(ii) drawings and details showing all advanced pretreatment units and appurtenances such as pumps, valves, floats, etc., size and type of piping, disinfection unit, blowers if needed, location of control panels, height of control panels, etc; and

(iii) documentation from the manufacturer supporting the proposed design and use of the advanced pretreatment system to achieve specified effluent standards if not otherwise approved by the Department in accordance with Section .1700 of this Subchapter;

(e) dispersal field plans and specifications with design and construction details:

(i) final field layout, including ground elevations based on field measurements at a maximum of two-foot intervals or spot elevations when there is less than a two-foot elevation difference across the site;

(ii) trench plan and profile drawings, including cross sectional details, length, spacing, connection details, cleanouts, etc., and invert elevations for each lateral;

(iii) manifolds, supply lines, pipe sizes, cleanouts and interconnection details, and invert elevations;

(iv) flow distribution device design;

(v) artificial drainage system locations, elevations, discharge points, and design details, as applicable;

(vi) site preparation procedures;

(vii) construction phasing and wastewater system testing; and

(viii) final landscaping and compliance with erosion control requirements, such as site stabilization procedures and drainage;

(f) materials specification for all materials to be used, methods of construction, means for assuring the quality and integrity of the finished product; and

(g) operation and maintenance procedures for the Management Entity, inspection schedules, and maintenance specifications for mechanical components and dispersal field vegetative cover; and

(5) any other information determined to be applicable by the LHD or the Department, such as the impact of projected wastewater constituents on the trench and receiving soil.

History Note: *Authority G.S. 130A-335.*

15A NCAC 18E .0305 SUBMITTAL REQUIREMENTS FOR PLANS, SPECIFICATIONS, AND REPORTS PREPARED BY LICENSED PROFESSIONALS FOR SYSTEMS LESS THAN OR EQUAL TO 3,000 GALLONS/DAY

Plans, specifications, and reports for wastewater systems with a DDF less than or equal to 3,000 gpd that are required to be prepared by an LSS or PE, if required in G.S. 89C or 89E, shall include the information required by the following:

(1) Rule .0304(1) of this Section;

(2) Rule .0304(2) of this Section for special site evaluations and submittals prepared under Rule .0510 of this Subchapter; and

(3) Rule .0304(4) of this Section for advanced pretreatment and IPWW.

History Note: *Authority G.S. 130A-335.*

SECTION .0400 – DESIGN DAILY FLOW AND EFFLUENT CHARACTERISTICS

15A NCAC 18E .0401 DESIGN DAILY FLOW[10]

(a) The minimum DDF for dwelling units shall be 120 gpd per bedroom or 60 gpd per person when occupancy exceeds two persons per bedroom, whichever is greater. ~~based on:~~

~~(1) 175 gpd for a one bedroom dwelling unit with no more than two occupants and 400 square feet of living space or less; or~~

~~(2) 120 gpd per bedroom with a minimum of 240 gpd per dwelling unit or 60 gpd per person when occupancy exceeds two persons per bedroom, whichever is greater.~~

(b) DDF for facilities other than dwelling units shall be in accordance with Table II as follows:

TABLE II. Design daily flow for Facilities

Facility type	Design daily flow
Commercial	
Airports, railroad stations, bus and ferry terminals, etc.	5 gal/traveler, food preparation not included
Barber shops	50 gal/chair
Bars, cocktail lounges∞	20 gal/seat, food preparation not included
Beauty shops, style shops, hair salons	125 gal/chair

[10] Changed by S.L. 2023-77, Section 9

Bed and breakfast homes and inns	Dwelling unit DDF based on Paragraph (a) of this Rule plus 120 gal/rented room which includes the following: Meals served to overnight guests Laundry for linens 150 gal/room with cooking facilities in individual rooms
Event Center∞	5 gal/person with toilets and hand sinks up to 4 hrs 10 gal/person with toilets and hand sinks up to 8 hrs 15 gal/person with toilets and hand sinks greater than 8 hrs Add 5 gal/person with full kitchen
Markets open less than four days/week, such as a flea market or farmers market	30 gal/stall or vendor, food preparation not included
Marinas with no holding tank discharge included	30 gal/boat slip, with bathhouse 10 gal/boat slip, wet slips or slips on dock 5 gal/boat slip, dry storage or warehouse
Motels/hotels	120 gal/room includes the following: No cooking facilities in individual rooms other than a microwave or other similar devices No food service or limited food service establishment Laundry for linens 150 gal/room with cooking facilities in individual rooms
Offices and factories with no IPWW included	12 gal/employee/≤ 8 hr shift Add 2 gal/employee/hr for more than 8 hr shift Add 10 gal/employee for showers
Stores, shopping centers, and malls	100 gal/1,000 ft^2 of retail sales area, food preparation not included
Warehouse that are not retail sales warehouses	100 gal/loading bay or 12 gal/employee/≤ 8 hr shift Add 2 gal/employee/hr for more than 8 hr shift
Storage warehouse including self-storage facilities and does not include caretaker residence	12 gal/employee/≤ 8 hr shift Add 2 gal/employee/hr for more than 8 hr shift
Alcoholic beverage tasting areas with no process wastewater included	200 gal/1,000 ft^2 of tasting area floor space and includes glass washing equipment Food preparation and food clean up not included 12 gal/employee/≤ 8 hr shift
Camps/Campgrounds	
Summer camps with overnight stays*	60 gal/person, applied as follows: 15 gal/person/food preparation 20 gal/person/toilet facilities 10 gal/person/bathing facilities 15 gal/person/laundry facilities
Day camps not inclusive of swimming area bathhouse*	20 gal/person and 5 gal/meal served with multiuse service or 3 gal/meal served with single-service articles
Temporary Labor Camp or Migrant Housing Camp with overnight stays*	60 gal/person, applied as follows: 15 gal/person/food preparation 20 gal/person/toilet facilities 10 gal/person/bathing facilities 15 gal/person/laundry facilities
Travel trailer or RV in an RV park*	100 gal/space
Recreational Park Trailer or Park Model Trailer 400 ft^2 or less in an RV park*	150 gal/space
Bathhouse for campsites and RV park sites with no water and sewer hook ups with a maximum of four people per campsite	70 gal/campsite
Food preparation facilities	
Food Establishments with multiuse articles*	25 gal/seat or 25 gal/15 ft^2 of floor space open 6 hrs/day or less 40 gal/seat or 40 gal/15 ft^2 of floor space open 6 to 16 hrs/day Add 4 gpd/seat for every additional hour open beyond 16 hrs
Food Establishments with single service articles*	20 gal/seat or 20 gal/15 ft^2 of floor space open 6 hrs/day or less 30 gal/seat or 30 gal/15 ft^2 of floor space open 6 to 16 hrs/day

	Add 3 gpd/seat for every additional hour open beyond 16 hrs
Food stand with up to eight seats, mobile food units, and commissary kitchens*	50 gal/100 ft^2 of food stand, food unit, or food prep floor space and 12 gal/employee/≤ 8 hr shift Add 2 gal/employee/hr for more than 8 hr shift
Other food service facilities*	5 gal/meal served with multiuse articles 3 gal/meal served with single service articles
Meat markets or fish markets with no process wastewater included*	50 gal/100 ft^2 of floor space and 12 gal/employee/≤ 8 hr shift Add 2 gal/employee/hr for more than 8 hr shift
Health care and other care institutions	
Hospitals*	300 gal/bed
Rest homes, assisted living homes, and nursing homes*	150 gal/bed with laundry 75 gal/bed without laundry Add 60 gal/resident employee with laundry
Day care facilities	15 gal/person open ≤ 12 hr shift without laundry Add 1 gal/person/hr open for more than 12 hrs per day Add 5 gal/person with full kitchen
Group homes, drug rehabilitation, mental health, and other care institutions	75 gal/person with laundry
Orphanages	60 gal/student or resident employee with laundry
Public access restrooms	
Convenience store, service station, truck stop*	250 gal/toilet or urinal meeting the following: Open less than 16 hrs/day Food preparation not included Retail space not included
	325 gal/toilet or urinal meeting the following: Open 16 to 24 hrs/day Food preparation not included Retail space not included
Highway rest areas and visitor centers*	325 gal/toilet or urinal or 10 gal/parking space, whichever is greater
Recreational facilities	
Bowling center	50 gal/lane, food preparation not included
Community center, gym∞	5 gal/person plus 12 gal/employee/≤ 8 hr shift Add 2 gal/employee/hr for more than 8 hr shift or 50 gal/100 ft^2, whichever is greater
Country club or golf course	10 gal/person 12 gal/employee/≤ 8 hr shift Add 2 gal/employee/hr for more than 8 hr shift 3 gal/person for convenience stations Food preparation not included
Fairground	250 gal/toilet or urinal
Fitness center, spas, karate, dance, exercise∞	50 gal/100 ft^2 of floor space used by clientele Food preparation not included
Recreational park, State park, county park, and other similar facilities with no sports facilities	10 gal/parking space
Outdoor sports facilities, mini golf, batting cages, driving ranges, motocross, athletic park, ball fields, stadium, and other similar facilities	250 gal/toilet or urinal, 5 gal/seat, or 10 gal/parking space, whichever is greater Food preparation not included
Auditorium, theater, amphitheater, drive-in theater	2 gal/seat or 10 gal/parking space, whichever is greater Food preparation not included
Swimming pools and bathhouses	5 gal/person domestic waste only, bathing load of pool may be used as an alternative method of sizing
Sports facilities courts or other similar facilities	250 gal/toilet or urinal or 50 gal/court, whichever is greater
Institutions	

Church or other religious institution*	2 gal/seat sanctuary only 3 gal/seat with warming kitchen in same structure as sanctuary 5 gal/seat with full kitchen in same structure as sanctuary
Public or private assembly halls used for recreation, regularly scheduled meetings, events, or amusement∞* For churches, flow shall be in addition to sanctuary structure flow	2 gal/person with toilets and hand sinks 3 gal/person with addition of a warming kitchen 5 gal/person with full kitchen
Schools	
Day schools*	6 gal/student with no cafeteria or gymnasium 9 gal/student with cafeteria only 12 gal/student with cafeteria and gymnasium
After school program	5 gal/student in addition to flow for regular school day
Boarding schools	60 gal/student and resident employee with laundry

* Facility has potential to generate HSE.
∞Designer shall use the maximum building occupancy assigned by the local fire marshal in calculating DDF unless another method for determining DDF is proposed, including the justification for not using the maximum building occupancy.

(c) The minimum DDF from any facility other than a dwelling unit shall be 100 gpd. For facilities with multiple design units, the minimum DDF shall be 100 gpd per design unit. The DDF of the facility shall be the sum of all design unit flows.
(d) DDF determination for wastewater systems with facilities not identified in this Rule shall be determined using available water use data, capacity of water-using fixtures, occupancy or operation patterns, and other measured data from the facility itself or a comparable facility.
(e) Where laundry is not specified for a facility in Table II, but is proposed to be provided, the DDF shall be adjusted to account for the proposed usage and machine water capacity. The applicant or a licensed professional shall provide cut-sheets for laundry machines proposed for use in facilities.
(f) HVAC unit or ice machine condensate, gutter or sump pump discharge, water treatment system back flush lines, or similar incidental flows shall not discharge to the wastewater system, unless a PE designs the wastewater system for these flows.
(g) Unless otherwise noted in Table II, the DDF per unit includes employees.
(h) Food service facilities and other facilities that are projected to generate wastewater with constituent levels greater than DSE, as defined in Rule .0402 of this Section, are identified in Table II with a single asterisk (*) as HSE. Any facility that has a food service component that contributes 50 percent or more of the DDF shall be considered to generate HSE. Determination of wastewater strength shall be based on projected or measured levels of one or more of the following: BOD, TSS, FOG, or TN. Table III of Rule .0402(a) of this Section identifies the constituent limits for DSE.
(i) Wastewater with constituents other than those listed in Table III of Rule .0402(a) of this Section may be classified as IPWW as defined in G.S. 130A-334(2a) on a site-specific basis.
(j) A request for an adjusted DDF shall be made in accordance with Rule .0403 of this Section.

History Note: *Authority G.S. 130A-335(e); S.L. 2013-413, s.34; S.L. 2014-120, ~~s.53.~~ s.53; S.L. 2023-77, s.9.*

15A NCAC 18E .0402 SEPTIC TANK EFFLUENT CHARACTERISTICS[11]
(a) Septic tank effluent standards for DSE shall be as set forth in Table III of this Paragraph. Effluent that exceeds these standards for any constituent shall be considered HSE. When measured, effluent characteristics shall be based on at least two effluent samples collected during normal or above-normal operating periods. A normal period is when the occupancy, operation, or use of the facility is average when compared to the occupancy, operation, or use over a time frame of a minimum of one year. The samples shall be taken from the existing or a comparable facility on non-consecutive days of operation. A comparable facility is based on documentation showing that the hours of operation, floor plan, water use practices, water-using fixtures, location, etc., are similar to the facility listed in the application. The samples shall be analyzed for a minimum of BOD_5, TSS, TN, and FOG.

Table III. Septic tank effluent standards for DSE

Constituent	Maximum DSE mg/L
BOD	≤ 350
TSS	≤ 100

[11] Changed by S.L. 2023-77, Section 10

~~TN*~~TKN	≤ 100
FOG	≤ 30

~~*TN is the sum of TKN, nitrate nitrogen, and nitrite nitrogen~~

(b) Designs for facilities that generate HSE or when an adjusted DDF is proposed in accordance with Rule .0403 shall address the issue of wastewater strength in accordance with one of the following:

(1) Wastewater systems that meet one of the following criteria shall utilize advanced pretreatment, designed in accordance with Rule .1201(b) of this Subchapter, to produce DSE or better prior to dispersal:
   (A) DDF greater than 1,500 gpd and HSE;
   (B) any proposed flow reduction in accordance with Rule .0403 of this Section where the DDF is greater than 1,500 gpd; or
   (C) any proposed flow reduction in accordance with Rule .0403 of this Section with projected or measured effluent characteristics that exceed DSE as set forth in Table III of this Rule; or

(2) A licensed professional, in accordance with G.S. 89C, 89E, or 89F, may justify not using advanced pretreatment by providing the following, as applicable:
   (A) the system design is determined based upon a mass loading adjusted LTAR calculated using site-specific LTAR and projected or measured BOD_5 and TSS values. The adjusted LTAR calculations shall be done as follows:

MLAF = 300/(BOD_5 + TSS) or one, whichever is smaller
ALTAR = MLAF x LTAR

Where MLAF = mass loading LTAR adjustment factor
BOD_5 = measured or projected
TSS = measured or projected
LTAR = LTAR assigned by the authorized agent for DSE in accordance with this Subchapter
ALTAR = adjusted LTAR

   (B) site-specific nitrogen migration analysis when projected or measured effluent total nitrogen levels are greater than 100 mg/L. Analysis shall demonstrate that the nitrate-nitrogen concentration at the property line will not exceed 10 mg/L; and
   (C) additional pretreatment to reduce FOG to less than or equal to 30 mg/L, including justification for the proposed pretreatment method.

(c) The requirements of Paragraph (b) shall not apply if the effluent for a specific facility identified in Rule .0401 of this Section as HSE has been measured in accordance with Paragraph (a) of this Rule and shown to be DSE.

History Note: *Authority G.S. 130A-335(e); S.L. 2013-413, s.34; S.L. 2014-120,* ~~*s.53.*~~ *s.53; S.L. 2023-77, s.10.*

15A NCAC 18E .0403 ADJUSTMENTS TO DESIGN DAILY FLOW

(a) The authorized agent or the Department shall approve an adjusted DDF relative to the values in Table II of Rule .0401(b) of this Section for new or existing facilities in accordance with this Rule. The water use information provided to support the proposed adjusted DDF shall meet the requirements of Paragraphs (b) or (c) of this Rule and may be provided by the owner, designer, or PE. All adjustments to DDF shall meet the requirements of Paragraph (d) of this Rule.

(b) Adjustments to DDF based on documented data from the facility or a comparable facility, as described in Rule .0402(a) of this Section, shall meet one of the following criteria:

(1) the submitted data shall consist of a minimum of 12 consecutive monthly total water consumption readings, and 30 consecutive daily water consumption readings taken during a projected normal or above normal wastewater flow month. A normal or above normal month is when the average flow equals or exceeds the mean of the 12 consecutive monthly total water consumption readings. The following calculations shall be done with the submitted data:
   (A) a hydraulic peaking factor shall be calculated by dividing the highest monthly flow of the 12 monthly readings by the sum of the 30 consecutive daily water consumption readings. The hydraulic peaking factor shall not be less than one; and
   (B) the adjusted DDF shall be calculated by multiplying the numerical average of the greatest 10 percent of the daily readings by the hydraulic peaking factor; or

(2) the adjusted DDF shall be calculated by multiplying the highest of the 12 monthly readings by 1.5 and then dividing by the number of days in the month.

(c) Adjustments to DDF based on the proposed use of extreme water-conserving fixtures, which use less water that the fixtures required by the North Carolina Plumbing Code, shall be based upon the capacity of fixtures and documentation of the amount of flow reduction to be expected from their use in the proposed facility. Cut sheets of the proposed fixtures shall be provided to the LHD and the Department, as applicable.

(d) The proposed adjusted DDF shall account for projected increased constituent concentrations due to the reduction in water use. Calculations shall be provided to verify that the criteria in Rules .0402 and .1201 of this Subchapter are met.

(e) Pursuant to S.L. 2013-413, s.34, as revised by S.L. 2014-120, s.53, a PE may propose an adjusted DDF for new or existing dwelling units or facilities identified in Table II of Rule .0401(b) of this Section in accordance with the following:

(1) DDF less than those listed in Rule .0401 of this Section that are achieved through engineering design that utilizes low-flow fixtures and low-flow technologies;
(2) comparison of flow from proposed fixtures and technologies to flow from conventional fixtures and technologies;
(3) the signed and sealed proposal shall account for the site-specific impact on the wastewater system based on projected increased constituent concentrations resulting from reduction in water use in accordance with Rule .0402(b) of this Section;
(4) inspection of the existing wastewater system and verification that the system meets the Rules of this Subchapter and can accept the increase in constituent loading, as applicable;
(5) proposed adjusted DDF for wastewater systems determined to be less than or equal to 3,000 gpd shall not require Department review in accordance with Rule .0302(e) of this Subchapter unless requested by the LHD; and
(6) neither the Department nor any LHD shall be liable for any damages caused by a system approved or permitted in accordance with this Paragraph.

(f) A PE may propose, and the Department shall approve an adjusted DDF for a facility made up of individual dwelling units in accordance with this Rule when the following criteria are met:

(1) DDF calculated in accordance with this Section is greater than 3,000 gpd;
(2) adjusted DDF is based on information in Paragraphs (b) or (c) of this Rule; and
(3) increase in wastewater strength is accounted for in accordance with Paragraph (d) of this Rule.

(g) Adjusted DDF based upon use of water-conserving fixtures shall apply only to design capacity requirements of the dosing system and dispersal fields. The DDF set forth in Rule .0401 of this Section shall be used to determine minimum tank and advanced pretreatment component capacities.

History Note: *Authority G.S. 130A-335(e); S.L. 2013-413, s.34; S.L. 2014-120, s.53.*

SECTION .0500 – SOIL AND SITE EVALUATION

15A NCAC 18E .0501 SITE EVALUATION

(a) Upon receipt of an application, an authorized agent shall investigate each proposed site in accordance with this Section to determine whether the site is suitable or unsuitable for the installation of a wastewater system. The field investigation shall include the evaluation of the following soil and site features with written field descriptions including:

(1) topography, slope, and landscape position;
(2) soil morphology:
    (A) depth of horizons;
    (B) texture;
    (C) structure;
    (D) consistence;
    (E) color; and
    (F) organic soils, as applicable;
(3) SWC;
(4) soil depth;
(5) restrictive horizons;
(6) the suitability for each profile description;
(7) LTAR; and
(8) available space.

(b) Soil profiles shall be evaluated at the site by borings, pits, or other means of excavation, and described to reflect variations in soil and site characteristics across both initial and repair areas.

(c) Soil profiles shall be evaluated and described to the following minimum depths:

(1) 48 inches from the ground surface; or
(2) to a LC determined in accordance with this Section.

(d) Owners may be required to provide pits when necessary for evaluation of the site as determined by the authorized agent, such as for evaluation of saprolite or soil structure.

(e) Based on the evaluation of the soil conditions and site features listed in Paragraph (a) of this Rule, each soil profile shall be classified suitable or unsuitable. The authorized agent shall specify the overall site suitability and classification in accordance with Rule .0509 of this Section.

(f) The authorized agent shall specify the LTAR in accordance with Section .0900 of this Subchapter for sites classified suitable in accordance with Rule .0509 of this Section.

(g) A LC initially classified unsuitable may be reclassified suitable if the requirements of Rule .0509(b) or (c) of this Section are met.

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