NORTH CAROLINA DEPARTMENT
OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH
ON-SITE WASTEWATER SECTION

INNOVATIVE WASTEWATER SYSTEM APPROVAL

INNOVATIVE WASTEWATER SYSTEM NO: IWWS-97-1

ISSUED TO: Michael T. Hoover
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FOR: Pressure Dosed Sand Filter Pretreatment Systems

APPROVAL DATE: May 1, 1997

In accordance with 15A NCAC 18A.1969, a proposal by Michael T. Hoover, Department Soil Science, NCSU, for approval of subsurface wastewater systems utilizing pressure-dosed sand filters has been reviewed and modified and the system has been found to meet the standards of an innovative system when all of the following conditions are met:

A. GENERAL

1. Scope of this .1969 Innovative System Approval

    a. Two treatment performance standards for advanced on-site pretreatment systems.

    b. Siting and sizing specifications for pressure-dosed sand filter pretreatment systems that meet these performance standards.

    c. Design and construction requirements for three types of pressure-dosed sand filter pretreatment systems that meet these standards.

    d. Operation, maintenance and monitoring requirements for pressure-dosed sand filter pretreatment systems that meet these performance standards.

2. This Innovative System Approval is applicable to wastewater systems utilizing pressure dosed sand filters that have a design flow not exceeding 1000 gallons per day, and that treat domestic sewage only (non-industrial wastewater). Influent waste strength to the sand filter shall not exceed domestic quality septic tank effluent, with an average biochemical oxygen demand (BOD_5) less than 300 mg/l, total suspended solids (TSS) less than 200 mg/l, ammonium-nitrogen (NH_3-N) less than 60 mg/l, and grease plus oil less than 30 mg/l.

B. ADVANCED TREATMENT PERFORMANCE STANDARDS (TS-I AND TS-II)

1. Treatment Standard I (TS-I): Tertiary treatment without nitrogen reduction.

   Pretreatment systems meeting TS-I are designed, installed and operated to meet the following standards:

   a. Biochemical Oxygen Demand, 5-day (BOD_5) <15 mg/l.
   b. Total suspended solids < 15 mg/l.
   c. Ammonium-nitrogen < 10 mg/l.
   d. Fecal coliform bacteria densities < 10,000 colonies/100 ml.

   Standards are arithmetic means, except fecal coliforms is a geometric mean.

2. Treatment Standard II (TS-II): Tertiary treatment with nitrogen-reduction.

   Pretreatment systems meeting TS-II are designed, installed and operated to meet the following standards:

   a. Biochemical oxygen Demand, 5-day (BOD_5) <10 mg/l.
   b. Total suspended solids < 10 mg/l.
   c. Ammonium-nitrogen < 10 mg/l.
   d. Either a 50% reduction of total nitrogen (organic + ammonium + nitrate forms) concentration in the septic tank effluent or a total nitrogen concentration in the effluent from the pretreatment unit < 15 mg/l.
   e. Fecal coliform bacteria densities < 10,000 colonies/100ml.

   Standards are arithmetic means, except fecal coliform is a geometric mean.

C. APPROVED PRESSURE-DOSED SAND FILTER PRETREATMENT SYSTEMS

1. Type A Sand Filter: Buried, pressure-dosed, single-pass sand filter designed according to the specifications in this approval and operated to meet Treatment Standard TS-I.

2. Type B Sand Filter: Free access, pressure-dosed single-pass sand filter designed according to the specifications in this approval and operated to meet Treatment Standard TS-I.

3. Type C Sand Filter: Free access, pressure-dosed, recirculating sand filter designed according to the specifications in this approval and operated to meet Treatment Standard TS-II.

4. Other types of pressure-dosed sand filter pretreatment systems that are designed and operated to meet Performance Standards TS-I or TS-II may be subsequently proposed for consideration by the State and as appropriate shall be appended to this approval.

D. SITING CRITERIA

Ground absorption systems receiving effluent from approved Pressure-Dosed Sand Filters meeting Treatment

Standards TS-I or TS-II may be used on sites classified as Suitable or Provisionally Suitable for conventional, modified, alternative or innovative systems in accordance with 15A NCAC 18A .1900 et seq. The following modifications to siting criteria, vertical or horizontal separation distance requirements shall be acceptable:

1. Minimum initial vertical separation siting criteria and minimum vertical separation distances for trench bottoms specified in Rules .1955 (m), .1956, and .1957 may be reduced for ground absorption systems receiving effluent from pretreatment systems meeting TS-I or TS-II as follows:

- by a maximum of 25 percent for gravity dosed drainfields, and
- by a maximum of 50 percent for pressure dosed drainfields (LPP or DRIP distribution),

when all of the following conditions are met:

a. the initial vertical separation siting criteria shall **not** be reduced to less than 12 inches from the soil surface to rock or any unsuitable soil horizon,

b. the trench bottom vertical separation distance shall **not** be reduced to less than 12 inches to rock or tidal water,

c. a Pressure-Dosed Sand Filter pretreatment system meeting Treatment Standard II (TS-II) shall be used in conjunction with any reduction to any soil wetness condition in the initial vertical separation siting criteria or the trench bottom vertical separation distance,

d. the site shall be evaluated by a Licensed Soil Scientist (see Section I, below),

e. with the exception of horizontal setback reductions from Drainage Systems, **no other reductions in horizontal setbacks or increases in Long Term Acceptance Rates**, as provided for in Sections D.4 and E.2, below, shall be used when any reductions in initial vertical separation siting criteria or trench bottom vertical separation distances are utilized. Furthermore, no reduction in trench bottom area shall be allowed for chambered or polystyrene aggregate systems when any of these reductions are utilized. These reductions are also not applicable to a PPBPS system sized in accordance with Rule .1956(3)(a)(ii), and

f. whenever any of the above reductions in initial vertical separation criteria or trench bottom vertical separation distances are utilized, the **property line minimum horizontal setback distance shall be increased to 25 feet.**

2. Drainage Systems: When a Pressure-Dosed Sand Filter pretreatment system meeting TS-I or TS-II is to be utilized, drainage may by used on sites with Group III Soil Texture, and soils with Provisionally Suitable (or Suitable) structure are allowed within the vertical separation zone. A groundwater lowering system may also be used to meet the siting criteria or vertical separation requirements for soil wetness conditions for fill systems specified in Rule .1957(b)(1). Site evaluation by a Licensed Soil Scientist shall be required, and the drainage system shall be designed by a person with demonstrated knowledge of drainage systems (see Section I, below).

3. Saprolite Systems: When a Pressure-Dosed Sand Filter pretreatment system meeting TS-I or TS-II is to be utilized, saprolite with sandy clay loam texture may be used. The maximum LTAR for sandy clay loam saprolite texture shall be 0.2 gpd/ft^2 for conventional trenches and 0.10 gpd/ft for LPP trenches. Nitrification trenches in saprolite may be installed up to **five** feet deep. Site evaluation by a Licensed Soil Scientist or Professional Geologist shall be required (see Section I, below).

4. Minimum horizontal setbacks shall be as specified in Rule .1950, except as provided for in Table 1.

Table 1. Minimum horizontal setbacks for ground absorption systems when Pressure-Dosed Sand Filter Pretreatment Systems meeting TS-I or TS-II are used.*

Land feature or component	Existing Rules .1950 (a)	Treatment Standard TS-I	TS-II
	--- minimum horizontal setback, feet ---		
(1) Any private water supply source, except any uncased well or spring.	100	70	50
(2) Any public water supply source	100	100	100
(3) Streams classified as WS-1	100	70	50
(4) Waters classified as S.A.	100	70	50
(5) Other coastal waters	50	35	25
(6) Any other stream, canal, marsh or other surface waters	50	35	25
(7) Any Class I or Class II reservoir	100	70	50
(8) Any permanent storm water retention pond	50	35	25
(9) Any other lake or pond	50	35	25
(10) Any building foundation	5	5	5
(11) Any basement	15	15	15
(12) Any property line	10	10	10
(13) Top of slope of embankments or cuts of 2 feet or more vertical height	15	15	15
(14) Any water line	10	10	10
(15) Drainage systems*:			
(A) Interceptor drains, etc.			
(i) upslope	10	7	7
(ii) sideslope	15	10	10
(iii) downslope	25	20	15
(B) Groundwater lowering ditches and devices	25	20	15
(16) Any swimming pool	15	15	15
(17) Any other nitrification field (except repair area)	20	10	10

***- Note: With the exception of the Drainage Systems horizontal setback reductions, the reductions in horizontal setbacks in Table 1, above, for TS-I and TS-II systems shall not be allowed when reductions in initial conditions or vertical separation distances are used in accordance with Section D.1, above, or when any increase in Long Term Acceptance Rate (LTAR) is used in accordance with Section E.2, below.**

E. SIZING CRITERIA

1. The system sizing criteria shall normally be based upon the Long Term Acceptance Rate (LTAR) specified in the appropriate portion of the Rules for the type of ground absorption system to be used.

2. The LTAR may be increased up to a factor of two when all of the following conditions are met:

a. initial vertical separation siting criteria or vertical separation distances for trench bottoms specified in Rules .1955(m), .1956 or .1957 have not been reduced,

b. sandy clay loam saprolite is not proposed to be used,

c. horizontal separation distances specified in Rule .1950 have not been reduced, and

d. for systems to be installed in fill, a pressure dosed drainfield (LPP or DRIP distribution) is to be used.

e. for systems to be installed on sites with Group III or IV soils within three feet of the trench bottom or on sites requiring drainage of Group II or III soils, the site has been evaluated by a Licensed Soil Scientist (see Section I, below).

3. For ground absorption systems utilizing modified, graveless or other types of nitrification trenches separately approved in accordance with Rules .1956 or .1969, no reductions in linear footage of nitrification trench or system area shall be applied when the LTAR has been increased in accordance with section E.2, above.

F. DESIGN CRITERIA

1. Pretreatment:

a. A septic tank as required in Rule .1952 shall be provided. An access riser extending above finished grade shall be provided over the outlet.

b. An effluent filter shall be provided instead of or in addition to the sanitary tee. Alternately, a screened pump vault may be provided in the pump tank.

2. Common Components of Type A, B, and C Pressure-Dosed Sand Filters

a. Sand Filter Containment Structures

(1) Lined built-in-place sand filters:

i. The containment structure shall consist at a minimum of a reinforced plywood support structure made from 1/2 -3/4-inch plywood placed in an excavated hole with a 30-mil PVC liner along the bottom and sides and appropriate welded seams at any liner seams.
ii.The liner shall be large enough to cover the bottom and extend up the sides of the support structure with enough excess to allow the liner to be firmly anchored (e.g., clamped or weighted).
iii. actory fabricated boots shall be used at the supply line and underdrain penetration points of the liner. All fittings shall extend into the liner and be watertight. Alternately, the supply line may be directed into the filter over the top edge of the liner, with adequate cover and freeze protection provided

(2) Prefabricated and built-in-place concrete tank filters.

i. The containment structure for systems using preconstructed concrete boxes shall consist of a watertight, precast, top-seam septic tank (without baffle wall) or pump tank constructed without a top, or the bottom half of a watertight, precast mid-seam septic tank (without baffle wall) or pump tank.
ii. The containment structure for built-in-place concrete filters shall be a cast-in-place concrete, block or brick masonry tank constructed without a top in accordance with Rule .1954(d).

iii. Precast openings shall be provided for the underdrain exit and supply line entrance points to the box or tank.

b. Sand filter underdrain

(1) A minimum of six-inches of washed stone (#5) or washed pea gravel (#467) shall be placed in the bottom of the filter containment structure. If pea gravel is used the underdrain pipe shall be surrounded by washed stone.

(2) Buried 4-inch diameter perforated or slotted underdrain collection pipes shall be placed level on a maximum of 10-foot centers on the bottom of the containment structure in the washed stone. The underdrain shall be covered with at least 2-inches of washed stone.

(3) Systems shall have cleanouts that come above the ground surface at the distal ends of all underdrain collection pipes.

(4) The underdrain must be vented, which could be accomplished utilizing an underdrain cleanout.

c. Sand filter media

(1) The sand filter media shall be washed, durable, clean granular material that has the specified characteristics and thickness required for each filter type, as described below.

(2) Acceptable media includes

i. fine filter sand with an effective size (ES or d_{10}) between 0.35-0.6 mm and a uniformity coefficient (UC) <3.0, and dust content < 0.5 percent; and
ii. coarse filter sand with ES between 0.8-1.5 mm and UC<2.5, and dust content < 0.5 percent, and
iii. other media approved by the State on a case-by-case basis.

(3) **Media replacement warning:** The following statement should be included on all permits and authorizations to construct: **"Notice: periodic replacement of the sand filter media shall be necessary for some sand filters that become clogged"**

d. Pressure distribution network

(1) The pressure distribution network shall consist of small diameter LPP laterals on a maximum of three-foot centers when fine filter sand is used and two-foot centers when coarse filter sand is used. Pipe perforations shall be located on a spacing no greater than the center-to-center spacing of the laterals.

(2) The distribution pipe shall be sleeved in 2 -4-inch diameter corrugated polyethylene drainage tubing or standard drainfield pipe to prevent gravel from blocking orifices and to promote more efficient distribution of the effluent over the sand filter surface. Alternately in Type B and C sand filters, specially designed orifice plates, half-sections of 6-inch or greater PVC pipe, chambers, or other equivalent protective devices to shield the orifices, may be used.

(3) Lateral and perforation sizes shall be designed to deliver a dosing volume determined by the dosing frequency chosen for the specific type of filter (see below). Minimum lateral pipe size may be 3/4-inch in diameter and minimum perforation size may be as small as

1/8-inch diameter. Note: small pipe and perforation sizes are preferred to provide the largest possible scouring velocity in the laterals, minimize hole clogging, and at the same time provide uniform distribution during frequent small doses.

(4) Pipe perforations shall point upwards, except 1-2 perforations which shall point downwards to drain the lateral.

(5) Requirements for LPP systems in Rule .1957(a)(5), except as provided for herein, shall otherwise be met. This includes requirements for lateral turn-ups, turn-up protective sleeves, and manifold cleanouts.

e. An observation port (minimum 6-inch diameter) or similar device with a removable cap shall be provided to facilitate easy above-grade observation of a portion of the sand filter surface.

f. An effluent sampling point must be established, such as follows:

(1) Locate a sampling access port in the discharge pipe between the underdrain exit point from the sand filter and the drainfield. A 4-way cross or similar device can be used where the underdrain discharge pipe and the vertical sampling port intersect to facilitate collection of effluent samples. The vertical sampling access port/vent pipe must come above the ground surface, be constructed of 4-inch diameter Schedule 40 PVC pipe, be vented to the atmosphere, and contain a removable cap to allow visual observation and sampling of sand filter effluent flowing to the drainfield. The cap shall be removable and constructed to prevent the entrance of rainwater, surface water, rodents and insects. This could also simultaneously meet the filter underdrainage system requirement.

(2) Alternately, if ventilation is otherwise provided for the filter underdrainage system (see above), a distribution box or drop box may be used for the sampling access point, located in the final effluent discharge line prior to the drainfield trenches. The box must be constructed to facilitate at-grade access.

g. Dosing system

(1) A State-approved pump tank shall be provided with a liquid capacity at least equal to the required septic tank liquid capacity.

(2) Small, frequent doses shall be used to provide maximum treatment of the effluent. Minimum dose volume shall be 5 times the liquid capacity of the distribution laterals, plus the volume of any manifold and supply line sections which drain between doses.

(3) Timed dosing regimes rather than on-demand dosing shall be utilized with dosing frequencies ranging from 4 to 24 doses per day for Type A and B sand filters, and 24 to 48 doses per day for Type C sand filters (see below).

(4) The pump shall be controlled using a control panel that includes an adjustable two-stage timer (to control and adjust number of doses per day and dosing time), an elapsed run time meter, and a pump impulse counter.

(5) The systems shall be designed for a minimum distal pressure head of 4 feet.

(6) Requirements for pump dosing systems in Rule .1952(c), except as provided for herein, shall otherwise be met.

3. Components Specific to Type A, B, and C Pressure-Dosed Sand Filters

a. Filter sand characteristics, thickness, dosing frequency and hydraulic loading rates shall be designed to be in accordance with Table 2:

Table 2. Filter sand thickness, dosing frequency and hydraulic loading rates for Type A, B, and C Pressure-Dosed Sand Filters

TYPE OF MEDIA	DESIGN PARAMETER	TYPE OF SAND FILTER		
		A	B	C
Fine Filter Sand (ES 0.35-0.6 mm) (UC < 3.0) (dust content < 0.5%)	Thickness (inches)	24	18	NA
	Doses/Day	4-24	4-24	NA
	Loading Rate (GPD/ft^2)	0.8-1.1	1.2-2.5	NA
Coarse Filter Sand (ES 0.8-1.5 mm) (UC < 2.5) (dust content < 0.5%)	Thickness (inches)	24	18	24
	Doses/Day	6-24	6-24	24-48
	Loading Rate (GPD/ft^2)	0.8-1.2	1.5-3.0	2.5-5.0

NA- Not Applicable: Type C sand filters utilize coarse filter sand only

b. Type A buried pressure-dosed single pass sand filters:

(1) The distribution network, including sleeves, shall be paced within a six-inch thick layer of washed stone or washed pea gravel. Lateral turn-up end caps and protector sleeves and manifold cleanouts must be at or above finished grade.

(2) Filter media/distribution network cover:

i. A nonwoven synthetic geotextile filter fabric shall be placed on top of the stone/gravel aggregate to prevent fine grained backfield materials from moving down into the filter media. The filter fabric shall not impair movement of air to the sand filter surface.
ii.The fabric-covered filter shall be backfilled with six to twelve-inches of Group I or II soil material that is mounded to shed surface water away from the filter surface.

c. Type B and Type C free-access pressure-dosed sand filters:

(1) The distribution network, except turnups and cleanouts or inspection ports, shall be covered or otherwise protected from damage due to sunlight and/or freezing.

(2) Filter cover:

i. Free-access sand filters shall be covered to minimize odors except when located greater than 50 ft. away from any occupied structure and the property line. The cover shall consist of a thin layer of washed stone or washed pea gravel, a removable water-proof, or equivalent.
ii. If washed stone or pea gravel is used as the filter cover, it shall be of uniform thickness as needed to cover the distribution network.
iii. If a removable waterproof cover is used it shall be designed to withstand a uniform live loading of 150 pounds per square foot and constructed of materials resistant to decay and degradation such as aluminum or fiberglass and reinforced with treated lumber. If constructed entirely of wood, it shall be made from tongue and groove lumber treated to avoid decay. Gaps between boards shall be filled after shrinkage has occurred. The cover shall fit snugly on top of the filter containment structure to minimize escape of sewage odors while still facilitating air exchange. The cover must be easily removable to facilitate inspection and routine maintenance.

d. Type C pressure-dosed sand filter recirculation system:

(1) The system shall be designed so that between 66 percent and 83 percent of the sand filter effluent is returned back into the recirculation tank after each dose for reapplication to the sand filter, with the remainder directed to the drainfield.

(2) Acceptable recirculation ratios range from 2:1 to 5:1. A 3:1 recirculation ratio returns 3 parts (3/4) of the sand filter effluent back to the recirculation tank while discharging part (1/4) of the sand filter effluent to the drainfield.

G. INSTALLATION AND TESTING PROCEDURES

1. A preconstruction conference shall be required to be attended by the sand filter system designer, installer, local health department, and licensed soil scientist and registered professional engineer, as applicable, prior to beginning construction of the sand filter and associated ground absorption system.

2. The pressure-dosed sand filter shall be located to prevent surface/subsurface water inflow/ infiltration. The filter location shall meet the horizontal setback requirements of Rule .1950(a), except uncovered Type B and C sand filters shall be located at least 50 feet away from occupied structures and property lines.

3. When a liner is used for the filter containment structure, a minimum leveling layer of 3 inches of Group I or II soil shall be placed in the excavation below the liner. The liner support structure shall be constructed such that nail points cannot penetrate the liner. The liner shall come above the original ground surface and extend into a perimeter berm built to shed surface runoff away from the filter.

4. Watertightness of the liner, its underdrain penetration points, and the preconstructed box or built-in-place concrete containment structure shall be demonstrated by a 24-hour leakage test conducted at the installation site after the underdrain and bedding is in place and prior to placement of sand in the containment structure. Sediment must be excluded from the system while the sand filter is open for this leakage test.

5. Laboratory analysis of the effective diameter, uniformity coefficient and dust content of the proposed sand filter media must be provided to the health department prior to sand media being installed. **This analysis shall be included with the Operation Permit to be issued for the system.**

6. Pressure distribution lateral perforations shall be cleaned of all filings, not have any visible burrs, and be reamed with a hole reamer prior to placement with the protective sleeve.

7. The top of the containment structures for Type B and C free access sand filters shall be constructed to extend at least six inches above the ground surface and the surrounding area graded to shed surface water away from the containment structure.

8. All tankage, including risers, shall be demonstrated to be watertight by a 24-hour leakage test conducted at the installation site prior to system startup. A water level change of 1/2 inch or more over 24 hours, or visual observation of leakage shall be cause for failure of the watertightness test.

9. Pressure head, pump delivery rate, and pump delivery rate efficiency (actual-vs-design pump delivery rate at design pressure head) shall be determined, to enable initial settings to be properly made to pump timer controls and pump activation elevations in the filter dosing tank prior to system start-up. The system's Operator in Responsible Charge (ORC) shall be present during these determinations.

10. Specified site preparation steps and construction specifications for the ground absorption system shall be strictly adhered to, including specified depth of trenches in relation to site limiting conditions.

H. OPERATION AND MAINTENANCE

1. System classification, management and inspection shall be in accordance with Rule .1961. Pressure-dosed sand filter systems shall be classified at a minimum as a Type Va system according to Table V(a) of Rule .1961(b).

2. System Inspections: Both the local health department and an Operator-in-Responsible Charge (ORC) must conduct monitoring inspections of pressure-dosed sand filters at a minimum frequency as specified in Table V of Rule .1961(b) and the Operation Permit.

3. At each sand filter inspection visit the ORC shall, at a minimum, observe and monitor:

a. wastewater level in the tanks,
b. the septic tank outlet filter or screened pump vault for clogging,
c. watertightness of tanks, risers and pipe connections at tanks,
d. operation of pumps, floats, valves, electrical controls and alarms,
e. pumping frequency from pump impulse counters and elapsed run time meters,
f. the sand filter surface for wastewater ponding,
g. physical integrity of the pipe network,
h. vegetative growth over the drainfield,
i. the drainfield area for surfacing the effluent, and
j. a sample of sand filter effluent collected from the sampling port to check for effluent clarity.

4. At least twice per year the ORC shall, at a minimum, measure and report to the health department:

a. sludge and scum levels in the septic tank,
b. sludge level in the pump tank,
c. pressure head in the distribution network,
d. pump delivery rate at the design pressure head and calculate the pump delivery rateefficiency,
e. dosing volume and measure or calculate average pump run time, and
f. number of turns the gate valves were opened when pressure head was set.

5. The ORC shall also conduct other additional observations, measurements, monitoring, and maintenance activities as specified in the Operation Permit.

6. Effluent Sampling and Analysis:

a. Sand filter effluent samples shall be collected at least yearly by the ORC.

(1) Samples shall be collected from the sampling port/vent pipe located between the underdrain exit point and the drainfield.

(2) The 4-way cross, P-trap, distribution box or similar device provided for effluent sampling shall be purged of accumulated effluent and allowed to refill prior to collecting a sample.

b. Sample collection frequency shall be specified by the local health department in the Operation and Permit can be modified, as needed, by the local health department.

c. All samples shall be obtained, preserved, and analyzed in accordance with 40 CFR 136. Samples shall be analyzed by a state certified wastewater laboratory for the treatment performance standards specified in Section B.l or 2.

d. For systems designed to meet TS-II, septic tank effluent samples must be collected at the same time as the sand filter effluent samples. The sand filter effluent samples may be analyzed first and the septic tank effluent samples discarded if total nitrogen is less than 15 mg/1. If the sand filter effluent total nitrogen is 15mg/1 or more, the septic tank effluent samples must also analyzed for total nitrogen to determine compliance with TS-II requirements

e. When samples do not meet treatment standards specified in Section B.1 or 2, the system shall be re-sampled two more times within the next 60 days with samples collected no less than 48 hours apart. The average system performance shall then be calculated as the arithmetic mean (geometric mean for fecal coliforms) of results from the three samples. System maintenance or repair shall be required whenever the average system performance as calculated above does not meet the applicable treatment standards specified in Section B.1 or 2.

7. Notification and Performance of Maintenance and Repairs

a. The ORC shall alert the system owner in a timely fashion of needed maintenance or repair activities including, but not limited to, landscaping, tank sealing, tank pumping, lateral pipe desludging, pipe or control system repairs, sand media replacement, and adjustments to any other system component. The ORC shall notify the system owner and local health department whenever the pump delivery rate efficiency or average pump run time are not within 25% of initial measurements conducted prior to system startup.

b. The ORC shall keep the septic tank outlet filter or screened pump vault cleaned and in proper operating condition.

c. System troubleshooting and needed maintenance (flushing lines etc.). must be provided to maintain the pump delivery rate efficiency and average pump run time within 25% of initial measurements conducted prior to system startup.

d. The septic tank will be pumped as needed upon recommendation of the ORC. However, at a minimum the septic tank will be pumped whenever the solids level exceeds 25% of the tank's total liquid working capacity or the scum layer is more than 4 inches thick.

e. The ORC shall notify the local Health Department and system owner in writing whenever repairs are required. All maintenance activities shall also be logged and recorded in the ORC reports provided to the local health department.

8. Reporting

a. After each required ORC system inspection, the ORC shall provide a completed written report to the system owner and the local health department within 30 days. At a minimum this report must specify:

(1) the date and time of inspection.
(2) system operating conditions observed according to H.3, above,
(3) system operating conditions measured according to H.4, and H.5, above,
(4) results from any laboratory analyses of any effluent samples,
(5) maintenance activities performed since the last inspection report,
(6) an assessment of overall system performance, and
(7) a determination of whether the system is malfunctioning, and the specific nature of the malfunction

b. After each required health department system inspection, the local health department shall provide a completed inspection report to the system owner and the State within 30 days. The local health department shall also provide an annual summary each January to the State including:

(1) the name of the environmental health specialist in the health department with primary responsibility for the sand filter program in the county/district,
(2) the number of improvement permits, construction authorizations, and operation permits issued for sand filter systems the prior year in the county/district,
(3) the total cumulative number of sand filter systems installed under this Approval in the County/District,
(4) the percentage of ORC reports due to the health department that have been received from the ORC's ,
(5) an assessment of overall performance of sand filter systems in the County/District, and
(6) the percentage of sand filter systems which malfunctioned during the prior year, thenature of the malfunctions, and any remedies implemented or needed.

I. RESPONSIBILITIES AND PERMITTING PROCEDURES

1. Prior to the installation of a Pressure-Dosed Sand Filter System at a site, the owner or owner's legal representative shall notify the local health department of their proposed use of such a system. The local health department shall issue an Improvement Permit or Authorization to Construct or amend a previously issued Improvement Permit or Authorization to Construct allowing for the use of the proposed Innovative System upon a finding that all provisions of this approval and all other applicable rules shall be met. Use of the proposed Innovative System and any conditions shall be described in the Improvement Permit and Authorization to Construct or amended Improvement Permit and Authorization to Construct, as well as described on the Operation Permit to be issued upon the acceptable completion of the system installation.

2. Prior to the issuance of the Improvement Permit, the site shall be evaluated by a Licensed Soil Scientist, whenever the following conditions are applicable:

a. initial vertical separation siting criteria or vertical separation distances for trench bottoms are proposed to be reduced in accordance with Section D.1, above,

b. drainage is proposed for Group III soils or a groundwater lowering system is proposed to be used in conjunction with a fill system (the drainage system shall be designed by someone with demonstrated knowledge of drainage systems),

c. sandy clay loam texture saprolite is proposed to be used (this evaluation could be performed by a Professional Geologist instead of a Licensed Soil Scientist), or

d. the LTAR is proposed to be increased on sites with Group III or IV soils within 3 feet of the trench bottoms or on sites where drainage of Group II or III soils is proposed, in accordance with Section E.2, above.

3. Where required, the Licensed Soil Scientist (or Professional Geologist where appropriate), shall conduct a detailed assessment of the site conditions and provide to the local health department a written, sealed report that includes:

a. detailed descriptions of landscape position and soil morphological conditions to a depth of at least three feet below the trench bottom in the drainfield and repair area,

b. field estimates of the depth and thickness of the least permeable horizons,

c. recommended depth for placement of the trench bottoms and the recommended LTAR,

d. a hydraulic assessment, based on site-specific information, substantiating the projected effectiveness of system performance. This shall include documentation that indicates the treated sewage effluent at the proposed LTAR will not discharge to the surface of the ground within or adjacent to the drainfield when the system is installed and operated within design parameters, and justification for any proposed drainage systems, and

e. other site-specific requirements for system design, installation, site preparation, modifications and final landscaping.

The local health department may request the assistance of the State in evaluating this report prior to Improvement Permit issuance.

4. Design responsibility: Prior to the issuance of an Authorization to Construct for a Pressure-Dosed Sand Filter System, site-specific plans and specifications prepared by a person with a demonstrated knowledge of such systems shall be submitted for review and approval by the local health department. Approval shall be contingent upon the following:

a. general plans and specifications for the proposed sand filter component have been submitted for review and pre-approved by the State and appended to this Innovative System Approval, or

b. specific plans and specifications for the sand filter component have been prepared by a professional engineer when the sand filter design proposed to be used has not received prior to State approval and been appended to this Innovative System Approval, and

c. the specific sand filter design proposed is in accordance with all provisions of this approval as applicable to the proposed facility and site.

5. The system shall be installed by a person with a demonstrated knowledge of installation of Pressure-Dosed Sand Filter systems.

6. For systems that have not received prior State approval and are required to be designed by a professional engineer, a professional engineer must certify in writing that the system was installed in accordance with the approved plans and specifications prior to Operation Permit issuance. For sites required to be evaluated by a Licensed Soil Scientist or Professional Geologist (see Section I.2, above), the health department may specify as a condition on the Improvement Permit and Authorization to Construct that a Licensed Soil Scientist or Professional Geologist oversee critical phases of the ground absorption system installation and certify in writing that the installation was in accordance with their

specified site/installation requirements prior to the Operation Permit issuance.

7. The operator requirements of Rule .1961(b) shall be met and the ORC shall be present during initial system setup in accordance with Section G.9, above, prior to issuance of the Operation Permit.

J. REPAIR OF SYSTEMS

The provisions of 15A NCAC 18A .1961(c) shall govern the use of Pressure-Dosed Sand Filter Pretreatment Systems for repairs to existing malfunctioning wastewater systems.

K. APPENDICES

Plans and specifications for specific sand filter designs which have been approved by the State shall be appended to this Innovative System Approval.

Approved by: _____ Date:_____

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