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

INNOVATIVE WASTEWATER SYSTEM APPROVAL

INNOVATIVE WASTEWATER SYSTEM NO: IWWS-2011-1

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For: "BioDiffuser" ARC 36 Low Profile (LP) Chamber

Approval Dates: April 5, 2011

In accordance with 15A NCAC 18A .1969, an application by PSA, Inc./ADS, Inc./Hancor, Inc. of Hilliard, OH, for approval of modifications to its previously approved chamber (gravel-less) nitrification trench system, and the conditions of approval thereof, has been reviewed. PSA, Inc./ADS, Inc./Hancor, Inc. has demonstrated that the modified system, the ARC 36 LP model with a minimum of six inches of cover, will perform in a manner equal or superior to the system as previously approved by Innovative wastewater system approval No. IWWS-97-2-R9 and its successors. The ARC 36 LP model with a minimum of six inches of cover is therefore hereby approved with innovative status subject the conditions contained herein.

I. Permitting

Prior to the installation of the approved PSA, Inc./ADS, Inc./Hancor, Inc. chamber nitrification trench system at a site for which application is being made for an Improvement Permit or Construction Authorization or at a site for which an Improvement Permit or Construction Authorization has been previously issued for a system described in 15A NCAC 18A .1955, .1956, or .1957, the owner or authorized agent shall notify the local health department. The local health department shall issue an Improvement Permit or Construction Authorization or amend the previously issued Improvement Permit or Construction Authorization allowing for the use of the proposed innovative system upon a finding that all provisions of this approval and all other applicable rules shall be met. Use of the proposed innovative system and any conditions shall be described in the construction authorization or amended construction authorization, as applicable. Such information shall also be described on the operation permit to be issued upon the acceptable completion of the system installation.

II. System Description

A. Minimum pretreatment by septic tank as required in 15A NCAC 18A .1952.

B. The ARC 36 LP unit consists of high-density polyethylene arch-shaped injection molded chambers. The connected overall length of an ARC 36 LP chamber is 5 feet. The chamber sidewall slope is approximately 20 degrees toward the chamber center and away from the trench sidewall.

Table I

BioDiffuser Chamber Dimensions						
Model	Length Overall (ft)	Height (in)	Bottom Width (in)	Average Open Bottom Width (in)	Slotted Sidewall Height (in)	Invert[1] Height (in)
ARC 36 LP	5	8.0	34	29.2	6	3.8 and 8.0

[1]Invert Height is for a 4-inch diameter Schedule 40 PVC Pipe

C. Each chamber unit shall be permanently marked as follows: ARC 36 LP.

D. Each chamber unit is designed to mechanically interlock with the downstream chamber forming a complete nitrification trench that consists of an inlet end plate and a solid end plate to be located at the distal end of any chamber nitrification line.

III. Siting Criteria

The ARC 36 LP nitrification trench assemblies may be utilized on any site that one can use rock aggregate and pipe which meet the following criteria:

A. Sites which are classified as Suitable or Provisionally Suitable for a conventional nitrification field system in accordance with 15A NCAC 18A .1948(a) or (b).

B. Sites which have been reclassified as Provisionally Suitable in accordance with 15A NCAC 18A .1956(1), (2), (4), (5), and (6).

C. Sites which meet the criteria for new or existing fill in accordance with 15A NCAC 18A .1957(b). The provisions of Rule .1957(b) are applicable whenever any portion of the chamber in an BioDiffuser chamber system extends into fill material. This reference to "fill material" applies to the site fill and not the backfill placed between the trench and the chamber sidewall.

D. The required vertical separation shall be measured from the bottom edge of the chamber.

E. Trench bottom depth shall not exceed 36 inches.

IV. BioDiffuser Chamber System Sizing

A. The maximum long-term acceptance rate (LTAR) shall be as follows:

Table II

Textural Group		LTAR (gpd/sq.ft.)	
		Natural Soil	Saprolite
Soil/Group I (Sands)	Sands	0.8 - 1.0	0.6-0.8
	Loamy Sand		0.5-0.7
Soil Group II (Coarse Loams)	Sandy Loam	0.6 - 0.8	0.4 - 0.6
	Loam		0.2-0.4
Soil Group III (Fine Loams)	Silt Loam	0.3 - 0.6	0.1-0.3
	Other Fine Loams		N.A.
Soil Group IV	Clays	0.1 - 0.4	N.A.

B. The LTAR shall be based on the most hydraulically limiting naturally occurring soil horizon within three feet of the ground surface or to a depth of one foot below trench bottom, whichever is deeper.

C. To determine the total trench bottom area (ft^2) required the design daily sewage flow shall be divided by the applicable long-term acceptance rate shown in Table II above.

D. **Reductions in total trench bottom area shall not be granted for low profile chambers.**

E. The minimum area (**without reduction**) for a bed system shall be determined as required in 15A NCAC 18A .1955(d) except that the chambers shall be placed in rows next to each other.

F. The available space requirements of Rule .1945 shall be met, and this approved innovative system may be designated as the required replacement system.

V. Design and Installation Criteria

A. The BioDiffuser chamber system used in nitrification trenches shall be installed according to the minimum and maximum dimensions in Table IV.

Table IV

BioDiffuser Installation Requirements (Depths Measured from Finished Grade)					
Model	Maximum Trench Width (in)	Minimum Trench Depth (in)	Maximum Trench Depth (in)	Minimum Trench Spacing (ft.o.c)	Minimum Soil Cover (in)
ARC 36 LP	36	14	36	9	6

B. The inlet to the BioDiffuser chamber shall be through the provided cutout in the uppermost portion of the inlet panel. For dosed systems receiving effluent from a pump or siphon, manufacturer's installation procedures shall be followed, including provisions to dissipate inflow rate so as to minimize soil scouring and modifications that enable the presence and effectiveness of these provisions to be field-verified.

C. Backfill shall be placed between the trench and chamber sidewall to a minimum compacted (carefully walked in) height that is equal to the top of the chamber louvers. Chamber systems can be installed utilizing native soil backfill (Group I, II, III, or IV). Backfill shall be free of trash or debris. The area adjacent to louvers shall be free of large (8"or greater) clods that do not break apart during the walk in procedure. The latest version of the manufacturer's installation procedure shall be followed.

D. The ARC 36 LP chamber model may be installed with a minimum compacted cover of 6 inches when the following conditions are met:
   1. The person installing or constructing the system is certified (documented) by PSA, Inc./ADS, Inc./Hancor, Inc. as specially trained and qualified to install the ARC 36 LP chamber units with a minimum soil cover of 6 inches;
   2. The person installing the ARC 36 LP chamber system shall produce documentation of certification by the manufacturer upon request by the State or local health department.
   3. When installing the ARC 36 LP chambers the installer shall carefully follow the manufacturer's installation guideline for shallow placement.
   4. In Group I soils, with only 6 inches of cover, tracked equipment shall be used during backfill as specified by the manufacturer's installation procedures.

   Vehicular traffic or construction equipment may traverse the chamber system only during system installation. The load must be bridged over the trench so as not to disturb the chambers. The load may be bridged with a minimum of six inches of compacted soil cover over the ARC 36 LP chamber.

E. Individual chamber trenches shall be constructed with ± ½ inch of trench levelness from side-to-side and shall follow the contour of the ground surface elevation (uniform depth). Trenches shall be constructed with continuous interlocking chambers, without any dams, stepdowns or other water stops, with a plus or minus 1-inch tolerance of trench levelness for any linear contoured segment.

F. BioDiffuser systems installed on a sloping site may use distribution devices or stepdowns as described in 15A NCAC 18A .1955(j) and (l) when it is necessary to change the nitrification line

segments from upper to lower elevations. Stepdown installation details shall be in accordance with PSA, Inc./ADS, Inc./Hancor, Inc.North Carolina Design and Installation Manual.

G. After installation of chambers in trench or bed configuration, a filter fabric barrier shall be installed to cover the chambers if chambers are installed in uncompacted, fine or very fine uniform sand and at least one of the following conditions are present.
   1. Installations are left uncovered and subject to a major rain event.
   2. Systems are subject to not being sodded (or stabilized) in a timely manner after final cover-up has occurred.
   3. The drainfield is not protected from surface drainage.

   The filter fabric shall be non-woven, weight 0.35 oz./s.y. to 1 oz./s.y., have apparent opening size (AOS) 20-30 U.S. Sieve (ASTM D-4571), or alternate with equal or better performance characteristics. An alternate fabric shall be approved in writing by the manufacturer on a case-by-case basis.

H. Manufacturer's installation instructions for the applicable BioDiffuser system used in septic tank systems shall be followed except as required herein or 15A NCAC 18A .1900 et.seq.

I. The system shall be installed by a NCOWCICB certified Level II Installer that is authorized in writing by the manufacturer to install the system.

VI. Operation, Maintenance and Monitoring Requirements

The BioDiffuser chamber system shall have a minimum classification as a Type III g system (other non-conventional trench systems) in accordance with Table V(a) of 15A NCAC 18A .1961(b).

VII.Repair Systems

The provisions of 15A NCAC 18A .1961(l) shall apply to the use of BioDiffuser chamber systems for repairs to existing malfunctioning septic tank systems.

Approved by:_____Date:_____