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

INNOVATIVE WASTEWATER SYSTEM APPROVAL

INNOVATIVE WASTEWATER SYSTEM NO: IWWS-2002-03-R
FOR: Tire Chip Substitution for Rock Aggregate in Nitrification Fields

APPROVAL DATE: October 24, 2002
Revised July 15, 2004

In accordance with NCGS 130A-343 and 15A NCAC 18A .1969, the use of tire chips has been found to meet the standards of an innovative system, technology, device, or component and is approved for use, subject to the conditions of this innovative approval. The Department issued an Experimental Approval, approving a research and testing program in accordance with Rule .1969(4) on October 1, 1996, to Dr. Aziz Amoozegar, NC State University, and received the final report from Dr. Amoozegar February 12, 1999. The Department has completed a comprehensive review and analysis of the research, testing, and performance of tire chips as a substitute for rock aggregate in the drainfields of on-site wastewater systems, including field investigations, research and testing conducted in North Carolina and in other states. Tire chip aggregate meeting the conditions of this approval have been demonstrated to have the physical and chemical properties to withstand the loads and conditions normally associated with on-site wastewater systems and to meet the materials construction standards for approval set forth by NCGS 130A-343(g) and Rule .1969(3)(a). Tire chip aggregate systems are found to perform in a manner equal to or superior to conventional wastewater systems using rock aggregate, in accordance with NSGS 130A-343(g) and Rule .1955(h), and to meet the requirements for approval set forth in Rule .1969(4)(f). As required by Statute, a notice of this proposed approval has been published in the North Carolina Register and the Department has received public comment on the application for over 30 days after the date of publication in the Register. This approval, including the specifications of circumstances in which use of tire chip aggregate in wastewater systems is appropriate and conditions and limitations related its use, reflects the Department's consideration of all data and findings reviewed, and all public comment received.

I. Permitting:

Approved tire chip aggregate may be substituted for washed gravel or crushed stone required under 15A NCAC 18A .1900 *et seq.* for soil absorption systems receiving domestic strength wastewater or sewage. Other tire chip aggregate substitutions may be made when designed by a Professional Engineer and specifically approved by the OSWS, DEH, DENR. An Authorized Agent of the Department shall indicate on the operation permit that tire chip aggregate is being used and name of the approved tire processor supplying the tire chip aggregate.

II. Specifications:

Tire chip aggregate used as a rock substitute in nitrification trenches shall meet the following specifications:

1. Shall be free (98% or better by weight) of balls of wire and fine rubber particles ;

2. Shall be clean and free (98% or better by weight) of any soil particles (fines) either adhering to the chips or floating loose within the chips;

3. Shall be nominally two (2) inches in size and may range from ½ inch to a maximum of four (4) inches in any one direction (95% or better by weight);

4. Shall be graded or sized in accordance with size numbers 2, 3, or 24 of ASTM D-448 (standard sizes of coarse aggregate);

5. Shall not contain wire protruding more than one-half inch from the sides of the chips (95% or better by weight); and

6. Tire chip aggregate shipped for use in OSWS in NC shall be supplied by a DENR/DEH/OSWS approved tire processor, and accompanied by a bill of lading certifying the specifications.

III. Tire Processor's Approval:

1. Any tire processor wishing to provide tire chip aggregate for use in onsite sewage treatment and disposal system drainfields in the state of North Carolina shall receive written approval from DENR-DEH-OSWS. Tire Processors must provide proof that they can continuously produce a tire chip coarse aggregate in conformance with the specifications in II of this approval.

2. Tire processors shall submit a representative sample of tire chips to DEH OSWS.

3. Samples shall be labeled with the name, address, date and designated use.

4. The processor shall have samples analyzed by a third party laboratory qualified to conduct particle size analysis for compliance with the above specifications.

5. Approved tire processors for tire chip aggregate for subsurface wastewater systems shall be listed on the OnSite Wastewater Section web page. (http://www.deh.enr.state.nc.us/oww).

6. Documentation of tire processors' product meeting the above specifications, shall be submitted as requested, at least yearly, to OSWS.

7. Approved tire processors must submit additional samples and analyses if tire processing equipment is replaced/changed, the tire chip processing method/sequence is altered, if the tire processing plant is relocated, or any other change in tire chip processing that might result in tire chips failing to meet the above standards.

8. Noncompliance with this approval may subject a tire processor to suspension or revocation of their approval.

9. Tire chip processors' approvals are not transferable.

IV. Siting Criteria:

The standard requirements for the siting of wastewater systems as specified in 15A NCAC 18A .1900 *et seq.* shall apply, except as follows:

1. Approved tire chip aggregate may be substituted for stone or gravel in subsurface sewage effluent absorption systems, required by 15A NCAC 18A .1900 *et seq.*.

2. The minimum vertical separation required by Rule 15A NCAC 18A .1955(m) shall not be reduced, notwithstanding the use of any advanced wastewater treatment system.

V. System sizing:

The tire chip aggregate system shall be sized by the same criteria as gravel or stone in subsurface sewage absorption systems as required in 15A NCAC 18A .1900 *et seq.*

VI. Installation Procedures:

The following installation requirements of tire chip aggregate shall be met:

1. The installation requirements of 15A NCAC 18A .1900 *et seq.*

2. Tire chip aggregate for subsurface sewage effluent absorption systems shipped from approved tire processors shall be accompanied by a freight bill of lading labeled as drainfield aggregate . The bill-of-lading shall certify that the material meets the specifications for drainfield use. Contractors purchasing tire chip coarse aggregate shall retain a copy of the freight bill-of-lading as documentation of the tire chip aggregate size and quality. A copy of the bill of lading shall be provided to the local health department prior to issuance of the operation permit, and shall be retained with the operation permit filed with the local health department.

3.The tire chip aggregate shall be covered with a single and continuous layer of non-woven filter fabric extending across the top of the tire chip aggregate before backfilling. The fabric shall have a unit weight of at least 3.0 oz./yd^2 (per ASTM D-5261), a permittivity of at least 1.0 sec^{-1} (per ASTM D-4491), a trapezoid tear strength of at least 35 lbs. (per ASTM D-4533), and have a mesh size equal to U.S. Sieve No. 70 (A.O.S.)(ASTM D-4751)**.

4. All tire chips not used in the nitrification trench shall be removed from the site by the installer or contractor for the onsite wastewater system

5. No soil shall contaminate the tire chips during installation.

6. For LPP systems, the orifices shall be protected from aggregate shadowing by sleeving the discharge pipe laterals within the perforated pipe [which meets Rule .1955(e)] typically used for conventional nitrification lines.

VII. Operation, Maintenance and Monitoring Requirements:

Operation, maintenance and monitoring requirements for the applicable system as required in 15A NCAC 18A .1961 (a) and (b) shall be the same as those in all onsite wastewater systems using stone or gravel as aggregate

VIII. Repair of System:

The provisions of 15A NCAC 18A .1961(l) shall govern the repairs to malfunctioning wastewater systems.

Approved by:_____ **Date:**_____

Revision date:_July 15, 2004_____

**Note: Numerous manufacturers produce geotextile fabric that meets the designated ASTM standards for tire chip aggregate. Contact OSWS for further information if needed