NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH SECTION
ON-SITE WATER PROTECTION BRANCH

CONTROLLED DEMONSTRATION WASTEWATER SYSTEM APPROVAL

CONTROLLED DEMONSTRATION NO: CDWS 2012-01

Issued To: Ron Suchecki
Hoot® Systems, Inc.
2885 Highway 14 East
Lake Charles, LA 70607
337-474-2804; Fax: 337-477-7904
http://www.hootsystems.com

For: Hoot® Subsurface Drip Dispersal System

Approval Date: November 30, 2012

In accordance with General Statute 130A-343, 15A NCAC 18A .1969 and .1970, a proposal by Hoot Systems, Inc., for approval of a subsurface wastewater system utilizing the Hoot Subsurface Drip Dispersal System with only the Hoot Systems H-Series Pretreatment System has been reviewed, and found to meet the standards of a Controlled Demonstration system when all of the following conditions are met:

I. General

A. Scope of this Controlled Demonstration Approval includes:
   1. Use, design, and construction requirements for the Hoot Subsurface Drip Dispersal System.
   2. Special operation, maintenance, and monitoring of the Hoot Subsurface Drip Dispersal Systems to ensure the treatment performance standards shall be met.
   3. Proposal for evaluation of this Controlled Demonstration system.

B. Influent to the Hoot System H-Series Pretreatment and Subsurface Drip Dispersal System as permitted with this Approval shall not exceed domestic septic tank quality effluent standards pursuant to Rule 15A NCAC 18A .1970(b).

C. This Controlled Demonstration is initially limited to 200 systems with daily design flows of up to 3,000 gallons per day. The intent of this Controlled Demonstration is to gain field experience sufficient to qualify this system for Innovative Approval, pursuant to Rule .1969(g). This shall include, at a minimum, data collected over at least a 12-month period from at least 15 operational systems. Sites shall be representative of multiple soil and topographic conditions, which typically occur in at least two of the three physiographic regions of the State.

D. Use of Hoot Subsurface Drip Dispersal Systems that have a daily design flow exceeding 3,000 gallons per day shall be designed by a North Carolina Professional Engineer and will be considered for approval by the State on a case-by-case basis in accordance with the Large Systems State Review/Approval Process (Rule 15A NCAC 18A .1938).

E. System siting, sizing, and horizontal setbacks shall be in accordance with this Approval. Where there are conflicts between the requirements of this Approval and the June 1, 2006, version of Rule .1970, the requirements of this Approval shall be applicable.

II. System Description

A.	Collection system	Conventional gravity, pressure sewer fed by grinder pumps or individual septic tank effluent pumping units
B.	Pretreatment	Approved Hoot H-Series Residential Wastewater Treatment System (RWTS) or approved Hoot H-Series TS-I advanced wastewater pretreatment system
C.	Filtration	Automatic, self-cleaning stainless steel effluent screen filter, or approved equal, capable of screening particles larger than or equal to 100 microns
D.	Manifold	Schedule 40 PVC to serve as inlet headers and outlet headers to which all tubing is connected
E.	Air vent	Air vacuum breaker(s) installed at the high point(s) of each drip field to allow air to be rapidly evacuated from the tubing during pressurization and to keep soil from being aspirated into the drip emitters due to back siphoning or back pressure after the pumps shut off
F.	Dripline	Geoflow's Wasteflow Classic pressure-compensating emitters with nominal flow rate of one gallon per hour spaced uniformly in the tubing on 12-inch or 24-inch centers. The tubing consists of three layers: the inside layer is an anti-bacterial protector; the middle layer is black; and the outside layer is purple-striped for easy identification. The emitters are impregnated with Treflan® to inhibit root intrusion.
G.	System Controls	Control/software package controlling all functions, including system dosing and filter flushing, audible/visible alarms, flow monitoring, self diagnostics, and telemetry
H.	Documentation	Current schematics, drawings, and manuals must be filed with NCDHHS for all major components utilized under this approval, for posting on the On-Site Water Protection Branch Webpage

III. Siting Criteria

Sites may be used for the initial installation of a Controlled Demonstration system when they meet the requirements of this Section and the criteria for a conventional, modified, alternative, approved innovative, or accepted wastewater system. The site shall have a repair area of sufficient size to install such a system and the manufacturer agrees to provide another approved system if the Controlled Demonstration system fails to perform properly per the standards of this Controlled Demonstration Approval and 15A NCAC 18A .1900 et seq. Exceptions to the repair area requirement are as set forth in Rule .1969(f)(3) and (4).

The Hoot Subsurface Drip Dispersal System may be utilized when one or more of the conditions set forth in Sections III.A through III.P of the approval are met, as applicable. Summary tables of siting criteria, including when a special site evaluation (Section V) is required, are included in Appendix A.

A. An aerobic subsurface drip dispersal system may be utilized on sites that meet one of the following criteria:
   1. Sites classified SUITABLE or PROVISIONALLY SUITABLE in accordance with Rules .1939-.1948;
   2. Sites reclassified to be PROVISIONALLY SUITABLE in accordance with Rules .1956(1), (2), (4), (5) or (6a); or

3. Sites meeting the criteria for low pressure pipe (LPP) systems in accordance with Rule .1957(a)(2).
4. A special site evaluation pursuant to Section V shall only be required if needed to justify the proposed long term acceptance (LTAR) as set forth in Section IV.

B. Required vertical separation requirements shall be measured from the trench bottom or point of application, whichever is deeper.

C. The minimum vertical separation distance to rock or tidal water for subsurface drip dispersal system shall be 12 inches, regardless of treatment.

D. A minimum of six inches of soil cover shall be maintained over driplines receiving effluent treated to TS-I or a less stringent standard.

E. Minimum required soil cover shall be uniform over the entire subsurface drip dispersal field or zone.

F. This requirement for at least six inches of cover may be met by the addition of up to six inches, after settling, of SUITABLE Group II or III soil material over the subsurface drip dispersal field. If cover material is required and the slope is over 30 percent, a slope stabilization plan must be provided by an appropriately licensed individual.

G. Driplines shall be installed at least one inch into naturally occurring soil. The drip installation shall otherwise be considered a fill system.

H. A subsurface drip dispersal system receiving effluent treated to the NSF-40 standard, or a more stringent standard, may be utilized on sites where there is at least 18 inches of useable naturally occurring soil above an UNSUITABLE soil horizon, rock, or soil wetness condition. The minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and any UNSUITABLE soil horizon, rock, or soil wetness condition shall be 12 inches.

I. A special site evaluation, pursuant to Section V of this Approval, shall be required whenever Group IV soils are encountered within 18 inches of the naturally occurring soil surface or within 12 inches of the trench bottom or point of application, whichever is deeper, and the LTAR pursuant to Section IV.B is proposed to exceed 0.10 gpd/ft^2 for NSF-40 effluent, or 0.12 gpd/ft^2 for TS-I effluent.

J. A subsurface drip dispersal system receiving aerobic effluent treated to TS-I may be utilized on sites where there is at least 15 inches of useable naturally occurring soil above an UNSUITABLE soil horizon, rock, or soil wetness condition.
   1. The minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and an UNSUITABLE soil horizon or soil wetness condition shall be nine inches for TS-I effluent.
   2. A special site evaluation, pursuant to Section V of this Approval, shall be required whenever there is less than 18 inches of useable naturally occurring soil above an UNSUITABLE soil horizon, rock, or soil wetness condition.

K. A subsurface drip dispersal system receiving aerobic effluent treated to at least the NSF-40 standard may be utilized when a groundwater lowering system (existing or proposed) is used to meet the vertical separation requirements to a soil wetness condition. In order to use a groundwater lowering system:
   1. When only Group I or Group II soils with SUITABLE structure and clay mineralogy are present within 36 inches of the naturally occurring soil surface, the system may receive effluent treated to the NSF-40 standard. A special site evaluation is required when the local health department or regional soil scientist (RSS) requires such an evaluation to determine the effectiveness of the groundwater lowering system.
   2. When there are Group III soils present at any depth above the invert elevation of the highest point of the drainage system or within 36 inches of the naturally occurring soil surface, whichever is deeper, effluent shall be treated to TS-I or a more stringent standard. A special site evaluation, pursuant to

Section V of this Approval, shall be required.

3. No groundwater lowering drainage of Group IV soils is allowed, regardless of treatment level.
4. On new fill sites [Rule .1957(b)(1)], when all or part of the dripline is to be installed in approved fill, effluent shall be treated to TS-I or a more stringent standard when used in conjunction with a groundwater lowering system. A special site evaluation, pursuant to Section V of this Approval, shall be required.
5. When a groundwater lowering system is used, the minimum vertical separation from the trench bottom or point of application, whichever is deeper, to the projected (drained) soil wetness condition shall be 12 inches.

L. An aerobic subsurface drip dispersal system receiving effluent treated to at least the NSF-40 standard may be utilized on new fill sites [Rule .1957(b)(1)] when all or part of the dripline is to be installed in approved fill material, when there is at least 18 inches of useable naturally occurring soil above an UNSUITABLE soil horizon or rock, and at least 12 inches above a naturally occurring soil wetness condition.
   1. The minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and any UNSUITABLE soil horizon or rock shall be 18 inches, and any soil wetness condition shall be 12 inches.
   2. Except as provided for herein, all requirements for new fill sites and systems of Rule 1957(b)(1) are applicable to drip systems in fill.

M. An aerobic subsurface drip dispersal system receiving effluent treated to TS-I may be utilized on new fill sites [Rule .1957(b)(1)], when all or part of the drip tubing is to be installed in approved fill material, when there is at least 12 inches of useable naturally occurring soil above an UNSUITABLE soil horizon or rock, and at least 12 inches above a naturally occurring soil wetness condition.
   1. The minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and any UNSUITABLE soil horizon or rock shall be 12 inches, and any soil wetness condition shall be 9 inches.
   2. A special site evaluation, pursuant to Section V of this Approval, shall be required.
   3. Except as provided for herein, all requirements for new fill sites and systems of Rule 1957(b)(1) are applicable to drip systems in fill.

N. An aerobic subsurface drip dispersal system may be utilized on sites meeting the criteria for existing fill, in accordance with Rule .1957(b)(2), when all or part of the dripline is to be installed in approved fill material.
   1. For an aerobic subsurface drip dispersal system receiving effluent treated to the NSF-40 standard, the minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and any UNSUITABLE soil horizon, rock, or soil wetness condition shall be 18 inches
   2. For an aerobic subsurface drip dispersal system meeting TS-I standards, the minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and any UNSUITABLE soil horizon, rock, or soil wetness condition shall be 12 inches
   3. Except as provided for herein, all requirements for existing fill sites and systems of Rule 1957(b)(2) are applicable to all subsurface drip dispersal systems in existing fill.

O. The minimum horizontal setback requirements of Rule .1970 shall be met for systems receiving effluent meeting the NSF-40 or TS-I standard, as applicable.

P. For drip systems used on sites where there is at least 18 inches of naturally occurring soil to an UNSUITABLE soil horizon, rock, or soil wetness condition, the horizontal setback reductions of Rule .1970 for NSF-40 or TS-I, as applicable, may be concurrently taken with LTARs as allowed in Section IV.F of this Approval.

Q. A special site evaluation, including a hydraulic assessment, shall be provided to the local health department on behalf of the owner, when required pursuant to Section V of this Approval.

IV. System Sizing

A. The LTAR shall be based on the most hydraulically limiting, naturally occurring soil horizon within 18 inches of the naturally occurring soil surface or to a depth of 12 inches below the trench bottom or point of application, whichever is deeper.

B. The following table shall be used in determining the long term acceptance rate (LTAR) for the Hoot Subsurface Drip Dispersal System.

Soil Group	LTAR (area basis) (gpd/ft^2) Advanced Pretreatment Standard	
	NSF-40	TS-I
I.	1.0-0.6	1.2-0.8
II.	0.6-0.4	0.8-0.5
III.	0.4-0.15	0.6-0.2
IV.	0.15-0.05	0.2-0.05

C. For aerobic subsurface drip dispersal systems in new fill [Rule .1957(b)(1)] receiving effluent treated to the NSF-40 standard, the LTAR shall not exceed 0.6 gpd/ft^2 for Group I, 0.4 gpd/ft^2 for Group II, 0.15 gpd/ft^2 for Group III, or 0.05 gpd/ft^2 for Group IV soils. Soil group is based on the most hydraulically limiting, naturally occurring soil horizon within 18 inches of the naturally occurring soil surface or 12 inches below the trench bottom or point of application, whichever is deeper.

D. For aerobic subsurface drip dispersal systems in new fill [Rule .1957(b)(1)] receiving effluent treated to the TS-I standard, the LTAR shall not exceed 1.0 gpd/ft^2 for Group I, 0.5 gpd/ft^2 for Group II, 0.2 gpd/ft^2 for Group III, or 0.07 gpd/ft^2 for Group IV. Soil group is based on the most hydraulically limiting, naturally occurring soil horizon within 18 inches of the naturally occurring soil surface or 12 inches below the trench bottom or point of application, whichever is deeper. An LTAR above 0.05 gpd/ft^2 in Group IV soil shall be supported by a special site evaluation and hydraulic assessment, pursuant to Section V of this Approval.

E. For aerobic subsurface drip dispersal systems in existing fill [Rule .1957(b)(2)] receiving effluent treated to NSF-40 or TS-I, the LTAR shall not exceed 0.8 gpd/ft^2 for NSF-40 and 1.0 gpd/ft^2 for TS-I.

F. When any reductions are taken in horizontal setbacks pursuant to the use of an NSF-40 or TS-I system pursuant to Rule .1970, on sites where there is at least 18 inches of naturally occurring soil to an UNSUITABLE soil horizon, rock, or soil wetness condition, any one of the following LTAR allowances may apply:
   1. The LTAR may be determined pursuant to Section IV.B when the only horizontal reductions taken are reduced setbacks to drainage devices.
   2. When effluent is treated to NSF-40, or a more stringent standard, the LTAR in gallons per day per square foot shall not exceed the lowest LTAR for the applicable soil group for Soil Groups I, II and III, pursuant to Section IV.B, and 0.10 gpd/ft^2 for Soil Group IV.

G. For subsurface drip dispersal systems receiving effluent treated to TS-I on sites with less than 18 inches of naturally occurring soil to any UNSUITABLE soil horizon, rock, or soil wetness condition, the LTAR shall shall not exceed the lowest LTAR for the applicable soil group for Groups I, II and III, pursuant to Section IV.B, and 0.10 gpd/ft^2 for Group IV, and a special site evaluation shall be provided pursuant to Section V of this Approval.

H. The following table shall be used in determining the LTAR for the Hoot Subsurface Drip Dispersal System installed in saprolite pursuant to Rule .1956(6). The LTAR shall be based on the most hydraulically limiting, naturally occurring saprolite to a depth of 24 inches below the trench bottom or point of application, whichever is deeper.

Saprolite Group	LTAR (area basis) (gpd/ft^2)		
	Texture	Advanced Pretreatment Standard	
		NSF-40	TS-I
I	Sand	0.5-0.4	0.6-0.4
	Loamy sand	0.4-0.3	0.5-0.3
II	Sandy loam	0.35-0.25	0.4-0.25
	Loam	0.25-0.2	0.3-0.2
III	Silt loam	0.1-0.05	0.15-0.05
	Sandy clay loam	0.1-0.05	0.15-0.05

I. In calculating the minimum number of square footage for the drainfield, the daily design flow shall be divided by the LTAR determined from the appropriate table above.

J. In calculating the minimum length of drip tubing to be used, the total square footage of drainfield as derived in Section IV.I shall be divided by two feet, unless additional linear footage is required pursuant to Section IV.K of this Approval, or at the recommendation of the designer as soil and site conditions allow.

K. The required total linear footage of drip tubing shall not be less than 0.5 x Q for Group I, 0.83 x Q for Group II, 1.25 x Q for Group III, or 3.33 x Q for Group IV Soils (Q = daily design flow). This shall not affect the total area required for the system based on Section IV.I above.

L. Sections of tubing without emitters (blank tubing) required to meet site-specific conditions shall not count towards the minimum length of tubing needed when laying out the system or when calculating the linear footage of dripline needed (see Section VI.H.14).

V. Special Site Evaluation

A special site evaluation shall be provided to the local health department on behalf of the owner, containing information required by Rule .1970(p)(2), as applicable, including a hydraulic assessment, to justify use of the proposed LTAR and system layout when any of the following conditions are applicable:

A. Group IV soils are encountered within 18 inches of the naturally occurring soil surface or within 12 inches of the trench bottom or point of application, whichever is deeper, and the LTAR, pursuant to Section IV.B, is proposed to exceed 0.10 gpd/ft^2 for NSF-40 effluent and 0.12 gpd/ft^2 for TS-I effluent.

B. The dripline is to be installed within the naturally occurring soil, and there is less than 18 inches of naturally occurring soil to an UNSUITABLE soil horizon, soil wetness condition, or rock.

C. An existing or proposed groundwater lowering system is used to meet soil depth and vertical separation requirements to a soil wetness condition and:
   1. There are Group III or IV soils present within 36 inches of the naturally occurring soil surface,
   2. There are Group III soils present at any depth above the invert elevation of the highest point of the drainage system, or
   3. When the local health department or regional soil scientist requires such an evaluation to determine the projected effectiveness of the groundwater lowering system.

   The evaluation shall include site-specific determination of saturated hydraulic conductivities and other critical site factors, and the proper application of appropriate drainage models and assessment tools.

D. To verify a proposed LTAR that exceeds the LTAR assigned by the EHS/LHD, pursuant to Section IV.B or Section IV.H of this Approval.

E. Aerobic subsurface drip meeting NSF-40 standards is proposed, and the LTAR is proposed to exceed 0.8 gpd/ft^2 for Group I, 0.5 gpd/ft^2 for Group II, 0.25 gpd/ft^2 for Group III or 0.1 gpd/ft^2 for Group IV soils.

F. Aerobic subsurface drip meeting TS-I standards is proposed, and the LTAR is proposed to exceed 1.0 gpd/ft^2 for Group I, 0.6 gpd/ft^2 for Group II, 0.3 gpd/ft^2 for Group III or 0.12 gpd/ft^2 for Group IV soils.

G. Aerobic subsurface drip meeting TS-I is proposed in new fill, and:
   1. A groundwater lowering drainage system (existing or proposed) is also used to meet soil depth and vertical separation requirements to a soil wetness condition; or
   2. Group IV soils are encountered within 18 inches of the naturally occurring soil surface and the LTAR is proposed to exceed 0.05 gpd/ft^2; or
   3. There is less than 18 inches of naturally occurring soil to an UNSUITABLE soil horizon or rock.

H. When required in Rule .1970 unless otherwise specified in this Approval.

I. The daily design flow for the design unit exceeds 1,500 gpd.

J. When any of the conditions listed below are met, the hydraulic assessment of the special site evaluation shall include one or more of the following: a lateral flow, linear loading, groundwater mounding, or water balance analysis.
   1. The local health department or regional soil scientist determines that the combination of soil conditions, site topography and landscape position, daily design flow, system layout, and proposed stormwater appurtenances creates the potential for hydraulic overloading of a site.
   2. The daily design flow is greater than 720 gpd and there is less than 18 inches of naturally occurring soil to an UNSUITABLE soil horizon, soil wetness condition, or rock.
   3. The dripline is to be installed within the naturally occurring soil and there is less than 18 inches of naturally occurring soil to an UNSUITABLE soil horizon, soil wetness condition, or rock.

In conjunction with the information required to be included by Rule .1970(p)(2), the report is to communicate to the designer site-specific details of the delineated area and include a preliminary system layout and design that complies with the requirements of this Approval. The report shall identify, comment on, and offer recommendations to address, as necessary, site specific conditions such as soil quality, slope, landscape position, stoniness, vegetation, surface drainage, site preparation, depth of installation, etc. that may, in the judgment of the evaluator, effect the design and/or field installation.

VI. Design Criteria

A. The Hoot System H-Series Pretreatment and Hoot Subsurface Drip Dispersal Systems shall be designed in compliance with this Approval and Rule .1970.

B. The Hoot Subsurface Drip Dispersal System shall be preceded by a Hoot System H-Series Pretreatment System design in accordance with the Hoot RWTS approval to meet NSF-40 Class I Treatment Standard, or the Hoot Controlled Demonstration Approval (CDWS 2009-01) designed to meet at least the TS-I treatment standard, as applicable.

C. Dosing tank
   1. The dosing system shall meet the design and construction criteria of Rules .1952-.1954.
   2. The dosing tank shall be a separate, approved pump tank with a minimum liquid capacity not less than the total liquid capacity of the septic tank that would be required for this system by Rule .1952, unless approved pursuant to Section VI.C.3 of this Approval.
   3. If the dosing tank is not separate, it must be designed by a North Carolina Professional Engineer or be an integral part of an approved advanced pretreatment system. The system designer must verify the following:
      a. The pretreatment system approval specifically includes the proposed integral dosing tank, where applicable.

b. The drip dosing pump can be feasibly installed, repaired, and maintained in the pretreatment system effluent dosing compartment.
c. The level control float and alarm requirements of Section VI.C and the pump requirements of Section VI.D of this approval shall be met.
d. All applicable pump submergence, dosing volume, flow equalization, and emergency storage capacity requirements of the system shall be met, without interfering with the performance of the advanced pretreatment system.
e. Normal operating levels shall not result in effluent backing up into a part of any pretreatment component designed for free gravity-flow drainage.
f. Minimum emergency storage capacity requirements may be reduced to eight hours when a telemetry system is provided, whereby the operator in responsible charge (ORC) shall be notified immediately of alarm conditions (high water or power outage). The telemetry system and alarm shall include automatically rechargeable battery backup power supply.
g. Level control floats in the dosing tank shall be adjustable and replaceable from the ground surface without requiring entrance into the tank.
h. The requirement for a separate high water alarm that is audible and visible by system users shall be met, in conjunction with any required self monitoring features of the Hoot Subsurface Drip Dispersal System.

D. Pumps shall be high head submersible pumps manufactured by ITT/Gould's Pumps or equivalent approved by Hoot Systems, Inc. and in accordance with Rule .1952(c)(2). Pump, controls, intake pipe and screen, as applicable, shall be easily accessible by the system ORC for routine operation, maintenance, monitoring, and servicing. Valving, disconnect, and probe access shall be no deeper than 18-inches below the lid of the riser.

E. Surface flushing disc filter(s) capable of preventing particles larger than or equal to that recommended by the drip tube manufacturer, typically 100 microns, shall be used. The self-cleaning process shall be automatic. Subsurface drip dispersal systems shall include a sampling petcock installed on the filtered side of the filter for the purpose of obtaining grab samples from the system. Arkal disc filters, or approved equal, shall be used. Filter flushing residuals shall be pumped into the upstream end of the septic tank with provisions made to minimize disturbance of any solids in the tank. Filter number and size shall be at least adequate to have a flow rate within manufacturers' specifications during both irrigation and flushing conditions. Duplex filters shall be required whenever duplex pumps are required.

F. A Hoot Subsurface Drip Dispersal headworks box shall be used. The headworks assembly typically includes the filters and associated filter backwash valves, field flush valve, and flow meter, and may also include zone dosing and isolation valves. Headworks components shall be incorporated into a 24 inch Polylok riser (or equivalent as approved by Hoot Systems, Inc.). The structure shall be a freeze resistant, ultra-violet and corrosion-resistant structure that is easily accessible at all times for routine operation, maintenance, monitoring, and servicing. If the riser is mounted on top of the pump tank of the system, it shall be located within 12 inches of the top opening to the riser at or above grade. This would allow up to one additional six inch riser above the Hoot Systems, Inc. headworks assembly. The headworks shall feature Schrader valves to check pressure in the field, pressure before the filter, and pressure after the filter.

G. The Hoot Systems, Inc. processing and control unit shall control both the pretreatment and subsurface drip dispersal system and shall be a Hoot Systems, Inc. system control panel or approved equal. Documentation shall be provided for inclusion on the On-Site Water Protection Branch's Homepage. The panel shall be able to do the following:
1. Controls shall provide for delivery of designer-specified preprogrammed volumes of effluent to each field zone (adjustable and variable between zones) at designer-specified time intervals (flow equalization); automatic flushing of integral unit filters (filter flushing), initiated by a timer (adjustable duration); automatic flushing (at least weekly) of the drip laterals (field flushing) with filtered effluent for designer-specified duration; and monitor pump cycles, run times (for each pump and field zone), and flow (with totalizing flow meter, or equal).
2. For systems designed for over 3,000 gallons per day, controls shall also monitor flow volume to each

zone and flow variance indication when flow is + or – 20 percent of design. The ORC shall be notified immediately of the flow variance (+ or – 20 percent). The telemetry system and alarm shall include automatically rechargeable battery backup power supply.

3. Any special equipment to monitor system performance shall either be provided with the system, or determined to be in the possession of the manufacturer-authorized ORC prior to system approval.
4. Controls and float levels shall be synchronized to assure the minimum dose is available prior to initiating a dosing cycle to a zone or subfield.
5. Minimum dose volume per zone shall be set, as needed, so that at least 80 percent of each dose is delivered when the minimum pressure in the field network is at least 10 pounds per square inch. This shall be approximated by using five times the liquid capacity of the drip laterals plus the liquid capacity of the supply and return manifold lines (only the portion which drains between doses), unless a smaller volume is field-determined to meet this performance criteria. For example, the minimum dose-time can be field-determined as follows:
    - When zone is "dry", measure the time from pump-start until the Top of Return pressure is >10 psi. This time shall be designated "Ti". Also measure the total gallons it took to reach 10 psi. This "fill" volume is designated "Gi"
    - Determine minimum additional dose time, as: (4xGI)/(irrigation flow rate) = "Tf"
    - Total adjusted minimum dose time can be reduced to "Ti" plus "Tf", and adjusted dose volume is 5x "Gi"
6. Minimum automatic field flushing volume per zone shall be <u>two</u> times the liquid capacity of the drip laterals plus the liquid capacity of supply and return and manifold lines that drain between doses.
7. Duplex pump dosing system shall be provided whenever the design flow rate exceeds 3,000 gallons per day or when the total length of drip lines exceeds 5,000 linear feet.
8. A telemetry system shall be provided for systems with a design flow greater than 600 gallons per day, whereby the operator shall be notified immediately of alarm conditions (high water and power outage), or when otherwise required when the dosing system also serves as the discharge from an advanced pretreatment system.
9. Flow monitoring shall include a determination of the 7-day and 30-day flow for the corresponding time period preceding any inspection, based upon field measurement, as required to meet Rule .1970 requirements.
10. Floats, pump and control circuits, and the control panel shall meet the requirements of Rule .1952(c). Panel and control equipment shall include lightning protection, be protected from unauthorized access, and remain accessible at all times to the system ORC.

H. Hoot Subsurface Drip Dispersal System Field Design (See Section IX for designer responsibilities)

1. The field network shall utilize either of the following:
    a. 1/2-inch (0.67 inch O.D., 0.57 inch I.D.) nominal size NETAFIM PC polyethylene dripline with pressure compensating emitters containing a biocide designed to deliver 0.61 to 0.65 gallons per hour per emitter (+ or – five percent) at internal tubing pressures of 7 to 60 pounds per square inch; or
    b. 16 mm, 18 mm, or 20 mm nominal size WASTEFLOW PC polyethylene dripline containing a bactericide incorporated into the inner lining and Treflan® root intrusion inhibitor bound into the pressure compensating emitters designed to deliver 0.53 or 1.02 gallons per hour per emitter (+ or –five percent) at internal tubing pressures of 7 to 60 pounds per square inch.
2. Pressure compensating emitters shall be spaced uniformly along the dripline on a maximum of two foot centers. Individual driplines shall be designed and installed level, following the naturally occurring ground contour. A maximum variance of + or - two inches off dead level within any contiguous run may be allowed.
3. The field shall consist of multiple separately and automatically dosed and valved zones whenever needed to meet irrigation and/or flushing requirements, and in adherence with manufacturer's recommendations.
4. The minimum zone size and linear footage of tubing in each zone shall adhere to the manufacturer's recommendations. The linear footage of tubing shall be maximized utilizing reduced tube spacing as the site and this Controlled Demonstration Approval permit, without necessarily requiring an increase in the area requirement as calculated in Section IV.I. Also refer to Subparagraph IV.L. and

subparagraphs pertaining to "blanking," below, for further information on options and constraints associated with system size and layout in the field.

5. Individual driplines shall be designed and installed on at least two-foot centers, unless approved to be spaced uniformly on less than two-foot centers to handle site-specific situations or for short segments as needed to avoid field obstructions, without reducing total area requirements.
    a. In no case shall tube spacing be less than 12 inches on center.
    b. In order to keep all laterals on contour, lines or portions of lines may be installed on greater than two-foot centers, requiring additional total application area.
    c. Short segments installed on less than two-foot centers as needed to avoid field obstructions should account for less than five percent of the total linear feet of emitter/tubing within any zone.
6. Solvent welded heavy duty nonperforated flexible PVC pipe shall be used to connect the supply and return manifolds with the driplines, or to connect common driplines installed at varying depths or locations (e.g.: in stepdowns or to connect looped dripline segments). The connection lines shall be made to the driplines by solvent welded manufacturer approved compression or insert adapters or fittings, or approved equal.
7. Connection lines shall be conveyed over earthen dams constructed at least two inches higher than the driplines served, to retain effluent in the lines at the end of each dose cycle. If the "TopFeed™" system is used, the manifold feed lines shall be on a continuous positive grade from the supply/return manifolds to each drip lateral through the earthen dam, without passing over a two-inch rise.
8. "Blanking" describes interior watertight sections of tubing without any drip emitters, which may be installed where unfavorable site conditions are encountered along a drip lateral, such as rocks, shell fragments (> 35 percent), trees, large roots, and large tree stumps as identified by the system designer, North Carolina Licensed Soil Scientist, installer, or local health department
9. Short sections of blanking tubing may also be used where minimum horizontal setback requirements as specified in Section VI.H.5 cannot be met.
10. Sections of blank tubing do not count as meeting the minimum linear footage requirements calculated for the zone containing the blanking section.
11. No more than 20 percent of the total lateral length in a zone shall be comprised of blanking sections.
12. Blanking tubing shall be either:
    a. Black or otherwise differently colored HDPE tubing of the same material, specifications, and inside diameter as the connecting drip tubing; or
    b. Non-perforated flexible PVC.
13. Non-perforated flexible PVC shall be used whenever the blanking section passes through an area having excessive abrasion hazards due to the number or conditions of rocks or an area where uniform bedding cannot be effectively ensured.
14. Blanking sections shall also meet the following conditions:
    a. Connection lines shall be made to the driplines (with emitters) by solvent welded manufacture approved compression or insert adapters or fittings, or approved equal.
    b. Blanking sections and connections shall be provided by the drip system manufacturer.
    c. Blanking sections shall be installed in hand-shaped trenches with a minimum of two inches of clean SUITABLE soil, free of organic material, on all sides to protect the entire length of tubing from abrasion or damage from contact with rocks, roots, voids, or other obstructions.
    d. All direction changes shall be gentle, sweeping bends which eliminate any danger of kinking, pinching, or collapse of the tubing.
    e. Where possible, blanking sections shall be installed level and at the same elevation as the dripper line being blanked. Where the blanking tubing trench floor elevation must vary from the dripper trench floor elevation due to specific obstructions, the blanking section shall go upslope in elevation around the obstruction, rather than downslope, with a single, sweeping high point rather than being installed up and down in elevation.
    f. The dripper tubing trench floor at both ends of any given section of blanking shall be maintained at the same elevation.
    g. A minimum of six inches of soil cover shall be maintained over blanking sections with care taken to provide proper surface drainage without creating areas of concentrated run-off.
    h. At least a single blanking section shall be used whenever a lateral must be installed where the horizontal separation between adjacent sections of dripper tubing is less than the minimum

spacing as set forth in Section VI.H.5 above, and this portion of the blank section backfilled with select, well compacted, low permeability, clay.

i. When lateral segments must be installed closer than 12 inches apart, both segments shall be "blanked" and those sections backfilled with hand-compacted clayey material.
j. Locations and lengths of blanking sections shall be noted on the record drawings for the project.

15. The hydraulic design shall be based on achieving the following conditions:
    a. No more than a 10 percent variation in flow between any individual emitters anywhere within a separately dosed zone, including any drain back.
    b. On sites with a slope greater than four percent, "Top Feed ™" manifolds will be utilized to minimize disproportionate amount of drainage into the lowest area of the zone.
    c. Maintenance of flushing velocities of at least 1.2 feet per second in the supply line from the dosing tank to the beginning of the drip field during normal dosing cycles.
    d. Maintenance of flushing velocities of at least 1.2 feet per second in each supply manifold segment during field flushing, and maximum flushing velocities less than 10 feet per second in each supply and return manifold segment.
    e. Minimum pressure of 10 pounds per square inch during flushing flows and a maximum of 60 pounds per square inch during normal dosing flows.
    f. Maintenance of flushing velocities of at least two feet per second at the distal end of each dripline during automatic field flushing.
16. The hydraulic design shall include documentation that minimum scour velocities and maximum pressure restrictions will be maintained, which shall include project specific calculations, computer simulations, or verification of adherence to pre-approved design criteria. Hydraulic calculations shall take into account sections of top-feed lateral feed/return lines and blanking, where applicable.
17. Field appurtenances include an air vent at the high point(s)/outlet of each zone; an isolation valve and check valve at the high point/outlet of each zone (when there is more than one zone); solenoid valve with separate isolation valves on each side at the low point/inlet to each zone (or by an appropriate alternate method which enables all valves to be serviced without effluent discharge from supply/return lines); cleanout at each end of the supply and return manifolds; a separate cleanout at the distal end of the supply line to each zone; and pressure monitoring fittings at the field inlet and outlet points, and at the headworks for measuring dead-head and operating pressures.
18. The ORC must be able to service all solenoid valves and air vents, and check pressures without effluent discharging from the network in preparation for these maintenance/testing procedures. Valves, pressure monitoring fittings, and cleanouts shall be provided with protective vaults or boxes that are decay resistant, ultra-violet rated, and that extend at least to finished grade (shall be accessible at all times).

VIII. Installation and Testing Procedures

A. A preconstruction conference shall be required prior to beginning any site modifications or construction of the Hoot Subsurface Drip Dispersal System and associated pretreatment system components. The conference shall be attended by the Hoot Systems, Inc. authorized system designer, Hoot Systems, Inc. authorized installer, and local health department (LHD). The North Carolina Licensed Soil Scientist and North Carolina Professional Engineer shall also be present, as applicable.

B. It shall be the responsibility of the system designer to specify equipment to be used, and site-specific procedures to be followed, including blanking provisions.

C. All Hoot H-Series Pretreatment and Subsurface Drip Dispersal Systems shall be installed according to directions provided by the manufacturer in the "Installation Manual" and instructions found on Hoot Systems, Inc. CAD drawings and specifications for each system. Additionally, all Hoot Systems, Inc. systems and components used with, but not manufactured by Hoot Systems, Inc., shall be installed in accordance with all applicable regulations and manufacturer instructions.

D. All individuals/companies installing Hoot Systems, Inc. H-Series Pretreatment and Subsurface Drip Dispersal Systems shall be in possession of all necessary permits and licenses before attempting any portion of an installation.

E. Watertightness of the tanks and any dosing tanks shall be demonstrated by either a 24-hour water leakage test or a vacuum test conducted at the installation site. A water level change of 1/2 inch or more, within a 24-inch riser, over 24 hours, or visual observation of leakage shall be cause for failure of the watertightness test. Initial water level shall be to two inches above the riser/adapter seam. For the vacuum test, a vacuum of five inches of mercury shall be pulled on the tanks and held for two minutes, without a loss of greater than 0.5 inches of mercury.

F. The preservation of the original structure of the soil in the initial and repair drainfield areas is essential to maintaining the absorptive capacity of the soil. No activity other than the construction of the system is permitted within these areas.

G. The drainfield area shall be prepared in a manner that minimized site disturbance.
   1. No equipment shall cross the field areas during rainfall events, or when the fields are above field capacity ("too wet to plow").
   2. Only equipment light enough to not compact the soil shall be used to remove trees, roots, and rocks, with hand incorporation of select fill material used to eliminate weak spots where roots or boulders must be removed.
   3. Fill material shall be in accordance with Rule .1957(b)(1)(F). In some instances, final cover material may be approved to be added after line installation.
   4. Field shall be prepared as needed to enable a grass cover to be established and maintained prior to line installation.
   5. The selection, transportation, and incorporation procedures of fill or cover must be carefully reviewed and concurred with by the system designer, soil evaluator, and local health department prior to and during installation.

H. Drip laterals shall be staked out by use of an engineer's or laser level and tape prior to permitting. At least every fourth drip run or adjacent dripline shall be field staked. However, staking shall be more frequent if needed, as determined by the system designer or the local health department, to assure conformation with natural contours and design requirements for sizing, location, and separations. Maximum dripline depth shall be in accordance with permit conditions.

I. Dripline shall be installed in accordance with designer's and manufacturer's recommendations for each site. A vibratory plow, static plow, trencher, or rock-saw is most typically used, or the system is installed by hand. Soil moisture must be dry enough so that soil compaction or smearing will not occur. The system is not to be constructed during periods of wet weather or when the soil is sufficiently wet at the depth of installation to exceed its plastic limit. The plastic limit is exceeded when the soil can be rolled between the palms of the hands to produce a roll (wire) 1/8 inch in diameter (>1.5-inch length) without breaking and crumbling. Questions about site workability shall be reviewed with the system designer, soil evaluator, and local health department prior to proceeding.

J. Leaf litter and debris shall be removed prior to the installation of dripline, where applicable. When a trencher is used or trenches are hand dug, the trench bottoms shall be hand cleaned of roots, debris and litter, and the dripline shall be secured to the center of the trench bottom prior to backfilling.

K. Minimum soil cover over drip tubing shall be six inches to finished grade. Cover material shall be free of rocks, debris, construction and demolition (C+D) waste, hazardous or contaminated waste, or material with concentrations or layers containing more than 35 percent by volume of shell fragments or more than 10 percent by volume of fibrous organics.

L. Minimum depth of valves in protective vaults or boxes shall be at least 12-18 inches below finished grade (as needed to be below normal frost depth). Protective vaults or boxes shall be decay resistant, ultra-violet

rated, and extend at least to finished grade and shall be accessible at all times.

M. Air vents shall be installed in a valve box so that the entire valve is below finished grade. The outlet of the valve must be above the installation depth of the dripline.

N. Extreme care must be taken during system installation to assure no extraneous debris enters the tankage, supply lines, and dripline network. Supply lines and manifolds shall be flushed out prior to system start-up.

O. Designer's and manufacturer's recommendations shall be followed for system startup. All leaks in pipe network or from emitters exhibiting excessive emission rates, as evidenced by wet spots during dosing cycles comparable to normal operating conditions, shall be repaired.

P. Dosing and flushing flow rates shall be measured. Dosing pressure shall be measured at the lowest point on the supply manifold to verify need for a pressure sustaining valve and its effectiveness, if valve is present. Flushing pressures at the ends of the each zone supply and return manifold shall be measured and determined to be in accordance with design criteria.

Q. Fields shall be finished and graded to shed surface water and in a manner which facilitates inspection, operation, maintenance, and repair as well as turf management with standard mowing equipment (if applicable). Provisions shall be made to establish and maintain a vegetative cover (e.g. grass) to prevent erosion, allow mowing with standard equipment, and to allow for effective system inspection (if applicable).

R. Other methods of site stabilization may be proposed, such as in woodland sites. Equivalent provisions for finished grading to shed surface water and, as needed, to facilitate inspection, operation, maintenance, and repair apply. Establishment of a permanent vegetative cover on a wooded site is not necessary if the site is otherwise effectively stabilized from erosion after construction until a protective litter cover is naturally reestablished. Site-specific procedures should be reviewed by the system designer, soil evaluator, and local health department. To facilitate inspection and maintenance, new woody vegetation must be prevented from becoming established over driplines and appurtenances.

S. All mechanical components, pumps, pump cycling, filters, flushing, high water alarm, and telemetry systems, as applicable, must be demonstrated to be fully operable in accordance with their design.

T. Prior to Operation Permit issuance, the final health department construction inspection shall include at least the following:
   1. Testing the controls and alarm settings.
   2. Recording all pump model numbers and time clock settings.
   3. Confirming that all air release vents are installed in the correct locations.
   4. Checking the dosing and return flushing flow, measuring and recording the pressures at the inlet to the supply manifold and outlet from the return manifold in the field, and measuring and recording pressures at the supply line and return line gauges.
   5. Confirming that the riser hatches have tamperproof bolts and/or riser lock ring.

U. Each Hoot System, Inc. control panel shall have a label as shown in Attachment B.

V. Prior to the issuance of an Operation Permit, the manufacturer or manufacturer's representative shall provide an acceptance letter to the local health department verifying satisfactory installation and operation measures.

VIII. Operation, Maintenance and Testing

A. System classification, management entity, inspection/maintenance and reporting frequency requirements shall be in accordance with Rules .1961 and .1970. The Hoot Subsurface Drip Dispersal System (with

Hoot Advanced Pretreatment System) shall be classified at a minimum as a Type V(c) system according to Table V(a) of Rule .1961(b).

B. Under this Controlled Demonstration Approval, the minimum frequency of inspection for each system by the ORC shall be quarterly (once every three months).

C. During the first operational inspection after system start-up, a Hoot Systems, Inc. representative shall meet with the ORC and the property owner to explain the system and answer any questions.

D. In the event any system is found to be out of compliance, Hoot Systems, Inc. will assist in the development of an action plan to bring the system back into compliance.

E. The ORC shall provide monitoring reports to the health department which include a log of all malfunction incidences/notifications, maintenance activities, and wastewater volume delivered to each zone between each required monitoring period.

F. At each Hoot Subsurface Drip Dispersal System inspection the ORC, at a minimum, shall observe, monitor, and record:
   1. Watertightness of tank(s), risers, and conduit pass throughs in and out of risers,
   2. Operation of controller, telemetry device, discharge pumps, and probes or floats,
   3. Observe and record flows on the water meters to determine output to and return from each field zone in gallons per minute,
   4. Visual observation of the dripfield(s), which shall include walking the fields during a field dosing event to determine whether any wet spots occur, and their locations,
   5. The condition of the filter screen(s), and
   6. The dosing flow rate to each zone, including flow meter readings, pump run times, and cycle counts.

G. Field dosing and flushing flow rates and pressure head measurements during flushing at the inlet and outlet of each field zone shall be taken at least twice per year.

H. The ORC shall be telemetrically notified of high water, power outage, and aerator malfunction alarms.

I. The ORC shall also conduct other additional observations, measurements, monitoring, and maintenance activities as specified on the Operation Permit and as recommended by Hoot Systems, Inc., or as otherwise required for the Hoot Subsurface Drip Dispersal System.

J. All Hoot Subsurface Drip Dispersal Systems shall be operated and maintained according to the latest version of the Hoot Systems, Inc. O&M Manual.

K. Notification and Performance of Maintenance and Repairs
   1. The ORC shall alert Hoot Systems, Inc. and the system owner in a timely fashion of needed maintenance or repair activities including, but not limited to, landscaping, pipe or control system repairs, and adjustments to any other system component.
   2. The ORC shall notify the system owner, Hoot Systems, Inc., and the local health department whenever the pump delivery rate efficiency or average pump run time are not within 25 percent of initial measurements conducted prior to system startup. System troubleshooting and needed maintenance shall be provided to maintain the pump delivery rate and average pump run time within 25 percent of initial measurements conducted during system startup.

L. See separate Hoot RWTS approval and Controlled Demonstration Approval (CDWS 2009-01) for pretreatment system inspection, sampling, and maintenance requirements by the ORC.

M. Reporting

1. The ORC shall provide a completed written report to Hoot Systems, Inc., the system owner, and the local health department within 30 days after each required visit. At a minimum this report shall specify:
   a. the date and time of inspection,
   b. system operating conditions observed and measured according to Sections VIII.F, G. and I,
   c. maintenance activities performed since the last inspection report,
   d. an assessment of overall system performance,
   e. a list of any improvements or maintenance needed; and,
   f. a determination of whether the system is malfunctioning, and the specific nature of the malfunction.
2. Proposal for Evaluation and Reporting.
   a. The manufacturer shall maintain a contract for evaluation of the performance of the controlled demonstration wastewater system with an independent third party laboratory, consultant, or other entity that has expertise in the evaluation of wastewater system and that is proposed by Hoot Systems, Inc. and approved by the Department. The third party shall review the site-specific flow-monitoring protocol, collect and analyze the ORC inspection reports, sampling and monitoring data, and prepare semi-annual reports summarizing all data for all the sites. These reports are due by January 31 and July 31 of each year, and shall include all data gathered through December 31 and June 30 of the previous six-month period, respectively. These reports shall provide information to the Department based upon the monitoring data and observations made from the Controlled Demonstration systems installed pursuant to this Approval. This should include:
      i. An assessment of system hydraulic performance in relation to the established performance criteria;
      ii. Recommended areas of applicability for the system; and
      iii. Any conditions and limitations related to the use of the system.
   b. Upon completion of the research and testing protocol, and prior to completing any application by Hoot Systems, Inc. to the State for reclassification of the Hoot Subsurface Drip Dispersal System as an Innovative System, and within a maximum of five years of the effective date of the first Controlled Demonstration System Operation Permit (CDSOP) issued pursuant to this approval, the approved third party shall:
      i. Prepare a Final Report to the State that includes the results from all of the systems installed during the Controlled Demonstration, including flow-monitoring information, ORC reports, etc., and provide recommendations on future use of the system, and
      ii. Provide the interim and final reports in electronic format suitable for posting on the On-Site Water Protection Branch's website without confidentiality. The contents of the interim and final reports shall not be altered from the original document without approval from Hoot Systems, Inc.
   c. The research and testing protocol that has been agreed to is as follows:
      i. Monitoring of hydraulic pressure conditions during various operating conditions, including monitoring at Schrader valves and/or gauges located at the filter, ends of each supply manifold, end of each scour manifold, and at filter discharge line. Flow rates and pressures during irrigation and flushing shall be recorded at system start-up, after one month of system operation, and at least quarterly thereafter.
      ii. Inspection of filter screen to ensure proper cleaning by backwash system on at least a monthly basis. Frequency of backwashing shall be verified and/or changed.
      iii. Record and verify from system control data that cycles, frequency, dose time, and flows are within design limits.

IX. Responsibilities and Permitting Procedures

A. Prior to the installation of a Hoot Subsurface Drip Dispersal System at a site, the owner or owner's agent shall notify the local health department of their proposed use of such a system. The local health department shall issue an Improvement Permit and a Construction Authorization or amend a previously issued Construction Authorization allowing for the use of a Hoot Subsurface Drip Dispersal System. Up to 200

Hoot Subsurface Drip Dispersal Systems can be installed statewide upon a finding that all provisions of this Approval and all other applicable rules are met.

B. The Improvement Permit and Construction Authorization shall contain all conditions the site approval is based upon, including the proposed use of the Controlled Demonstration System. The Operation Permit shall include all conditions as specified in the Improvement Permit and Construction Authorization. Notification of the issuance of all Improvement Permits, Construction Authorizations, and Operation Permits prior to issuance by the local health department, pursuant to this Controlled Demonstration Approval, shall be submitted to the On-Site Water Protection Branch. The State shall notify the manufacturer and local health department if the proposed use is found to be inconsistent with the approved testing program, or other conditions of this approval.

C. Hoot Systems, Inc. is responsible for providing training necessary to its authorized representatives, including authorized designers, installers and ORCs, about all specific design, installation, and operation requirements of this Controlled Demonstration Approval, including but not limited to:
   1. Site and layout limitations,
   2. Installation of flow meters and pressure monitoring points at inlet to supply manifold and outlet from return manifold,
   3. Use of flexible PVC at manifold connections and end-loops,
   4. Method of determining 7-day and 30-day flows, and
   5. Proper start-up set-up, measurement, and operational performance verification.

D. The Hoot Subsurface Drip Dispersal System shall be designed by one of the following: a Hoot Systems, Inc. certified designer or a North Carolina Professional Engineer.

E. The Hoot Subsurface Drip Dispersal System shall be designed by a North Carolina Professional Engineer when the system design flow exceeds 600 gallons per day, when duplex pumps are required in accordance with Section VI.G.7, or whenever the complexity of the system dictates non-standard design as determined by the local health department or the manufacturer.

F. Prior to the issuance of an Construction Authorization for a Hoot Subsurface Drip Dispersal System, a design submittal prepared by an authorized designer or North Carolina Professional Engineer shall be submitted for review and approval by the local health department. The design submittal shall include the information specified in "Requirements for Submittals of Soil Reports and Pretreatment and/or Dispersal System Designs". Systems designed by an authorized designer shall include a review letter from the manufacturer along with a submittal checklist signed by the manufacturer for each system.

G. It is recommended that local authorized environmental health specialists attend a design training session offered by the manufacturer prior to permitting the system. Also, at the request of the local health department, the Regional Engineer shall review the design.

H. The system shall be installed by a NCOWCICB-certified Level IV Installer authorized in writing by the manufacturer to install the system. The installer shall coordinate the installation with the authorized designer and manufacturer's field representative.

I. For sites required to be evaluated by a North Carolina Licensed Soil Scientist or Professional Geologist, the local health department shall specify as a condition on the Improvement Permit and Construction Authorization that a North Carolina 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, based upon their field inspection of the system.

J. The Hoot Systems, Inc. authorized installer and authorized designer shall certify in writing that the system was installed in accordance with the approved plans and specifications prior to the Operation Permit issuance.

K. A North Carolina Professional Engineer shall certify in writing that a system required to be designed by a North Carolina Professional Engineer was installed in accordance with the approved plans and specifications prior to an Operation Permit issuance.

L. The ORC shall be present during initial system commissioning. The ORC shall be certified as a NC Subsurface Operator, a Grade II biological wastewater treatment plant operator, and an authorized Hoot Systems, Inc. Treatment System Operator.

N. Prior to issuance of an Operation Permit a contract for operation and maintenance shall be executed between the system owner and an ORC as required in accordance with Rule .1961(b), who has been trained and certified in writing by Hoot Systems, Inc. to operate and maintain Hoot Subsurface Drip Dispersal Systems.

O. Hoot Systems, Inc. shall provide lists of manufacturer's authorized designers, installers, and ORCs to the State and applicable local health departments. The manufacturer shall also provide notice of all scheduled manufacturer-authorized training programs for individuals seeking authorization, or on-going training.

X. Repair of Systems

The provisions of 15A NCAC 18A .1961(c) shall govern the use of the Hoot Systems, Inc. Subsurface Drip Dispersal System for repairs to existing malfunctioning wastewater systems.

Approved By: _____ Date: _____

Appendix A

In the Tables "SWC" means "Soil Wetness Condition" and "USC" means an "UNSUITABLE Soil Condition," other than a SWC, and NOSS means "naturally occurring soil surface"

Table A-1 - Siting criteria for subsurface drip dispersal systems where dripline is installed below the elevation of the naturally occurring soil surface (NOSS)

Criteria or requirement	Treated to NSF 40 or more stringent	Treated to TS-I
Minimum useable soil depth below NOSS to USC or SWC	18 inches	15 inches
Minimum vertical separation between the trench bottom or point of application, whichever is deeper, and USC or SWC	12 inches	9 inches (12 inches to rock or tidal water)
Allowance to meet 6 inch cover requirement	Addition of up to 6 inches SUITABLE Group II or III soil material, after settling	
Special site evaluation not required, unless specifically required below	18 inches or more of useable soil	
Special site evaluation required (Section V)	Group IV within 18 inches of NOSS and LTAR >.10	Group IV within 18 inches of NOSS and LTAR >0.12
	Proposed LTAR exceeds LTAR assigned by EHS/LHD per Section IV.B	
		Groundwater lowering system used and any Group III soil above invert elevation of drain or any Group III or IV soil within 36 inches of NOSS
	Groundwater lowering system used and LHD or RSS determines evaluation needed	
	Daily Design Flow exceeds 1,500 gallons per day	
		Less than 18 inches from NOSS to USC or SWC
	LTAR: >0.8 (Group I) >0.5 (Group II) >0.25 (Group III); >0.10 (Group IV)	LTAR: >1.0 (Group I) >0.6 (Group II) >0.3 (Group III) >0.12 (Group IV)

Table A-2-Siting criteria for aerobic subsurface drip dispersal systems on new fill sites, when all or part of the dripline is to be installed in approved fill material

Criteria or requirement	Treated to NSF-40 or more stringent	Treated to TS-I
Minimum useable soil depth below NOSS to USC or SWC	18 inches to USC 12 inches to SWC	12 inches to USC 12 inches to SWC
Minimum vertical separation between the trench bottom or point of application, whichever is deeper, and USC or SWC	18 inches to USC 12 inches to SWC	12 inches to USC 9 inches to SWC
Special site evaluation not required, unless specifically required below	18 inches or more of useable soil	
Special site evaluation required (Section V)		<18 inches to USC
		Group IV soil within 18 inches of NOSS and LTAR >0.05
		Groundwater lowering system is used with fill
		<18 inches to USC
	Daily Design Flow Exceeds 1,500 gallons per day	

Table A-3-Siting criteria for subsurface drip dispersal systems on existing fill sites, when all or part of the drip tubing is to be installed in approved fill material

Criteria or requirement	Treated to NSF 40 or more stringent	Treated to TS-I
Minimum depth Group I fill/soil below existing fill surface to USC or SWC	24 inches	
Minimum vertical separation between the trench bottom or point of application, whichever is deeper, and USC or SWC	18 inches	12 inches

Attachment B
Label is 4.75 inches long by 1.5 inches tall.

NON-TYPICAL SEPTIC SYSTEM
HOOT SYSTEMS H-SERIES
CONTROLLED DEMONSTRATION
SUBSURFACE WW OPERATOR NAME AND
CONTACT INFORMATION