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

INNOVATIVE WASTEWATER SYSTEM APPROVAL

Innovative Wastewater System Approval Number: IWWS 1998-01-R4

Issued To:	Anua PO Box 77457 Greensboro, NC 27417 336-547-9338 anuainternational.com	
Contact:	Colin Bishop	
For:	Puraflo® Peat Biofilter System	
Approval Date:	May 15, 1998	
	August 16, 1999	
	April 3, 2001	
	April 8, 2003	Revised siting, design, installation, and monitoring criteria
	December 31, 2024	Updated for 18E and renewed for 2025

In accordance with G.S. 130A-343 and 15A NCAC 18E, Section .1700, an application by Anua for a renewal of the approval for their advanced pretreatment system, Puraflo® Peat Biofilter, has been reviewed and found to meet the standards of an innovative system when the following conditions are met.

I. General

A. Scope of this Innovative Approval
   1. Design, installation, use, and operation and maintenance guidelines for Puraflo® Peat Biofilter systems to meet TS-I effluent standards pursuant to Rule 15A NCAC 18E .1201(a), Table XXV.
   2. Operation, maintenance, and monitoring requirements for Puraflo® Peat Biofilter systems and associated dispersal fields to ensure the treatment performance standards are met.

B. This Innovative System Approval is applicable to wastewater systems treating domestic strength effluent, as defined in 15A NCAC 18E .0402(a), Table III, utilizing Puraflo® Peat Biofilter systems that have a design daily flow not exceeding 3,000 gallons per day (gpd).

Use of Puraflo® Peat Biofilter systems for facilities with high strength effluent, as defined in 15A NCAC 18E .0402(a), Table III or industrial process wastewater, shall be proposed by Anua and a North Carolina Professional Engineer (PE) to the Department for review and approval on a case-by-case basis, prior to permitting by the local health department (LHD). The system design shall include the proposed raw wastewater strength (BOD_5, COD, TN, TSS, and fats, oils, and grease, the expected organic loading rate (in pounds of BOD), and hydraulic loading rate on the pretreatment system, and the calculations, references, and any other needed information to support the proposed design.

C. Any site utilizing these systems shall have wastewater with sufficient alkalinity to facilitate biological treatment processes. The influent shall not have a pH or toxins that significantly inhibit microbial growth.

D. Use of Puraflo® Peat Biofilter systems that have a design daily flow exceeding 3,000 gpd may be permitted after approval by the Department on a case-by-case basis in accordance with 15A NCAC 18E .0302(e) or in accordance with G.S. 130A-336.1.

II. System Description

The Puraflo® Peat Biofilter system consists of the following components: a Department approved septic tank; and single or multiple Puraflo® Peat Biofilter modules. Type A systems are installed with a gravel pad underneath the module. Type B systems utilize a standalone Puraflo® Peat Biofilter module followed by a pump tank and dispersal field.

III. Siting Criteria

The Puraflo® Peat Biofilter systems and associated dispersal fields shall be sited and sized in accordance with 15A NCAC 18E, Section .1200 for TS-I systems. Drip irrigation systems used with Puraflo® Peat Biofilter systems shall be sited and sized in accordance with 15A NCAC 18E .1204 and the manufacturer specific drip approval. The Puraflo® Peat Biofilter systems and associated dispersal fields shall meet all applicable horizontal setback requirements in accordance with 15A NCAC 18E Section .0600 or .1202 and be located to prevent surface/subsurface water inflow/infiltration.

IV. System Sizing

The system sizing criteria shall be based upon the long-term acceptance rate specified in the appropriate portion of the rules or the Provisional, Innovative, or Accepted system approval for the type of dispersal system to be used.

V. Special Site Evaluation

A special site evaluation may be required based on the proposed dispersal system. Refer to manufacturer specific drip approvals and 15A NCAC 18E .0510.

VI. Design Criteria

A. The Puraflo® Peat Biofilter system shall be designed in accordance with the following criteria.
   1. The septic tank shall be sized in accordance with 15A NCAC 18E .0801.
   2. The pump tank shall be sized in accordance with 15A NCAC 18E .0802.
   3. Dosing onto the peat biofilter media shall be controlled by a control panel with a programmable two stage timer, elapsed time meter, event counter, and alarm system. Dosing frequencies shall range from eight to 24 doses per day.
   4. The system shall be designed to deliver a net dosing volume of five to 15 gallons per module per dosing cycle at a rate of seven to 12 gallons/minute per module. Drainback volumes shall be factored in the design where applicable.
   5. The Puraflo® Peat Biofilter is a pre-engineered proprietary treatment system. The containment modules are made of pre-assembled, UV-protected polyethylene material, with approximate dimensions of 7.08 feet long by 4.58 feet wide by 2.5 feet deep. The modules are fitted with UV-protected, removable polyethylene lids, which contain ventilation and drain holes. Each module in the system is installed at the exact same elevation, with effluent flow uniformly split between the separate modules. The system designer shall specify the elevations required for all relevant system components, and set the elevations relative to a site specific vertical benchmark.
   6. The fibrous peat treatment media is residues of Eriophorum (Cotton Grass) plants, extracted from raised bog peats (other natural residues and peat fines are also present).
   7. The peat biofilter media shall be designed in accordance with the following parameters:
      a. Media thickness in inches: 24
      b. Maximum hydraulic loading rate in gpd per square foot: 4.9
      c. Minimum number of Peat Biofilter Modules per bedroom: 1
      d. Minimum number of Peat Biofilter Modules per 150 gpd for non-residential systems: 1
   8. Distribution to the Peat Biofilter Modules is achieved by a pressure manifold. The supply line from the pump tank connects to the pressure manifold. Flexible pipe with orifice plates, or constrictions, connect the pressure manifold to pre-installed distribution grids within each Peat Biofilter Module. The orifice plates convert the pressure head in the pressure manifold to the same velocity head as it enters each of the module distribution grids, splitting the flow equally amongst the modules. The modules must be installed at the same elevation. The distribution grid inside the module distributes the effluent uniformly over the module surface. The distribution grid is covered with a layer of fibrous peat media.
   9. The treated effluent exits from the base of the module under gravity through weepholes or solid piping depending on the type of Puraflo® Peat Biofilter system utilized. Modules are color coded to indicate different hook-up and effluent exit arrangements. The system designer shall specify which modules are needed for a specific design.
   10. The lids on the peat biofilter modules contain vent holes which accommodate the passive diffusion of oxygen into the modules. These vent holes shall not be covered.
   11. The following design details are for a Type A Puraflo® Peat Biofilter system:
      a. Each module shall be centered on a contiguous level bed of rock with a width of five to 12 feet, and length of eight to 15 feet. The minimum depth of the rock shall be eight inches. The rock shall meet the requirements of 15A NCAC 18E .0902(b)(4).
      b. The bed shall be constructed as an elongated berm, with the long axis parallel to the ground elevation contours of the slope. The bottom of the bed shall be excavated level, ±¼ inch, in all directions. The gravel bed shall be immediately installed without allowing machinery to traverse the excavated and exposed bed bottom. Exposed portions of the rock bed not

under the modules shall be covered by a geotextile fabric prior to backfilling. The geotextile fabric shall be capable of preventing the downward movement of silt-sized particles while allowing the movement of moisture and gases.

c. Effluent, after passing through the peat media, is distributed over the rock bed through multiple weepholes that are installed at the base of each module. If the module is connected to a sampling chamber, there will be no weepholes in the base of the module.
d. For effluent sampling, the bottom half of one or two adjoining modules in each installation shall not contain weepholes but shall include an underdrain collection pipe connected to a specially designed sample collection chamber to be installed immediately adjacent to the module(s) on the rock pad. Holes in the side of the sample chamber allow seepage of uncollected effluent into the underlying rock pad.

12. The following design details are for a Type B Puraflo® Peat Biofilter system:
    a. Modules shall be installed contiguous to each other on a level gravel bed. Gravel shall be clean, crushed No. 5 or No. 57 stone or fine sand with a minimum depth of six inches. Alternative bedding designs may be proposed by the authorized designer. The alternative design shall provide for the modules to be supported and level.
    b. The gravel or sand bed shall be installed level, ± ¼ inch, in all directions, with configuration and specified color-coded modules installed as directed by the authorized designer or PE for each site. The gravel or sand bed must extend a least six inches beyond the ends of the modules in all directions.
    c. Effluent, after passing through the peat media, is piped from the base of the sealed modules. If piped directly from each module, there shall be an individual trench serving each module. If the effluent is collected from all modules, it shall drain by gravity to a dispersal field or to a pump tank. Trenches shall be separated horizontally from the gravel bed beneath the modules by at least two feet.
    d. For effluent sampling, a sampling access port shall be located in the discharge pipe between the underdrain exit point from at least one of the peat modules and the dispersal field. A four-way cross or similar device can be used where the module discharge pipe and the vertical sampling port intersect to facilitate collection of effluent samples. The vertical sampling access port 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 sampling of effluent flowing to the dispersal field. The cap shall be removable and constructed to prevent the entrance of rainwater, surface water, rodents, insects, etc.
    e. As an alternative to the sampling access port above, a distribution box or drop box may be used for the sampling access point, located in the effluent discharge line from at least one of the peat modules prior to the dispersal field. The box must be constructed to facilitate at-grade access.
13. Backfill shall be installed over the gravel bed along the sides of the modules, with the module tops remaining at least six inches above finished grade. Minimum backfill depth shall be six inches. Backfill shall be installed with a side slope not to exceed a rise to run ratio of 1:3, unless a dry stacked interlocking block retaining wall is constructed adjacent to the gravel bed. Any other type of retaining wall shall be designed by a PE and approved by the LHD. The use of a retaining wall for supporting backfill does not supersede side slope requirements for fill systems, which still must be met, where applicable.

B. Puraflo® Peat Biofilter systems shall be designed by a designer authorized in writing by Anua (authorized designer) or a PE. Systems over 1,000 gpd shall be designed by a PE.

VII. Installation and Testing

A. A preconstruction conference shall be required to be attended by the authorized designer, PE, if applicable, installer authorized in writing by Anua (authorized installer), and LHD prior to beginning installation of the Puraflo® Peat Biofilter system.

B. All Puraflo® Peat Biofilter systems shall be installed according to directions provided by Anua.

C. All individuals or companies installing Puraflo® Peat Biofilter systems shall be in possession of all necessary permits and licenses before attempting any portion of a new or repair installation. The company or individual must be a Level IV installer and authorized in writing by Anua.

D. Watertightness of the septic and pump tanks shall be demonstrated by a leak test in accordance with one of the following:
   1. 24-hour water leak test conducted at the installation site. A water level change of one-half inch or more over twenty-four hours, or visual observation of leakage shall be cause for failure of the watertightness test; or
   2. one of the testing methods in 15A NCAC 18E .0805(b).

E. The authorized installer, PE or authorized designer, and the operator authorized in writing by Anua (authorized operator), shall conduct a final inspection and start-up of the Puraflo® Peat Biofilter system and all associated system components. The LHD will attend and observe the final inspection and start-up.

F. Specified site preparation steps and construction specifications for the dispersal system shall be strictly adhered to, including specified depth of trenches in relation to site limiting conditions, cover material specifications if needed, trench installation method, etc.

VIII. Operation, Maintenance, Monitoring, and Reporting

A. Puraflo® Peat Biofilter systems shall be classified, at a minimum, as a Type Va system in accordance with 15A NCAC 18E .1301(b), Table XXXII. Management and inspection shall be in accordance with 15A NCAC 18E, Section .1300.

B. All Puraflo® Peat Biofilter systems require an operation and maintenance agreement between the system owner and Anua, its authorized representative, or with an authorized operator in accordance with 15A NCAC 18E .1302(c). The authorized operator must have proper equipment and training to access and program the control panels on site. The authorized operator shall be:
   1. a North Carolina certified subsurface operator (Operator in Responsible Charge); and
   2. either an employee of Anua or authorized in writing by Anua.

C. All Puraflo® Peat Biofilter systems shall be operated and maintained according to the latest version of Anua USA O&M manual.

D. At each Puraflo® Peat Biofilter system inspection, the authorized operator shall follow service procedure steps identified in the Anua USA O&M Manual and, at a minimum, observe, monitor, and record the following:
   1. Wastewater, sludge, and scum levels in all tanks;
   2. Watertightness of all tanks, risers, and pipe connections at the tanks;
   3. Operation of pumps, floats, valves, electrical controls, and alarms, including record of alarms since last visit and troubleshooting actions;
   4. Dispersal field pump delivery rate based on a drawdown test, determination of the average pump run time, and dispersal field dosing volume;
   5. Readings from pump cycle counters and elapsed time meters or water meter;
   6. Any structural damage, accessibility issues, adequate ventilation, excess odors, ponding of effluent, insect infestations, vegetative growth over the dispersal field, or surfacing of effluent on the dispersal field; and
   7. Effluent sample collected from the sampling port. An influent sample shall only be collected if needed.
   8. All Puraflo® Peat Biofilter modules shall be opened annually to observe effluent distribution within and between modules, the condition of the peat, root or sand infiltration, insect infiltration, and effluent ponding in the peat filter.

E. The authorized operator shall conduct any other measurements, monitoring, maintenance activities, and observations as specified in the Operation Permit (OP) and recommended by the manufacturer.

F. Sampling
   1. All sampling shall be done in accordance with 15A NCAC 18E .1302 and .1709. Puraflo® Peat Biofilter systems shall be sampled annually when the design daily flow is less than or equal to 1,500 gpd. Systems with design daily flows greater than 1,501 gpd and less than or equal to 3,000 gpd shall be sampled twice a year.
   2. Effluent for all systems shall be tested for BOD_5 and NH_3-N.
   3. Influent samples, if needed, shall be taken from the outlet end of the septic tank.
   4. Effluent samples shall be collected from the sampling port.
      a. For Type A systems the pump shall not be manually operated prior to collecting the effluent. The sample may be collected by placing the collection receptacle in the sampling port and allowing effluent to accumulate for up to three hours prior to removing the receptacle for transportation to the laboratory.
      b. For Type B systems the sample shall be collected either by collecting a sample at a pre-established, manufacturer approved sampling port in the effluent line from the system, in the pump tank influent line, or the pump discharge line. An effluent sample could also be taken by capturing the effluent as it enters the pump tank. If taking the sample in this method, a grab sample should be taken between 12 to 18 inches below the liquid surface in the pump tank with a Coliwasa.

G. Notification and Performance of Maintenance and Repairs
   1. The authorized operator shall alert Anua, the LHD, and the system owner within 48 hours of needed maintenance or repair activities including but not limited to landscaping, tank

sealing, tank pumping, pipe or control system repairs, media or aerator replacement, and/or adjustments to any other system component.

2. The authorized operator shall notify the system owner, Anua, and the LHD whenever the pump delivery rate efficiency or average pump run times are not within 25 percent of the initial measurements conducted prior to system start-up.
3. 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 start-up.
4. Tank compartments will be pumped as needed upon recommendation of the authorized operator and in accordance with the Anua system Operation and Maintenance instructions.
5. The tanks shall be pumped by a permitted septage management firm, and the septage handled in accordance with 15A NCAC 13B .0800.
6. All maintenance activities shall be logged and recorded in the authorized operator reports provided to the LHD.

H. Reporting

The authorized operator shall provide a written report to the system owner, Anua, and the LHD within 30 days of each inspection. At a minimum, this report shall specify:

1. The date and time of inspection;
2. System operating conditions measured and observed according to VIII.D and VIII.E;
3. Results from laboratory analyses of effluent samples, and influent samples as needed;
4. Maintenance activities performed since the last inspection report;
5. An assessment of overall system performance;
6. A list of any improvements or maintenance needed;
7. 7- and 30-day readings as required in 15A NCAC 18E .1702(a)(2)(I);
8. A determination of whether the system is malfunctioning, and the specific nature of the malfunction; and
9. Any changes made in system settings based on recommendations of the manufacturer.

IX. Responsibilities and Permitting Procedures

A. Prior to the installation of a Puraflo® Peat Biofilter system at a site, the owner shall submit an application or Notice of Intent (NOI) to the LHD for the proposed use of this system. Improvement Permits (IP) or Construction Authorizations (CA) issued by the LHD shall have a soil and site evaluation conducted either by the LHD, LSS, or Authorized On-Site Wastewater Evaluator (AOWE). The NOI shall include a soil and site evaluation conducted by an LSS.

B. The IP, CA, and NOI shall contain all the conditions the site approval is based upon, including the proposed used of the Innovative system. The OP will include all conditions specified in the IP and CA. The Authorization to Operate (ATO) should include all the conditions specified in the NOI.

C. When a special site evaluation is required pursuant to 15A NCA 18E .0510, an evaluation and written, sealed report from a Licensed Soil Scientist (LSS) regarding the site shall be provided to the LHD. The report shall contain the information specified in 15A NCAC 18E .0510(d). The LHD

may request the assistance of their Regional Soil Scientist in evaluating this report prior to permit issuance.

D. Puraflo® Peat Biofilter systems shall be designed by either an authorized designer, AOWE, or a PE. Systems over 1,000 gpd, or as required in accordance with 15A NCAC 18E .0303(a) shall be designed by a PE.

E. Prior to the LHD issuing a CA for a Puraflo® Peat Biofilter system, a design submittal prepared by an authorized designer, AOWE, or PE shall be submitted. The design submittal shall include the information required in 15A NCAC 18E .0305.

F. It is recommended that local authorized environmental health specialists attend a design training session offered by the manufacturer or the authorized representative prior to permitting the system. Also, at the request of the LHD, a Regional Engineer will review designs.

G. For sites required to be evaluated by an LSS or Licensed Geologist (LG), see Section V and IX.C, the LHD, AOWE, or PE may specify as a condition of the IP and CA that an LSS or LG oversee critical phases of the dispersal field installation and certify in writing that the installation was in accordance with their specified site and installation requirements prior to the OP or ATO issuance.

H. The authorized operator shall be present during the final inspection of the system prior to the issuance of the OP or ATO.

I. The LHD shall issue the OP after the following:
   1. Field verification of installation completion;
   2. Receipt of written documentation from the authorized designer, AOWE, or PE that the system has been designed, installed, and is operating in accordance with the approved plans; and
   3. All necessary legal documents have been completed, including the contract between the system owner and the authorized operator.

   The LHD shall issue the OP for an (a2) and (a5) application after all necessary legal documents have been completed, including the contract between the system owner and the authorized operator.

   The ATO shall be submitted to the LHD in accordance with G.S. 130A-336.1 and G.S. 130A-336.2.

X. Repair of Systems

The provisions of 15A NCAC 18E .1302 shall govern the use of the Puraflo® Peat Biofilter system for repairs to existing malfunctioning wastewater systems.

Approved By: _____ Date: _____