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 2025-01

Issued To: Hydro-Action Industries
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For: Hydro-Action® AN Series

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In accordance with G.S. 130A-343 and 15A NCAC 18E, Section .1700, an application by Hydro-Action Industries for an approval utilizing the Hydro-Action® AN Series (AN Series) system in an on-site wastewater system has been reviewed and found to meet the requirements 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 (O&M) requirements for AN Series systems meeting TS-I effluent standards pursuant to 15A NCAC 18E .1201(a), Table XXV.
   2. Operation, maintenance, and monitoring requirements for AN Series systems and associated dispersal systems to ensure the treatment performance standards are met.

B. This Innovative Approval is applicable to wastewater systems treating domestic strength effluent, as defined in 15A NCAC 18E .0402(a), Table III, utilizing AN Series systems that have a design daily flow less than or equal to 3,000 gallons per day (gpd).

   Use of AN Series 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 Hydro-Action Industries and a North Carolina licensed 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 untreated wastewater strength in BOD_5, COD, TN, TSS, and fats, oils, and grease, the expected organic loading rate in pounds of BOD or N, the 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 contaminants that significantly inhibit microbial growth.

D. Use of AN Series systems that have a design daily flow greater than 3,000 gpd may be permitted after approval by the Department on a case-by-case basis in accordance with 15A NCAC 18E .0302(f) or in accordance with G.S. 130A-336.1.

II. System Description

The Hydro-Action® AN Series wastewater system is a self-contained, extended aeration, aerobic treatment facility utilizing the combination of the activated sludge process and wastewater recirculation for denitrification. The plant consists of an engineered pre-treatment septic tank and a cylindrically shaped aeration tank with an offset service access, a cone shaped clarification compartment, and an outlet tee-assembly. Three fine-bubble air diffuser assemblies with hard pipe diffusers and a Hydro-Action® air pump are combined to provide aeration.

Domestic strength wastewater enters the pre-treatment tank via gravity. From the pretreatment tank the wastewater flows via gravity to the aeration compartment and is mixed thoroughly with the mixed liquor suspended solids (MLSS). Mixing is provided by the injection of air through the porous air diffusers placed near the bottom of the aeration chamber.

Hydraulic displacement causes the mixed liquor to enter the clarification cone and move upward toward the outlet tee-assembly. The suspended solids settle to the bottom of the clarifier where they are remixed with the MLSS for additional biological treatment. The remaining clarified effluent leaves the plant via the outlet tee assembly and discharge line.

The AN Series systems are operated by the Hydro-Action OPS®. The OPS® integrates electrical controls, visible and audible alarms, and the air pump in a protective polyethylene enclosure. The OPS® can be either platform mounted on the plant or remotely located.

III. Siting Criteria

The AN Series 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 AN Series systems shall be sited and sized in accordance with 15A NCAC 18E .1204 and the manufacturer specific drip approval. The AN Series 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 and subsurface water inflow and infiltration.

IV. Dispersal Field System Sizing

The dispersal field 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 15A NCAC 18E .0510(c) for when a special site evaluation is required.

VI. Design Criteria

A. AN Series systems shall be designed by a designer authorized in writing by Hydro-Action Industries (authorized designer) or PE, if required.

B. AN Series systems shall be designed in accordance with the following criteria.
   1. The system model number, whether or not the settling tank is an integral part of the unit, and the maximum design daily flow for each model are listed in Table I.

Table I

AN Series Model Number	Settling Tank and Size	Maximum Design Daily Flow
AN-400	Integral, 390 gallons	440 gpd
AN-IVS	Integral, 584 gallons	450 gpd
AN-500	Integral, 527 gallons	550 gpd
AN-600	Integral, 768 gallons	660 gpd
AN-800	Integral, 835 gallons	800 gpd
AN-1100	Integral, 1,137 gallons	1,100 gpd

   5. Influent samples, as needed to demonstrate compliance with effluent standards, shall be collected from the inlet pipe in the first compartment. Effluent samples shall be collected from the effluent line discharging to the pump tank in pump dosing systems or from the drop tee located at the top center of the clarifier cone in gravity dispersal systems.
   6. For dispersal systems that require a pump, a control panel that meets the requirements of 15A NCAC 18E .1103 shall be used. Gravity effluent dispersal systems shall use either public water use records or a meter on the well to measure and record the daily flow in accordance with 15A NCAC 18E .1702(a)(2)(I).
   7. The dispersal field dosing tank shall be a state-approved tank sized in accordance with 15A NCAC 18E .0802.
   8. AN Series systems shall not be placed in driveways, parking areas, or other areas subject to vehicular traffic.

VII. Installation and Testing

A. A preconstruction conference shall be required to be attended by the following, as applicable: authorized designer, Authorized On-Site Wastewater Evaluator (AOWE), PE, installer authorized

in writing by Hydro-Action Industries (authorized installer), Hydro-Action Industries licensed distributor, and LHD prior to beginning installation of the AN Series system.

B. AN Series systems shall be installed according to instructions provided by Hydro-Action Industries.

C. All individuals or companies installing AN Series 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 Hydro-Action Industries.

D. Watertightness of the septic and pump tanks shall be demonstrated by a leak test in accordance with one of the testing methods in 15A NCAC 18E .0805(b).

E. The authorized installer, PE, AOWE, or authorized designer, and the operator authorized in writing by Hydro-Action Industries (authorized operator), shall conduct a final inspection and start-up of the AN Series 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. AN Series 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 AN Series systems require an O&M agreement between the system owner and Hydro-Action Industries, 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 Hydro-Action Industries or authorized in writing by Hydro-Action Industries.

C. All AN Series systems shall be operated and maintained according to the latest version of Hydro-Action Industries O&M manual.

D. At each AN Series system inspection, the authorized operator shall follow service procedure steps identified in the Hydro-Action Industries O&M Manual and, at a minimum, observe, monitor, and record the following:
   1. Wastewater, sludge, and scum levels in all tanks;
   2. Proper operation of system aerator, noting any unusual sounds or physical appearance, and cleaning the intake filter;
   3. Solids level in the first and second compartments;

4. Clarity of system effluent, along with system odors. Aerobic chamber should smell earthy and pretreatment tank should smell like sewage;
5. Watertightness of all tanks, risers, and pipe connections at the tanks;
6. Operation of pumps, floats, valves, electrical controls, and alarms, including record of alarms since last visit and troubleshooting actions;
7. Dispersal field pump delivery rate based on a drawdown test, determination of the average pump run time, and dispersal field dosing volume;
8. Readings from pump cycle counters and elapsed time meters or water meter;
9. 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
10. An influent sample shall only be collected if needed to demonstrate compliance with the effluent standards.

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. AN Series 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 1,500 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, TSS, and NH_3. Systems designed to meet the TS-II standard shall also have the effluent analyzed for TN (TKN and NO_3-N). Sampling is not required for fecal coliforms when the site is found to be compliant with all other constituents in Table XXV of 15A NCAC 18E .1201(a).
   3. Influent samples, if needed to demonstrate compliance with effluent standards, shall be taken from the influent chamber of the treatment system.
   4. Effluent samples shall be collected from the disinfection unit inside the third compartment of the unit or a tap on the dispersal field force main. The tap should be located before the spin filter for drip systems.

G. Notification and Performance of Maintenance and Repairs
   1. The authorized operator shall alert Hydro-Action Industries, 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, Hydro-Action Industries, 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 Hydro-Action Industries system O&M Manual.

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 system owner, Hydro-Action Industries, and the LHD.

H. Reporting

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

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

IX. Responsibilities and Permitting Procedures

A. Prior to the installation of an AN Series 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, Licensed Soil Scientist (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 use 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 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 On-Site Water Protection Branch (OSWP) Regional Soil Scientist in evaluating this report prior to permit issuance.

D. AN Series 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 an AN Series 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, an OSWP 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 AN Series system for repairs to existing malfunctioning wastewater systems.

Approved By: _____ Date: _____