15A NCAC 2H .0219 has been amended with changes as published in 7:5 NCR 437-444 as follows:

.0219 MINIMUM DESIGN REQUIREMENTS

(a) All facilities requiring a permit pursuant to this Section shall be designed following good engineering practice ~~and shall not result in nuisance conditions~~. The plans and specifications for all projects must be sealed by a Professional Engineer. The only exceptions from the Professional Engineer requirement are those allowed in Rule .0205 (d)(1)(A) (iii), of this Section.

(b) Waste, including treated waste, shall not be placed directly into, or in contact with, GA classified groundwater unless such placement will not result in a contravention of GA groundwater standards, as demonstrated by predictive calculations or modeling methods acceptable to the Director.

(c) Impoundments, trenches or other excavations made for the purpose of storing or treating waste will not be excavated into bedrock unless the placement of waste into such excavations will not result in a contravention of assigned standards, as demonstrated by predictive calculations or modeling methods acceptable to the Director.

(d) The bottoms of earthen impoundments, trenches or other similar excavations with the exception of nitrification fields, infiltration systems, and sewer line excavations shall be at least four feet above the bedrock surface, except that the bottom of excavations which are less than four feet above bedrock shall have a liner with a hydraulic conductivity no greater than 1 x 10-7 centimeters per second. Liner thickness will be that thickness necessary to achieve a leakage rate consistent with the sensitivity of classified groundwaters. Separation distances or liner requirements may be reduced if it can be demonstrated by predictive calculations or modeling methods acceptable to the Director, that construction and use of these treatment and disposal units will not result in contravention of assigned standards.

(e) ~~Industrial waste~~ Waste shall not be applied or discharged onto or below the land surface when the vertical separation between the waste and the seasonal high water table is less than one foot. If the area is to be utilized for industrial waste and has a separation of less than three feet, and in other areas as designated by the Director, a demonstration must be made using predictive calculations or modeling methods, acceptable to the Director, that such placement will not result in contravention of classified groundwater standards.

(f) Treatment works and disposal systems utilizing earthen basins, lagoons, ponds or trenches, excluding nitrification fields, infiltration systems, and holding ponds containing non-industrial treated effluent prior to spray irrigation, for treatment, storage or disposal shall have either a liner of natural material at least one foot in thickness and having a hydraulic conductivity of no greater than 1 x 10-6 centimeters per second when compacted, or a synthetic liner of sufficient thickness to exhibit structural integrity and an effective hydraulic conductivity no greater than that of the natural material liner.

(g) Except as otherwise provided by these requirements or by terms of a permit, all waste treatment, storage and disposal facilities must maintain and operate a groundwater monitoring system as approved by the Division. The monitoring system must be designed to assess the impact of any discharge on the quality of the underlying groundwaters and must be based on the results of the hydrogeologic investigation.

(h) For pumping stations:

(1) no by-pass or overflow lines;

(2) multiple pumps shall be provided capable of pumping at a rate of 2.5 times the average daily flow rate with any one pump out of service. Pump-on/Pump-off elevations shall be set such that 2-8 pumping cycles per hour may be achieved in the pump station at average flow. If extended detention times are necessary due to phased development, the need for odor and corrosion control must be evaluated by the applicant;

(3) ~~where waters classified as WS, SA, B or SB could be impacted by a power failure~~ at least one of the following shall be required:
(A) dual source or standby power supply on site or;
(B) telemetry systems with sufficient numbers of standby generators and personnel for distribution or;
(C) approval by the Director that the pump station:
(i) serves a private water distribution system which has automatic shut-off at power failure and no elevated water storage tanks, and
(ii) has sufficient storage capacity that no potential for overflow exists, and
(iii) is connected to facilities that can tolerate septic wastewater due to prolonged detention or;
(D) where the waters that would be impacted by a power failure are classified as C, the applicant may be allowed to show a history of power reliability that would demonstrate that an alternative power source or other reliability measures would not be needed.
(4) ~~The need for~~ screened vents ~~must be evaluated~~ for all wet wells;
(5) high water audio and visual alarms;
(6) protection from a 100 year flood;
(7) restricted access to the site and equipment.
(8) all-weather roadway to the site;

(i) For sewer systems and sewer system extensions:
(1) All building drains and building sewers which are approved by the local building inspector in accordance with the North Carolina Building Code are deemed to be permitted by the Environmental Management Commission;
(2) All sewers shall be designed based upon at least minimum standards which include:
(A) wastewater flow rate at design loading should result in the sewer flowing approximately half full. The sewer must also be evaluated as to its ability to carry peak loadings;
(B) a velocity of two feet per second;
(C) construction and operation shall not result in water pollution;
(D) infiltration rate limited to ~~200~~ 100 gallons per day per inch of pipe diameter per mile of pipe
(E) construction and operation consistent with all applicable local ordinances;
(F) for public gravity sewers, a minimum eight inch diameter pipe and for private gravity sewers, a minimum six inch diameter pipe;
(G) minimum separations

(i)	Storm sewers (vertical)	12 inches
(ii)	Water mains (vertical-water over sewer)	18 inches
	or	
	(horizontal)	10 feet
(iii)	In benched trenches (vertical)	18 inches
(iv)	Any private or public water supply source, including any WS-I waters or Class I or Class II impounded reservoirs used as a source of drinking water	100 feet
(v)	Waters classified ~~WS-I~~, WS-II, WS-III, B, SA, ORW, HQW, or SB [from normal high water (or tide elevation)]	50 feet
(vi)	Any other stream, lake or impoundment	10 feet
(vii)	Any building foundation	5 feet
(viii)	Any basement	10 feet
(ix)	Top slope of embankment or cuts of 2 feet or more vertical height	10 feet

(x) Drainage systems
(I) Interceptor drains 5 feet
(II) Ground water lowering and surface drainage ditches 10 feet
(xi) Any swimming pool 10 feet
(xii) Ferrous sewer pipe with joints equivalent to water main standards, shall be used where these minimum separations cannot be maintained. The minimum separation shall however not be less than 25 feet from a private well or 50 ft from a public water supply well.

(H) three feet 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;

(I) the maximum separation between manholes shall be 425 feet unless written documentation is submitted with the application that the owner/authority has the capability to perform routine cleaning and maintenance on the sewer at the specified manhole separation;

(J) drop manholes shall be provided where invert separations exceed 2.5 feet;

(K) manholes shall be designed for 100-year flood protection;

(L) ~~The need for~~ an air relief valve shall be ~~evaluated~~ provided at all high points along force mains;

(M) odor and corrosion control must be ~~evaluated~~ satisfactorily addressed by the applicant for all sewers and force mains with extended travel times.

(j) For treatment works and disposal systems:

(1) no by-pass or overflow lines;

(2) multiple pumps if pumps are used;

(3) ~~where waters classified as WSI, WS II, WS III, B, SA, or SB could be impacted by a power failure,~~ at least one of the following:

(A) dual source/dual feed or automatically activated standby power supply on site, capable of powering all essential treatment components under design conditions or,

(B) approval by the Director that the facility:

(i) serves a private water distribution system which has automatic shut-off at power failure and no elevated water storage tanks, and

(ii) has sufficient storage capacity that no potential for overflow exists, and

(iii) can tolerate septic wastewater due to prolonged detention or

(C) where the waters that would be impacted by a power failure are classified as C Waters, the applicant may be allowed to show a history of power reliability that would demonstrate that an alternative power source or other reliability measures would not be needed.

(4) protection from 100 year flood.

(5) buffer zones of at least the following distances, and greater where necessary to comply with Section 2H .0400 of this Subchapter or to address particular site or waste characteristics:

(A) Any habitable residence or place of public assembly under separate ownership or which ~~are~~ is to be sold:

(i) for spray irrigation systems (application area) not covered by 2H .0219(k) 400 feet
(ii) for surface ~~sludge~~ residual application 400 feet
(iii) for subsurface sludge residual injection 200 feet
(iv) for facultative lagoons 400 feet
(v) for activated sludge plants or surface sand filters 100 feet
(vi) for soil remediation sites 100 feet

(B) Any private or public water supply source	100 feet
(C) Streams classified as WS ~~I~~ , ~~WS II, WS III~~ or B:	
(i) for subsurface disposal	50 feet
(ii) for non-discharge surface disposal <u>except for high rate infiltration systems</u>	100 feet
<u>(iii) high rate infiltration systems</u>	<u>200 feet</u>
(D) Waters classified SA or SB<u>:</u>	
<u>(i) all systems except for high rate infiltration systems</u>	100 feet from ~~normal~~ <u>mean</u> high water
<u>(ii) high rate infiltration systems</u>	<u>200 feet from mean high water</u>
(E) Any other stream, canal, marsh, or coastal waters<u>:</u>	
(i) for subsurface disposal	50 feet
(ii) for non-discharge surface disposal <u>except for high rate infiltration systems</u>	100 feet
<u>(iii) high rate infiltration systems</u>	<u>200 feet</u>
<u>(iv) wastewater treatment facilities</u>	<u>50 feet</u>
(F) Any Class I or Class II impounded reservoir used as a source of drinking water:	
<u>(i) all systems except for high rate infiltration systems</u>	100 feet from normal high water
<u>(ii) high rate infiltration systems</u>	<u>200 feet from normal high water</u>
(G) Any other lake or impoundment:	
(i) for subsurface disposal	50 feet
(ii) for surface disposal <u>except for high rate infiltration systems</u>	100 feet
<u>(iii) high rate infiltration systems</u>	<u>200 feet</u>
(H) Any building foundation except treatment facilities:	
(i) for subsurface disposal	10 feet
(ii) for surface disposal	15 feet
(I) Any basement:	
(i) for subsurface disposal	15 feet
(ii) for surface disposal	15 feet
(J) Any property line<u>:</u>	
(i) for spray irrigation	150 feet
(ii) for other surface disposal systems	~~100~~ <u>50</u> feet
(iii) for subsurface sludge <u>residuals</u> injection	~~100~~ <u>50</u> feet
(iv) for other surface treatment systems	50 feet
(v) for other subsurface systems	50 feet
<u>(vi) for soil remediation sites</u>	<u>50 feet</u>

(K) Top of slope of embankments or cuts ~~or~~ of two feet or more in vertical height:
  (i) for systems other than rapid infiltration systems — 15 feet
  (ii) for rapid infiltration systems — 100 feet
(L) Any water line from a disposal system — 10 feet
(M) Drainage systems (Ditches, drains, surface water diversions, etc):
  (i) Interceptor drains and surface water diversions (upslope)
    (I) for subsurface disposal — 10 feet
    (II) for surface disposal other than spray irrigation systems and rapid infiltration systems — 10 feet
    (III) for spray irrigation systems — 100 feet
    (IV) for rapid infiltration systems — 200 feet
  (ii) Interceptor drains and surface water diversions (downslope)
    (I) for subsurface disposal — 25 feet
    (II) for surface disposal other than spray irrigation systems and rapid infiltration systems — 25 feet
    (III) for spray irrigation systems — 100 feet
    (IV) for rapid infiltration systems — 200 feet
  (iii) Groundwater lowering and surface drainage ditches
    (I) for subsurface disposal — 25 feet
    (II) for surface disposal other than spray irrigation and rapid infiltration systems — 25 feet
    (III) for spray irrigation systems — 100 feet
    (IV) for rapid infiltration systems — 200 feet
(N) Any swimming pool
  (i) for subsurface disposal — 15 feet
  (ii) for surface disposal — 100 feet
(O) Any other nitrification field (except repair area) — 20 feet
(P) Any well with the exception of an approved groundwater monitoring well — 100 feet
(Q) Public right-of-way surface disposal — 50 feet

(6) ~~adequate~~ flow equalization of at least 25 percent of the facilities permitted hydraulic capacity must be provided for all seasonal or resort facilities and all other facilities with fluctuations in influent flow which may adversely affect the performance of the system;

(7) preparation of an operational management plan, including restricted access to the site and equipment, and, if appropriate, a crop management plan;

(8) except for facilities for single family residences or as approved by the Director, appropriate monitoring wells designed to assess the impacts on the groundwater of any discharge and constructed in accordance with Section 2C .0100 of this Chapter;

(9) a minimum of 30 days of residual holding must be provided.

(k) For Land Application of Domestic Wastewater on Golf Courses and Other Public Access Areas:

(1) Aerated flow equalization facilities with a capacity of at least 25 percent of the daily system design flow.

(2) All essential treatment ~~and disposal~~ units shall be provided in duplicate.

(3) The treatment process shall produce an effluent with a monthly average TSS of less than 5 mg/l and a daily maximum TSS of less than 10 mg/l and a maximum fecal

coliform level of less than ~~1/100~~ 5/100 ml, prior to discharge to a five-day detention pond.

(4) There must be no public access to the five-day detention pond.

(5) The size of ~~the~~ any irrigation pond, that follows the five day holding pond, shall be justified using a mass water balance for worse case conditions of record.

(6) An automatically activated standby power source or other means to prevent improperly treated wastewater from entering the five-day detention pond shall be provided.

(7) Requirements for the lining of the five-day detention and irrigation ponds, which may include use of impervious natural materials, shall be site-specific.

(8) In the design of the sprinkler system, ~~the piping shall be a separate system, with~~ there shall be no direct cross-connections to a potable water supply (includes no spigots on the distribution system).

(9) The rate of application shall be site-specific. ~~but not exceeding 1 and 3/4 inches/week (as given in 2H .0404(g)(8).~~

~~(10) The time of spraying shall occur between 11:00 p.m. and three hours prior to the daily opening of the course.~~

~~(11)~~(10)There shall be a ~~100~~ 50 foot vegetative buffer zone between the edge of spray influence and the nearest dwelling.

~~(12)~~(11)Signs shall be posted at the proshop stating that the course is irrigated with treated wastewater.

~~(13)~~(12)There shall be a certified operator of a class equivalent to the class ~~plant~~ facility on call 24 hours/day.

(l) Wastewater Flow Rates:

(1) In determining the volume of sewage from dwelling units, the flow rate shall be 120 gallons per day per bedroom. The minimum volume of sewage from each dwelling unit shall be 240 gallons per day and each additional bedroom above two bedrooms will increase the volume by 120 gallons per day. Each bedroom or any other room or addition that can reasonably ~~by~~ 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.

(2) The following table shall be used to determine the minimum allowable design daily flow of wastewater facilities. Design flow rates for establishments not identified below shall be determined using available flow data, water-using fixtures, occupancy or operation patterns, and other measured data.

Type of Establishments	Daily Flow For Design
Airports, also RR Stations, bus terminals. (not including food service facilities)	5 gal/passenger
Barber Shops	50 gal/chair
Bars, Cocktail Lounges (not including food services)	20 gal/seat
Beauty Shops	125 gal/booth or bowl
Bowling Alleys	50 gal/lane
Businesses (other than those listed in this table)	25 gal/employee
Camps	
Construction or work camps	60 gal/person
Summer camps	60 gal/person
Camp grounds Without water and sewer hookups	100 gal/campsite

Travel trailer/recreational vehicle park with water and sewer hookup	120 gal/campsite
Churches (not including food service, day care and camps)	3 gal/seat
Country Clubs - Resident Members	60 gal/person
Nonresident Members	20 gal/person
Day Care Facilities	15 gal/person
Factories (exclusive of industrial wastes) -- per shift	25 gal/person
Add for showers -- per shift	10 gal/person
Food Service Facilities Restaurants (including fast food)	40 gal/seat or 40 gal/15 ft^2 of dining area, whichever is greater
24-hour Restaurants	50 gal/seat
Single-Service (exclusive of fast food)	25 gal/seat
Food Stands	
(1) Per 100 square feet of total floor space	50 gal
(2) Add per employee	25 gal
Hospitals	300 gal/bed
Laundries (self-service)	500 gal/machine
Marinas	10 gal/boat slip
With bathhouse	30 gal/boat slip
Meat Markets	
(1) Per 100 square feet of total floor space	50 gal
(2) Add per employee	25 gal
Motels/Hotel	120 gal/room
with cooking facilities in room	175 gal/room
Nursing/Rest Homes -- With laundry	120 gal/bed
Without laundry	60 gal/bed
Offices -- per shift	25 gal/person
Residential Care Facilities	60 gal/person
Resort (e.g. condominiums, apartments, motels, hotels)	200 gal/room
Restaurants	40 gal/seat or 40 gal/15 ft^2 of dining area (whichever is greater)
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	60 gal/person
Service Stations	250 gal/water closet or urinal
Stadiums, Auditoriums, Theaters, Drive-ins	5 gal/seat or space
Stores, shopping centers and malls -- Note: if food service is included, add 40 gal/seat	120 gal/1000 ft^2
Swimming Pools and Bathhouses	10 gal/person

(3) An adjusted daily sewage flow may be granted upon a showing that a sewage system is adequate to meet actual daily water consumption from a facility included in Subparagraph (1) or (2) of this Paragraph. Documented, representative data from that facility or a comparable facility shall be submitted, consisting of at least 12 consecutive monthly total water consumption readings and daily total water consumption readings for at least 30 consecutive days of water use. The daily readings shall be taken during a projected peak sewage flow month. The adjusted design daily sewage flow shall be determined by taking the numerical average of the daily readings that fall within the upper 10 percent of the daily readings when ranked in descending order.

(m) For Treatment and Disposal of Soil Containing Petroleum Products:

(1) Landfarming of Soils Containing Petroleum Products at Minimum Rates. Petroleum contaminated soils shall be incorporated into the native soils of the receiver site immediately upon application. Liming, fertilization, and aeration of the soils mixture shall be optional, unless otherwise required by the Division. Subsequent application of petroleum contaminated soils onto the same receiver site shall not occur for at least 18 months from the date of the most recent application of petroleum contaminated soils and shall cause the receiver site to be reclassified as a "dedicated remediation site" unless the permittee or applicant can demonstrate, through soil sampling and contaminant analytical procedures approved by the Department, that the petroleum contaminant level in the upper eight inches of the receiver site soils is below analytical detection levels;

(2) Landfarming of Soil Containing Petroleum Products at Conventional Rates Landfarming of soils containing petroleum product at an application thickness greater than one inch shall require fertilization, liming, and aeration of the native soils and petroleum contaminated soils mixture as approved by the Division. Application thickness shall be based upon the nature of the receiver site soils, depth to the seasonal high water table, the intended cover crop, and the source of contamination, in accordance with procedures approved by the Division. Operation of the landfarming program shall not result in contravention of classified groundwater or surface water quality standards. Subsequent application of petroleum contaminated soils onto the same receiver site shall not occur for at least 18 months from the date of the most recent application of petroleum contaminated soils and shall cause the receiver site to be reclassified as a "dedicated disposal site" unless the permittee or applicant can demonstrate, through soil sampling and contaminant analytical procedures approved by the Department, that the petroleum contaminant level in the upper eight inches of the receiver site soils is below analytical detection levels;

(3) Containment and Treatment of Soil Containing Petroleum Products:

(A) A containment structure designed to bioremediate or volatilize soil containing petroleum products shall be constructed of either a synthetic liner of at least 30 mils thickness or of a one foot thick liner of natural material, compacted to at least 95 percent standard proctor dry density and with a permeability of less than 1×10^{-7} cm/sec.

(B) The bottom of the containment structure shall be at least three feet above the seasonal high water table or bedrock.

(C) A leachate collection system must be installed in order to prevent runoff from the petroleum contaminated soils within the containment structure, or steps taken to avoid accumulation of stormwater within the containment structure.

(4) Disposal of Petroleum Contaminated Soils at Dedicated Sites. Subsequent applications of petroleum contaminated soils at dedicated sites shall not recur until such time as it can be demonstrated, by computer modeling or predictive calculations, that additional applications of contaminated soils will not result in the contravention of any applicable environmental standards. Disposal of

petroleum contaminated soils at dedicated sites shall conform to procedures established by the Division.

(n) For Systems utilizing Infiltration Galleries:

(1) An infiltration gallery shall be designed such that its largest surface dimension is greater than its depth and no vertical piping shall be installed within the trench.

(2) An infiltration gallery shall be designed such that discharges from the infiltration gallery which reach the water table must be within the zone of influence of any on-site groundwater recovery system, and must not cause or contribute to the migration of contaminants into previously uncontaminated areas. Predictive modeling shall be used to estimate the zone of influence, infiltration rate, groundwater movement and flow direction.

(o)(m) Additional requirements:

(1) distance between water supply wells and waste facilities in accordance with Rule 2C .0107(a) of this Chapter or, if a greater area may be impacted, a distance in accordance with the perimeter of compliance described in ~~Rule~~ Subchapter 2L . ~~0103(h)~~ of this Chapter;

(2) compliance with the groundwater standards specified in Subchapter 2L of this Chapter;

(3) where applicable compliance with rules on "coastal waste treatment disposal" found in Section .0400 of this Subchapter; and

(4) For subsurface disposal systems, compliance with rules on subsurface disposal systems found in ~~Section .0300 of this subchapter~~ 15A NCAC 18A .1900. Copies of these Rules are available from The Division of Environmental Health, P.O. Box 29535, Raleigh, North Carolina 27626-0535.

(p)(n) Alternative Design Criteria may be approved by the Director. This approval will only be given in cases where the applicant can demonstrate that the Alternative Design Criteria will provide the following:

(1) Equal or better treatment of the waste; and

(2) Equal or better protection of the waters of the state; and

(3) No increased potential for nuisance conditions.

History Note: Statutory Authority G.S. 143-215.1; 143-215.3(a)(1);
Eff. October 1, 1987;
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