



Onslow County Health Department
612 College Street
Jacksonville, North Carolina 28540
Phone: (910) 938-5851 Fax: (910) 989-2341

EXPIRED

IMPROVEMENT PERMIT
(GS 130A-336)

Permit No: EIP2012-00900
Category: Individual Dwelling

A building permit cannot be issued with only an Improvement Permit.

Expiration: Valid for 5 years from date of issuance

Owner: TITUS EDWARD W & DONNA M

Address: ETHAL LN SNEADS FERRY, NC 28460

SR #:

Subdivision: Lot: 2 Section: Phase:

Block: Part: System: Unit: Division: Tract:

Location:

System Type/Description: III Infiltrator Quick4 Plus Low Profile CD

System Classification: g. Other non-conventional trench system

System Info: Initial and repair is Shallow placement Low Profile Chamber trench system, 3-50' trenches, 10" trench depth. System shall be installed in accordance with Controlled Demonstration Wastewater System Approval # CDWS-2010-1, attached.

Facility/Daily design flow: 3 bedroom residence < 360 gpd

LTAR: .8 gpd/sq. ft.

Water Supply: Public

(SEE ATTACHED PAGES 1 - 1 of 1 FOR ADDITIONAL PERMIT CONDITIONS)

Signed By: Jason Smith

[Handwritten signature]

Date:

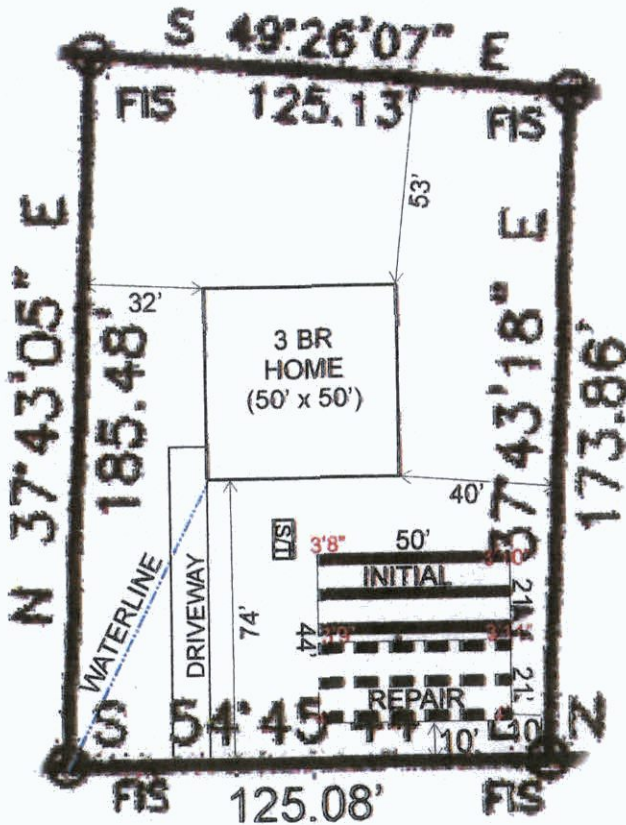
02/04/2013

The issuance of this permit by the Onslow County Health Department in no way guarantees the issuance of other permits. The permit holder is responsible for checking with appropriate governing bodies in meeting their requirements. This permit is subject to revocation if the site plan, plat, or the intended use changes. This Improvement Permit shall not be affected by a change in ownership of the site. This permit is subject to compliance with the provisions of the Laws and Rules for Sewage Treatment and Disposal and to conditions of this permit.

OWNER: Edward & Donna Titus  
 ADDRESS: Ethel Ln Lot 2  
 LOCATION: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**PLOT PLAN**

SCALE: 1 inch = 50' feet



ETHEL LANE

**ADDITIONAL PERMIT CONDITIONS:**

1. Do not park or drive on any part of the septic system or repair area.
2. Nitrification trench aggregate shall be covered with straw, untreated paper or other approved materials prior to final cover / backfilling.
3. Do not install system under wet conditions.
4. Rock used in soil absorption systems shall be clean, washed gravel or crushed stone and graded or size in accordance with size numbers 3, 4, 5, 57, or 6 of ASTM D-448 (standard sizes of coarse aggregate) which is hereby adopted by reference in accordance with G.S. 150 B-14 (c). Documentation of aggregate size shall be available upon request.
5. Adhere to minimum setback requirements as stated in Rule .1950 and .1951 of NC Laws and Rules for Sewage Treatment and Disposal Systems (Article 11, G.S. Chapter 130A), unless otherwise indicated in this permit.
6. All pump tanks shall be tested for water tightness. In addition, septic tanks may be subject to a water tightness test.
7. The septic tank is designed to receive sewage or wastewater under gravity flow. However, if a system subject to the N.C. Plumbing Code is used to pump raw sewage to the septic tank, the sewage shall be reduced to gravity/non-turbulent flow by approved means at the inlet of the septic tank.
8. An accepted wastewater system may also be installed in accordance with the Accepted Wastewater System Approval (AWWS-05-01 or AWWS-05-02). Maximum LTAR of 1.0 gpd / ft<sup>2</sup>.
9. Run lines parallel to contour. System components represent approximate contours only. The contractor must flag the system prior to beginning the installation to insure that proper grade is maintained.
10. A recorded plat or deed and corresponding map shall be submitted to the Environmental Health Section of the Onslow County Health Department **PRIOR TO** the issuance of the Construction Authorization.
11. An **APPROVED** stormwater plan shall be submitted to the Environmental Health Section of the Onslow County Health Department **PRIOR** to issuance of a Construction Authorization.
12. **FOR DWELLING UNIT WASTEWATER SYSTEMS ONLY** – This wastewater system is designed only for the number of bedrooms shown as bedrooms or sleeping rooms on the building/floor plan approved by Onslow County Code Enforcement. No other room or space may be relabeled as a bedroom, used as a bedroom, or converted into a bedroom without prior approval from Onslow County Environmental Health.

**SYSTEM DESIGN**

Initial & Repair - Shallow Low Profile Chamber System

- 0.8 gal/ day/ sq ft LTAR
- 360/0.8 = 450 sq ft
- 450 sq ft/3' wide trenches = 150 linear feet
- No Reduction Taken
- 3 x 50' laterals on 9' centers
- 21' x 50' system area
- System area flagged with orange pin flags
- 6" cap on lower end of system area to grade
- 14" - 16" trench bottoms after addition of 6" cap

RELATIVE ELEVATIONS SHOWN IN RED

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

**CONTROLLED DEMONSTRATION  
SYSTEM APPROVAL**

**CONTROLLED DEMONSTRATION WASTEWATER SYSTEM NO: CDWS-2010-1**

Issued To: Dave Lentz  
Infiltrator Systems Inc.  
PO Box 768  
Old Saybrook, CT 06475  
800-221-4436; Fax: 860-577-7001  
www.infiltratorsystems.com

For: Infiltrator Quick4 Plus Standard Low Profile (LP) Chamber

Approval Dates: May 24, 2010

In accordance with 15A NCAC 18A .1969, an application by Infiltrator Systems Inc. of Old Saybrook, CT for use of the Quick4 Plus Standard LP Chamber (gravel-less) nitrification trench system has been reviewed and has been found to meet the standards of a controlled demonstration system when all of the following conditions are met:

I. General

- A. This Controlled Demonstration Approval arises from Infiltrator Systems Inc.'s application to modify Innovative Wastewater System No. IWWS-2010-1 (incorporated herein by reference), by allowing installation of the Quick4 Plus Standard LP chamber at a site having a minimum of 20 inches of Group II, III, or IV or a minimum of 26 inches of Group I suitable or provisionally suitable soil with the system sized at a rating of 3.0 square feet per linear foot (sf/lf). In response to Infiltrator Systems Inc.'s Application for Modification, the Innovative & Experimental Committee ("I&E Committee") recommended and the NC Onsite Staff approved the modification as a Controlled Demonstration system.
- B. The purpose of this Controlled Demonstration is to evaluate the performance of a wastewater system that is constructed and operated as described herein.

- C. The scope of this Controlled Demonstration Approval is as follows:
1. North Carolina field performance evaluation: This approval establishes the siting, sizing and testing criteria for the Quick4 Plus Standard LP in shallow soil profiles, as described in detail below. The field evaluation of at least 42 and up to 200 Quick4 Standard LP chamber systems in North Carolina shall be limited to evaluating the hydraulic performance and surge volume capability of the Quick4 Plus Standard LP chamber system.
- D. Except for the criteria provided herein, the design, siting, permitting, operation and maintenance shall be governed by the provisions of the Infiltrator Systems Inc. Innovative Wastewater System Approval No. IWWS-2010-1 or most recent version, and the applicable laws and regulations of the State of North Carolina.

## II. System Description, Siting, and Sizing Criteria

- A. The Quick4 Plus Standard LP unit consists of a polypropylene arch-shaped injection molded chamber. The connected overall length is 4 feet, the height is 8 inches, and the slotted sidewall height is 6.3 inches. The nominal width is 34 inches, and the average open bottom width is 29.2 inches. The invert height is 3.3 or 9 inches. Twenty-five Quick4 Standard LP chambers are approximately equal to 100 feet.
- B. For Group II, III, and IV soils, the nitrification trench assembly may be utilized on any site where a minimum of 20 inches and maximum of 24 inches of naturally occurring soil are present above saprolite, rock, parent material, expansive clay mineralogy, unsuitable soil structure, restrictive horizon, or soil wetness conditions and all other factors are provisionally suitable or suitable.
- C. For Group I soils, the nitrification trench assembly may be utilized on any site where a minimum of 26 inches and maximum 30 inches of naturally occurring soil are present above saprolite, rock, or soil wetness conditions and all other factors are provisionally suitable or suitable.
- D. To determine the total trench bottom area (ft<sup>2</sup>) required, the design daily sewage flow shall be divided by the applicable long-term acceptance rate. The minimum linear footage for the Quick4 Plus Standard LP chamber shall be determined by dividing the total trench bottom area by an equivalency factor of 3.0 square feet per linear foot (3.0 sf/lf).

### EXAMPLE:

Assume: Three bedroom residence with a design daily sewage flow of 360 gallons on a sandy clay loam (Group III) soil.

Then: Total computed trench bottom area is:  
 $360 \text{ gpd}/0.5 \text{ LTAR} = 720 \text{ ft}^2$

The required linear footage for Standard Infiltrator Systems is:

$$720 \text{ ft}^2/3.0 \text{ ft} = 240 \text{ linear ft.}$$

(Where 3.0 ft. is the equivalency factor for the chamber system)

- E. The Quick4 Plus Standard LP chamber system used in nitrification trenches shall be installed with

a maximum trench width of 36 inches, and with a minimum trench depth of 8 inches. The minimum on-center trench spacing shall be 9 feet, and the minimum soil cover shall be 6 inches.

- F. Each nitrification trench shall be installed with a minimum 2-inch-diameter inspection port located at the distal end of the trench. The observation port shall be extended directly to grade, without turns or elbows to facilitate access for periodic monitoring of ponding levels.
- G. This Controlled Demonstration study shall be for nitrification trenches only. Successful demonstrated performance of the Quick4 Plus Standard LP in trenches shall be adequate to justify innovative approval in other types of system configurations.
- H. The systems shall be for primary residences only, with a maximum daily design flow of 720 gallons per day.
- I. The county health department shall conduct a soil evaluation prior to each system installation site and shall complete a soil evaluation sheet.
- J. For systems included in the field performance evaluation:
  - 1. Pump systems shall be equipped with a pressure manifold and Aquaworx control panel to monitor effluent flow volume.
  - 2. Where water use records are not available, a water meter shall be installed on gravity systems to ascertain effluent flow volume.

### III. Controlled Demonstration Criteria

- A. The Controlled Demonstration study shall span a minimum of eighteen months from the date of the twenty-first Quick4 Plus Standard LP system installation for evaluation in each of the Piedmont and Coastal Plains physiographic regions. Successful demonstrated performance of the Quick4 Plus Standard LP in the Piedmont and Coastal Plains physiographic regions shall be adequate to justify innovative approval in the Mountain physiographic region.
- B. Systems shall be installed for at least two wet seasons, defined as the time period beginning January 1 and ending April 30. A maximum of 200 systems may be installed. Sites shall be identified by street address, city, and zip code. Global positioning coordinates should be provided when available.
- C. The hydraulic performance of 42 systems shall be monitored. Of the monitored sites, there shall be 21 systems installed in the Piedmont and 21 systems installed in the Coastal Plains. Water usage records shall be provided for all 42 monitored sites. All monitored systems shall be designed and installed using parallel distribution. Successful demonstrated performance of the Quick4 Plus Standard LP in parallel distribution shall be adequate justification for innovative approval in both parallel and serial distribution configurations.
- D. The average ponding height across all trenches of an individual site during each site visit shall not exceed 5 inches. Ponding measurements shall be recorded in each trench. All measurements shall be reported for each individual site at each visit. To quantify the ponding behavior for the 42 designated systems, they shall be evaluated no sooner than 12 months after installation. The designated systems shall be evaluated in December, March and July by an independent third-party. Visual inspection for evidence of malfunction shall also be conducted at the ground surface, and

the homeowner or occupant shall be interviewed about system operation. Criteria for evaluation of each system are provided in Appendix A. Homeowner or occupant information shall be gathered where available, recognizing that the homeowner or occupant may not be available to answer questions.

- E. Should any of the evaluated systems reveal an average ponding height greater than 5 inches, the following analysis shall be provided by the independent third-party:
1. Acquire property water usage records;
  2. Investigate plumbing fixtures for broken seals or running water;
  3. Evaluate and report condition of septic tank and effluent filter; and/or
  4. Install continuous monitoring equipment to assess system use characteristics over an extended period.

Infiltrator Systems, Inc. may commission a North Carolina-licensed soil scientist to conduct an evaluation to determine if the observed effluent ponding resulted from the Quick4 Plus Standard LP chambers or other unrelated factors.

- F. At the conclusion of the controlled demonstration period, it shall be determined whether the Quick4 Plus Standard LP chamber provides adequate hydraulic performance and surge capacity when installed in the soil profiles described herein. The performance standard is: a minimum of 20 of the 21 designated systems in each region tested, shall meet the hydraulic performance criterion of having an average ponding height not exceeding 5-inches during each monitoring event, and without indications of a malfunction based on visual inspection of the drainfield.
- G. Systems determined to have malfunctioned as a result of improper siting, installation, or usage will not be considered in determining performance. In the event that such a system is identified, an alternate site will be substituted in the evaluation.
- H. A written report summarizing the results of the review shall be developed by an independent third party, approved by both the NC Onsite Section and Infiltrator Systems Inc., and submitted along with any recommendations for changes as identified during the demonstration period. Copies of all ponding height measurement reports and soil evaluation sheets for monitoring systems shall be submitted with the final report.
- I. Successful passage of the above criteria and compliance with the requirements in 15A NCAC 18A.1969, (g), (1) shall result in innovative approval of the Quick4 Plus Standard LP for sites having a minimum of 20 inches of Group II, III, or IV or a minimum of 26 inches of Group I suitable or provisionally suitable soil

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Appendix A

North Carolina Controlled Demonstration Criteria for Evaluating the Performance of the Quick4  
 Standard LP in Shallow Soil

System Question	Response (Comment required for no response)	Comments
<b>INSTALLATION</b>		
What is the address of the site being evaluated?	Address: _____ City : _____ Zip : _____	
When was the system installed?	Month__ Day__ Yr__	
What soil group and at what depth was the system installed?	Group: I Depth (in): 26 27 28 29 30  Group: II, III, IV Depth (in): 20 21 22 23 24	
Was the elevation of the top of the chamber equal to the elevation of the natural grade?	Yes No	If no, explain:
Was the system gravity fed or pressure dosed?	Gravity Pressure dosed	
Was the residence supplied by public water source? If no, is another means of water usage recording provided?	Yes No	If no, provide recording method:
<b>MONITORING</b>		
When was the system evaluated?	December, March, July Yr: _____	
Were water usage records obtained for determining average daily flow?	Yes No	If no, explain:
Were any wet areas observed above or near the drainfield?	Yes No	If yes, explain:
What were the ponding levels recorded for each trench? Calculate average.	T1__" T2__" T3__" T4__"  Average Ponding Ht: ____"	
Was the homeowner or occupant available for interview?	Yes No	If no, explain:
Did the homeowner or occupant cite functional wastewater drainage within residence?	Yes No	If no, explain:
Did the homeowner or occupant cite backing of water in the home or surfacing near the drainfield?	Yes No	If yes, explain:
Did the homeowner or occupant cite system malfunction as a result of a system component other than the drainfield?	Yes No	If yes, explain: