

15A NCAC 18E .0907 LOW PRESSURE PIPE SYSTEMS

(a) LPP systems utilize a network of small diameter pipes with three feet to six feet pressure head to distribute effluent across the entire dispersal field. Any subsurface dispersal system listed in this Section may incorporate LPP dispersal.

(b) LPP systems with advanced pretreatment shall comply with Rules .1202, .1203, .1205, or .1206 of this Subchapter.

(c) The LTAR shall be determined as follows:

- (1) Tables XXI and XXII shall be used to determine the LTAR for LPP systems, as applicable;
- (2) the LTAR determined from Table XXI shall be based on the soil textural class of the most limiting, naturally occurring soil horizon to a depth of 12 inches below the infiltrative surface;
- (3) the LTAR determined from Table XXII shall be based on the saprolite textural class of the most limiting, naturally occurring saprolite to a depth of 24 inches below the infiltrative surface, or less than 24 inches if combined with soil in accordance with Rule .0506(b) of this Subchapter; and
- (4) for facilities that generate HSE as specified in Rule .0401(h) of this Subchapter or a facility with a full kitchen, the LTAR shall not exceed the mean rate for the applicable Soil Group.

TABLE XXI. LTAR for LPP systems based on Soil Group and texture class

Soil Group	USDA Soil Textural Class		LTAR in gpd/ft ²
I	Sands	Sand	0.4 – 0.6
		Loamy Sand	
II	Coarse Loams	Sandy Loam	0.3 – 0.4
		Loam	
III	Fine Loams	Sandy Clay Loam	0.15 – 0.3
		Silt Loam	
		Clay Loam	
		Silty Clay Loam	
IV	Clays	Sandy Clay	0.05 – 0.2
		Silty Clay	
		Clay	

TABLE XXII. LTAR for LPP systems in saprolite based on Saprolite Group and texture class

Saprolite Group	Saprolite Textural Class		LTAR in gpd/ft ²
I	Sands	Sand	0.3 – 0.4
		Loamy Sand	0.25 – 0.35
II	Loams	Sandy Loam	0.2 – 0.3
		Loam	0.1 – 0.2
		Silt Loam	0.05 – 0.15

(d) The minimum required dispersal field area and trench length shall be calculated in accordance with the following:

- (1) the minimum required dispersal field area shall be calculated by dividing the DDF by the LTAR; and
- (2) the minimum trench length shall be calculated by dividing the required dispersal field area by a lateral spacing of five feet. The following equation shall be used to calculate the minimum line length required.

$$TL = (DDF / LTAR) / LS$$

Where TL = length of trench, in feet
 DDF = design daily flow, in gpd
 LTAR = in gpd/ft²
 LS = five-foot line spacing

- (3) When HSE is proposed to be discharged to an LPP dispersal field with no advanced pretreatment or has not been reclassified as DSE in accordance with Rule .0402(c) of this Subchapter, a licensed professional, if required in G.S. 89C, 89E, or 89F, shall calculate the adjusted LTAR in accordance with Rule .0402(b) of this Subchapter.
- (e) In addition to the requirements set forth in Rule .0901(g) of this Section, LPP system design and installation shall comply with the following, unless otherwise specified in a PIA Approval:
- (1) the LPP distribution network shall be constructed of one to two-inch diameter pressure rated Schedule 40 PVC laterals placed in gravel that meets the requirements in Rule .0902(b)(4) of this Section or other approved media;
 - (2) the trench width shall be one to two feet;
 - (3) trenches shall be located not less than three times the trench width on center. The minimum spacing for trenches shall be five feet on center;
 - (4) trenches shall include a minimum of eight inches of gravel or other approved media, either from a PIA Approval or subsurface dispersal system listed in Section .0900 of this Subchapter. The lateral shall be installed a minimum of five inches above the infiltrative surface;
 - (5) laterals, manifolds and LPP fields shall comply with the following design criteria:
 - (A) the maximum lateral length shall yield no more than a 10 percent difference in orifice delivery rate between the first and last orifice along the lateral;
 - (B) no more than one-third of the total number of holes shall be less than 5/32 inches in diameter, with no orifices sized smaller than one-eighth inch in diameter in any lateral line;
 - (C) all orifices shall face upwards, except for two orifices, one-third of the way from the beginning and end of each lateral, which shall face downward; and
 - (D) maximum orifice spacing shall be as follows: Soil Group I - five feet; Soil Group II - six feet; Soil Group III - eight feet; and Soil Group IV - 10 feet;
 - (6) the orifices shall be protected by the following:
 - (A) lateral sleeved within a three or four-inch perforated corrugated or smooth wall tubing meeting the requirements of Rule .0703(d) of this Subchapter; or
 - (B) orifice shields that prevent aggregate, soil, and tree roots from clogging the orifices;
 - (7) the following additional design provisions shall be required for sloping sites:
 - (A) separately valved manifolds shall be required for all subfield segments where the elevation difference between the highest and lowest laterals exceeds three feet;
 - (B) the orifice spacing, orifice size or both shall be adjusted to compensate for relative elevation differences between laterals branching off a common supply manifold and to compensate for the lines at the lowest elevation receiving more effluent at the beginning and end of a dosing cycle;
 - (C) the lateral network shall be designed to achieve a 10 to 40 percent higher steady state flow rate per linear foot into the upper lines, relative to the lower lines, depending on the amount of elevation difference and the number of laterals. The steady state flow rate is based on the pipe being full;
 - (D) maximum elevation difference between the highest and lowest laterals in a field shall not exceed 10 feet unless the flow is uniformly divided using multiple pumps or split between subfield segments without requiring simultaneous adjustment of multiple pressure regulating valves in separate locations. Flow shall be uniformly divided such that the dose volumes to the subfields does not vary more than 10 percent on an area basis; and
 - (E) the Department shall approve other designs based upon the authorized designer or PE providing documentation showing equivalent hydraulic performance to this Subparagraph;
 - (8) turn-ups shall be provided at the ends of each lateral, constructed of Schedule 40 PVC pipe or stronger pressure-rated pipe, and shall terminate at the ground surface and be installed in a valve box or equivalent that provides access for operation and maintenance;
 - (9) the supply manifold shall be constructed of solvent-welded pressure rated Schedule 40 PVC;
 - (10) the supply manifold shall be sized large enough based on the size and number of laterals served to prevent more than a 20 percent variation in pressure head between the first and last laterals due to losses within the manifold when feeding the manifold from a lower elevation;

- (11) the supply manifold shall comply with the following design criteria:
 - (A) 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 as measured from where the supply line connects to the manifold;
 - (B) the reduction between the manifold and connecting laterals shall be made off the manifold using reducing tees or fittings; and
 - (C) cleanouts shall be installed at the distal ends of the supply manifold and shall be enclosed in valve boxes accessible from the ground surface;
 - (12) pressure regulating valves shall be provided for pressure adjustment at the fields;
 - (13) valves shall be installed in an access device, such as a valve box, and be accessible and operable from the ground surface. Valves serving contiguous subfields shall be in a common valve box;
 - (14) the LPP dosing system shall comply with the following design criteria:
 - (A) the pump operating flow rate shall be based upon delivering three feet to six feet of residual pressure head at the distal end of all laterals;
 - (B) the dose volume shall be between five and 10 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; and
 - (C) when pumping downhill and the supply line volume exceeds 20 percent of the calculated dose volume, special design considerations shall be followed to prevent more than 20 percent of the dose volume from draining by gravity to the dispersal field between doses; and
 - (15) the trenches shall be covered to a minimum depth of four inches after settling.
- (f) The authorized agent or Department may approve on a site-specific basis drip dispersal systems used in LPP trenches and other LPP designs based on documentation showing that the proposed design meets the performance requirements of this Rule.

*History Note: Authority G.S. 130A-335(e) and (f);
Eff. January 1, 2024.*