings and at least 30 consecutive daily water consumption readings. The daily readings shall be taken during a projected normal or above normal sewage flow month. A peaking factor shall be derived by dividing the highest monthly flow as indicated from the 12 monthly readings by the sum of the 30 consecutive daily water consumption readings. The adjusted design daily sewage flow shall be determined by taking the numerical average of the greatest ten percent of the daily readings and multiplying by the peaking factor. In addition to the adjusted design flow derivation, the minimum adjusted flow shall be no less than the average of the daily flow during the peak month multiplied by a factor of 1.5. Further adjustments shall be made in design sewage flow rate used for sizing nitrification fields and pretreatment systems when the sampled or projected wastewater characteristics exceed those of domestic sewage, such as wastewater from restaurants or meat markets.

(2) An adjusted daily sewage flow rate may be granted contingent upon use of extreme water-conserving fixtures, such as toilets which use less than 1.6 gallons per flush, foot operated or sensor activated faucets with flow rates of one gallon per minute or less, and showerheads with flow rates of two gallons per minute or less. The amount of sewage flow rate reduction shall be determined by the local health department and the State based upon the type of fixtures and documentation of the amount of flow reduction to be expected from the proposed facility. Adjusted daily flow rates based upon use of water-conserving fixtures shall apply only to design capacity requirements of dosing and distribution systems and nitrification fields. Minimum pretreatment capacities shall be determined by the design flow rate of Table I of this Rule.

(d) For single family dwellings in which the number of bedrooms is not clearly defined, the OCHD may, as an alternate method to paragraph (a) of this rule, determine the volume of sewage for a single family dwelling by applying the following method:

(1) For dwellings of 2000 square feet or less, the minimum volume of sewage shall be 360 gallons per day with a maximum occupancy of six persons.

(2) For dwellings of 2500 square feet or less and greater than 2000 square feet, the minimum volume of sewage shall be 480 gallons per day with a maximum occupancy of eight persons.

(3) For dwellings of greater than 2500 square feet, the minimum volume of sewage shall be 600 gallons per day with a maximum occupancy of ten persons.

For the purposes of this rule, the square footage of the dwelling shall be determined by measuring all heated finished living area in the dwelling. If the occupancy of the dwelling exceeds the maximum allowable under (1), (2), and (3) above, the volume of sewage shall be determined by the maximum occupancy at a rate of 60 gallons per person. This paragraph shall not apply if the dwelling contains an apartment or if any business is conducted out of the dwelling. When systems are sized by this alternative method, a properly executed and approved declaration of covenants regarding wastewater restrictions shall be recorded at the Orange County Register of Deeds prior to the issuance of an Operation Permit.

(e) For systems that generate industrial process wastewater, the flow rate shall be determined by using available documented data submitted to the OCHD as well as information supplied by the State. Floor drains that are accessible to vehicles shall be prohibited from connecting to a ground absorption system. The backwash discharge from a water treatment device shall not be plumbed into the wastewater system unless it is specifically designed for that purpose.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. January 1, 1990; January 1, 1984,
Amended Eff. February 26, 2015.

**.1950 LOCATION OF SANITARY SEWAGE SYSTEMS**

(a) Every sanitary sewage treatment and disposal system shall be located at least the minimum horizontal distance from the following:

| | | |
|---|---|---|
| (1) | Any private water supply source, including any well or spring | 100 feet; |
| (2) | Any public water supply source | 100 feet; |
| (3) | Streams classified as WS-I | 100 feet; |
| (4) | Waters classified as S.A. (from mean high water mark) | 100 feet, from mean high water mark |
| (5) | Other coastal waters | 50 feet, from mean high water mark |
| (6) | Any other stream, canal, marsh, or other surface waters | 50 feet; |
| (7) | Any Class I or Class II reservoir | 100 feet, from normal pool elevation |
| (8) | Any permanent storm water retention pond | 50 feet, from flood pool elevation; |
| (9) | Any other lake or pond | 50 feet, |

| | | |
|---|---|---|
| | | from normal pool elevation; |
| (10) | Any building foundation or building footing | 15 feet; |
| (11) | Any basement | 15 feet; |
| (12) | Any property line | 10 feet; |
| (13) | Top of slope of embankments or cuts of 2 feet or more vertical height | 15 feet; |
| (14) | Any water line | 10 feet; |
| (15) | Drainage Systems: | |
| | (A)Interceptor drains, foundation drains, and storm water diversions | |
| | (i) upslope | 10 feet, |
| | (ii) sideslope | 15 feet, |
| | (iii) downslope | 25 feet; |
| | (B)Groundwater lowering ditches and devices | 25 feet; |
| (16) | Swimming pool or hot tub (in-ground construction) | 25 feet; |
| | (above ground) | 15 feet |
| (17) | Any other nitrification field (except repair area) | 20 feet; |
| (18) | Drip Line | 5 feet |
| (19) | Lined / watertight ornamental pond | 25 feet |

(b) Ground absorption sewage treatment and disposal systems may be located closer than 100 feet from a private water supply, except springs, bored wells and uncased wells located downslope and used as a source of drinking water, for repairs, space limitations, and other site-planning considerations but shall be located the maximum feasible distance and in no case less than 50 feet.

(c) Nitrification fields and repair areas shall not be located under paved areas or areas subject to vehicular traffic. If effluent is to be conveyed under areas subject to vehicular traffic, ductile iron or its equivalent pipe shall be used. However, pipe specified in Rule .1955 (e) may be used if a minimum of 30 inches of compacted cover is provided over the pipe.

(d) In addition to the requirements of Paragraph (a) of this Rule, sites to be used for subsurface disposal for design units with flows over 3,000 gallons per day, as determined in Rule .1949 (a) or (b) of this Section, which include one or more nitrification fields with individual capacities of greater than 1,500 gallons per day, shall be located at least the minimum horizontal distance from the following:

| | | |
|---|---|---|
| (1) | Any Class I or II reservoir or any public water supply source utilizing a shallow (under 50 feet) groundwater aquifer | 500 feet; |
| (2) | Any other public water supply source, unless determined to utilize a confined aquifer | 200 feet; |
| (3) | Any private water supply source, unless determined to utilize a confined aquifer | 100 feet; |
| (4) | Waters classified as SA | 200 feet, from mean high water mark; |
| (5) | Any waters classified as WS-I | 200 feet; |
| (6) | Any surface waters classified as WS-II,WS-III, B, or SB | 100 feet; and |
| (7) | Any property line | 25 feet. |

(e) Collection sewers, force mains, and supply lines shall be located at least the minimum horizontal distance from the following:

| | | |
|---|---|---|
| (1) | Any public water supply source, including wells, springs, and Class I or Class II reservoirs | 100 feet, unless constructed of leakproof pipe, such as ductile iron pipe with mechanical joints equivalent to water main standards, in which case the minimum setback may be reduced to 50 feet; |

| | | |
|---|---|---|
| (2) | Any private water supply source, including wells and springs, | 50 feet, unless constructed of similar leakproof pipe, such as ductile iron pipe with mechanical joints equivalent to water main standards, in which case the minimum setback may be reduced to 25 feet; |
| (3) | Any waters classified as WS-I, WS-II,WS-III, B, SA, or SB | 50 feet, unless constructed of similar leakproof pipe, such as ductile iron pipe with mechanical joints equivalent to water main standards, in which case the minimum setback may be reduced to 10 feet; |
| (4) | Any other stream, canal, marsh, coastal waters, lakes and other impoundments, or other surface waters | 10 feet; |
| (5) | Any building foundation or basement | 10 feet; |
| (6) | Any property line | 5 feet; |
| (7) | Top of slope of embankments or cuts of two feet or more vertical height that are not stabilized to prevent erosion | 10 feet; |
| (8) | Drainage Systems: | |
| | (A) Interceptor drains, storm drains, and storm water diversions | 5 feet; |
| | (B) Ground-water lowering ditches and devices | 10 feet; |
| (9) | Any swimming pool | 10 feet; |
| (10) | Any other nitrification field | 5 feet. |

(f) Sewer lines may cross a water line if 18 inches clear separation distance is maintained, with the sewer line passing under the water line. When conditions prevent an 18-inch clear separation from being maintained or whenever it is necessary for the water line to cross under the sewer, the sewer line shall be constructed of ductile iron pipe or its equivalent and the water line shall be constructed of ferrous materials equivalent to water main standards for a distance of at least ten feet on each side of the point of crossing, with full sections of pipe centered at the point of crossing.

(g) Sewer lines may cross a storm drain if:

(1) 12 inches clear separation distance is maintained; or

(2) the sewer line is constructed of ductile iron pipe or encased in concrete or ductile iron pipe for at least five feet on either side of the crossing.

(h) Sewer lines may cross a stream if at least three feet of stable cover can be maintained or the sewer line is of ductile iron pipe or encased in concrete or ductile iron pipe for at least ten feet on either side of the crossing and protected against the normal range of high and low water conditions, including the 100-year flood/wave action. Aerial crossings shall be by ductile iron pipe with mechanical joints or steel pipe. Pipe shall be anchored for at least ten feet on either side of the crossing.

(i) Septic tanks, lift stations, wastewater treatment plants, sand filters, and other pretreatment systems shall not be located in areas subject to frequent flooding (areas inundated at a ten-year or less frequency) unless designed and installed to be watertight and to remain operable during a ten-year storm. Mechanical or electrical components of treatment systems shall be above the 100-year flood level or otherwise protected against a 100-year flood.

History Note: Authority G.S. 130A-335(e) and (f);
Eff. July 1, 1982;
Amended Eff. January 1, 1990; October 1, 1982.

**.1951 APPLICABILITY OF RULES**

(a) Except as required in Paragraph (b) of this Rule, the minimum horizontal distance requirements in Rule .1950(a)(4), (10), (11), (12), or (13) shall not apply to the installation of a single septic tank system serving a single-family residence not to exceed four bedrooms on a lot or tract of land:

(1) which, on July 1, 1977, is specifically described in a deed, contract, or other instrument conveying fee title or which is specifically described in a recorded plat; and

(2) which, on July 1, 1977, is of insufficient size to satisfy the minimum horizontal distance requirements in Rule .1950(a)(4), (10), (11), (12), or (13) of this Section; and

(3) which, on the date system construction is proposed to begin, is not capable of being served by a community or public sewage system.

(b) For those lots or tracts of land described in Rule .1951(a) of this Section, where any of the minimum horizontal distance requirements prescribed in Rule .1950(a)(4), (10), (11), (12), or (13) of this Section can be met, such minimum horizontal distances shall be required.

(c) For those lots or tracts of land described in Rule .1951(a) of this Section, where a specific minimum horizontal distance requirement prescribed in Rule .1950(a)(4), (10), (11), (12), or (13) of this Section cannot be met, the maximum feasible horizontal distance, as determined by the local agency, shall be required. Provided, however, that at least the following minimum horizontal distances shall be required in all cases:

| | | |
|---|---|---|
| (1) | Waters classified as S.A. | 50 feet, from mean high water mark; |
| (2) | Any building foundation or building footing | 5 feet; |
| (3) | Any basement | 8 feet; |
| (4) | Any property line | 5 feet; |
| (5) | Top of slope of embankments or cuts of 2 feet or more vertical height | 5 feet; |

(d) All other provisions of this Section except as exempted by this Rule shall apply to the lots or tracts of land described in Rule .1951(a) of this Section. Any rules and regulations of the Commission for Health Services or any local board of health in effect on June 30, 1977, which establish greater minimum distance requirements than those provided for in this Section, shall remain in effect and shall apply to a lot or tract of land to which Rule .1950(a)(4),(10), (11), (12), or (13) of this Section do not apply.

(e) It shall be the responsibility of any owner of a lot or tract of land, who applies for a permit required by Rule .1937 of this Section, and who seeks, under the provisions of Rule .1951(a) of this Section, to exempt his lot or tract of land from any of the minimum horizontal distance requirements of Rule .1950(a)(4), (10), (11), (12), or (13) of this Section to provide to the local health department necessary records of title to the lot or tract of land for which the exemption is sought in order that the local agency may determine whether the applicant is entitled to any such exemption.

(f) For those lots or tracts of land which, on the effective date of this Section, are specifically described in a deed or recorded plat, and the minimum horizontal distance requirements prescribed in Rule .1950(a)(15)(B) cannot be met, the maximum feasible horizontal distance, as determined by the local health department, shall be required, but shall not be less than ten feet.

(g) For those tracts of land that are specifically described in a plat or document on file with the Orange County Health Department prior to July 22, 1999, the requirements of .1946(5) shall not apply.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. January 1, 1990.

**.1952 SEPTIC TANK, EFFLUENT FILTER, DOSING TANK AND LIFT STATION DESIGN**

(a) A septic tank or dosing tank shall be watertight, structurally sound, and not subject to excessive corrosion or decay. Septic tanks shall be of two-compartment design. The inlet compartment of a two-compartment tank shall hold between two-thirds and three-fourths of the total tank capacity. Septic tanks and pump tanks shall be installed on a level, smooth, and stable base. When necessary, a 4" layer of washed stone shall be used to provide a base for the tank. Septic tanks shall have an approved effluent filter and access devices. The effluent filter shall function without a bypass of unfiltered wastewater, sludge, or scum. The effluent filter case shall be designed to function as a sanitary tee with the inlet extending down to between 25 and 40 percent of the liquid depth. The requirement(s) for an effluent filter and access devices shall apply to septic tanks for which a Construction Authorization is issued on or after January 1, 1999. A properly designed dosing siphon or pump shall be used for discharging sewage effluent into nitrification lines when the total length of such lines exceeds 750 linear feet in a single system and as required for any pressure-dosed system. When the design daily flow from a single system exceeds 3,000 gallons per day or when the total length of nitrification lines exceeds 2,000 linear feet in a single system, alternating siphons or pumps shall be used which shall discharge to separate nitrification fields. The dose volume from pump or siphon systems shall be of such design so as to fill the nitrification lines from 66 percent to 75 percent of their capacity at each discharge except as required for low-pressure distribution systems. The discharge

rate from dosing systems shall be designed to maximize the distribution of the effluent throughout the nitrification field. Pressurized distribution systems shall be used when specified by the Construction Authorization. Septic tanks shall have access risers with covers extending above finished grade to provide access to each compartment and sanitary tee or effluent filter for the purpose of inspection, maintenance, and septage removal. All access risers shall be designed, installed and maintained to prevent surface water inflow. Joints between the tank and riser sections shall be watertight. The access riser opening shall be adequate to accommodate the installation and removal of the septic tank lids and filter device. All dosing tanks shall have a properly functioning high-water alarm. The alarm shall be audible and visible by system users and constructed and installed to conform with NEMA 4X for electrical equipment in wet locations and shall be located adjacent to the dosing tank unless otherwise specified by the OCHD. The alarm circuit shall be provided ahead of any pump or control overload protection device and shall be provided with a manual disconnect in a watertight, corrosion-resistant outside enclosure (NEMA 4X or equivalent) adjacent to the dosing tank.

(b) Minimum liquid capacities for septic tanks shall be in accordance with the following:

(1) Residential Septic Tanks (for each individual residence or dwelling unit):

| Number of Bedrooms | Minimum Liquid Capacity | Equivalent Capacity Per Bedroom |
|---|---|---|
| 3 or less | 1000gallons | 330 gallons |
| 4 | 1200 gallons | 300 gallons |
| 5 | 1500 gallons | 300 gallons |

For individual residences with more than five bedrooms, the liquid capacity of the septic tank shall be designed in accordance with the following: $V = 200B + 500$; where V is the liquid capacity of the septic tank and B is the number of bedrooms.

(2) Septic tanks for large residences, multiple dwelling units, or places of business or public assembly shall be in accordance with the following:

(A) The minimum liquid capacity of septic tanks for places of business or places of public assembly with a design sewage flow of 600 gallons per day or less shall be determined in accordance with the following: $V = 2Q$; where V is the liquid capacity of the septic tank and Q is the design daily sewage flow.

(B) For multiple-family residences, individual septic tank systems serving two or more residences, or any place of business or public assembly where the design sewage flow is greater than 600 gallons per day, but less than 1,500 gallons per day, the liquid capacity of the septic tank shall be designed in accordance with the following: $V = 1.67Q + 500$; where V is the liquid capacity of the septic tank and Q is the design daily sewage flow. The minimum liquid capacity of a septic tank serving two or more residences shall be 1,500 gallons.

(C) Where the design sewage flow is between 1,500 gallons per day and 4,500 gallons per day, the liquid capacity of the septic tank shall be designed in accordance with the following: $V = 0.75Q + 1,125$; where V is the liquid capacity of the septic tank and Q is the design daily sewage flow.

(D) Where the design sewage flow exceeds 4,500 gallons per day, the septic tank shall be designed in accordance with the following: $V = Q$; where V is the liquid capacity of the septic tank and Q is the design daily sewage flow.

(E) The minimum liquid capacity requirements of Subparagraph (b)(2) of this Rule shall be met by use of a single two-compartment septic tank or by two tanks installed in series, provided the first tank is constructed without a baffle wall and contains at least two-thirds of the total required liquid capacity.

(3) The minimum capacity of any septic tank shall be 1000 gallons.

(4) When garbage grinders, are installed prior to a septic tank, two septic tanks installed in series, each containing an approved effluent filter and sized and constructed in accordance with this section, shall be required. Garbage grinders shall not be used in conjunction with a Low Pressure Pipe wastewater disposal system.

(5) When grinder pumps, or sewer lift pumps are installed prior to the septic tank, an additional septic tank (surge tank) of at least 1000 gallon capacity with an effluent filter shall be installed prior to the septic tank to receive the pump discharge flow.

(c) The following are minimum standards of design and construction of pump tanks and pump dosing systems:

(1) The liquid capacity of a pump tank shall be considered as the entire internal volume with no additional requirement for freeboard. Pump tanks shall have a minimum liquid capacity in accordance with the following:

(A) Pump tanks for systems with nitrification fields installed in Soil Group I, II, or III soils, as defined in these Rules, shall have a minimum liquid capacity equal to two-thirds of the required septic tank liquid capacity.

(B) Pump tanks for systems installed in Group IV soils shall have a minimum liquid capacity equal to the required septic tank liquid capacity.

(C) The minimum liquid capacity of any pump tank shall be 1000 gallons and shall also provide for the following capacities:

i. coverage of the pump at the off-elevation

ii. dosing volume as required by the system design, and

iii. 24 hour emergency storage above the high-water activation

(D) The emergency storage capacity requirement is determined based on the type of facility served, the classification of surface waters which would be impacted by a pump tank failure, and the availability of standby power devices and emergency maintenance personnel. The emergency storage capacity shall be the freeboard space in the pump tank above the high-water alarm activation level plus the available freeboard space in previous tankage and in the collection system below the lowest ground elevation between the pump tank and the lowest connected building drain invert. The minimum emergency storage capacity for residential systems and other systems in full-time use on sites draining into WS-I, WS-II, WS-III, SA, SB, and B waters shall be 24 hours, without standby power, or 12 hours with standby power manually activated, or four hours with standby power automatically activated or with a high-water alarm automatically contacting a 24-hour maintenance service. The minimum emergency storage capacity for systems not in full-time use and for all systems at sites draining into all other surface waters shall be 12 hours without standby power, or eight hours with standby power manually activated, or four hours with standby power automatically activated or with a high-water alarm automatically contacting a 24-hour maintenance service.

(E) Notwithstanding Paragraphs (c)(1)(A)-(D), other criteria for pump tank capacity may be approved by the local health department and the State for raw sewage lift stations, pressure sewer systems, and systems with design flows exceeding 3,000 gallons per day.

(2) The effluent pump shall be capable of handling at least one-half inch solids and designed to meet the discharge rate and total dynamic head requirements of the effluent distribution system. The pump shall be listed by Underwriter's Laboratory or an equivalent third party electrical testing and listing agency, unless the proposed pump model is specified by a registered professional engineer. The pump intake shall be at least 5 inches above the floor of the tank or in accordance with the pump manufacturer's recommendations.

(3) Pump discharge piping and fittings shall be of Schedule 40 PVC or stronger material, listed for potable water service by NSF or equivalent, and adequately secured. Fittings and valves shall be of compatible corrosion-resistant material. A threaded union, flange, or similar restrained joint disconnect device shall be provided in each pump discharge line. All submersible pumps shall be provided with a corrosion-resistant rope or chain attached to each pump enabling pump removal from the ground surface without requiring dewatering or entrance into the tank. Valves and disconnects shall be rated Schedule 80 or stronger material and located within 18 inches of the top of the riser access opening..

(4) Antisiphon holes (three-sixteenth inch minimum) shall be provided when the discharge or invert elevation of the distribution system is below the high-water alarm elevation in the pump tank, or in accordance with pump manufacturer's specifications. Check valves shall be provided when the volume of the supply line is greater than 25 percent of the dosing volume, or in accordance with pump manufacturer's specifications. An anti-airlock hole (three-sixteenth inch minimum) shall be provided in accordance with the pump manufacturer's specifications. When provided, the anti-airlock hole shall be located between the pump and the check valve.

(5) Electrical control floats or similar devices designed for detecting effluent levels shall be provided to control pump cycles. A separate level sensing device shall be provided to activate the high-water alarm. The level sensing devices shall be listed by Underwriter's Laboratory or an equivalent third party electrical testing and listing agency. Pump-off elevation shall be set to keep

the pump submerged at all times or in accordance with the manufacturer's specifications. A minimum of 12 inches of effluent shall be maintained in the bottom of the pump tank. The high-water alarm float shall be set to activate within six inches of the pump-on level. The lag pump float switch, where provided, shall be located at or above the high-water alarm activation level. Level sensing devices shall be supported utilizing durable, corrosion resistant material, and designed to be adjustable, removable, and replaceable from the ground surface without requiring dewatering, entrance into the tank, or pump removal.

(6) Pump and control circuits shall be provided with manual circuit disconnects within a watertight, corrosion-resistant, outside enclosure (NEMA 4X or equivalent) adjacent to the pump tank, securely mounted at least 12 inches above the finished grade. The pump cycles shall be controlled by an approved compatible control panel device which shall be listed by Underwriters Laboratory or an equivalent third party electrical testing and listing agency. The panel shall include: independent overload protection (if not integral with the pump motor), a circuit breaker, a motor contactor that breaks all current to the pump, a latching H-O-A (Hand-Off-Automatic) switch, a pump-run light, an elapsed time meter and event counter. The pump(s) shall be manually operable without requiring the use of special tools or entrance into the tank for testing purposes. Conductors shall be conveyed to the disconnect enclosure through waterproof, gasproof, and corrosion-resistant conduits, with no splices or junction boxes provided inside the tank. Wire grips, duct seal, or other suitable material shall be used to seal around wire and wire conduit openings inside the pump tank and disconnect enclosure.

(7) For systems requiring duplex and multiplex pumps, a control panel shall be provided which shall include short-circuit protection for each pump and for the control system, independent disconnects, automatic pump sequencer, hand-off-automatic (H-O-A) switches, run lights, and elapsed time meters and event counters for each pump. Alarm circuits and control circuits shall be independent of each other and shall be supplied ahead of any pump overload or short circuit protective devices. Additional panel components such as adjustable timer controls, pump event counters, and alarm event counters may be required as determined by the system type. The control panel shall be in a watertight, corrosion-resistant enclosure (NEMA 4X or equivalent)and shall be located adjacent to the pump tank securely mounted at least 4 feet above finished grade. The panel shall be protected from intense solar heating.

(8) Dual and multiple fields shall be independently dosed by separate pumps which shall automatically alternate. The supply lines shall be "H" connected to permit manual alternation between fields dosed by each pump. "H" connection valving shall be readily accessible from the ground surface, either from the pump tank access or in a separate valve chamber outside the pump tank. Other equivalent methods of dosing dual or multiple fields may be approved by the State.

(9) The pump tank shall have a properly functioning high-water alarm. The alarm circuit shall be supplied ahead of any pump overload and short circuit protective devices. The alarm shall be audible and visible by system users and weatherproof in an enclosure (NEMA 4X or equivalent).

(d) Siphons and siphon dosing tanks may be used when at least two feet of elevation drop can be maintained between the siphon outlet invert and the inlet invert in the nitrification field distribution system.

(1) Siphon dosing tanks shall be designed in accordance with the minimum dose requirements in this Rule and shall meet the construction requirements of this Section. The siphon dose tank shall provide at least 12 inches of freeboard, and the inlet pipe shall be at least three inches above the siphon trip level. The high-water alarm shall be set to activate within two inches of the siphon trip level.

(2) Siphon dosing tanks shall have a watertight access opening over each siphon with a minimum diameter of 24 inches and extending to finished grade and designed to prevent surface water inflow.

(3) The slope and size of the siphon discharge line shall be sufficient to handle the peak siphon discharge by gravity flow without the discharge line flowing full. Vents for the discharge lines shall be located outside of the dosing tank or otherwise designed to not serve as an overflow for the tank.

(4) All siphon parts shall be installed in accordance with the manufacturer's specifications. All materials must be corrosion-resistant, of cast iron, high density plastic, fiberglass, stainless steel, or equal.

(5) Siphon dosing tanks shall have a properly functioning high-water alarm that is audible and visible by system users and weatherproof if installed outdoors in an enclosure (NEMA 4X or equivalent).

(e) Raw sewage lift stations shall meet the construction standards of this Section and all horizontal setback requirements for sewage treatment and disposal systems in accordance with Rule .1950(a) of this Section unless the station is a sealed, watertight chamber, in which case the setback requirements for collection sewers in Rule .1950(e) of this Section shall apply. Sealed, watertight chambers shall be of a single, prefabricated unit, such as fiberglass, with sealed top cover, and preformed inlet and outlet pipe openings connected with solvent welds, O-ring seals, rubber boots, stainless steel straps, compression grommets, or equivalent. Dual pumps shall be provided for stations serving two or more buildings or for a facility with more than six water closets. Pumps shall be listed by Underwriter's Laboratories or an equivalent third party electrical testing and listing agency, and shall be grinder pumps or solids-handling pumps capable of handling at least three-inch spheres unless the station serves no more than a single water closet, lavatory, and shower, in which case two-inch solids handling pumps shall be acceptable. Minimum pump capacity shall be 2.5 times the average daily flow rate. The dosing volume shall be set so that the pump-off time does not exceed 30 minutes, except for stations serving single buildings, and pump run-time shall be from three to ten minutes at average flow. Pump station emergency storage capacity and total liquid capacity shall be determined in accordance with Paragraph (c)(1)(D) of this Rule except for a sealed, watertight chamber serving an individual building, in which case a minimum storage capacity of eight hours shall be required. All other applicable requirements for pump tanks and pump dosing systems in accordance with Paragraph (c) of this Rule shall also apply to raw sewage lift stations.

History Note: Authority G.S. 130A-335 (e)(f)(f1)[2nd];
Eff. July 1, 1982;
Amended Eff. August 1, 1991; January 1, 1990;
Temporary Amendment Eff. January 1, 1999;
Amended Eff. August 1, 2000.

**.1953 PREFABRICATED SEPTIC TANKS AND PUMP TANKS**

When prefabricated concrete tanks or tanks of other material are used, they shall be constructed in accordance with the plans which have been approved by the State and shall comply with all requirements of this Section. At least three complete sets of plans and specifications for the initial design of the prefabricated septic tank or subsequent changes and modifications shall be submitted to the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642. Separate plans and specifications for the design of each septic tank or pump tank to be produced shall be submitted to On-Site Water Protection Section for approval. These plans and specifications shall show the design of the septic tank in detail, including:

(1) All pertinent dimensions;
(2) Reinforcement material and location;
(3) Material strength;
(4) Liquid depth;
(5) Pipe penetration, joint material and method of sealing;
(6) Access manhole, riser, lid, and other proposed appurtenances to the septic tank;
(7) Approved effluent filter(s), filter support detail and filter access detail;
(8) Other design features.

History Note: Authority G.S. 130A--335 (e)) and (f)f1)[2nd];
Eff. July 1, 1982;
Amended Eff. January 1, 1990;
Temporary Amendment Eff. January 1, 1999;
Amended Eff. August 1, 2000.

**.1954 MINIMUM STANDARDS FOR PRECAST REINFORCED CONCRETE TANKS**

(a) The following are minimum standards of design and construction of precast reinforced concrete septic tanks:

(1) The minimum requirement for the liquid depth is 36 inches.
(2) A minimum of nine inches freeboard is required, the freeboard being the air space between the top of the liquid and the bottom side of the lid or cap of the tank.
(3) The length of the septic tank shall be at least twice as long as the width.
(4) Pipe penetrations in the tank shall be through approved resilient, watertight, sealed, non-corrosive and flexible connective sleeves [ASTM C923]. The pipe penetrations shall be precast to be

compatible with the connective sleeves. No pipe penetration points or openings shall be permitted below the tank liquid level.

(5) The inlet pipe in the tank shall be a straight pipe. The septic contractor shall be responsible for providing the tank inlet pipe which shall extend at least 6" from the exterior of the tank wall.

(6) The outlet shall be through an approved effluent filter secured in place in an effluent filter support case. The effluent filter support case shall serve as a functioning sanitary tee with the bottom inlet extending down between 25 and 40 percent of the liquid depth. The approved effluent filter and support case shall be furnished by the septic tank manufacturer. The invert of the outlet shall be at least two inches lower in elevation than the invert of the inlet.

(7) Other equivalent methods of supporting the effluent filter and for making the pipe penetrations shall be approved by the On-Site Wastewater Section.

(8) In order to obtain approval of an effluent filter the filter manufacturer shall submit to the State the following information with supporting documentation:

(a) For each septic tank system that is designed to treat 3000 gallons per day or less of sewage, a written certification that the effluent filter is designed, constructed, and performs in compliance with North Carolina General Statute 130A-335. 1(a)(1)(2)(3), and (4);

(b) Sizing as to capacity and wastewater strength for all models of proposed filters to be approved, and;

(c) Specifications for application, installation, operation, and maintenance.

(9) All tanks shall be manufactured with a cast-in-place partition so that the tank contains two compartments. The partition shall be located at a point not less than two-thirds nor more than three-fourths the length of the tank from the inlet end. The top of the partition shall be cast with an opening at least 12.5 square inches at the tank top in order to leave space for air or gas passage between compartments. The top and bottom halves of the partition shall be cast in such manner as to leave a water passage slot four inches high for the full width of the tank. The partition (both halves) shall be reinforced by the placing of six-inch by six-inch No. 10 gage welded reinforcing wire. The reinforcing wire shall be bent to form an angle of 90 degrees on the ends in order to form a leg not less than four inches long. When the wire is placed in the mold the four-inch legs should lay parallel with the sidewall wire and adjacent to it. It is recognized that there are other methods of constructing a partition or two-compartment tank. Any method other than the one described will be considered on an individual basis for approval by On-Site Wastewater Section. However, the tank wall thickness must remain not less than two and one-half inches thick throughout the tank except for pipe penetrations.

(10) Tank access openings must be provided in the tank top. Access shall be provided for cleaning or rodding out of the inlet pipe, for cleaning or clearing the air or gas passage space above the partition, for pumping of each compartment, and for the maintenance of the effluent filter. This shall be accomplished by locating two access openings with each having a minimum opening of 15 inches by 15 inches or 17 inches in diameter as the opening cuts the plane of the bottom side of the top of the tank or other equi-dimensional opening with at least 225 square inches.. The access lids shall be beveled on all sides in such manner as to accommodate a uniform load of 150 pounds per square foot without damage to the cover or the top of the tank. Access lids shall have a handle of steel or other rot-resistant material equivalent in strength to a No. 4 reinforcing rod (rebar). Handles shall be shaped like an inverted "U" and shall be anchored into the access lid having a clearance of at least 1.5 inches in height be 3.5 inches in width.

(11) The concrete tank and tank lid shall be reinforced by using a minimum reinforcing of six-inch by six-inch No. 10 gage welded steel reinforcing wire in the top, bottom ends, and sides of the tank. The reinforcing wire shall be lapped at least six inches. Concrete cover shall be required for all reinforcement. Reinforcement shall be placed to maximize the structural integrity of the tank. The tank, tank lid, riser and riser cover shall be able to withstand a uniform live loading of 150 pounds per square foot in addition to all loads to which an underground tank, riser, or riser cover is normally subjected, such as the dead weight of the concrete and soil cover, active soil pressure on tank walls, and the uplifting force of the ground water. Additional reinforcement shall be required when the loads on a concrete tank, riser, or riser cover are exceeded by subjecting it to vehicular traffic or when the top of the tank is placed deeper than three feet below the finished grade.

(12) The top, bottom, ends, and sides of the tank must have a minimum thickness of two and one-half inches.

(13) A minimum 28-day concrete compressive strength of 4000 pounds per square inch shall be used in the construction of the septic tank, concrete access riser and riser cover. The concrete shall achieve a minimum compressive strength of 3,500 pounds per square inch prior to removal of the tank from the place of manufacture. It shall be the responsibility of the manufacturer to certify that this condition has been met prior to shipment. A septic tank shall be subject to testing to ascertain the strength of the concrete prior to its being approved for installation. Recognized devices for testing the strength of concrete include a properly calibrated Schmidt Rebound Hammer or Windsor Probe Test. Accelerated curing in the mold by use of propane gas or other fuels is prohibited, except in accordance with accepted methods and upon prior approval of the State.

(14) After curing, tanks manufactured in two sections and as required, concrete risers shall be joined and sealed at the joint by using a mastic, butyl rubber, or other pliable sealant that is waterproof, corrosion-resistant, and approved for use in septic tanks. The sealant shall have a minimum size of one inch nominal diameter or equivalent. Before sealing, the joint shall be smooth, intact, and free of all deleterious substances. Tank halves shall be properly aligned to ensure a tight seal. The sealant shall be provided by the manufacturer.

(15) All tanks produced shall bear an imprint identifying the manufacturer, the serial number assigned to the manufacturer's plans and specifications approved by the State, and the liquid or working capacity of the tanks. This imprint shall be located to the right of the blockout made for the outlet pipe on the outlet end of the tank. All tanks shall also be permanently marked with the date of manufacture adjacent to the tank imprint or on the top of the tank directly above the imprint.

(16) Risers and access covers shall have a clear opening sized to allow for maintenance and removal and replacement of the tank lid and internal devices of the septic tank and shall not allow accidental entry. The access cover and tank lid shall be designed, constructed, and maintained to prevent unauthorized access and shall remain in place. Riser sections shall be sealed watertight to each other and where they join the top of the septic tank, and constructed to prevent water inflow through the lid or cover.

(17) Prior to backfilling, the local health department shall make a finding that a septic tank is watertight if the seam is located below the liquid level of the tank, if the tank is used in conjunction with a pump tank, or if the tank is located within 100 feet of a well. For septic tanks with the seam located below the liquid level, the finding shall be made after placement of the tank.

(18) Tanks shall be installed level and shall be evenly supported by a minimum of 4" layer of washed stone.

(b) Pump tanks shall meet the construction requirements of Paragraph (a) of this Rule with the following modifications.

(1) Tanks shall be cast with a single compartment, or, if a partition is provided, the partition shall be cast to contain a minimum of two four-inch diameter circular openings, or equivalent, located no more than 12 inches above the tank bottom.

(2) There shall be no requirement as to tank length, width, or shape, provided the tank satisfies all other requirements of this Section.

(3) The invert of the inlet openings shall be located within 12 inches of the tank top. No freeboard shall be required in the pump tank.

(4) After joining, tanks with the seam located below the liquid level, shall be plastered along the joint with hydraulic cement, cement mortar, or other waterproofing sealant. Other methods of waterproofing tanks may be used as specifically approved in the plans and specifications for the tank. Prior to backfilling, the local health department shall make a finding that the pump tank is watertight. It shall be the responsibility of the system installer to provide the necessary materials and equipment to make this determination. The testing shall be conducted in accordance with accepted standards and methods as determined by the OCHD.

(5) Tanks shall be vented if located more than 150 feet from the facility and accessible for routine maintenance. A watertight access riser with removable lid shall be provided over the pump with a minimum diameter of 24 inches. The access riser shall extend at least to six inches above finished grade and be designed and maintained to prevent surface water inflow. Larger or multiple access risers shall be provided when two or more pumps are required. Pumps shall be removable without requiring entrance into the tank. Riser covers and electrical controls shall be secured against

unauthorized access. Risers shall be joined to the tank top and sealed in accordance with Paragraphs (a)(14) and (b)(4) of this Rule.

(6) All pump tanks shall bear an imprint identifying the manufacturer, pump tank serial number assigned by the Division of Environmental Health, and the capacity of the tank. The imprint shall be located to the left of the outlet blockout. All tanks shall also be permanently marked with the date of manufacture adjacent to the tank imprint or on the top of the tank directly above the imprint.

(c) Plans for prefabricated tanks, risers and riser covers, other than those approved under Paragraphs (a) or (b) of this Rule shall be approved on an individual basis as determined by the information furnished by the designer which indicates the tank, riser or riser cover will provide equivalent effectiveness as those designed in accordance with the provisions of Paragraphs (a) and (b) of this Rule.

(d) Septic tanks and pump tanks which are constructed in-place shall designed by a professional engineer and approved by the State.

(e) Manufacturers of septic tanks, effluent filters, pump tanks, risers, and riser locators shall comply with the General Statutes, this Section, and Approval conditions. If the approved products or materials are found to be in non-compliance, the Operation Permit shall not be issued or shall be denied. The State shall suspend or revoke the product approval upon a finding that the information submitted is falsified, the product has been subsequently altered, or subsequent experience with the product results in altered conclusions about its design or performance. Suspension or revocation of the product approval shall not affect systems previously installed pursuant to the approval.

History Note: Authority G.S. 130A-335 (e)(f)f1)[2nd];
Eff. July 1, 1982;
Amended Eff. August 1, 1991; January 1, 1990;
Temporary Amendment Eff. January 1, 1999;
Amended Eff. August 1, 2000.

**.1955 DESIGN AND INSTALLATION CRITERIA FOR CONVENTIONAL SEWAGE SYSTEMS**

(a) Conventional septic tank systems shall utilize a septic tank of approved construction with an approved effluent filter and support case, access devices, and design volume which provides primary treatment of the sewage in accordance with the provisions of these Rules. The effluent filter support case shall be solvent welded to a PVC Schedule 40 outlet pipe with a minimum diameter of three inches inserted through the outlet connective sleeve creating a watertight and mechanically sound joint and shall extend at least 24 inches beyond the tank outlet. The filter and support case shall be installed and maintained in accordance with the filter manufacturer's specifications. The effluent filter shall be accessible without the operator entering the septic tank and removable by hand. The effluent filter shall be secured in the support case and located under the outlet access opening or manhole. When the top of the septic tank or access manhole is installed below finished grade, the location of each access opening or manhole shall be visibly marked at finished grade. The visible marker(s) shall be located over or within a five foot radius of each access opening, the marker(s) shall indicate location of tank access opening(s) or manhole(s). The access riser may serve as the visible marker. The filtered effluent from the septic tank shall be conveyed to an approved nitrification line where the soil provides for final treatment and disposal of the sewage.

(b) Table II shall be used in determining the maximum long-term acceptance rate for septic tank systems of conventional trench design. The long-term acceptance rate shall be based on the most hydraulically limiting naturally occurring soil horizon within three feet of the ground surface or to a depth of one foot below trench bottom, whichever is deeper.

TABLE II

| SOIL GROUP | SOIL TEXTURE CLASSES (USDA CLASSIFICATION | | LONG-TERM ACCEPTANCE RATE gpd/ft$^2$ |
|---|---|---|---|
| I | Sands (With S or PS structure and clay mineralogy) | Sand<br>Loamy Sand | 1.2 - 0.8 |

| | | | |
|---|---|---|---|
| II | Coarse Loams (With S or PS structure and clay mineralogy) | Sandy Loam<br>Loam | 0.8 - 0.6 |
| III | Fine Loams (With S or PS structure and clay mineralogy) | Sandy Clay Loam<br>Silt Loam<br>Clay Loam<br>Silty Clay Loam<br>Silt | 0.6 - 0.3 |
| IV | Clays (With S or PS structure and clay mineralogy) | Sandy Clay<br>Silty Clay<br>Clay | 0.4 - 0.1 |

The long-term acceptance rate shall not exceed the mean rate for the applicable soil group for food service facilities, meat markets, and other places of business where accumulation of grease can cause premature failure of a soil absorption system. Long-term acceptance rates up to the maximum for the applicable soil group may be permitted for facilities where data from comparable facilities indicates that the grease and oil content of the effluent will be less than 30 mg/l and the chemical oxygen demand (COD) will be less than 500 mg/l.

(c) The design daily sewage flow shall be divided by the long-term acceptance rate to determine the minimum area of nitrification trench bottom. The total length of the nitrification line shall be determined by dividing the required area of nitrification trench bottom by the trench width, not to exceed 36 inches. Trenches shall be located not less than three times the trench width on centers with a minimum spacing of five feet on centers.

(d) The local health department may permit the use of a bed system on sites where the soil texture can be classified into either Soil Groups I, II, or III, meeting the other requirements of this Section, and only on lots which are limited by topography, space, or other site-planning considerations. In such cases, the number of square feet of bottom area needed shall be increased by 50 percent over what would be required for a trench system. Nitrification lines shall be at least 18 inches from the side of the bed and shall have lines on three-foot centers. When the design daily flow exceeds 600 gallons per day, bed systems shall not be used.

(e) The pipe or tubing used between the septic tank and a gravity distribution device and the nitrification line shall be a minimum of three-inch nominal size Schedule 40 polyvinyl chloride (PVC), polyethylene (PE), or acrylonitrile-butadiene-styrene (ABS) or equivalent with a minimum fall of one-eighth inch per foot. The pipe shall be supported on a base of unexcavated soil or, when soil has been excavated below the pipe elevation, a concrete footing poured in place. All joints from the septic tank to the nitrification line shall be watertight.

(f) When four or six-inch diameter corrugated plastic tubing is used for nitrification lines, it shall be certified as complying with ASTM F 405, Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings, which is hereby adopted by reference in accordance with G.S. 150B-14(c). The corrugated tubing shall have three rows of holes, each hole between one-half inch and three-fourths inch in diameter, and spaced longitudinally approximately four inches on centers. The rows of holes may be equally spaced 120 degrees on centers around the periphery, or three rows may be located in the lower portion of the tubing, the outside rows being approximately on 120-degree centers. The holes may be located in the same corrugation or staggered in adjacent corrugations. Other types of pipe may be used for nitrification lines provided the pipe satisfies the requirements of this Section for hole size and spacing and the pipe has a stiffness equivalent to corrugated polyethylene tubing (ASTM F-405) or stronger. The nitrification line shall be located in the center of the nitrification trench.

(g) Nitrification trenches shall be constructed as level as possible but in no case shall the fall in a single trench bottom exceed one-fourth inch in 10 feet as determined by an engineer's level or equivalent. When surface slopes are greater than two percent, the bottom of the nitrification trenches shall follow the contour of the ground. An engineer's level or equivalent shall be used for installation and inspection. The nitrification trench shall not exceed a width of three feet and a depth of three feet, except as approved by the local health department.

(h) Rock used in soil absorption systems shall be clean, washed gravel or crushed stone and graded or sized in accordance with size numbers 3, 4, 5, or 6 of ASTM D-448 (standard sizes of coarse aggregate) which is hereby adopted by reference in accordance with G.S. 150B-14(c). Copies may be inspected in, and copies obtained from the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642. The rock shall be placed a minimum of one foot deep with at least six inches below the pipe and two inches over the pipe and distributed uniformly across the trench bottom and over the pipe.

(i) The soil cover over the nitrification field shall be to a depth of at least six inches. The finished grade over the nitrification field shall be landscaped to prevent the ponding of surface water and runoff of surface water shall be diverted away from the nitrification field. Soil cover above the original grade shall be placed at a uniform depth over the entire nitrification field, except as required to prevent the ponding of surface water, and shall extend laterally five feet beyond the nitrification trench. The soil cover shall be placed over a nitrification field only after proper preparation of the original ground surface. The type of soil cover and placement shall be approved by the local health department.

(j) Effluent distribution devices, including distribution boxes, flow dividers, and flow diversion devices, shall be of sound construction, watertight, not subject to excessive corrosion, and of adequate design as approved by the local health department. Effluent distribution devices shall be separated from the septic tank and nitrification lines by a minimum of two feet of undisturbed or compacted soil and shall be connected with Schedule 40 pipe. The device shall be placed level on a solid foundation of soil or concrete to prevent differential settlement of the device. The installer shall demonstrate that the distribution devices perform as designed.

(k) Grease traps or grease interceptors shall be required at food service facilities, meat markets, and other places of business where the accumulation of grease can cause premature failure of a soil absorption system. The following design criteria shall be met:

(1) The grease trap shall be plumbed to receive all wastes associated with food handling and no toilet wastes;

(2) The grease trap liquid capacity shall be sufficient to provide for at least five gallons of storage per meal served per day, or at least two-thirds of the required septic tank liquid capacity, or a capacity as determined in accordance with the following:

$$LC = D \times GL \times ST \times HR/2 \times LF$$

where LC = grease trap liquid capacity (gallons)
D = number of seats in dining area (for restaurants)
GL = gallons of wastewater per meal (1.5 single-service; 2.5 full service)
ST = storage capacity factor = 2.5
HR = number of hours open
LF = loading factor =(1.25 interstate highway
=1.0 other highways and recreational areas
=0.8 secondary roads)

(3) Four or more chambers must be provided, with total length-to-width ratio at least 6:1. Chamber opening and outlet sanitary tee must extend down at least 50 percent of the liquid depth.

(4) Access risers, with a minimum diameter of 24 inches, shall be provided over each chamber, outlet filter, and sanitary tee. The access riser shall extend 6" above finished grade and be designed and maintained to prevent surface water infiltration. The risers shall also have readily removable covers to facilitate inspection, filter maintenance, and grease removal.

(5) One tank or multiple tanks, in series, shall be constructed in accordance with Rules .1952, .1953, and .1954 of this Section, and the provisions of Paragraphs (k)(3) and (k)(4) of this Rule.

(6) Where it has been demonstrated that specially designed grease interceptors will provide improved performance, the grease trap liquid capacity may be reduced by up to 50 percent.

(7) Grease interception filters with openings no greater than 1/32" shall be required on the grease trap outlets as well as on the outlet of the septic tanks downflow from the grease trap.

(l) Stepdowns or drop boxes may be used where it is determined by the local health department that topography prohibits the placement of nitrification trenches on level grade. Stepdowns shall be constructed of two linear feet of undisturbed soil and constructed to a height which fully utilizes the upstream nitrification trench. Effluent shall be conveyed over the stepdown through pipe as specified in (e) of this paragraph

Drop boxes shall be constructed so that the invert of the inlet supply pipe is one inch above the invert of the outlet supply pipe which is connected to the next lower drop box. The top of the trench outlet laterals, which allow effluent to move to the nitrification lines, shall be two inches below the invert of the outlet supply line. Area taken up by stepdowns and drop boxes shall not be included as part of the minimum area required for nitrification trench bottoms.

(m) Nitrification trenches shall be installed with at least one foot of naturally occurring soil between the trench bottom and saprolite, rock, or any soil horizon unsuitable as to structure, clay mineralogy or wetness. If the separation between the bottom of the nitrification trench and any soil wetness condition is less than 18 inches, and if more than six inches of this separation consists of Group I soils, a low pressure pipe system shall be required.

(n) If sewage effluent pumps are used, the applicable requirements of Rule .1952 of this Section shall apply.

(o) Collection sewers shall be designed and constructed in accordance with the following minimum criteria:

(1) Building drains and building sewers shall be in accordance with the state plumbing code and approved by the local building inspector.

(2) Pipe material shall be specified to comply with the applicable ASTM standards, with methods of joining and other special installation procedures specified which are appropriate for the pipe to be used.

(3) Gravity sewers shall be designed to maintain scour velocities of at least two feet per second with the pipe half full and a minimum of one foot per second at the peak projected instantaneous flow rate. Force mains shall be sized to obtain at least a two-foot per second scour velocity at the projected pump operating flow rate.

(4) Infiltration and exfiltration shall not exceed 100 gallons per day per inch diameter per mile of gravity sewer pipe or 20 gallons per day per inch diameter per mile of pressure pipe in force mains and supply lines.

(5) Three-foot minimum cover shall be provided for all sewers unless ferrous material pipe is specified. Ferrous material pipe or other pipe with proper bedding to develop design-supporting strength shall be provided where sewers are subject to traffic-bearing loads.

(6) Manholes shall be used for sewers at any bends, junctions, and at least every 425 feet along the sewer lines. Drop manholes are required where the inlet to outlet elevation difference exceeds 2.5 feet. Manhole lids shall be watertight if located below the 100-year flood elevation, within 100 feet of any public water supply source, or within 50 feet of any private water supply source or any surface waters classified WS-I, WS-II, WS-III, SA, SB, or B.

(7) Cleanouts may be used instead of manholes for four-inch and six-inch sewers serving one or two buildings or as otherwise allowed by the North Carolina Plumbing Code. When used, cleanouts are required at least every 50 feet for four-inch sewers and every 100 feet for six-inch sewers and at all junctions and bends which exceed 45 degrees.

(8) Additional ventilation provisions may be required for collection sewers. Air relief valves shall be provided as needed for force mains.

(p) Alternating dual field nitrification systems may be utilized where soils are limited by high clogging potentials (Soil Groups III and IV) and where the potential for malfunction and need for immediate repair is required. Nothing in this section shall eliminate the requirement for sufficient available space and repair area as required in .1945. Alternating dual nitrification fields shall be designed with two complete nitrification fields, each sized a minimum of 75 percent of the total area required for a single field and separated by an effluent flow diversion valve. The diversion valve shall be constructed to resist 500 pounds crushing strength, structurally sound, and shall be resistant to corrosion. Valves placed below ground level shall be provided with a valve box and suitable valve stem so that they may be operated from the ground surface.

(q) The system installer shall be responsible for ensuring that the soil conditions are suitable for system construction. No construction or backfilling of a system shall be conducted when soil conditions are wet enough to adversely affect soil structure or reduce permeability by smearing the trench walls.

(r) All roof drainage, foundation drainage, and surface water runoff shall be directed to an area that will ensure flow away from the wastewater system.

(s) The system owner shall be responsible for ensuring that the surface of the ground over the system is smooth and free of depressions and areas where water will pond. The system owner shall also ensure that an appropriate vegetative cover is established and maintained on the system drainfield.

History Note: Authority G.S. 130A-335(e) and (f)(f1)[2nd];);
Eff. July 1, 1982;

Amended Eff. August 1, 1991; January 1, 1990; August 1, 1988; February 1, 1987.
Temporary Amendment Eff. January 1, 1999
Amended Eff. August 1, 2000.

**.1956 MODIFICATIONS TO SEPTIC TANK AND OTHER WASTEWATER TREATMENT SYSTEMS**

The following are modifications to septic tank and other wastewater treatment systems or sites which may be utilized singly or in combination to overcome selected soil and site limitations. Except as required in this Rule, the provisions for design and installation of Rule .1955 and .1970 of this Section shall apply:

(1) SHALLOW SYSTEMS: Sites classified UNSUITABLE as to soil depth or soil wetness may be reclassified as PROVISIONALLY SUITABLE with respect to soil depth or soil wetness conditions by utilizing shallow placement of nitrification trenches in the naturally occurring soil. Shallow trenches may be used where at least 24 inches of naturally occurring soil are present above saprolite, rock, or soil wetness conditions and all other factors are PROVISIONALLY SUITABLE or SUITABLE. Effluent distribution devices shall be required as determined by the OCHD. Shallow trenches shall be designed and constructed to meet the vertical separation requirements in Rule .1955(m) or .1970 of this Section. The long-term acceptance rate shall be based on the most hydraulically limiting naturally occurring soil horizon within 24 inches of the ground surface or to a depth of one foot below the trench bottom, whichever is deeper. Soil cover above the original grade shall be placed at a uniform depth over the entire nitrification field and shall extend laterally five feet beyond the nitrification trench. The type and placement of soil cover shall be approved by the local health department.

(2) DRAINAGE AND RESTRICTIVE HORIZONS: Sites classified UNSUITABLE as to soil wetness conditions or restrictive horizons may be reclassified PROVISIONALLY SUITABLE as to soil wetness conditions or restrictive horizons when:

(a) Soils are Soil Groups I or II with SUITABLE structure, and clay mineralogy;

(b) Restrictive horizons, if present, are less than three inches thick or less than 12 inches from the soil surface;

(c) Modifications can be made to meet the requirements in Rule .1955(m) of this Section for the separation between the water table and the bottom of the nitrification trench at all times and when provisions are made for maintenance of the drainage systems;

(d) Easements are recorded and have adequate width for egress and ingress for maintenance of drainage systems serving two or more lots; and

(e) Maintenance of the drainage system is made a condition of any permit issued for the use or operation of a sanitary sewage system.

Drainage may be used in other types of soil when the requirements of Rule .1942, .1970 or .1948(d) in this Section are met.

(3) MODIFIED TRENCHES: Modified nitrification trenches or lines, including large diameter pipe (greater than four inches I.D.), and specially designed porous block systems may be permitted by the local health department as follows:

(a) GRAVELLESS TRENCHES: Gravelless nitrification trench systems may be substituted for conventional trench systems on any site found to be SUITABLE or PROVISIONALLY SUITABLE in accordance with Rules .1940 to .1948 of this Section to eliminate the need for gravel, minimize site disturbance, or for other site planning considerations. Gravelless nitrification trench systems shall not be used, however, where wastes contain high amounts of grease and oil, such as restaurants. Gravelless nitrification trench systems shall utilize pressure distribution of the effluentLarge diameter pipe systems and porous block systems may be permitted by the local health department as follows:

(i) Large diameter pipe systems shall consist of eight-inch or 10-inch (inside diameter), corrugated, polythylene tubing encased in a nylon, polyester, or nylon/polyester blend filter wrap installed in a nitrification trench, 12 or more inches wide and backfilled with soil classified as soil group I, II, or III. Nitrification area requirement shall be determined in accordance with Rules .1955(b) and .1955(c), or in Rule .1956(6)(b), Table III(a) of this Section, when applicable, with eight-inch tubing considered equivalent to a two-foot-wide conventional trench and 10-inch tubing considered equivalent to a two and one-half-foot-wide conventional trench. The long-term acceptance rate shall not exceed 0.8 gallons per day per square foot. Tubing and fittings shall comply with the requirements of ASTM F-667, "Standard Specification for Large Diameter Corrugated Polyethylene Pipe and Fittings," which is hereby incorporated by reference including any subsequent amendments and editions. Copies of the standards may be inspected at the On-Site Water

Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642, and copies may be downloaded from the Internet at http://www.astm.org, or obtained from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19438-2959, at a cost of $30.00. The corrugated tubing shall have two rows of holes, each hole between three-eighths and one-half-inch in diameter, located 120 degrees apart along the bottom half of the pipe (each 60 degrees from the bottom center line) and staggered so that one hole is present in the valley of each corrugation. The tubing shall be marked with a visible top location indicator, 120 degrees away from each row of holes. Filter wrap shall be spun, bonded, or spunlaced nylon, polyester, or nylon/polyester blend nylon filter wrap meeting the minimum requirements in Table III(a):

Table III(a): Minimum Filter Wrap Requirements for Large Diameter Pipe Systems

| PROPERTY | VALUE |
|---|---|
| Unit Weight | 1.0 ounce per square yard |
| Sheet Grab Tensile Strength | Machine Direction: 23 pounds |
| Trapezoid Tear Strength | Machine Direction: 6.2 pounds<br>Cross Direction: 5.1 pounds |
| Mullen Burst Strength | 40 pounds per square inch or<br>276 kilopascals |
| Frazier Air Permeability | 500 cubic feet per minute per square foot at pressure differential of 0.5 inches of water |

Corrugated tubing shall be covered with filter wrap at the factory and each joint shall be immediately encased in a black polyethylene sleeve which shall continue to encase the large diameter pipe and wrap until just prior to installation in the trench to prevent physical damage and ultraviolet radiation deterioration of the filter wrap. Large diameter pipe systems shall be installed in accordance with this Rule and the manufacturer's guidelines. The trench bottom and pipe shall be level (with a maximum fall of one inch in 100 feet). Rocks and large soil clumps shall be removed from backfill material prior to being used. Clayey soils (soil group IV) shall not be used for backfill. The near end of the large diameter pipe shall have an eight-inch by four-inch offset adapter (small end opening at top) suitable for receiving the pipe from the septic tank or distribution device and making a mechanical joint in the nitrification trench.

(ii) A Prefabricated, Permeable Block Panel System (PPBPS), utilizing both horizontal and vertical air chambers and constructed to promote downline and horizontal distribution of effluent, may be used under the following conditions:

(A) the soil and site criteria of this Section shall be met;

(B) in calculating the required linear footage for a PPBPS's nitrification field, the linear footage for the nitrification line as determined in Rule .1955 (b) and (c), or in Rule .1956 (6)(b), Table III(a) of this Section when applicable, shall be multiplied by 0.5 for a 16 inch PPBPS;

(C) installation of the PPBPS shall be in accordance with Rule .1955 except:

(I) the PPBPS trench shall be located not less than eight feet on centers;

(II) the installation shall be in accordance with the manufacturer's specifications; and

(III) the sidewalls of nitrification trenches placed in Group IV soils shall be raked to open pores which were damaged or sealed during excavation;

(D) where design sewage flow is more than 480 gallons per day, the system shall be pressure-dosed; and

(E) the long-term acceptance rate shall not exceed 0.8 gallons per day per square foot.

(b) Other types of nitrification trenches or lines may be approved by the local health department on a site-specific basis in accordance with Rule .1969 of this Section.

(4) INTERCEPTOR DRAINS: Sites classified as UNSUITABLE as to soil wetness conditions because of the presence of lateral water movement may be reclassified PROVISIONALLY SUITABLE as to soil wetness conditions when such water is intercepted and diverted to prevent saturation of the soil absorption system.

(5) STEEP SLOPES: Stable slopes greater than 30 percent may be reclassified as PROVISIONALLY SUITABLE when:

(a) The soil characteristics can be classified as SUITABLE or PROVISIONALLY SUITABLE to a depth of at least one foot below the bottom of the nitrification trench at the upslope side of the trench;

(b) Surface water runoff is diverted around the nitrification field if necessary to prevent scouring or erosion of the soil over the field; and

(c) The finished grade over the nitrification field site is returned to the original topography and seeded to establish a permanent vegetative cover, unless otherwise specified by the local health department.

(6) SAPROLITE SYSTEM: Sites classified UNSUITABLE as to soil depth, with saprolite present, may be reclassified PROVISIONALLY SUITABLE as to soil depth when:

(a) An investigation of the site using pits at locations specified by the local health department is conducted. The health department may require particle size analyses of the saprolite in accordance with .1941(a)(1)(F) of this section. The following physical properties and characteristics shall be present in the two feet of saprolite below the proposed trench bottom:

(i) the saprolite texture is sand, loamy sand, sandy loam, loam, or silt loam;

(ii) clay mineralogy is SUITABLE;

(iii) greater than two-thirds of the material has a moist consistence that is loose, very friable, friable, or firm;

(iv) the saprolite wet consistence is nonsticky or slightly sticky and nonplastic or slightly plastic;

(v) the saprolite is in an undisturbed, naturally occurring state; and

(vi) the saprolite has no open and continuous joints, quartz veins, or fractures that are relic of parent rock to a depth of two feet below the proposed trench bottom.

(b) Table III(b) is used in determining the long-term acceptance rate. The long-term acceptance rate shall be based on the most hydraulically limiting, naturally occurring saprolite to a depth of two feet below trench bottom.

Table III(b): Long-Term Acceptance Rates for Saprolite Systems

| SAPROLITE GROUP | SAPROLITE TEXTURAL CLASS | | LONG-TERM ACCEPTANCE RATE (gallons per day per square foot) |
|---|---|---|---|
| I | Sands | Sand | 0.8 – 0.6 |
| | | Loamy Sand | 0.7 – 0.5 |
| II | Loams | Sandy Loam | 0.6 – 0.4 |
| | | Loam | 0.4 – 0.2 |
| | | Silt Loam | 0.3 – 0.1 |

If a low pressure pipe system is used, the long-term acceptance rate in Table III(b) shall be reduced by one-half and the system shall be designed in accordance with Rule 1957(a) of this Section, except that Rule .1957 (a)(2)(B) and Rule .1957(a)(3) shall not apply. Other design criteria may also be used in conjunction with an advanced pretreatment system pursuant to Rule .1970. Saprolite textural classifications shall be determined from disturbed materials and determined by Rule .1941(a)(1) of this Section. Low-pressure distribution shall be used when the total length of nitrification lines exceeds 750 feet in a single system.

(c) The design daily flow does not exceed 1000 gallons.

(d) The nitrification field is constructed using nitrification trenches with a maximum width of three feet and a maximum depth of three feet on the downslope side of the nitrification trench. The bottom of a nitrification trench shall be a minimum of two feet above rock or saprolite that does not meet the requirements of Subparagraph (6)(a) of this Rule, or the requirements of Subparagraph (h)(2) of Rule .1970 in conjunction with an advanced pretreatment system. However, where SUITABLE or PROVISIONALLY SUITABLE soil underlies the trench bottom, this separation distance may be reduced by subtracting the actual soil depth beneath the trench

bottom from 24 inches to establish the minimum separation distance from the trench bottom to rock.

(e) The bottom of any nitrification trench is a minimum of two feet above any wetness condition.

(f) Surface and subsurface interceptor drains are required on sites with more slowly permeable horizons above the usable saprolite to intercept laterally flowing waters or perched waters.

Exceptions to the provisions of Rule .1950(a) found in Rule .1950 and .1951 of this Section shall not apply to systems installed pursuant to this Item [Rule .1956(6)]. Other saprolite systems may be approved on a site-specific basis in accordance with Rule .1948(d) or .1970 of this Section.

(7) SAND LINED TRENCH SYSTEM: Sites classified UNSUITABLE as to soil wetness, soil morphology, restrictive horizon or soil depth where a horizon with higher permeability underlies less permeable horizons, may be reclassified PROVISIONALLY SUITABLE as to soil wetness, soil morphology, restrictive horizon or soil depth (soil depth to parent material, not rock) when:

(a) An investigation of the site using pits or auger borings at locations specified by the local health department is conducted. The following physical properties and characteristics shall be present:

(i) if the receiving permeable horizon is deeper than five feet below the natural grade, the effluent is to receive pretreatment to TS-I or TS-II level prior to pressure dispersal in the sand lined trenches. If the receiving permeable horizon is encountered at depths of five feet or less below the natural grade, pretreatment to TS-I or TS-II level and pressure dispersal is not required;

(ii) the texture of the receiving permeable horizon is sand, loamy sand, sandy loam, loam, or silt loam;

(iii) the structure of the receiving horizon is classified as SUITABLE or PROVISIONALLY SUITABLE;

(iv) the moist consistence of the receiving permeable horizon is loose, very friable, friable, or firm;

(v) if the receiving permeable horizon has zones of heavier textured materials, these zones are discontinuous with an average thickness not exceeding 1/3 of the required thickness of the receiving permeable horizon;

(vi) if the texture of the receiving permeable horizon is sandy loam or loam, and the system design flow is greater than 600 gallons per day, the saturated hydraulic conductivity of the permeable horizon shall be field-determined; and

(vii) if the texture of the receiving permeable horizon is silt loam, the saturated hydraulic conductivity of the permeable horizon shall be field-determined.

(b) The minimum thickness required of the receiving permeable horizon is dependent upon the texture of the receiving horizon as follows:

(i) sand or loamy sand – 1 foot thick;

(ii) sandy loam or loam – 2 feet thick; or

(iii) silt loam – 3 feet thick.

(c) Table III (c) is used in determining the long-term acceptance rate (LTAR) for all sand-lined trench systems. The long-term acceptance rate shall be:

(i) the rate set forth in Table III(c), based on the most hydraulically limiting, naturally occurring soils overlying the permeable receiving layer, or

(ii) when the saturated hydraulic conductivity of the underlying horizons is required to be determined pursuant to Subitem (7)(a)(vi) or Subitem (7)(a)(vii) of this Rule, either the rate set forth in Table III(c), based on the most hydraulically limiting, naturally occurring soils overlying the permeable receiving layer, or 10 percent of the saturated hydraulic conductivity of the underlying permeable horizon (or 20 percent with TS-I or TS-II pretreatment), whichever is less.

Table III(c): Long-Term Acceptance Rates for Sand Lined Trench Systems

| SOIL GROUP | TEXTURAL CLASS OF MOST HYDRAULICALLY LIMITING OVERLYING SOIL HORIZON | DISTRIBUTION OR PRETREATMENT CONDITION | LONG-TERM ACCEPTANCE RATE (LTAR) (gallons per day per square foot, on trench bottom area basis)* |
|---|---|---|---|
| I | Sands (Sand, Loamy Sand) | Gravity Distribution | 0.7 – 0.9 |

| | | | |
|---|---|---|---|
| | | Pressure Dispersal | 0.8 – 1.2 |
| | | Pressure Dispersal and TS-I or TS-II pretreatment | 0.9 – 1.4 |
| II | Coarse Loams (Sandy Loam, Loam) | Gravity Distribution | 0.5 – 0.7 |
| | | Pressure Dispersal | 0.6 – 0.8 |
| | | Pressure Dispersal and TS-I or TS-II pretreatment | 0.7 – 1.0 |
| III | Fine Loams (Sandy Clay Loam, Silt Loam, Clay Loam, Silty Clay Loam, Silt) | Gravity Distribution | 0.2 - 0.4 |
| | | Pressure Dispersal | 0.3 – 0.6 |
| | | Pressure Dispersal and TS-I or TS-II pretreatment | 0.4 – 0.8 |
| IV | Clays (Clay, Sandy Clay, Silty Clay) | Gravity Distribution | 0.1 – 0.2 |
| | | Pressure Dispersal | 0.15 – 0.3 |
| | | Pressure Dispersal and TS-I or TS-II pretreatment | 0.2 – 0.4 |

*The LTAR for all sand-lined trench systems shall not exceed the loading rates set forth in this table or 10 percent of the saturated hydraulic conductivity of the underlying permeable horizon (or 20 percent with TS-I or TS-II pretreatment) when required to be determined pursuant to Subitem (7)(a)(vi) or Subitem (7)(a)(vii) of this Rule, whichever is less. There shall be no reduction in trench length compared to a conventional gravel trench when accepted or innovative nitrification trenches are used.

If a low pressure pipe system is used, the system shall be designed in accordance with Rule .1957(a) of this Section, except that Rule .1957 (a)(2)(B) and Rule .1957(a)(3) shall not apply and trenches shall be a maximum of three feet in width. Textural classifications of the overlying material shall be determined from disturbed materials and determined by Rule .1941(a)(1) of this Section. Pressure distribution shall be used when the total length of nitrification lines exceed 600 linear feet in a single system and pressure dispersal such as LPP or drip irrigation shall be used when the total length of nitrification lines exceeds 1200 linear feet in a single system.

(d) A Certified Operator or a Public Management Entity with a Certified Operator is required for all sand lined trench systems, if required by Article 3 of G.S. 90A. A Public Management Entity with a Certified Operator, if required by Article 3 of G.S. 90A, shall be required for sand lined trench systems when drainage is utilized to lower the water table on a site.

(e) The sand lined trench system is classified as a type V system in accordance with Rule .1961 of this Section, except that the required inspection frequency shall be at least once per year by the operator and greater frequency for advanced pretreatment and pressure dispersal systems as required by Rule .1961, Rule .1969 or Rule .1970.

(f) The design daily flow does not exceed 1000 gallons.

(g) The nitrification field is constructed using nitrification trenches with a maximum width of three feet. The bottom of the gravel portion of the sand lined trench shall be no deeper than 24 inches below finished grade.

(h) The sand lined trenches are constructed to extend into the permeable horizon. If the sand lined trench bottoms are deeper than five feet below the natural grade, the effluent shall receive pretreatment to TS-I or TS-II level prior to dispersal in the sand lined trench.

(i) Filter media used in the sand lined portion of the trench is sand or loamy sand in texture. If required by the local health department in the Construction Authorization, the installer shall provide written laboratory verification of the media textural classification and quality prior to the sand lined trench being installed. When laboratory analysis is required, the material shall be determined to be a clean, uncoated fine, medium, or coarse sand with at least 90 percent in sizes ranging from 0.1 to 1.0 millimeters, with no more than one percent smaller than 0.002 millimeters.

(j) Drainage is required when the sand lined trench is used and soil wetness conditions are present that are not related to lateral water movement. Drainage shall extend into the permeable layer. Drainage shall be maintained on the site to provide for 18 inches of separation between the water table and the bottom of the gravel portion of the trench. This separation distance may be reduced

to 12 inches if pressure dispersal is utilized, nine inches if advanced pretreatment meeting TS-I or TS-II is utilized and six inches if both pressure dispersal and TS-I or TS-II pretreatment are utilized.

(k) The drainage plan is prepared by a person or persons who are licensed or registered to consult, investigate, evaluate, plan or design wastewater systems, soil and rock characteristics, ground water hydrology, or drainage systems if required in G.S. 89C, 89E, 89F, or 90A Article 4. The drainage shall have an outlet accessed by gravity or by a designed pump drainage system. The outlet location and elevation must be shown with relative water level elevations and drainfield site elevations labeled on the drainage plan.

(l) Plans and specifications for a drainage system serving two or more lots are prepared in accordance with Rule .1938(c) of this Section.

(m) All required drainage components are considered to be a part of the wastewater system and subject to ownership and easement requirements in Item (2)(d) of this Rule and Paragraphs (c) and (j) of Rule .1938.

(n) Side ditches or surface swales in a U shape around the system are used to facilitate surface water removal. Swales shall be at least 18 inches deep and located at least 25 feet from the outer edge of the nitrification trenches.

(o) The drainfield area is crowned at a minimum grade of one percent as measured from the centerline of the drainfield to the top of the bank of the side ditches or surface swales.

(p) No depressions are allowed over the drainfield area, including no linear depressions shall be allowed over the trenches.

Exceptions to the provisions of Rule .1950(a) found in Rule .1950 and .1951 of this Section shall not apply to systems installed pursuant to this Item [Rule .1956(7)]. Other sand lined trench systems may be approved by the local health department on a site-specific basis in accordance with Rule .1948(d) of this Section.

History Note: Authority G.S. 130A-335(e) and (f);
Eff. July 1, 1982;
Amended Eff. August 1, 2007; November 1, 1999; July 1, 1995; April 1, 1993; January 1, 1990; August 1, 1988.

**.1957 DESIGN CRITERIA FOR DESIGN OF ALTERNATIVE SEWAGE SYSTEMS**

(a) LOW-PRESSURE PIPE SYSTEMS: Low-pressure pipe (LPP) systems with a two to five-foot pressure head may be utilized on sites which are SUITABLE or PROVISIONALLY SUITABLE for conventional or modified systems and on sites where soil and site conditions prohibit the installation of a conventional or modified septic tank or other wastewater treatment system if the requirements of this Paragraph are met.

(1) The LPP system shall consist of the following basic components:

(A) a network of small-diameter (one to two inches) perforated PVC Schedule 40 pipe or equivalent placed in naturally occurring soil at shallow depths (generally 12 to 18 inches) in narrow trenches not less than eighteen inches in width and spaced not less than six feet on center. Trenches shall include at least five inches of washed stone or washed gravel as specified in .1955 (h) below the pipe and two inches above the pipe; and four inches of soil cover. The lateral pipes shall be placed inside 4" pipe as specified in .1955(f)

(B) a properly designed, two-compartment septic tank or other approved pretreatment system, a dosing tank, a pump, and an electrical pump cycling control system;

(C) a watertight supply manifold pipe, of Schedule 40 PVC or equivalent, for conveying effluent from the dosing chamber to the low-pressure network.

(2) The soil and site criteria for LPP systems shall meet the following minimum requirements:

(A) LPP nitrification fields shall not be installed on slopes in excess of ten percent unless special design procedures to assure proper distribution of effluent over the nitrification field are approved. Landscaping of the LPP distribution field shall be constructed to shed rainwater or runoff. All other requirements of Rule .1940 of this Section shall be met.

(B) Site suitability for an LPP system shall be based on the first 24 inches of soil beneath the naturally occurring soil surface. This 24 inches shall consist of SUITABLE or PROVISIONALLY SUITABLE soil as determined in accordance with Rules .1941 through .1944 and .1956 of this Section.

(C) Location of the septic tank, other approved pretreatment unit, pumping or dosing chamber, and nitrification field shall be in accordance with Rule .1950 of this Section. Horizontal distances from the nitrification field shall be measured from a margin two and one-half feet beyond the lateral and manifold pipes.

(D) There shall be no soil disturbance of the site or repair area for an LPP system except the minimum required for installation.

(E) The available space requirements of Rule .1945 of this Section shall apply.

(3) Table IV shall be used in determining the long-term acceptance rate for LPP systems. The long-term acceptance rate shall be based on the most hydraulically limiting, naturally occurring soil horizon within two feet of the ground surface or to a depth of one foot below the trench bottom, whichever is deeper.

TABLE IV

| SOIL GROUP | SOIL TEXTURAL CLASSES (USDA CLASSIFICATION) | | LONG-TERM ACCEPTANCE RATE gpd/ft$^2$ |
|---|---|---|---|
| I | Sands (With S or PS structure and clay mineralogy) | Sand<br>Loamy Sand | 0.6 - 0.4 |
| II | Coarse Loams (With S or PS structure and clay mineralogy) | Sandy Loam<br>Loam | 0.4 - 0.3 |
| III | Fine Loams (With S or PS structure and clay mineralogy) | Sandy Clay Loam<br>Silt Loam<br>Clay Loam<br>Silty Clay Loam<br>Silt | 0.3 - 0.15 |
| IV | Clays (with S or PS structure and clay mineralogy) | Sandy Clay<br>Silty Clay<br>Clay | 0.2 - 0.05 |

LPP systems shall not be used for food service facilities, meat markets, and other places of business where accumulation of grease can cause premature failure of a soil absorption system.

(4) In calculating the number of square feet for the nitrification field, the design sewage flow shall be divided by the long-term acceptance rate from Table IV. In calculating the minimum length of trenches in the LPP system, the total square footage of the nitrification field shall be divided by five feet.

(5) Low-pressure systems shall be designed for uniform distribution of effluent. The trenches shall be level and parallel to the ground elevation contours.

(A) The maximum lateral length shall yield no more than a ten-percent difference in discharge rate between the first and last hole along the lateral.

(B) Minimum hole size shall be 3/16-inch for at least two-thirds of the field lateral lines. Smaller holes (no less than 5/32-inch) may be used in no more than one-third of the lateral lines where necessary to balance flow distribution on sloping sites.

(C) Maximum hole spacing shall be as follows: Soil Group I, five feet; Soil Group II, six feet; Soil Group III, eight feet; and Soil Group IV, ten feet.

(D) The following design provisions are required for sloping sites:

(i) Separately valved manifolds are required for all subfield segments where the elevation difference between the highest and lowest laterals exceeds three feet.

(ii) The hole spacing, hole size or both shall be adjusted to compensate for relative head differences between laterals branching off a common supply manifold and to compensate for the bottom lines receiving more effluent at the beginning and end of a dosing cycle. The lateral network shall be designed to achieve a ten to 30 percent higher steady state (pipe full) flow rate into the upper lines, relative to the lower lines, depending on the amount of elevation difference.

(iii) Maximum elevation difference between the highest and lowest laterals in a field shall not exceed ten feet unless the flow is hydraulically split between subfield segments without requiring simultaneous adjustment of multiple valves.

(E) Turn-ups shall be provided with a threaded male adapter and cap at the ends of each lateral and manifold, constructed of Schedule 40 PVC pipe or equivalent, and protected with sleeves of larger diameter pipe (six inches or greater). Turn-ups and sleeves shall either:

(i) extend at least 12" above finish grade, or

(ii) in mowed lawn areas, may terminate at finish grade provided a rigid sleeve and cover is provided with a poured concrete apron measuring at least 14" in diameter and 6" in depth around the sleeve.

(F) The supply manifold shall be sized large enough relative to the size and number of laterals served so that friction losses and differential entry losses along the manifold do not result in more than a 15 percent variation in discharge rate between the first and last laterals.

(i) The ratio of the supply manifold inside cross sectional area to the sum of the inside cross sectional areas of the laterals served shall exceed 0.7:1.

(ii) The reduction between the manifold and connecting laterals shall be made directly off the manifold using reducing tees.

(iii) Cleanouts to the ground surface shall be installed at the ends of the supply manifold.

(G) Gate valves shall be provided for pressure adjustment at the fields whenever the supply line exceeds 50 feet in length. Valves shall be readily accessible from the ground surface and adequately protected in covered valve boxes.

(6) Septic tanks, pump tanks, pump dosing systems, siphons, and siphon dosing tanks shall be provided in accordance with Rule .1952 of this Section.

(A) Design flow rate shall be based upon delivering two feet to five feet of static pressure head at the distal end of all lateral lines.

(B) Dose volume shall be between five and ten times the liquid capacity of the lateral pipe dosed, plus the liquid capacity of the portions of manifold and supply lines which drain between doses.

(b) FILL SYSTEM: A fill system (including new and existing fill) is a system in which all or part of the nitrification trench(es) is installed in fill material. A fill system, including an existing fill site, may be approved where soil and site conditions prohibit the installation of a conventional or modified septic tank, or other wastewater treatment system if the requirements of this Paragraph are met.

(1) Fill systems may be installed on sites where at least the first 24 inches below the naturally occurring soil surface consists of soil that is suitable or provisionally suitable with respect to soil structure and clay mineralogy, and where organic soils, restrictive horizons, saprolite or rock are not encountered. Further, no soil wetness condition shall exist within the first 24 inches below the naturally occurring soil surface and a groundwater lowering system shall not be used to meet this requirement. Fill systems shall not be utilized on designated wetlands unless the proposed use is specifically approved in writing by the designating agency. The following requirements shall also be met:

(A) Nitrification trenches shall be installed with at least 24 inches separating the trench bottom and any soil horizon unsuitable as to soil structure, clay mineralogy, organic soil, rock or saprolite. However, if a low pressure pipe system is used, the minimum separation distance shall be 18 inches.

(B) Nitrification trenches shall be installed with at least 18 inches separating the trench bottom and any soil wetness condition. This separation requirement for soil wetness

conditions may be met with the use of a groundwater lowering system only in Soil Groups I and II, with suitable structure and clay mineralogy. However, if a low pressure pipe system is used, the minimum separation distance shall be 12 inches.

(C) Systems shall be installed only on sites with uniform slopes less than 15 percent. Storm water diversions and subsurface interceptor drains or swales may be required upslope of the system.

(D) The long-term acceptance rate shall be based on the most hydraulically limiting soil horizon within 18 inches of the naturally occurring soil surface or to a depth one foot below the trench bottom, whichever is deeper. The lowest long-term acceptance rate for the applicable soil group shall be used for systems installed pursuant to this Rule. However, the long-term acceptance rate shall not exceed 1.0 gallons per day per square foot for gravity distribution or 0.5 gallons per day per square foot for low-pressure pipe systems installed on sites with at least 18 inches of Group I soils below the naturally occurring soil surface or to a depth of one foot below the trench bottom, whichever is deeper.

(E) If the fill system uses low-pressure pipe distribution, all the requirements of Paragraph (a) of this Rule, except Paragraph (a)(2)(B), shall apply. Systems with a design daily flow greater than 480 gallons per day shall use low-pressure pipe distribution.

(F) Fill material shall have such soil texture to be classified as sand or loamy sand (Soil Group I) up to the top of the nitrification trenches. The final six inches of fill used to cover the system shall have a finer texture (such as Group II, III) for the establishment of a vegetative cover. Existing fill material shall have no more than ten percent by volume of fibrous organics, building rubble, or other debris and shall not have discreet layers containing greater than 35 percent of shell fragments.

(G) Where fill material is added, the fill material and the existing soil shall be mixed to a depth of six inches below the interface. Heavy vegetative cover or organic litter shall be removed before the additional fill material is incorporated.

(H) The fill system shall be constructed as an elongated berm with the long axis parallel to the ground elevation contours of the slope.

(I) The side slope of the fill shall not exceed a rise to run ratio of 1:4. However, if the first 18 inches below the naturally occurring soil surface is Group I soil, the side slope of the fill shall not exceed a rise to run ratio of 1:3.

(J) The outside edge of the nitrification trench shall be located at least five feet horizontally from the top of the side slope.

(K) The fill system shall be shaped to shed surface water and shall be stabilized with a vegetative cover against erosion.

(L) The setback requirements shall be measured from the projected toe of the slope. However, if this setback cannot be met, the setback requirements shall be measured from a point five feet from the nearest edge of the nitrification trench if the following conditions are met:

(i) Slope of the site shall not exceed two percent;

(ii) The first 18 inches of soil beneath the naturally occurring soil surface shall consist of Group I soils;

(iii) The lot or tract of land was recorded on or before December 31, 1989; and

(iv) A condition is placed upon the Permits and Authorization to require connection to a public or community sewage system within 90 days after such system is available for connection and after it is determined that 300 feet or less of sewer line is required for connection.

(M) The available space requirements of Rule .1945 of this Section shall apply.

(2) An existing fill site that does not meet the requirements of Paragraph (b)(1) of this Rule may be utilized for a sanitary sewage system if the following requirements are met:

(A) Substantiating data are provided by the lot owner (if not readily available to the local health department) indicating that the fill material was placed on the site prior to July 1, 1977.

(B) The fill material placed on the site prior to July 1, 1977 shall have such soil texture to be classified as sand or loamy sand (Group I) for a depth of at least 24 inches below the existing ground surface. This fill material shall have no more than ten percent by volume

of fibrous organics, building rubble, or other debris. This fill shall not have discreet layers containing greater than 35 percent of shell fragments. However, if at least 24 inches of Group I fill material was in place prior to July 1, 1977, additional fill with soil texture classified as Group I may be added to meet the separation requirements of Paragraph (b)(2)(D) of this Rule.

(C) Soil wetness conditions, as determined by Rule .1942(a) in this Section, are 18 inches or greater below the ground surface of the fill placed on the lot prior to July 1, 1977. This requirement shall be met without the use of a groundwater lowering system.

(D) Low-pressure pipe distribution shall be used and shall meet all the requirements of Paragraph (a) of this Rule, except (a)(2)(B). The long-term acceptance rate shall not exceed 0.5 gallons per day per square foot. However, for existing fill sites with 48 inches of Group I soils, conventional nitrification trenches utilizing a maximum long-term acceptance rate of 1.0 gallons per day per square foot may be installed in lieu of low-pressure pipe systems. The minimum separation distance between the trench bottom and any soil wetness condition or any soil horizon unsuitable as to soil structure, clay mineralogy, organic soil, rock, or saprolite shall be 24 inches for low pressure pipe systems and 48 inches for conventional systems. This separation requirement may be met by adding additional Group I soil, but shall not be met with the use of a groundwater lowering system. Where fill is to be added, the requirements of Paragraphs (b)(1)(C), (F), (G), (H), (J), (K), of this Rule and the following requirements shall be met:

(i) The side slope of the fill shall not exceed a side slope ratio of 1:3, and;

(ii) The setback requirements shall be measured from the projected toe of the slope. However, if this setback cannot be met, the setback requirements shall be measured from a point five feet from the nearest edge of the nitrification trench if the following conditions are met:

(I) Slope of the site shall not exceed two percent;

(II) The lot or tract of land was recorded on or before December 31, 1989; and

(III) A condition is placed upon the Permits and Authorization to require connection to a public or community sewage system within 90 days after such system is available for connection and after it is determined that 300 feet or less of sewer line is required for connection.

(E) The available space requirements of Rule .1945 of this Section shall apply.

(F) The design flow shall not exceed 480 gallons per day.

(3) Other fill systems may be approved by the local health department on a site-specific basis in accordance with Rule .1948(d) of this Section.

(c) Residential Wastewater Treatment Systems (RWTS) that comply with the National Sanitation Foundation (NSF) Standard 40 for Class I residential wastewater treatment systems shall be designed constructed and operated in accordance with this Rule to serve a design unit with a design flow rate of up to 1500 gallons per day, as determined in Rule .1949(a) or .1949(b) of this Section. RWTS shall not be used, however, where wastes contain high amounts of fats,grease and oil(30 mg/l or more), including restaurants and food service facilities. The strength of the influent wastewater shall be similar to domestic sewage with raw influent Biological Oxygen Demand (BOD) and suspended solids not to exceed 300 parts per million. RWTS performance, siting, sizing, installation, operation, monitoring, maintenance and reporting requirements shall comply with G.S. 130A-342 and .1970 NSF Standard 40 for Class I residential wastewater treatment systems is hereby incorporated by reference including any subsequent amendments and editions. Copies of the standards may be inspected at the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642, and copies may be obtained on-line at http://www.techstreet.com/nsfgate.html at a cost of ninety-five dollars ($95.00), or by mail from Techstreet, 777 East Eisenhower Parkway, Ann Arbor, MI 48108 at a cost of ninety-five dollars ($95.00) plus shipping and handling. RWTS shall bear the NSF mark and the NSF listed model number or shall bear the certification mark and listed model number of a third party certification program accredited by the American National Standards Institute (ANSI), pursuant to ANSI Policy and Procedures for Accreditation of Certification Programs to certify residential wastewater treatment systems in accordance with NSF Standard Number 40. The following conditions for approval, design, construction and installation of RWTS shall be met:

(1) An application shall be submitted in writing to the State for an RWTS, which shall include the following, as applicable:

(A) manufacturer's name, address, phone number, plant location(s), and contact information for manufacturer's licensed distributors in North Carolina and their current service areas;

(B) verification of current approval and listing of a NSF Standard 40 Class I system by the National Sanitation Foundation or other ANSI-accredited third party certification program;

(C) manufacturer's identifying name or logo, listed model number(s) and treatment capacity (in gallons per day) to be imprinted on unit;

(D) three legible copies of plans and specifications, and information required to evaluate any tanks as required pursuant to .1953; and

(E) fee payment as required by G.S. 130A-343(k)(6), by corporate check, money order or cashier's check made payable to: North Carolina On-Site Wastewater System Account or NC OSWW System Account, and mailed to the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642 or hand delivered to Rm. 1A-245, 2728 Capital Blvd., Raleigh, NC.

(2) The rated capacity of RWTS listed as complying with NSF Standard 40 shall not be less than the design daily flow as determined by Rule .1949(a) or .1949(b) of this Section.

(3) The following are minimum standards of design and construction of RWTS:

(A) No blockouts or openings shall be permitted below the liquid level of the RWTS.

(B) RWTS shall be resilient, watertight, corrosion resistant structures, with all components needing to be routinely maintained easily accessible to the system operator. Access openings shall be provided in the RWTS top. Access shall be provided for:

(i) cleaning or rodding out the inlet pipe,

(ii) cleaning or clearing the air or gas passage space above the partition,

(iii) pumping of each compartment required to be pumped,

(iv) sampling the effluent, and

(v) repairing any system components or maintaining system component requiring repair or maintenance.

(C) Tanks used in RWTS designed to hold sewage or effluent shall comply with the same design and construction requirements as septic tanks and pump tanks pursuant to .1954, as applicable.

(D) Fiberglass reinforced plastic tanks used in RWTS designed to hold sewage or effluent shall be constructed with materials capable of resisting corrosion from sewage and sewage gases, and the active and passive loads on the unit walls. Except as required by the rules of this Section, fiberglass tanks shall comply with IAPMO PS 1-2004, Standard for Prefabrication Septic Tanks, and CSA International B66-05, Standard for Design, Material, and Manufacturing Requirements for Prefabricated Septic Tanks and Sewage Holding Tanks, as applicable. IAPMO PS 1-2004 and CSA International B66-05 are hereby incorporated by reference including any subsequent amendments and editions. Copies of these standards may be inspected at the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642, and copies may be obtained from the ANSI On-Line Store at http://webstore.ansi.org/ansidocstore at a cost of forty-nine dollars and ninety-five cents ($49.95), and from the Canadian Standards Association, at 5060 Spectrum Way, Suite 100, Mississauga, Ontario, L4W 5N6 Canada at a cost of one hundred dollars ($100.00) plus shipping and handling, respectively. Documentation shall be provided that at least one of each size tank in each model meets specified physical properties set forth in IAPMO PS 1-2004 and CSA International B66-05, as applicable. At least one of each size of fiberglass reinforced plastic tank used in an RWTS shall be subjected to a vacuum test by an independent testing laboratory. Test unit must withstand negative pressure of 2.5 pounds per square inch (69.3 inches of water) without leakage or failure. Test results shall be included with the specifications that are provided to the state for approval.

(E) Prefabricated tanks used in RWTS other than precast reinforced concrete or fiberglass reinforced plastic units shall be approved on an individual basis by the State based on information furnished by the designer which indicates the unit will provide effectiveness equivalent to reinforced concrete or fiberglass reinforced plastic units.

(F) RWTS shall bear an imprint identifying the manufacturer, the RWTS serial number assigned to the manufacturer's model approved by the State, and the liquid or working capacity of the unit. The imprint shall be located to the right of the outlet opening pipe penetration point.

(G) The design, construction, and operation of RWTS shall prevent bypass of wastewater.

(H) Electrical circuits to the RWTS shall be provided with manual circuit disconnects within a watertight, corrosion-resistant, outside enclosure (NEMA 4X or equivalent) adjacent to the RWTS securely mounted at least 12 inches above the finished grade. Control panels provided by the manufacturer shall be installed in a watertight, corrosion-resistant enclosure (NEMA 4X or equivalent) mounted at least 12 inches above finished grade and located adjacent to the RWTS or in view of the RWTS on the side of the facility. The control panel shall not be located more than 50 feet from the RWTS components controlled by the panel. The control panel shall remain accessible at all times to the system operator (ORC). Conductors shall be conveyed to the disconnect enclosure and control panel through waterproof, gasproof, and corrosion-resistant conduits. Splices and wire junctions, if needed, shall be made outside the RWTS in a watertight, corrosion-resistant enclosure (NEMA 4X or equivalent) securely mounted adjacent to the unit at least 12 inches above the finished grade. Wire grips, duct seal, or other similar materials shall be used to seal around wire and wire conduit openings inside the RWTS and disconnect enclosure that shall prevent the transfer of liquid or gas into the RWTS or into the enclosure. The RWTS shall have an alarm device or devices to warn the user or operator of a unit malfunction or a high water condition. The alarm shall be audible and visible by system users and securely mounted adjacent to the RWTS, at least 12 inches above finished grade or in view of the RWTS on the side of the facility. The alarm shall not be located more than 50 feet from the RWTS component triggering the alarm condition. The alarm shall remain accessible at all times to the system operator (ORC). The alarm shall meet NEMA 4X standards or otherwise be equivalently watertight and corrosion resistant. The alarm circuit or circuits shall be supplied ahead of any RWTS electrical control circuit overload and short circuit protective devices. Blower location shall be shown on plans and plans and specifications shall detail proposed corrosion-resistant blower enclosure, if applicable.

(4) A settling tank shall be required prior to or as an integral part of the design of the RWTS. The liquid capacity of the settling tank shall be at least equal to half of the design daily flow of the RWTS, or as otherwise specified by the manufacturer, whichever is larger. The settling tank may either be an integral chamber of the RWTS tank, an approved prefabricated septic tank or another tank specially designed for a specific individual system and approved by the State as a part of the plans for the RWTS.

(5) A manufacturer of an RWTS who desires consideration for approval as an Experimental, Controlled Demonstration, Innovative or Accepted system shall apply separately pursuant to Rule .1969 of this Section.

History Note: Authority G.S. 130A-335(e),(f); 130A-342;
Eff. July 1, 1982;
Amended Eff. June 1, 2006; April 1, 1993; May 1, 1991; December 1, 1990; January 1, 1990.

**.1958 NON-GROUND ABSORPTION SEWAGE TREATMENT SYSTEMS**

(a) Where an approved privy, an approved septic tank system, other approved wastewater system, or a connection to an approved public or community sewage system is impossible or impractical, this Section shall not prohibit the state or local health department from permitting approved non-ground absorption treatment systems utilizing heat or other approved means for reducing the toilet contents to an inert or stabilized residue or to an otherwise harmless condition, rendering such contents noninfectious or noncontaminating. Alternative systems shall be designed to comply with the purposes and intent of this Section.

(b) Holding tanks shall not be considered as an acceptable sewage treatment and disposal system. An improvement permit shall not be issued for a sewage holding tank for any new construction. However, an Authorization to Construct may be issued for a holding tank for pumping and hauling of wastewater effluent to a wastewater system approved under this Section when the owner has provided a showing that a malfunctioning system cannot otherwise be repaired by connection to a system approved under this Section

or to a system approved under the rules of the Environmental Management Commission. Pumping and hauling wastewater effluent shall be performed by a septage management firm permitted in accordance with G.S. 130A-291.1. Design requirements of a pump and haul system shall include: a dual-stage high level alarm; telemetry notifying the operator, the wastewater management firm, and the Health Department; minimum tank requirements; reporting requirements; and a contract between the owner of the facility and the wastewater management firm.

(c) Incinerating, composting, vault privies, and mechanical toilets shall be approved by the state agency or local health department only when all of the wastewater is handled by a system approved under this Section.

(d) Sewage recycling systems which discharge treated waste-water meeting the state drinking water standards may be used only for toilet flushing and recycled sewage shall not be used for body contact or human consumption. Such systems must be approved by the state or local health department.

(e) Chemical or portable toilets for human waste may be approved in accordance with G.S. 130A-335. Chemical or portable toilets shall have a watertight waste receptacle constructed of nonabsorbent, acid resistant, noncorrosive material. The chemical or portable toilet waste collected shall be discharged into an approved sewage treatment and disposal system.

(f) Chemical toilets shall not be allowed as the primary nor the permanent method of wastewater disposal at any permanent foodhandling establishment.

History Note: Authority G.S. 89C; 89E; 89F; 90A; 130A-335;
Eff. July 1, 1982;
Amended Eff. August 1, 1991; January 1, 1990;
Temporary Amendment Eff. January 20, 1997;
Amended Eff. August 1, 1998.

**.1959 PRIVY CONSTRUCTION**

An "approved privy" shall consist of a pit, floor slab, and seat assembly housed in a building which affords privacy and reasonable protection from the weather.

(1) The pit shall consist of an excavation at least 42 inches square and in no case shall the bottom of an excavation be closer than one foot to the seasonally high water table or rock.

(2) The pit shall be properly curbed to prevent caving. In sandy or loose soil, the curb should extend the full depth of the pit. In tight soils, partial curbing is acceptable if it prevents caving.

(3) The privy floor slab shall be constructed of reinforced concrete. Where it is impractical to secure or construct reinforced concrete floor assemblies, wood construction shall be acceptable provided the floor slab is made of pressure treated joists with tongue and groove pressure treated plywood or other type flooring materials to provide strength, durability and prevent entrance of flies and mosquitoes to the privy pit. Where wood construction is used, floors shall be anchored to at least four-inch by four-inch sills.

(4) Wood used for riser, seat assemblies, and the floor slab shall be tongue-and-groove or plywood (exterior or marine) material.

(5) Privies shall not be used for the disposal of water-carried sewage.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. December 1, 1990.

**.1960 MAINTENANCE OF PRIVIES**

(a) Any person owning or controlling the property upon which a privy is located shall be responsible for these requirements:

(1) The privy building shall afford a reasonable degree of protection from bad weather conditions.

(2) When the pit becomes filled to within 18 inches of the top of the ground, the privy building shall be moved to a new pit and the old pit completely covered with earth.

(3) If the pit caves in, a new pit shall be provided.

(b) The tenant or person occupying the property shall be responsible for these requirements:

(1) The walls, floors, and seat of the privy and grounds immediately adjacent to the building shall be kept in a clean and decent condition.

(2) Fowl and other animals shall not be harbored in the privy building.

(3) Seat cover shall be hinged and closed at all times when the privy is not in use.

(4) Flies shall be excluded from the pit at all times.
(5) Ashes, garbage, and trash shall be kept out of the pit.

History Note: Authority G.S. 130A-335(e) and (f);
Eff. July 1, 1982;
Amended Eff. January 1, 1990.

**.1961 MAINTENANCE OF SEWAGE SYSTEMS**

(a) Any person owning or controlling the property upon which a ground absorption sewage treatment and disposal system is installed shall be responsible for the following items regarding the maintenance of the system:

(1) Ground absorption sewage treatment and disposal systems shall be operated and maintained to prevent the following conditions:

(A) a discharge of sewage or effluent to the surface of the ground, the surface waters, or directly into groundwater at any time; or

(B) a back-up of sewage or effluent into the facility, building drains, collection system, or freeboard volume of the tanks; or

(C) a free liquid surface within three inches of finished grade over the nitrification trench for two or more observations made not less than 24 hours apart. Observations shall be made greater than 24 hours after a rainfall event.

The system shall be considered to be malfunctioning when it fails to meet one or more of these requirements, either continuously or intermittently, or if it is necessary to remove the contents of the tank(s) at a frequency greater than once per month in order to satisfy the conditions of Parts (A), (B), or (C) of this Paragraph. Legal remedies may be pursued after an authorized agent has observed and documented one or more of the malfunctioning conditions and has issued a notice of violation.

(2) Ground absorption sewage treatment and disposal systems shall be inspected, the filters maintained, and the contents of the septic tank removed, periodically from all compartments, to ensure proper operation of the system. The contents shall be pumped whenever the solids level is found to be more than 1/3 of the liquid depth in any compartment.

(3) The ground surface over the system shall be kept smooth and free of depressions or areas of ponding. After settling, a compatible vegetative cover shall be established on the drainfield surface. The system area, including the repair area, shall be kept free of debris and mowed or cleared as needed in order to maintain access to the site for inspection and maintenance. The system area, including the repair area, shall not be improved, modified, or other disturbed unless specifically authorized by OCHD. Surface water shall be diverted from the system area.

(4) The owner shall keep a certified operator under contract as required on Table V(b) and shall disclose the requirement for an operator prior to transfer of system ownership. The owner shall ensure that the system operator carries out the duties and responsibilities prescribed in this Section and the Operation Permit.

(b) System management in accordance with Tables V(a) and V(b) of this Rule shall be required for all systems installed or repaired after July 1, 1992. After July 1, 1992, system management in accordance with Tables V(a) and V(b) shall be required for all existing Type V and Type VI systems.

(c) No Improvement Permit or Construction Authorization shall be issued for Type IV, Type V, or Type VI systems, unless a management entity of the type specified in Table V(b) is specifically authorized, funded, and operational to carry out this management program in the service area where the proposed system is to be located.

(d) A local health department may be a public management entity for systems classified Type IV, V(a) and V(b) only when specifically authorized by resolution of the local board of health.

(e) A contract shall be executed between the system owner and a management entity prior to the issuance of an Operation Permit for a system required to be maintained by a public or private management entity, unless the system owner and certified operator are the same. The contract shall include the specific requirements for maintenance and operation, responsibilities of the owner and system operator, provisions that the contract shall be in effect for as long as the system is in use, and other requirements for the continued proper performance of the system. It shall alsobe a condition of the Operation Permit that subsequent owners of the system execute such a contract.

(f) Inspections of the system shall be performed by a management entity at the frequency specified in Table V(b). The management entity shall report the results of their inspections to the local health department at

the specified reporting frequency. However, where inspections indicate the need for system repairs, the management entity shall notify the local health department within 48 hours in order to obtain a Construction Authorization for the repairs.

(g) The management entity shall be responsible for assuring routine maintenance procedures and monitoring requirements in accordance with the conditions of the Operation Permit and the contract.

(h) Sewage systems with multiple components shall be classified by their highest or most complex system type in accordance with Table V to determine local health department and management entity responsibilities.

(i) Sewage systems not identified in this Rule shall be classified by the Department after consultation with the appropriate commission governing operators of pollution control facilities.

(j) The local health department shall routinely review the performance and operation reports submitted in accordance with Table V(b) of this Rule and shall perform an on-site inspection of the systems as required in Table V(a).

(k) The certified operator shall hold a valid and current certificate from the appropriate commission, and nothing in this Section shall preclude any requirements for system operators, in accordance with Article 3 of G.S. 90A.

TABLE V(a)

LOCAL HEALTH DEPARTMENT RESPONSIBILITIES

| System Classification | System Description | Permits Required | Minimum System Review Frequency |
|---|---|---|---|
| Type I | a. Privy<br>b. Chemical toilet<br>c. Incinerating toilet<br>d. Other toilet system<br>e. Grease trap | Improvement Permit, Construction Authorization, and Operation Permit | N/A |
| Type II | a. Conventional septic system (single-family or non SFD 480 GPD GPD or less)<br>b. Conventional septic system with 750 linear feet of nitrification line or less<br>c. Conventional system with shallow placement | Improvement Permit, Construction Authorization, and Operation Permit | N/A |
| Type III | a. Conventional septic system > 480 GPD (excluding single-family residence)<br>b. Septic system with single effluent pump or siphon<br>c. Gravity fill system<br>d. (Dual gravity field system<br>e. PPBPS system, gravity dosed<br>f. Large diameter pipe system<br>g. Other non-conventional trench systems | Improvement Permit, Construction Authorization, and Operation Permit | 5 yrs (IIIb only) |
| Type IV | a. Any system with LPP distribution<br>b. System with more than 1 pump or siphon | Improvement Permit, Construction Authorization, and Operation Permit | 3 yrs. |

| | | | |
|---|---|---|---|
| Type V | a. Pretreatment system Fixed media filter<br>b. Any > 3,000-GPD septic tank system with a nitrification field designed for > 1500 GPD<br>c. Aerobic Treatment Unit (ATU)<br>d. Other mechanical, biological, or chemical pretreatment plant (< 3000 GPD) | Improvement Permit, Construction Authorization, and Operation Permit | 12 mos. |
| Type VI | a. Any > 3,000 GPD system with mechanical, biological, or chemical pretreatment system plant<br>b. Wastewater reuse/recycle | Improvement Permit, Construction Authorization, and Operation Permit | 6 mos. |

TABLE V(b)

MANAGEMENT ENTITY RESPONSIBILITIES

| System Classification | Management Entity | Minimum System Inspection/Maintenance Frequency | Reporting Frequency |
|---|---|---|---|
| Type I | Owner | N/A | N/A |
| Type II | Owner | N/A | N/A |
| Type III | Owner | N/A | N/A |
| Type IV<br>(a) & (b) | Public Management Entity with a Certified Operator or a private Certified Operator | 2/yr. | 12 mos. |
| (c) | Owner or Certified Operator | 1/yr | 12 mos. |
| Type V<br>(a) & (b) | Public Management Entity With a Certified Operator or a Private Certified Operator | a. 2/yr (0-1500 GPD)<br>4/yr (1500-3000 GPD)<br>12/yr (3000-10000 GPD)<br>1/wk (> 10000 GPD)<br>b. 12/yr (3000-10000 GPD)<br>1/wk (> 10000 GPD) | 6 mos. |
| (c) & (d) | Public Management Entity With Certified Operator | c. 4/yr.<br>d. 12/yr. | |
| Type VI | Public Management Entity With a Certified Operator | a. 1/wk(3000-10000 GPD)<br>2/wk(10000-25000 GPD)<br>3/wk(25000-50000 GPD)<br>5/wk(> 75000 GPD)<br>b. 12/yr. | 3 mos. |

(l) A sewage collection, treatment, and disposal system that creates or has created a public health hazard or nuisance by surfacing of effluent or discharge directly into ground water or surface waters, or that is partially or totally destroyed shall be repaired by the system owner within 30 days of notification by the state or local health department unless the notification otherwise specifies a repair period in writing. If a system described in the preceding sentence has for any reason been disconnected or fallen into disuse, the system shall be repaired prior to reuse. The state or local health department shall use its best professional judgement in requiring repairs that will reasonably enable the system to function properly. If, for any reason, a sewage collection, treatment, and disposal system is found to be non-repairable, or is no longer required, the system shall not be used, and may be required to be abandoned in accordance with subparagraph (n). as directed by the authorized agent to protect the public health and safety.

(m) When necessary to protect the public health, the state or local health department may require the owner or controller of a malfunctioning system to pump and haul sewage to an approved wastewater system during the time needed to repair the system.

(n) Any septic tank or pump tank that is not repairable, or the use has been discontinued shall be permanently abandoned by the following method:

1. The entire tank contents shall be removed by a North Carolina-licensed septage pumper and disposed of in an approved manner, and;
2. The top of the tank and at least one sidewall shall be collapsed into the tank, or the tank shall be removed from the ground and disposed of in an approved manner, and;
3. The pit shall be backfilled with soil that is free of roots, rubble or other debris and shall be compacted so as to leave no underground voids.

As an acceptable alternative to (n)2. and (n)3. above, the entire tank volume shall be filled with a concrete mixture with a 28 day compressive strength of at least 3000 psi.

If sewage or parts of the tank have come into contact with the ground surface, those areas shall be covered with hydrated lime.

(o) Should the management entity fail to provide a satisfactory report as required by this Section, the Orange County Health Department may perform an on-site inspection of the system to monitor compliance with the Operation Permit. When such inspections are performed, the system owner shall pay the appropriate fees pursuant to .1938(I) of this Section.

History Note: Filed as a Temporary Amendment Eff. July 3, 1991, for a Period of 180 Days to Expire on December 30, 1991;
Filed as a Temporary Amendment Eff. June 30, 1990, for a Period of 180 Days to Expire on December 27, 1990;
Authority G.S. 130A-335(e) and (f);
Eff. July 1, 1982;
Amended Eff. August 1, 1991; October 1, 1990; January 1, 1990; August 1, 1988;
Temporary Rule Amendment Eff. January 20, 1997;
Amended Eff. August 1, 1998,
Amended May 23, 2008 (n),
Amended August 28, 2013,
Amended Eff. February 26, 2015

**.1962 APPLICABILITY**

The provisions of this Section shall not apply to properly functioning sewage collection, treatment, and disposal systems in use. This provision is applicable only where the sewage flow and sewage characteristics are unchanged. This provision does not affect the requirements for system operation, maintenance, and management in accordance with Rule .1961 of this Section.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. August 1, 1991; December 1, 1990.

**.1963 DISUSE OF SEWAGE SYSTEM**

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;

Repealed Eff. August 1, 1988.

**.1964 INTERPRETATION AND TECHNICAL ASSISTANCE**

(a) The provisions of this Section shall be interpreted, as applicable, in accordance with the recognized principles and practices of soil science, geology, engineering, and public health.

(b) The State will provide technical assistance. Local health departments may obtain technical information and assistance from appropriate personnel as may be needed for interpretation of this Section.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. January 1, 1990.

**.1965 APPEALS PROCEDURE**

Appeals concerning the interpretation and enforcement of the rules in this Section shall be made in accordance with G.S. 130A-24.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. February 1, 1987.

**.1966 SEVERABILITY**

If any provision of these Rules or the application thereof to any person or circumstance is held invalid, the remainder of the rules or the application of such provisions to other persons or circumstances shall not be affected thereby.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982.

**.1967 INJUNCTIONS**

A person who violates any rule of this Section is subject to the injunctive relief provisions of G.S. 130A-18.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. January 1, 1985.

**.1968 PENALTIES**

A person who violates any rule of this Section is subject to the penalty provisions contained in G.S. 130A-22(c) (Administrative Penalties), 130A-23 (Suspension and Revocation of Permits), and 130A-25 (Criminal Penalties).

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;
Amended Eff. January 1, 1985.

**.1969 APPROVAL AND PERMITTING OF ON-SITE SUBSURFACE WASTEWATER SYSTEMS, TECHNOLOGIES, COMPONENTS, OR DEVICES**

(a) Experimental, controlled demonstration, and innovative wastewater systems (hereinafter referred to as E & I systems) are any wastewater systems, system components, or devices that are not specifically described in Rules .1955, .1956, .1957, or .1958 of this Section, including any system for which reductions are proposed in the minimum horizontal or vertical separation requirements or increases are proposed to the maximum long-term acceptance rates of this Section; or any E & I systems as defined by G.S. 130A-343(a) and approved pursuant to applicable laws and this Rule. Accepted systems are as defined by G.S. 130A-343(a). This Rule shall provide for the approval and permitting of E & I and accepted systems.

(b) APPLICATION: An application shall be submitted in writing to the State for an E & I system. The application shall include the information required by G.S. 130A-343 (d), (e), (f), and (g), and the following, as applicable:

(1) specification of the type of approval requested as either innovative, controlled demonstration, experimental, or a combination;

(2) description of the system, including materials used in construction, and its proposed use;

(3) summary of pertinent literature, published research, and previous experience and performance with the system;

(4) results of any available testing, research or monitoring of pilot systems or fullscale operational systems and shall identify whether the testing, research or monitoring provided was conducted by a third party research or testing organization;

(5) specification of system evaluation protocol as either an approved and listed protocol by the State or the applicant shall submit an alternative protocol for the evaluation of the performance of the manufacturer's system. National Sanitation Foundation (NSF) Standard 40 has been approved as an evaluation protocol pursuant to G.S. 130A-343(d);

(6) verification that a system being submitted for approval has been tested and certified in accordance with an approved evaluation protocol, if applicable. For systems with no prior approval pursuant to this Rule, the manufacturer shall provide an affidavit certifying that the product submitted for approval is the same as the certified or listed product or identify any modifications made to the submitted product.

(7) identity and qualifications of any proposed research or testing organization and the principal investigators, and an affidavit certifying that the organization and principal investigators have no conflict of interest and do not stand to gain financially from the sale of the E & I system;

(8) objectives, methodology, and duration of any proposed research or testing;

(9) specification of the number of systems proposed to be installed, the criteria for site selection, and system monitoring and reporting procedures;

(10) operation and maintenance procedures, system classification, proposed management entity and system operator;

(11) procedure to address system malfunction and replacement or premature termination of any proposed research or testing;

(12) notification of any proprietary or trade secret information, system, component, or device;

(13) in the case of a request for innovative system approval intended by the applicant to be subsequently reclassified from an innovative to an accepted system, monitoring, reporting and evaluation protocols to be followed by the manufacturer, the results of which shall be submitted in its future petition for accepted status; and

(14) fee payment as required by G.S. 130A-343(k), by corporate check, money order or cashier's check made payable to: North Carolina On-Site Wastewater System Account or NC OSWW System Account, and mailed to the On-Site Water Protection Section, 1642 Mail Service Center, 2728 Capital Blvd., Raleigh, NC 27699-1642 or hand delivered to Rm. 1A-245, Parker Lincoln Building, 2728 Capital Blvd., Raleigh, NC.

(c) REVIEW: The State shall review all applications submitted as follows:

(1) the completeness of the application shall be determined, and a determination shall be made whether additional information is needed to continue the review. The State shall inform the applicant of the acceptance or rejection of the application, or of any additional information needed to continue the review, within 30 days. When an application is rejected, the State shall inform the applicant in writing of the reasons for rejection and whether additional information is required for the application to be reconsidered. Acceptance of the application does not constitute a qualitative review of the information provided, nor the approval or denial of the proposed system designation. Additional requested information for the application to be considered complete shall be received within 180 days, or the application file shall be closed. Notwithstanding a prior rejection or denial, an applicant may reapply pursuant to Paragraph (b) of this Rule;

(2) the determination shall be made for a complete application whether the system meets the standards of an experimental system under G.S. 130A-343(a)(4), G.S. 130A-343(e) and Paragraph (d) of this Rule; a controlled demonstration system under G.S. 130A-343(a)(2), G.S. 130A-343(f) and Paragraph (e) of this Rule; or whether the system meets the standards of an innovative system under G.S. 130A-343(a)(5), G.S. 130A-343(g), and Paragraph (g) of this Rule, as applicable. This review shall be completed in accordance with the following time frame:

Table VI: Time Frame For State Review of Completed E & I System Applications

| Type of Approval Requested | Normal Review | Fast Track Review | Rule Reference |
|---|---|---|---|
| Experimental | 90 days | 45 days | .1969(d)(2) of this |

| | | | |
|---|---|---|---|
| | | | Section |
| Controlled Demonstration | 120 days | 60 days | .1969(e)(4) of this Section |
| Innovative | 180 days | 120 days | .1969(g)(2) of this Section |

and:

(3) The State shall notify the applicant and local health department of the approval or denial of an E & I system. Such notice shall include conditions for permitting, siting, installation, use, monitoring, operation and maintenance, and number of systems which can be installed, as applicable.

(d) APPROVAL OF EXPERIMENTAL SYSTEMS: A system may be approved for use as an experimental system as follows:

(1) the system shall be part of a research or testing program which has been approved by the State. The research or testing program shall be conducted by a third party research or testing organization which has knowledge and experience relevant to the proposed research or testing and has no conflict of interest and does not stand to gain financially from the sale of the proposed system. To be approved by the State, the proposed research or testing program shall:

(A) Be designed such that, if the objectives were met, the system would satisfy the standards for approval as a controlled demonstration or an innovative system under Paragraph (e) or Paragraph (g) of this Rule, respectively; and

(B) Be designed and include research and testing methodology that shall have a reasonable likelihood of meeting the objectives, and

(C) Include in the proposal for evaluation all information required pursuant to G.S. 130A-343(e).

(2) Applications for an experimental system shall be "Fast Track" approved or denied within 45 days from the acceptance of a complete application when the proposed research or testing program is a prior approved evaluation protocol.

(e) APPROVAL OF CONTROLLED DEMONSTRATION SYSTEMS: A system may be approved for use as a controlled demonstration system as follows:

(1) Acceptable research is provided from prior evaluation of the system in North Carolina as an experimental system or from any comparable evaluations of the system in other states, including any prior evaluation pursuant to an approved evaluation protocol, which supports the proposed use of the system; and

(2) Documentation is provided of at least 50 installations operational for at least 12-months, unless:

(A) data have been collected that show all other requirements for controlled demonstration approval have been met from a lesser number of North Carolina installations in conjunction with an approved experimental research or testing program; or

(B) documentation is provided of the system's design and functional similarity to another approved system and that substantiates performance in a manner equal or superior to the comparable approved system in terms of structural integrity, chemical durability, hydraulic performance and wastewater treatment; or

(C) the provisions for "Fast-Track" approval of Subparagraph (4) of this Paragraph are met; and

(3) The system shall be part of a research or testing program which has been approved by the State. To be approved by the State, the proposed research or testing program shall:

(A) Be designed such that, if the objectives were met, the system would satisfy the standards for approval as an innovative system under Paragraph (g) of this Rule, and

(B) Be designed and include testing methodology that shall have a reasonable likelihood of meeting the objectives, and

(C) Include in the proposal for evaluation all information required pursuant to G.S. 130A-343(f).

(4) Applications for a controlled demonstration shall be "Fast Track" approved or denied within 60 days from the acceptance of a complete application when the application

includes TS-I or TS-II compliant certification data collected under NSF Standard 40 or another prior-approved evaluation protocol, and all other available field verification data provided under Subparagraph (b)(4) of this Rule are consistent with TS-I or TS-II performance standards.

(f) PERMITTING OF EXPERIMENTAL AND CONTROLLED DEMONSTRATION SYSTEM: A local health department shall issue an Improvement Permit and Construction Authorization and an Operation Permit for an experimental or controlled demonstration system when the following conditions are met:

(1) There is an application for an Improvement Permit and Construction Authorization in accordance with .1937(c), with the proposed use of an experimental or controlled demonstration system specified;

(2) The proposed site is included as part of an approved research or testing program and any conditions specified for use of the system have been met;

(3) When an experimental or controlled demonstration system is proposed to serve a residence, place of business or place of public assembly, there shall be a designated area for a repair system in accordance with the provisions of .1945(b) or an innovative or accepted system of this Rule, except:

(A) When an existing and properly functioning wastewater system is available for immediate use, including connection to a public or community wastewater system; or

(B) When the experimental or controlled demonstration system is used as a repair to an existing malfunctioning system when there are no other approved or accepted repair options; or

(C) As provided in G.S. 130A-343(f) for Controlled Demonstration Systems;

(4) When an experimental or controlled demonstration system is proposed which shall not serve a residence, place of business, or place of public assembly, a repair area or backup system shall not be required.

(5) The application for an experimental system shall include statements that the property owner is aware of its experimental nature, that the local health department and State do not guarantee or warrant that these systems will function in a satisfactory manner for any period of time, that use of the system may need to be discontinued if the system research or testing program is prematurely terminated, and that the site and system are to be accessible during reasonable hours for monitoring and evaluation by the research or testing organization. Such statements shall be signed by the owner;

(6) Provisions shall be made for operation and maintenance of the system;

(7) Any special conditions required for the installation of the experimental or controlled demonstration system shall be specified in the Improvement Permit and the Construction Authorization. Use of an experimental or controlled demonstration system and any conditions shall be described on the Improvement Permit, Construction Authorization and any subsequent operation permits, with provisions for a repair area and backup system specified;

(8) The State shall be notified of a proposed Improvement Permit, Construction Authorization and any subsequent operation permits for experimental or controlled demonstration systems prior to issuance by the local health department. The State shall notify the manufacturer and local health department if the proposed use is found to be inconsistent with the approved research or testing program.

(9) Upon completion of the installation and prior to use, an Experimental or Controlled Demonstration System Operation Permit (ESOP or CDSOP) shall be issued by the local health department. The ESOP or CDSOP shall be valid for a specified period of time based upon the projected duration of the research and testing program, not to exceed five years. Maintenance, monitoring and testing requirements shall be specified as permit conditions, in accordance with the approved research or testing program. Failure to carry out these conditions shall be grounds for permit suspension or revocation.

(10) Prior to expiration of the ESOP (CDSOP) and based upon satisfactory system performance as determined during the research or testing program, the local health department shall issue an Operation Permit. Premature termination of the research or testing program shall be grounds for ESOP (CDSOP) suspension or revocation.

(11) Upon completion of monitoring, research and testing, the research or testing organization shall prepare a final report to the State including recommendations on future use of the system. If the State determines that the results indicate that the standards of Paragraph (e) or (g) of this Rule are met, the State shall approve the use as a controlled demonstration or an innovative system, respectively.

(g) INNOVATIVE SYSTEMS: Innovative systems, technologies, components, or devices shall be reviewed and approved by the State, and the local health department shall permit innovative systems in accordance with the following:

(1) The State shall approve the system as an innovative system when there has been successful completion of a prior evaluation of the system in North Carolina as an experimental or controlled demonstration system or when sufficient documentation is provided from any comparable evaluations of the system in other states which support the proposed use of the system, and when the performance requirements for an innovative system of G.S. 130A-343(a) and G.S. 130A-343(g) and the following conditions have been met:

(A) The system, shall have been demonstrated to perform equal or superior to a system, which is described in Rules .1955, .1956, .1957, or .1958, of this Section, based upon controlled pilot-scale research studies or statistically-valid monitoring of full-scale operational systems;

(B) Materials used in construction shall be equal or superior in physical properties and chemical durability, compared to materials used for similar proposed systems, specifically described in Rules .1955, .1956, .1957, or .1958 of this Section; and

(C) Documentation is provided of at least 100 installations operational for at least 12-months unless data have been collected that show all other requirements for innovative approval have been met from a lesser number of North Carolina installations in conjunction with an approved experimental or controlled demonstration research or testing program.

(2) In lieu of the requirements specified in Subparagraph (1) of this Paragraph, applications for innovative approval shall be "Fast Track" approved or denied within 120 days from the acceptance of a complete application when the application includes TS-I or TS-II compliant evaluation data collected under NSF Standard 40 or another prior approved evaluation protocol; and the following:

(A) The system, shall have been demonstrated to perform equal or superior to a system, which is described in Rules .1955, .1956, .1957, or .1958, of this Section, and to comply with TS-I or TS-II standards, based upon statistically valid third-party field verification data which include at least 50 data points from a minimum of 15 sites, with a minimum of two data points per site, collected over at least a 12-month period, and with no data excluded from the field sampling sites; and

(B) Materials used in construction shall be equal or superior in physical properties and chemical durability, compared to materials used for similar proposed systems, specifically described in Rules .1955, .1956, .1957, or .1958 of this Section.

(3) Approved innovative systems shall be assigned a unique code for tracking purposes. Prior to making a request for reclassification of a system from innovative to accepted, the manufacturer shall have a system in place to keep track of the number and location of new system installations, and of any system installations it becomes aware of which were required to be repaired, and to provide this information to the State upon request and in any subsequent petition for accepted status.

(4) A local health department shall issue an Improvement Permit and a Construction Authorization for any innovative system approved by the State upon a finding that the provisions of this Section including any conditions of the approval are met. Use of an innovative system and any conditions shall be described on the Improvement Permit, Construction Authorization, or Operation Permit.

(5) Manufacturers of proprietary innovative systems which include an advanced pretreatment component may choose to comply with the performance audit requirements as stipulated

in Subparagraph (h)(8) of this Rule, in lieu of routine effluent sampling for each system on an annual basis as may otherwise be required, and shall comply with those performance audit requirements prior to being granted accepted system status. The approved audit procedure shall be carried out annually until receipt of Accepted System approval by the Commission.

(h) ACCEPTED SYSTEMS: A petition to the Commission for reclassification of a proprietary innovative system to an accepted system, as defined in G.S. 130A-343(a)(1), shall be submitted by the manufacturer for review to the State, accompanied by the fee payment as required by G.S. 130A-343(k) and as stipulated in Paragraph (b) of this Rule. The State shall review all petitions submitted and evaluate the following: the completeness of the petition, and whether additional information is needed to continue the review; and whether the system meets the standards of an accepted system under G.S. 130A-343(a)(l), G.S. 130A-343(h), and this Section. The State shall inform the petitioner if the petition is determined to be complete or of any additional information needed to continue the review, within 30 days. When a petition is determined to be incomplete, the petitioner shall be informed in writing why and whether additional information is required for the petition to be reconsidered. This review of the petition for completeness does not constitute a qualitative review of the information provided, nor the approval or denial of the proposed system designation. Additional requested information for the petition to be considered complete shall be received within 180 days, or the petition file shall be closed. Upon request of the petitioner, the Commission may modify this 180 day time frame if the Commission determines that more time is necessary to obtain the additional information requested by the State and it can be provided within the requested modified time frame. The petitioner may also request Commission review of the State's determination that a petition is incomplete or a request by the State for additional information. The State may also initiate a review of a nonproprietary innovative system pursuant to G.S. l30A-343(i)(2). The State shall submit to the Commission findings and recommendations based upon its review for final Commission action on system designation. The State's findings and recommendations for a proprietary innovative system shall be presented to the Commission within 120 days of receipt of a complete petition. The Commission shall designate a wastewater system technology, component or device as an accepted system when it finds that the standards set forth by G.S. 130A-343(a)(1) and G.S. l30A-343(h) have been met. The following factors shall be considered prior to granting accepted system status:

(1) documentation provided that there have been at least 300 systems installed statewide and the system has been in use as an approved innovative system for more than five years;

(2) data and findings of all prior evaluations of the system performance as provided by the manufacturer;

(3) results of prior performance surveys of innovative systems in use in North Carolina for at least the five year period immediately preceding the petition, including any information available to the manufacturer pertinent to the accuracy and validity of performance surveys not completed under their control;

(4) review(s) of records on system use and performance reported by local health departments and other information documenting the experiences with performance of the system in North Carolina, including information collected and reported pursuant to Subparagraph (g)(1) and Paragraph (p) of this Rule. Upon request of the manufacturer, the State and manufacturer shall meet to discuss the accuracy and validity of performance data and surveys to be considered for inclusion in the review. Local health departments shall be invited to participate in the discussion;

(5) for proprietary nitrification trench systems, a statistically valid survey of system performance shall be performed, as follows:

(A) The manufacturer shall provide a proposed survey plan for State concurrence prior to carrying out the survey. This plan shall specify the number of systems to be evaluated, period of evaluation, method to randomly select systems to be evaluated, methods of field and data evaluation, and proposed survey team members, including proposed cooperative arrangements to be made with State and local health department on-site wastewater program staff. The State shall facilitate local health department participation with any performance review or survey. The State shall utilize the Division of Public Health's State Center for Health Statistics for assistance in evaluating the statistical validity of proposed evaluation protocols.

(B) The survey shall include the field evaluation of at least 250 randomly selected innovative systems compared with 250 comparably-aged randomly selected conventional systems, with at least 100 of each type of surveyed system currently in use and in operation for at least five years. Systems surveyed shall be distributed throughout the three physiographic regions of the state (Mountain, Piedmont and Coastal Plain) in approximate proportion to the relative usage in the three regions. The survey shall determine comparative system failure rates, with field evaluations completed during a typical wet-weather season (February through early April), with matched innovative and conventional systems sampled during similar time periods in each region. The petitioner shall provide a statistical analysis of the survey results showing a "one-sided" test where, if the failure rate in the sample of 250 innovative systems is at least five percentage points higher than the failure rate in the sample of 250 conventional systems, there is only a five percent chance that a difference this large would occur by chance (95% confidence level). If a statistically significant higher failure rate in the innovative system is not detected, the Commission shall find that the innovative system performs the same as or better than the conventional system.

(6) The Commission shall grant accepted status to an innovative system based upon a showing by the manufacturer that there have been at least 10,000 operational systems installed in the state, in more than one county of the state, over at least an eight year period with a total reported failure rate statewide based on records provided by the manufacturer and local health departments of less than one percent. However, the granting of accepted status based upon this criteria shall be conditioned on the manufacturer successfully completing an approved field survey pursuant to Parts (h)(5)(A) or (h)(5)(B) of this Rule within no more than 24 months of being granted accepted status;

(7) The manufacturer of a proprietary innovative system, which includes an advanced pretreatment component designed to achieve NSF-40, TS-I or TS-II effluent quality standards requesting accepted status shall document that the system has received certification under NSF Standard 40 or another prior approved evaluation protocol. A certified system which has been modified pursuant to Paragraph (i) of this Rule or as otherwise necessary to be approved for use in North Carolina shall still be considered in compliance with this certification requirement. For approved innovative systems in general use in North Carolina for more than five years prior to January 1, 2006, which only lack certification under NSF Standard 40 or another approved evaluation protocol but meet all other requirements for Accepted System status, the Commission shall grant conditional accepted status provided such certification is obtained within 24 months from the date this conditional status is granted;

(8) Performance Audit: Prior to Accepted System approval by the Commission of a proprietary innovation system which includes an advanced pretreatment component, a performance audit shall be run for a minimum of three consecutive years or until data have been collected from at least 30 separate operational North Carolina systems. The performance audit shall consist of third-party random sampling of a minimum of 10 separate operational North Carolina sites by an approved field evaluation protocol. The manufacturer shall propose the third-party, and the third-party shall submit a plan for system evaluation to include their third-party credentials and the number of systems to be sampled, the method for randomly selecting the sites to be sampled, and details of the procedure for sample collection and analysis, which shall be prior-approved by the State. Samples shall be collected by 24-hour composite sampling (grab sampling for fecal coliform) and analyzed by a wastewater laboratory certified by the Division of Water Quality for all applicable performance parameters. All systems to be included in the performance audit shall be found by the third-party to be in compliance with the design requirements of the Innovative Approval. In order to be granted accepted status, the following conditions shall be met:

(A) the mean values of sample data from all sites statewide in each sampling year shall meet NSF-40, TS-I or TS-II effluent quality standards for each parameter, as applicable;

(B) no more than 20 percent of these randomly sampled sites during each sampling year shall exceed the designated NSF-40, TS-I or TS-II effluent quality standards for any parameter, as applicable;

(C) the sampled systems for the purposes of evaluation for Accepted System status shall be operational for at least three years, with at least 10 systems in operation for at least five years, and results from no more than 20 percent of these sampled systems over five years old shall exceed the designated NSF-40, TS-I or TS-II effluent quality standards for any parameter, as applicable;

(D) no data collected and analyzed pursuant to Parts (A) through (C) of this Subparagraph shall be considered as part of the audit that is collected before April 1, 2006;

(E) operation, maintenance or sampling activities that have taken place or are proposed by the third-party at the audited sites, including Operator reports, maintenance logs and projected sample collection days and laboratory reports for samples analyzed, shall be provided to the local health department and the State;

(F) if the performance criteria in Parts (A) and (B) of this Subparagraph are not met in any sampling year, the sites from which substandard samples are obtained shall be resampled for any non-compliant parameter. If the performance criteria in Parts (A) and (B) of this Subparagraph are still not met using the results from the resampled data, at least 20 new sites or twice as many as were initially sampled, not to exceed 30, shall be sampled for all applicable performance parameters. If this second set of sample results does not meet performance criteria stipulated in Parts (A) and (B) of this Subparagraph, the accepted system status shall be denied.

(9) Provisions shall be in place for the manufacturer of a proprietary accepted system which include an advanced pretreatment component to remain certified and listed under NSF Standard 40 or another prior State approved evaluation, certification and listing protocol that includes routine audits of the system manufacturing facilities and of the performance of operational systems that verifies ongoing conformity with the approved protocol.

(10) Other criteria for determining whether the proposed system has been in general use, and other surveys, including evaluations of different numbers of innovative and conventional systems, designed to verify equal or superior performance of the innovative system compared to the conventional system under actual field conditions in North Carolina shall be approved by the state when they are demonstrated to have comparable statistical validity as described in Subparagraphs (5) or (8) of this Paragraph, as applicable. The State's review and approval of proposed alternate criteria for determining whether the system has been in general use, or of other proposed surveys are subject to review and concurrence by the Commission.

(i) APPROVAL AND PERMITTING OF ACCEPTED SYSTEMS: The following conditions apply to the approval and permitting of accepted systems:

(1) When a petition or recommendation for an accepted wastewater system designation is approved by the Commission, the State shall notify local health departments and publish a listing of accepted systems. The Commission shall impose any use, design, installation, operation, maintenance, monitoring, and management conditions pursuant to G.S. 130A-343.

(2) The local health department shall permit systems designated as accepted nitrification trench systems that meet the requirements of this Section, laws, and conditions of its accepted system approval in an equivalent manner as a conventional system. The Owner may choose to substitute an accepted system for a conventional system or another accepted system without prior approval of the health department as long as no changes are necessary in the location of each nitrification line, trench depth, or effluent distribution method.

(3) The owner may choose to substitute an accepted advanced pretreatment system for another accepted advanced pretreatment system provided the owner applies to the local health department and receives a revised Construction Authorization prior to its installation.

(4) The type of accepted system installed shall be indicated on the Operation Permit, including designation of the manufacturer and model or unique code.

(j) MODIFICATION OF APPROVED SYSTEMS: Where a manufacturer of an approved E & I or accepted system seeks to modify such system or its conditions of approval (including siting or sizing criteria) and retain its approved status, the manufacturer shall submit to the State a request for approval of the proposed modification. If the manufacturer demonstrates that the modified system will perform in a manner equal or superior to the approved system in terms of structural integrity, chemical durability, hydraulic performance and wastewater treatment, the state shall approve the modified system with the same status as the previously approved system. Approvals of proposed modifications to E & I systems pursuant to this Paragraph shall be made by the State. Approvals of proposed modifications to accepted systems pursuant to this Paragraph shall be made by the Commission when the manufacturer's demonstration provides clear, convincing and cogent supporting evidence. In order to confirm the satisfactory performance of an approved modified accepted system, the manufacturer shall conduct a survey or audit of installed modified systems in accordance with Subparagraphs (h)(5) or (h)(8) of this Rule, as applicable, within one year of the fifth anniversary of the approval of the modified system and shall submit the results of the survey to the State. The State may modify, suspend, or revoke its approval of the modified system based on the survey results or any other information that supports a finding that the modified system does not perform in a manner equal or superior to the previously approved E & I system. The Commission may similarly modify, suspend, or revoke its approval of a modified accepted system.

(k) The State may modify, suspend or revoke the approval of a system as provided for in G.S. 130A-343(c), and as follows:

(1) The system approval shall be modified as necessary to comply with subsequent changes in laws or rules which affect their approval.

(2) The approval of a system may be modified, suspended or revoked upon a finding that:

(A) subsequent experience with the system results in altered conclusions about system performance, reliability, or design;

(B) the system or component fails to perform in compliance with performance standards established for the system; or

(C) the system or component or the system applicant fails to comply with wastewater system laws, rules or conditions of the approval.

(3) The State shall notify the Commission of any action required for Commission approval of any modifications to the status of an accepted system. The Commission may require the manufacturer or the State to complete a follow-up survey of a proprietary nitrification trench system or a performance audit of an advanced pretreatment system such as described in this Rule if the Commission determines further information is necessary prior to rendering a final decision on modification of the status of an accepted system.

(l) Modification, suspension or revocation of a system approval shall not affect systems previously installed pursuant to the approval.

(m) Reductions in total nitrification trench length allowed for systems, as compared to the system sizing requirements delineated in Rule .1955 of this Section for conventional systems based upon excavated trench width, apply only to drainfields receiving septic tank effluent of domestic strength or better quality. The system may be used for facilities producing non-domestic strength wastewater with nitrification trench length and trench bottom area determined based upon excavated trench width equal to what is required by Rule .1955 of this Section for a conventional gravel trench system, with no reduction or application of an equivalency factor. However, reductions up to 25 percent when allowed for approved innovative or accepted system models may be applied for facilities producing higher strength wastewater following a specifically approved pretreatment system designed to assure effluent strength equal to or better than domestic septic tank effluent, with a five-day Biochemical Oxygen Demand (BOD) less than 150 milligrams per liter (mg/l), total suspended solids (TSS) less than 100 mg/l and fats, oil and grease (FOG) less than 30 mg/l.

(n) A Performance Warranty shall be provided by the manufacturer of any approved innovative or accepted wastewater system handling untreated septic tank effluent which allows for a reduction in the total nitrification trench length of more than 25 percent as compared to the total nitrification trench length required for a 36-inch wide conventional wastewater system, pursuant to G.S. 130A-343(j). The Department shall approve the warranty when found in compliance with the applicable laws and this Paragraph. When a wastewater system warranted according to G.S. 130A-343(j) (warranty system) is proposed to serve a residence, place of business, or place of public assembly, the site shall include a repair

or replacement area in accordance with Rule .1945(b) of this Section or an innovative or accepted system approved under this Rule with no more than a 25 percent reduction in excavated trench bottom area. The following conditions are applicable for the performance warranty and a system approved pursuant to this Paragraph:

(1) The Manufacturer shall provide the approved Performance Warranty in effect on the date of the Operation Permit issuance to the owner or purchaser of the system. The warranty shall be valid for a minimum of five-years from the date the warranty system is placed into operation.

(2) The Manufacturer shall issue the Performance Warranty to the property owner through its authorized installer who shall sign the Performance Warranty indicating the system has been installed in accordance with the manufacturer's specifications, any conditions of the system approval granted by the Department, and all conditions of the Authorization to Construct a Wastewater System by the local health department. The installer or contractor shall return a copy of the signed Performance Warranty to the Manufacturer within 10 days indicating the physical address or location of the facility served by the warranty system, date the system was installed or placed into use, and type and model of system installed.

(3) The Performance Warranty shall provide that the manufacturer shall furnish all materials and labor necessary to repair or replace a malfunctioning warranty system as defined in Rule .1961(a) of this Section or a warranty system that failed to meet any performance conditions of the approval. The system shall be repaired or replaced with a fully functional wastewater system at no cost to the Owner, in accordance with this Section and applicable laws.

(4) Performance Warranty repairs such as full replacement of the nitrification system, extension of the nitrification system or other repairs shall be completed pursuant to a repair Authorization to Construct that is issued by the local health department in accordance with this Section.

(5) The Performance Warranty shall be attached to the Operation Permit issued by the Health Department for the wastewater system. The Performance Warranty shall remain in effect, notwithstanding change in ownership, to the end of the five-year warranty period.

(o) Manufacturers of proprietary systems approved under this Rule shall provide a list of manufacturer's authorized installers to the Department and applicable local health departments, and update this list whenever there are additions or deletions. No Operation Permit shall be issued for a proprietary system installed by a person not authorized by the Manufacturer, unless the Manufacturer of the proprietary system specifically approves the installation in writing.

(p) The local health department shall include in its monthly activity report submitted to the State the number of new system Operation Permits issued for E & I and accepted systems. Additionally, the number of Operation Permits issued for repairs of E & I and accepted systems, and repair system type shall be reported to the State as part of the monthly activity report. The State shall accumulate and store this installation data for future reference and surveys, including site locations.

(q) The State shall provide assistance and training to its authorized agents to assure approved E & I and accepted systems are permitted, installed, operated and evaluated in accordance with the system approval.

History Note: Authority G.S. 130A-335(e),(f); 130A-343;
Eff. April 1, 1993;
Temporary Amendment Eff. June 24, 2003; February 1, 2003;
Amended Eff. June 1, 2006; February 1, 2005; May 1, 2004.

**.1970 ADVANCED WASTEWATER PRETREATMENT SYSTEM**

(a) ADVANCED PRE-TREATMENT SYSTEM PERFORMANCE STANDARDS: A wastewater system with a design flow of up to 3000 gallons per day approved pursuant to .1957(c) or .1969 that includes an advanced pretreatment component shall be specifically designed to meet one of the effluent quality standards specified in Table VII prior to dispersal of the effluent to the soil and shall comply with the requirements of this Rule.

Table VII (Effluent Quality Standards for Advanced Pretreatment Systems)

| Parameter | NSF-40 | TS-I | TS-II |
|---|---|---|---|
| Carbonaceous Biochemical Oxygen Demand (CBOD) | <25 (mg/l)* | <15 (mg/l) | <10 (mg/l) |
| Total Suspended Solids (TSS) | <30 (mg/l) | <15 (mg/l) | <10 (mg/l) |
| Ammonium Nitrogen (NH4-N) | | <10 (mg/l) | <10 (mg/l) |

| | | | |
|---|---|---|---|
| Total Nitrogen (TN) (TN is Total Kjeldahl Nitrogen plus Nitrate+Nitrite Nitrogen) | | | <20 mg/l or >60% removal |
| Fecal Coliform | | <10,000 (colonies/100 ml) | <1,000 (colonies/100 ml) |

*mg/l is milligrams per liter

System performance monitoring, site and system compliance criteria pursuant to these standards are delineated in Paragraphs (n) and (o) of this Rule. These standards or modifications to these standards may be proposed to be complied with by the designer of systems with a design flow of over 3000 gallons per day or Industrial Process Wastewater Systems and approved by the State pursuant to Rules .1938(e) or .1938(f) of this Section, respectively, when documentation is provided that the performance criteria of Rule .1946 of this Section and 15A NCAC 02L shall be met.

(b) Design influent quality shall not exceed the criteria specified in Table VIII, unless the system is designed and approved by the State to handle higher strength wastewater on a product or project-specific basis.

Table VIII (Influent Quality Standards for Advanced Pretreatment Systems)

| Parameter | Influent Not to Exceed (mg/l)* |
|---|---|
| Biochemical Oxygen Demand (BOD) | 350 |
| Total Suspended Solids (TSS) | 200 |
| Total Kjeldahl Nitrogen (TKN) | 100 |
| Fats, Grease and Oil (FOG) | 30 |

*mg/l is milligrams per liter

Maximum influent characteristics in Table VIII are based upon septic tank pretreatment. The product's RWTS, Experimental, Controlled Demonstration, Innovative or Accepted System approval, as applicable, may include alternate or additional influent limitations, such as for systems designed to handle untreated wastewater and special limitations for TS-I and TS-II systems to achieve the proper amount of nitrification.

(c) The site shall be initially evaluated and classified in accordance with the rules of this Section or as otherwise specified in a system-specific approval issued pursuant to .1969. A ground absorption system receiving effluent from an advanced wastewater pretreatment system may be used on sites classified as SUITABLE or PROVISIONALLY SUITABLE for conventional, modified, alternative, or E & I or accepted systems in accordance with this Section. Modifications to siting and system design criteria pursuant to Paragraphs (d), (e), (f), (g), (h), (i), and (j) of this Rule shall be acceptable, as applicable.

(d) NSF-40 SYSTEMS SITING AND SIZING REQUIREMENTS: For systems approved to achieve at least NSF-40 standards and designed for no more than 1500 gallons per day, the following siting and sizing factors apply when designing the soil absorption system:

(1) Trench or bed bottom separation distances are as specified in this Subparagraph. In Table IX, "SWC" means "Soil Wetness Condition," and "USC" means an "UNSUITABLE Soil/Fill Condition," other than a SWC.

Table IX: Vertical Separation Requirements for NSF-40 Systems ≤1500 gallons per day

| Soil/System Criteria | Rule* Reference | Depth from Surface** to UNSUITABLE Soil/Fill Condition | | Minimum Vertical Trench/Bed Bottom Separation Requirement | | | |
|---|---|---|---|---|---|---|---|
| | | | | Gravity Distribution | | Pressure Dispersal | |
| | | Gravity Distribution | Pressure Dispersal | Depth to USC | Depth to SWC | Depth to USC | Depth to SWC |
| Soil Group I | Rules .1955, .1956, and .1957(a) | 24- inches | 24-inches | 12-inches | 12-inches | 12-inches | 12-inches |
| Soil Groups II-IV | Rules .1955, .1956, and .1957(a) | 24-inches | 24-inches | 12-inches | 12-inches | 12-inches | 12-inches |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| New Fill | Rule .1957(b)(1) | 18-inches to USC, and 12-inches to SWC | 18-inches to USC, and 12-inches to SWC | 18-inches | 18-inches | 18-inches | 12-inches |
| Existing Fill (□480 gpd only) | Rule .1957(b)(2) | 36-inches of Group I Fill/Soils | 24-inches of Group I Fill/Soils | 36-inches | 36-inches | 18-inches | 18-inches |

*Except as allowed in this Rule, all other requirements of the Rules referenced remain applicable
**Minimum depth of soil/fill required at site to permit system. Depth shall be measured from the naturally occurring soil surface or Existing Fill surface, as applicable

(2) The total drainfield trench length or bed system bottom area, as required for a ground absorption system receiving septic tank effluent, is reduced by 25 percent in soils which are Groups I or II with SUITABLE structure and clay mineralogy. No other reductions in linear footage of nitrification trench, square footage of trench bottom area or system area shall be applied when a PPBPS or innovative trenches or accepted systems are used for the absorption field, except where based on an adjusted design daily flow rate granted in accordance with .1949(c). Bed systems remain restricted to a design flow of 600 gallons per day or less; and

(3) The minimum horizontal setback requirements of .1950, .1951 and .1956(6)(g), as applicable, shall be met, except as follows:

Table X

| Minimum horizontal setbacks for ground absorption systems Where NSF-40 Pretreatment System are used for ≤ 1500 gallons per day | |
|---|---|
| Land Feature or Component | NSF-40 (feet) |
| Streams classified as WS-1, except for saprolite | 70 |
| Waters classified as S.A., from mean high water mark | 70 |
| Other coastal waters from mean high water mark | 35 |
| Any other stream, canal, marsh or other surface waters, from normal pool elevation | 35 |
| Any Class I or Class II reservoir from normal pool elevation | 70 |
| Any permanent storm water retention pond from flood pool elevation | 35 |
| Any other lake or pond from normal pool or mean high water elevation | 35 |

The Provisions of Subparagraphs (1), (2) and (3) of this Paragraph are also applicable to systems approved as meeting TS-I or TS-II standards pursuant to .1969, unless otherwise restricted elsewhere in this Rule.

(e) TS-I SYSTEMS SITING AND SIZING REQUIREMENTS: Except as allowed in Parts (3)(A) and (3)(B) of this Paragraph, when trenches are used for the drainfield in conjunction with an advanced pretreatment system meeting TS-I standards, one and only one of the following siting, sizing or system factors pursuant to Subparagraphs (1), (2) or (3) of this Paragraph apply when designing the ground absorption component of the system. When a system is permitted pursuant to this Paragraph, the provisions of Paragraph (d) of this Rule do not apply.

(1) Trench bottom separation distances for a system with a design flow no greater than 1000 gallons per day are as specified in this Subparagraph. In Table XI, "SWC" means "Soil Wetness Condition," and "USC" means an "UNSUITABLE Soil/Fill Condition," other than a SWC.

| Table XI: Vertical Separation Requirements for TS-I Systems ≤ 1000 gallons per day |
|---|

| Soil/System Criteria | Rule* Reference | Depth from Surface** to UNSUITABLE Soil/Fill Condition | | Minimum Vertical Trench Bottom Separation Requirement | | | |
|---|---|---|---|---|---|---|---|
| | | | | Gravity Distribution | | Pressure Dispersal | |
| | | Gravity Distribution | Pressure Dispersal | Depth to USC | Depth to SWC | Depth to USC | Depth to SWC |
| Soil Group I | Rules .1955, .1956, and .1957(a) | 24- inches | 18-inches | 12-inches | 12-inches | 9-inches | 9-inches |
| Soil Groups II-IV | Rules .1955, .1956, and .1957(a) | 21-inches | 18-inches | 9-inches | 9-inches | 9-inches | 9-inches |
| New Fill | Rule .1957(b)(1) | 14-inches to USC, and 12-inches to SWC | 12-inches | 18-inches | 14 -inches | 12-inches | 9-inches |
| Existing Fill (□480 gpd only) | Rule .1957(b)(2) | 36-inches of Group I Fill/Soil | 24-inches of Group I Fill/Soil | 36-inches | 36-inches | 12-inches | 12-inches |

*Except as allowed in this Rule, all other requirements of the Rules referenced remain applicable
**Minimum depth of soil/fill required at site to permit system. Depth shall be measured from the naturally occurring soil surface or Existing Fill surface, as applicable

(A) The trench bottom vertical separation distance shall not be reduced to less than 12 inches to rock or tidal water;

(B) With the exception of the reduced setbacks to drainage devices pursuant to Table XII of this Rule, the minimum horizontal setback requirements of .1950, .1951 and .1956(6)(g), as applicable, shall be met;

(C) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule; or

(2) The long term acceptance rate (LTAR) that would be assigned by the local health department for a ground absorption system using septic tank effluent may be increased by up to a factor of two when all of the following conditions are met:

(A) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule, when Group III or IV soils or saprolite occur within three feet of the trench bottom or the site requires drainage of Group II or III soils or whenever the design flow exceeds 1000 gallons per day;

(B) No further reductions in linear footage of nitrification trench or system area shall be applied when a PPBPS or innovative trenches or accepted systems are used for the absorption field;

(C) For systems to be installed in fill, pressure dispersal (LPP or Drip distribution) shall be utilized;

(D) With the exception of the reduced setbacks to drainage devices pursuant to Table XII of this Rule or as allowed pursuant to Part (3)(B) of this Paragraph, the minimum horizontal setback requirements of .1950, .1951, and .1956(6)(g), as applicable, shall be met. For systems with a design flow in excess of 1000 gallons per day, a 25-foot horizontal separation shall be maintained to the property line, unless a site-specific nitrogen migration analysis indicates that a nitrate concentration at the property line will not exceed 10 milligrams per liter (mg/l); or

(3) The minimum horizontal setback requirements of .1950, .1951 and .1956(6)(g), as applicable, shall be met, except as follows for a system with a design flow not to exceed 1000 gallons per day:

Table XII

| Minimum horizontal setbacks for ground absorption systems Where TS-I Pretreatment Systems are used for ≤ 1000 gallons per day | |
|---|---|
| Land Feature or Component | TS-I (feet) |

| | |
|---|---|
| Any public water supply | 100 |
| Streams classified as WS-I, except for saprolite | 70 |
| Waters classified as S-A, from mean high water mark | 70 |
| Other coastal waters, from mean high water mark | 35 |
| Any other stream, canal, marsh or other surface waters, from normal pool elevation | 35 |
| Any Class I or Class II reservoir, from normal pool elevation | 70 |
| Any permanent storm water retention pond, from flood pool elevation | 35 |
| Any other lake or pond, from normal pool or mean high water elevation | 35 |
| Any building foundation | 5 |
| Any basement | 15 |
| Any property line | 10 |
| Top of slope of embankments or cuts of 2 feet or more vertical height | 15 |
| Any water line | 10 |
| Upslope interceptor/foundation drains/diversions | 7 |
| Sideslope interceptor/foundation drains/diversions | 10 |
| Downslope interceptor/foundation drains/diversions | 20 |
| Groundwater lowering ditches or devices | 20 |
| Any swimming pool | 15 |
| Any other nitrification field (except the system repair area) | 10 |

(A) With the exception of the reduced setbacks to drainage devices or as allowed pursuant to Part (B) of this Subparagraph, when any horizontal setbacks are proposed to be reduced pursuant to Table XII, the vertical separation modifications or LTAR increases shall not be concurrently applied pursuant to Subparagraphs (1) and (2) of this Paragraph, respectively.

(B) When an accepted system is used which allows for a 25 percent reduction in drainfield trench length, compared with a conventional trench system, for a system designed for 1000 gallons per day or less, the horizontal setback modifications in Table XII and a 25 percent trench length reduction may be concurrently applied when the site has space for an equivalently sized repair system. A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule, when Group III or IV soils or saprolite occur within three feet of the trench bottom.

(f) TS-II SYSTEMS SITING AND SIZING REQUIREMENTS: Except as allowed in Parts (3)(A) and (3)(B) of this Paragraph, when trenches are used for the drainfield in conjunction with an advanced pretreatment system meeting TS-II standards, one and only one of the following siting, sizing or system factors pursuant to Subparagraphs (1), (2) or (3) of this Paragraph apply when designing the ground absorption component of the system. When a system is permitted pursuant to this Paragraph, the provisions of Paragraph (d) of this Rule do not apply.

(1) Trench bottom separation distances for systems with a design flow no greater than 1000 gallons per day are as specified in this Subparagraph. In Table XIII, "SWC" means "Soil Wetness Condition," and "USC" means an "UNSUITABLE Soil/Fill Condition," other than a SWC.

| Table XIII: Vertical Separation Requirements for TS-II Systems ≤ 1000 gallons per day | | | | | | | |
|---|---|---|---|---|---|---|---|
| Soil/System Criteria | Rule* Reference | Depth from Surface** to UNSUITABLE Soil/Fill Condition | | Minimum Vertical Trench Bottom Separation Requirement | | | |
| | | | | Gravity Distribution | | Pressure Dispersal | |
| | | Gravity Distribution | Pressure Dispersal | Depth to USC | Depth to SWC | Depth to USC | Depth to SWC |
| Soil Group I | Rules .1955, .1956, and .1957(a) | 24- inches | 15-inches | 12-inches | 12-inches | 6-inches | 6-inches |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Soil Groups II-IV | Rules .1955, .1956, and .1957(a) | 21-inches | 15-inches | 9-inches | 9-inches | 6-inches | 6-inches |
| New Fill | Rule .1957(b)(1) | 14-inches to USC, and 12-inches to SWC | 12-inches | 18-inches | 14-inches | 12-inches | 9-inches |
| Existing Fill (≤480 gpd only) | Rule .1957(b)(2) | 36-inches of Group I Fill/Soil | 24-inches of Group I Fill/Soils | 36-inches | 36-inches | 12-inches | 12-inches |

*Except as allowed in this Rule, all other requirements of the Rules referenced remain applicable
**Minimum depth of soil/fill required at site to permit system. Depth shall be measured from the naturally occurring soil surface or Existing Fill surface, as applicable

(A) The trench bottom vertical separation distance shall not be reduced to less than 12 inches to rock or tidal water;

(B) With the exception of the reduced setbacks to drainage devices pursuant to Table XIV of this Rule, the minimum horizontal setback requirements of .1950, .1951 and .1956 (6)(g), as applicable, shall be met;

(C) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule; or

(2) The long term acceptance rate (LTAR) that would be assigned by the local health department for a ground absorption system using septic tank effluent may be increased by up to a factor of 2.0 in Group II, III and IV Soils and by up to a factor of 2.5 in Group I Soils when all of the following conditions are met:

(A) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule, when Group III or IV Soils or saprolite occur within three feet of the trench bottom or the site requires drainage of Group II or III soils, or whenever the design flow exceeds 1000 gallons per day;

(B) No further reductions in linear footage of nitrification trench or system area shall be applied when a PPBPS or innovative trenches or accepted systems are used for the absorption field;

(C) For systems to be installed in fill, a pressure dispersal system (LPP or Drip distribution) shall be utilized;

(D) With the exception of the reduced setbacks to drainage devices pursuant to Table XIV of this Rule or as allowed pursuant to Part (3)(B) of this Paragraph, the minimum horizontal setback requirements of .1950, .1951 and .1956 (6)(g), as applicable, shall be met;

(E) For the LTAR to be increased by a factor above 2.0 (up to 2.5) for a system designed for 1000 gallons per day, or less, there must be at least 36 inches of Group I Soils from the naturally occurring soil surface, the depth to a soil wetness condition below the naturally occurring soil surface must be at least 24 inches, a pressure dispersal system (LPP or Drip) shall be utilized, and there must be a 100-percent repair area;

(F) For the LTAR to be increased by a factor above 2.0 (up to 2.5) for a system designed for greater than 1000 gallons per day, there must be at least 48 inches of Group I Soils from the naturally occurring soil surface, the depth to a soil wetness condition below the naturally occurring soil surface must be at least 30 inches, a pressure dispersal system (LPP or Drip) shall be utilized, and there must be a 100-percent repair area; or

(3) The minimum horizontal setback requirements of .1950, .1951 and .1956(6)(g), as applicable, shall be met, except as follows for a system with a design flow not to exceed 1000 gallons per day:

| Table XIV: Minimum horizontal setbacks for ground absorption systems Where TS-II Pretreatment Systems are used for ≤ 1000 gallons per day | |
|---|---|
| Land Feature or Component | TS-II (feet) |
| Any public water supply | 100 |
| Streams classified as WS-I, except for saprolite | 50 |
| Waters classified as S-A, from mean high water mark | 50 |

| | |
|---|---|
| Other coastal waters, from mean high water mark | 25 |
| Any other stream, canal, marsh or other surface waters, from normal pool elevation | 25 |
| Any Class I or Class II reservoir, from normal pool elevation | 50 |
| Any permanent storm water retention pond, from flood pool elevation | 25 |
| Any other lake or pond, from normal pool or mean high water elevation | 25 |
| Any building foundation | 5 |
| Any basement | 15 |
| Any property line | 10 |
| Top of slope of embankments or cuts of 2 feet or more vertical height | 15 |
| Any water line | 10 |
| Upslope interceptor/foundation drains/diversions | 7 |
| Sideslope interceptor/foundation drains/diversions | 10 |
| Downslope interceptor/foundation drains/diversions | 15 |
| Groundwater lowering ditches and devices | 15 |
| Any swimming pool | 15 |
| Any other nitrification field (except the system repair area) | 10 |

(A) With the exception of the reduced setbacks to drainage devices or as allowed pursuant to Part (B) of this Subparagraph, when any horizontal setbacks are proposed to be reduced pursuant to Table XIV, the vertical separation modifications or LTAR increases shall not be concurrently applied pursuant to Subparagraphs (1) and (2) of this Paragraph, respectively.

(B) If the horizontal setbacks for a TS-II system are only proposed to be reduced to the extent allowed for a TS-I system (Table XII), for a system designed for 1000 gallons per day or less, a 25 percent trench length reduction may be concurrently applied, compared to the length required for any type of trench system receiving septic tank effluent, when the site has space for an equivalently sized repair system. A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule when Group III or IV soils or saprolite occur within three feet of the trench bottom. No further reductions in linear footage of nitrification trench or system area shall be applied when a PPBPS or innovative trenches or accepted systems are used for the absorption field.

(g) ARTIFICAL DRAINAGE SYSTEMS which include a TS-I or TS-II pretreatment system may be used when soils are Group I, II or III with SUITABLE clay mineralogy, and all other soil and site factors are SUITABLE or PROVISIONALLY SUITABLE or when a groundwater lowering system is proposed to meet the requirements for a fill system, provided all other soil and site factors are met pursuant to .1957(b)(i). The following conditions shall be met:

(1) The drainage system shall meet the requirements of Rule .1956(2)(c), (d) and (e) of this Section;

(2) The provisions for LTAR or Horizontal Setbacks pursuant to Paragraphs (e) or (f) of this Rule for TS-I or TS-II systems, respectively, shall also apply to Artificial Drainage Systems. However, there shall be no vertical separation modifications pursuant to Subparagraph (e)(1) or (f)(1) of this Rule from as specified elsewhere in the rules of this Section;

(3) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule, when there are Group III soils at any depth above the proposed drainage system invert elevation, when a groundwater lowering system is proposed for a fill system, or whenever the system is designed for greater than 1000 gallons per day; and

(4) Plans and specifications are provided to the local health department of the drainage system pursuant to .1938(c).

(h) SAPROLITE SYSTEMS which include a TS-I or TS-II pretreatment system may be used for systems with a design flow not to exceed 1000 gallons per day when the following conditions are met:

(1) The requirements of Rule .1956(6) of this Section shall be met, except where modifications are specifically allowed in this Paragraph.

(2) Allowable saprolite textures include sandy clay loam in addition to sand, loamy sand, sandy loam, loam, or silt loam.

(3) Maximum trench depth is five feet.

(4) The provisions for LTAR or Horizontal Setback modifications as allowed in Paragraphs (e) or (f) of this Rule for TS-I or TS-II systems, respectively, shall also apply to Saprolite Systems. However, there shall be no vertical separation modifications from as specified elsewhere in the Rules of this Section;

(5) For systems installed in saprolite with sandy clay loam texture, the maximum LTAR for gravity trenches shall be 0.2 gallons per day per square foot and 0.1 gallons per day per square foot for pressure dispersal (LPP or Drip) systems and

(6) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule.

(i) BED GROUND ABSORPTION SYSTEMS may be used in conjunction with a TS-I or TS-II system as specified in the system approval on sites with a design flow not to exceed 1000 gallons per day under the following circumstances:

(1) Bed Systems designed for 1000 gallons per day or less shall be subject to the siting and system criteria of this Subparagraph. In Table XV, "SWC" means "Soil Wetness Condition," and "USC" means an "UNSUITABLE Soil/Fill Condition," other than a SWC.

Table XV: Vertical Separation Requirements for TS-I and TS-II Bed Systems Designed for ≤1000 Gallons Per Day

| Soils/System Criteria to Permit System | Allowable Adjustments to Soil Criteria to Permit System | Depth from Surface* to Soil Wetness Condition | Minimum Vertical Bed Bottom Separation Requirement | |
|---|---|---|---|---|
| | | | Depth to USC | Depth to SWC |
| SUITABLE or PROVISIONALLY SUITABLE Soils, 30-inches Group I or II Soils from naturally occurring soil surface, and slope ≤2% | can increase allowable slope from ≤2% to ≤10% based on hydraulic assessment | 36 –inches | 24-inches | 12-inches |
| 36-inches of Group I Soils from naturally occurring soil surface, and Slope ≤2% | can reduce from 36 to 18-inches of Group I Soils based on hydraulic assessment, and/or b. can increase allowable slope from ≤2% to ≤10% based on hydraulic assessment | 12-inches | 12-inches | 12-inches |
| 24-inches of Group I Existing Fill meeting Rule .1957(b)(2)(A),(B), and (C), and only when design flow ≤480 gallons per day | No Adjustments Applicable | 18-inches | 18-inches | 18-inches |

* Minimum depth of soil/fill required at site to permit system. Depth shall be measured from the naturally occurring soil surface or Existing Fill surface, as applicable

(A) Vertical separation requirements may be met by adding additional SUITABLE Group I fill material, but shall not be met with the use of a groundwater lowering system.

(B) The hydraulic assessment in Table XV shall be completed pursuant to Paragraph (p) of this Rule, and shall demonstrate that effluent will not discharge to the ground surface and the required separation distance to soil wetness can be maintained.

(C) When effluent is distributed to the bed by a pump or siphon and the bed is not located directly beneath the pretreatment component, effluent shall be uniformly distributed by a pressure dispersal system (LPP or Drip).

(2) Horizontal separation distances specified in Subparagraphs (e)(3) and (f)(3) of this Rule are applicable for systems receiving TS-I or TS-II effluent, respectively. The setbacks shall be measured from the nearest edge of the gravel bed, except for fill systems. For fill systems, the setbacks shall be measured from a point five feet from the nearest edge of the gravel bed sidewall, or from the projected toe of the side slope of the fill that is required to meet soil and site limitations, whichever is greater. The system shall be considered to be a fill system only if the gravel bed bottom is installed less than six inches below the naturally occurring soil surface. For fill systems, the requirements of Rule .1957(b) of this Section, for the side slope of the fill shall be met, as determined beginning at a point six-inches above the top edge of the gravel bed.

(3) The minimum number of square feet of bottom area shall be determined by dividing the design daily sewage flow by the LTAR, determined in accordance with Rule .1955 of this Section. When the bed is installed in fill material, the LTAR shall not exceed 1.0 gallons per day per square foot. The minimum bed size may be reduced as follows:

(A) The minimum bed size may be reduced by 25 percent, unless the bed is installed in existing fill, in which case the bed area shall not be reduced; or

(B) For sites that have Group I Soil in the first 36 inches of naturally occurring soil and no soil wetness condition exists within the first 30 inches below the naturally occurring soil surface, the minimum bed size may be reduced by 40 percent when a pressure dispersal system is utilized to distribute flow uniformly throughout the bed area; a timer controller is used to distribute flow evenly over a 24-hour period; and the system is designed and approved to meet TS-II performance standards. Furthermore, the repair area exemption in .1945(c) does not apply when the bed size is reduced by more than 25 percent pursuant to this Part.

With the exception of reduced setbacks to drainage devices (Tables XII or XIV), whenever the minimum bed size is reduced pursuant to Parts (A) or (B) of this Subparagraph, the minimum horizontal setbacks as specified in Rules. 1950, .1951 and .1956(6)(g) of this Section, as applicable, shall apply and with no reductions applied.

(j) BED GROUND ABSORPTION SYSTEMS may be used in conjunction with a TS-I or TS-II system as specified in the system approval on sites with a design flow greater than 1000 gallons per day not to exceed 3000 gallons per day under the following circumstances:

(1) Bed Systems designed for greater than 1000 gallons per day but not exceeding 3000 gallons per day shall be subject to the siting and system criteria of this Subparagraph.

| Table XVI: Vertical Separation Requirements for TS-I and TS-II Bed Systems Designed for >1000 to ≤3000 Gallons Per Day | | | |
|---|---|---|---|
| Soils/System Criteria | Depth from Surface* to Soil Wetness Condition | Minimum Vertical Bed Bottom Separation Requirement | |
| | | Depth to Soil Wetness Condition | Allowable Adjustment in Depth to Soil Wetness Condition |
| 54-inches of Group I Soils from naturally occurring soil surface | 48-inches | 24-inches | Can reduce from 24-inches to 12-inches in naturally occurring soil, or to 18-inches for fill systems based on groundwater mounding analysis |

*Minimum depth required at site to permit system shall be measured from the naturally occurring soil surface.

(A) Vertical separation requirements may be met by adding additional SUITABLE Group I fill material, but shall not be met with the use of a groundwater lowering system.

(B) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule. The groundwater mounding analysis in Table XVI must demonstrate that required vertical separations between bed bottom and a

soil wetness condition shall be maintained after accounting for projected groundwater mounding.

(C) Two or more equally sized beds shall be utilized for any TS-I system designed for over 1000 gallons per day, or for any TS-II system designed for over 1500 gallons per day. When two beds are used, the minimum separation between beds shall be 20 feet, and when three or more beds are used, the minimum separation between beds shall be 10 feet. Effluent shall be distributed to the beds by a pump and timer control system to distribute flow evenly over a 24-hour period.

(D) When the system is designed for greater than 1500 gallons per day, the beds shall be located in an area separate from the pretreatment components.

(E) Whenever the beds are not located directly beneath the pretreatment components, effluent shall be uniformly distributed by a pressure dispersal system (LPP or Drip).

(2) Horizontal separation distances specified in Rules .1950(a), .1951, or .1956(6)(g) of this Section shall apply without reduction for bed systems designed for greater than 1000 gallons per day. Furthermore, a 25-foot horizontal separation distance shall be maintained from the bed to the property line and the bed, unless a site-specific nitrogen migration analysis indicates that the nitrate concentration at the property line will not exceed 10 milligrams per liter (mg/l), or TS-II effluent is produced by the approved system.

(3) The minimum number of square feet of bed bottom area shall be determined by dividing the design daily sewage flow by the LTAR, determined in accordance with Rule .1955 of this Section. When the bed is installed in fill material, the LTAR shall not exceed 1.0 gallons per day per square foot. The minimum bed size may be reduced as follows:

(A) The minimum bed size may be reduced by 25 percent, unless the bed is installed in existing fill, in which case the bed area shall not be reduced; or

(B) For sites that have Group I Soil in the first 54 inches below the naturally occurring soil surface and no soil wetness condition exists within the first 36 inches below the naturally occurring soil surface, the minimum bed size may be reduced by 40 percent when a pressure dispersal system (LPP or Drip) is utilized to distribute flow uniformly throughout the bed area; a timer controller is used to distribute flow evenly over a 24-hour period; the system is designed and approved to meet TS-II performance standards; and there shall be a 100-percent repair area.

(k) DESIGN:

(1) Special system design requirements shall be as prescribed in the product's RWTS, Experimental, Controlled Demonstration, Innovative or Accepted System approval, as applicable.

(2) Provisions shall be made to allow for the influent to and effluent from the system to be sampled while the system is operational, and

(3) The system design shall include a means to measure and record daily wastewater flows. The recording device shall provide a means for determining at least the last 30 days of wastewater flow to the system

(l) INSTALLATION: Pre-treatment systems shall be installed according to the manufacturer's installation specifications and system-specific installation conditions prescribed in the product's RWTS, Experimental, Controlled Demonstration, Innovative or Accepted System approval, as applicable, by a manufacturer-authorized installer. Installation and construction specifications for the ground absorption system shall be in accordance with this Section and site-specific conditions as specified in the Authorization to Construct.

(m) OPERATION AND MAINTENANCE: Maintenance, as specified in the product's RWTS, Experimental, Controlled Demonstration, Innovative or Accepted System approval, as applicable, shall be performed by the certified operator pursuant to .1961 and as specified in the product approval. The following provisions apply to the Operation and Maintenance of Advanced Pretreatment Systems:

(1) For systems installed after July 1, 2006, the manufacturer of a proprietary advanced pretreatment system shall provide for the ongoing operation and maintenance of its systems. The manufacturer shall make available to the owner an operation and maintenance contract that meets the management entity requirements for the system pursuant to .1961. The contract shall be renewable and the contract term shall be for a minimum of one year.

(2) For systems installed prior to July 1, 2006, the manufacturer shall provide an optional renewable yearly operation and maintenance contract with the owner that fulfills the management entity requirements for the system pursuant to .1961.

(3) Prior to the issuance or re-issuance of an Operation Permit for a proprietary advanced pretreatment system after July 1, 2006, the owner shall provide to the health department documentation that a contract for operation and maintenance of the system is in place with either the manufacturer, manufacturer's representative, or with a certified operator authorized in writing by the manufacturer or manufacturer's representative to operate the system.

(4) The manufacturer shall notify the local health department and the State when the owner chooses to not renew an operation and maintenance contract executed pursuant to Subparagraphs (1) or (2) of this Paragraph.

(n) SYSTEM PERFORMANCE: The performance of each system shall be monitored by the certified wastewater treatment facility operator (ORC). A performance report shall be submitted annually to the local health department by the ORC. Type of monitoring and monitoring frequency shall vary by type of approval, the designated performance standard, system design flow, and history of system performance as follows:

(1) Each system shall be visually inspected by the ORC at least annually using a procedure proposed by the manufacturer and approved by the state as part of the product's RWTS, Experimental, Controlled Demonstration, Innovative or Accepted System approval, as applicable,

(2) The 7-day and 30-day influent wastewater flow from the facility to the system prior to a monitoring visit shall be measured by the ORC using the recording device delineated in Subparagraph (k)(3) of this Rule, or by an alternate approved means. For systems serving Vacation Rentals subject to the North Carolina Vacation Rental Act, G.S. 42A, this visit shall be scheduled during the seasonal high use period and shall be coincident with any required water quality sampling. For existing systems where it is not feasible to directly obtain the past 7-day and 30-day influent wastewater flow data, wastewater usage during the 7 to 30 day period prior to the monitoring visit shall be estimated by using either elapsed time clock readings when an effluent pump is present, water meter readings, or as otherwise specified in the product or site-specific system approval.

(3) Effluent from an approved Controlled Demonstration, RWTS and Innovative System shall be sampled prior to disposal in the absorption field as follows:

(A) A Controlled Demonstration system shall be sampled quarterly for all applicable performance parameters until the system receives Innovative approval, unless the product specific approval includes an alternate monitoring schedule proposed by the manufacturer and approved by the State;

(B) Sites with an approved RWTS or Innovative system shall be grab or composite sampled annually for all applicable performance parameters (semi-annually when the design flow is 1500 to 3000 gallons per day). After two years of data have been collected from at least 50 separate sites that indicate compliant system performance, the number of parameters sampled for TS-I and TS-II Systems may be reduced by 50 percent. An alternative monitoring schedule may be proposed by the manufacturer and approved by the State when determined to provide an equal or more reliable indication of system performance compliance; or

(C) Sites with a design flow up to 1500 gallons per day, which are being managed under an on-going maintenance and operation contract between the owner and the system manufacturer or ORC authorized by the manufacturer, can alternatively be sampled randomly if the manufacturer chooses to comply with the performance audit requirements as stipulated in .1969(h)(8), when there are at least 10 operational systems covered under such contracts. The manufacturer can also choose to include other existing sites in the performance audit required prior to obtaining accepted system status. Notwithstanding this provision for random sampling, sampling at any other site not being sampled during the audit may be determined to be necessary by the ORC during the visual inspection of the system pursuant to Subparagraph (1) of this Paragraph.

An influent sample to the pre-treatment system (e.g., septic tank effluent) shall be taken concurrently whenever the system effluent is sampled and analyzed for at least BOD and TKN. Effluent shall be re-sampled within 15 days when laboratory results indicate non-compliance with Part (o)(1)(C) of this Rule and analyzed at least for the non-compliant parameter(s), unless an alternate re-sampling schedule is required for a site included in a performance audit. When re-sampling, an influent sample shall be collected concurrently and analyzed for the corresponding parameter.

(4) An Accepted System with a design flow up to 1500 gallons per day shall comply with Subparagraphs (n)(1) and (n)(2) of this Rule and .1969(h)(9). Routine sampling of individual sites shall no longer be carried out, unless determined to be necessary during the visual inspection of the system pursuant to Subparagraph (n)(1) of this Rule or if required as part of an enforcement action by the local health department or the State. In the event that sampling is determined to be necessary, an alternative monitoring schedule may be proposed by the manufacturer or the State and approved by the Commission when the system is granted accepted Status.

(5) All samples shall be collected, preserved, transported and analyzed in compliance with 40 CFR 136. The manufacturer shall demonstrate that the system can be sampled in compliance with 40 CFR 136 and that the method for system sampling accurately monitors system performance. Samples shall be analyzed by a state certified laboratory. Samples shall be analyzed for the applicable parameters. The sample collector shall maintain a complete chain of custody from sample collection to analysis for each sample collected. The results of all analyses for each sample shall be reported by the certified wastewater laboratory directly to the ORC and simultaneously to the health department and the state. Repeat sampling at any site shall be performed as required in the system approval, approved performance audit, this Rule, or as otherwise directed by the health department or state as part of an enforcement action. The owner or manufacturer or manufacturer's representative may also re-sample a system to verify or refute sample results, as long as the results of all samples collected are similarly reported.

(o) SITE AND SYSTEM COMPLIANCE: Compliance with the performance standards shall be determined as follows:

(1) An individual advanced pretreatment system at a single site shall be considered to be in compliance when:

(A) The annual visual inspection indicates compliant conditions as specified in the visual inspection procedure approved pursuant to Subparagraph (n)(1) of this Rule; and

(B) The 7-day inflow does not exceed 1.3 times the design daily flow and the 30-day inflow does not exceed the design daily flow; and

(C) Influent wastewater to the system does not exceed the requirements in Table VIII, at sites where influent sampling is required; and

(D) When annual effluent sampling is required, sample value is no more than two times (2.5 times for fecal coliform) the designated standard for one or more parameters in Table VII, even after re-sampling; or if four or more effluent samples are collected on different operating days over a one year period, the arithmetic mean (geometric mean for fecal coliform) of the data does not exceed the designated standard for one or more parameters in Table VII, even when excluding from the mean a statistical outlier or an instance of non-compliance that has been remedied by corrective maintenance.

(2) An approved system shall be considered in compliance when:

(A) The arithmetic mean (geometric mean for fecal coliform) of all data collected from all sites during a given one-year period, or from a representative sampling of sites in the state (excluding statistical outliers) does not exceed the designated standard.

(B) No more than 20 percent of the sites from which the data were collected in Part (o)(2)(A) of this Rule shall exceed the designated standard for one or more parameters (an individual non-compliant site shall be reclassified "compliant" if found to meet the designated standard upon re-sampling within 30 days).

(C) No more than 10 percent of samples collected from all sites during a given one-year period or from a representative sampling of sites in the state shall exceed two times the designated standard for one or more parameters (with the exception of fecal coliform, for which a 2.5 multiplication factor shall be used).

When determining compliance with system performance standards set forth in Parts (A), (B) and (C) of this Subparagraph, data shall be excluded from individual advanced pretreatment systems at single sites found to be out of compliance pursuant to Parts (1)(B) and (1)(C) of this Paragraph and from individual sites that have otherwise been documented to have been subjected to significant abuse, as specified by the manufacturer in its operation and maintenance manual which has been provided to the system owner.

(3) When a site or system is found to be out of compliance the following actions shall occur:

(A) The Operator (ORC) shall inform the owner and the local health department of an individual system at a single site found to be out of compliance, including when

wastewater flow is greater than the system design flow rate; influent wastewater quality exceeds the standards set forth in Table VII; or maintenance/repairs are found to be needed as identified during system inspection. This notice shall identify non-compliant condition(s), explain potential impacts, and suggest methods to bring the system or use back into compliance.

(B) The local health department shall issue a notice of violation to the owner of an individual system at a single site found to be out of compliance when, the system is found to be malfunctioning as determined during the visual inspection specified in Part (1)(A) of Paragraph (o) of this Rule; wastewater flow exceeds wastewater flow standards in Part (1)(B) of this Paragraph; or the effluent sample results are out of compliance as specified in Parts (1)(D) or (1)(E) of this Paragraph, even upon re-sampling. The notice shall identify the violations and steps necessary to remedy the problems, including modification of the system, establish time frame to achieve compliance, and other follow-up requirements and set forth further enforcement possibilities if compliance is not achieved.

(C) The state shall issue a notice of violation to the manufacturer of a system found to be out of compliance as specified in Subparagraph (2) of this Paragraph. The notice shall identify the violations and steps necessary to remedy the problems, including modification of the system, establish time frame to achieve compliance, and other follow-up requirements and set forth further enforcement possibilities if compliance is not achieved, which may include action on the system's approval status pursuant to applicable Laws and Rules.

(D) The local health department shall issue the manufacturer or manufacturer's representative an intent to suspend issuance of new construction authorizations for new systems of a particular manufacturer that has installed and has in operation at least 10 systems in the county if more than 10 percent of the manufacturer's systems installed in the county are found to be malfunctioning during the visual inspection specified in Subparagraph (n)(1) of this Rule, or in violation of effluent performance standards as specified in Parts (1)(D) or (1)(E) of this Paragraph in any single year, excluding single sites found to be out of compliance pursuant to Parts (1)(B) or (1)(C) of this Paragraph, sites where the owner has not maintained a contract for operation and maintenance of the system pursuant to Rule .1961 of this Section, and individual sites that have otherwise been documented to have been subjected to significant abuse, as specified by the manufacturer in its operation and maintenance manual which has been provided to the system owner.

(E) The local health department shall issue the manufacturer or manufacturer's representative an intent to suspend issuance of new construction authorizations for new systems of a particular manufacturer that has installed and has in operation at least 10 systems in the county if more than five percent of the manufacturer's systems installed in the county that are being managed under an ongoing maintenance and operation contract between the owner and the system manufacturer or ORC authorized by the manufacturer have required operation and maintenance activities under the control of the manufacturer that have not been completed for the last reported year.

(F) All individual system compliance data and all operations and maintenance records shall be submitted to the local health department. The local health department shall convey information on individual system compliance to the State on at least an annual basis. Action by a local health department on approval of a system in a county does not preclude action by the State on the system's approval status, pursuant to applicable Laws and Rules.

(G) Notwithstanding the activities delineated for dealing with non-compliance elsewhere in Subparagraph (3) of this Paragraph, nothing shall preclude the local health department or State from using any available remedy when an imminent health hazard is determined to exist, in accordance with applicable Laws and Rules.

(p) RESPONSIBILITIES AND PERMITTING PROCEDURES: Special responsibilities and permitting procedures for pre-treatment systems shall be as prescribed in the system approval and applicable rules of this Section. The following summarize the conditions requiring a special evaluation of a site where the ground absorption system is to be preceded by an advanced pretreatment system, and what such an evaluation shall include:

(1) Prior to the issuance of the Improvement Permit at a site where the drainfield is to be preceded by an advanced pre-treatment system, an evaluation shall be provided to the local health department on behalf of the owner when any of the following conditions are applicable:

(A) the initial vertical separation siting criteria or vertical separation distances for trench bottoms are proposed to be reduced in accordance with Subparagraphs (e)(1) or (f)(1) of this Rule,

(B) drainage is proposed for Group III soils or a groundwater lowering system is proposed to be used in conjunction with a fill system in accordance with Paragraph (g) of this Rule,

(C) sandy clay loam texture saprolite is proposed to be used in accordance with Paragraph (h) of this Rule,

(D) the LTAR is proposed to be increased on a site with Group III or IV soils within three feet of the proposed trench bottom or on a site where drainage of Group II or III soils is proposed, or on any site when the design flow exceeds 1000 gallons per day, in accordance with Subparagraphs (e)(2) or (f)(2) of this Rule, or

(E) for a bed system with flow exceeding 1000 gallons per day in accordance with Paragraph (j) of this Rule, or if required for other bed systems in accordance with Subparagraph (i)(1) of this Rule.

(2) When a special site evaluation is required pursuant to Subparagraph (1) of this Paragraph, it shall contain the following information, as applicable. This evaluation shall be prepared by a person or persons who are licensed or registered to consult, investigate, or evaluate soil and rock characteristics, hydraulic conductivity, lateral flow, groundwater hydrology and nutrient transport, if required pursuant to G.S. 89F or 89E. This evaluation shall be provided to the local health department in a written report sealed, signed and dated by any licensed or registered professionals who contributed to the report.

(A) detailed descriptions of soil profiles and soil morphological conditions to a depth of at least three feet below the proposed trench or bed bottom and description of landscape setting in the initial system area and repair area;

(B) field measurements of the depth and thickness of each of the soil horizons;

(C) recommended location and depth for placement of the trenches or beds and the recommended LTAR;

(D) hydraulic assessment, based on site-specific information, substantiating the projected effectiveness of system performance. This shall include supporting documentation that indicates the treated effluent applied at the proposed LTAR will not result in the discharge of effluent to the surface of the ground after the system is installed and operated within design parameters; that all required vertical separation distances shall be maintained; and justification for any proposed drainage systems or other site modifications. This hydraulic assessment shall require in-situ tests of saturated hydraulic conductivity, groundwater mounding analysis, lateral flow analysis, and monitoring or modeling of existing or projected depth to a soil wetness condition based upon procedures of Rule .1942 of this Section, as needed;

(E) site-specific nitrogen migration analysis, if needed pursuant to Subparagraphs (e)(2) or (j)(2) of this Rule; and

(F) proposed site-specific requirements for system design, installation, site preparation, modifications, final landscaping and vegetative cover.

History Note: Authority G.S. 130A-334; 130A-335; 130A-336; 130A-337; 130A-340; 130A-342; 130A-343; Eff. June 1, 2006.

# ORANGE COUNTY BOARD OF HEALTH

## A RESOLUTION CONCERNING THE ADOPTION OF RULES FOR WASTEWATER TREATMENT AND DISPOSAL SYSTEMS IN ORANGE COUNTY

**WHEREAS**, the Orange County Board of Health is charged with protecting the health, safety, and welfare of all Orange County residents; and

**WHEREAS**, the Orange County Board of Health desires to protect all residents of Orange County from exposure to pathogens from failing wastewater systems; and

**WHEREAS**, failing wastewater systems constitute a significant public health risk for residents living in the County, and

**WHEREAS**, failing wastewater systems may lead to groundwater and surface water contamination and exposure of humans and vectors to untreated sewage; and

**WHEREAS**, the soils and underlying geology in Orange County dictate certain siting, design, installation, and operation considerations in order to avoid premature failure of septic systems. Limiting site features include, but are not limited to; slowly permeable clay soil, seasonally high water table, shallow soil depth to rock, and limited available space; and

**WHEREAS**, it is the opinion of the Orange County Board of Health that these rules are necessary to ensure the proper operation of wastewater systems in Orange County and thereby protect the public health and natural resources of the County; and

**Now, therefore, be it resolved by the Orange County Board of Health that:**

1. The Orange County Board of Health does hereby adopt by reference Title 15a - Department of Environment and Natural Resources; Chapter 18 - Environmental Health; Subchapter 18a - Sanitation; Section .1900 et seq.- Sewage Treatment And Disposal Systems; and

2. The Orange County Board of Health as enabled by North Carolina General Statute 130A-39 adopts these Rules for Wastewater Treatment and Disposal Systems in Orange County hereby deemed to be more stringent because they are necessary to protect the public health of the citizens in Orange County; and

3. The Orange County Board of Health does hereby request the Department of Health and Human Services to review these rules concerning wastewater systems, and

4. These rules shall be in full force and effect unless otherwise acted on by the Orange County Board of Health.

This the 25th day of February, 2015.

Susan Elmore, DVM
Chair, Orange County Board of Health

Colleen M Bridger, MPH, DrPH PhD
Orange County Health Director