



Agri-Waste Technology, Inc.

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**WELL INSPECTION REPORT FOR:
4804 Spring Forest Rd. Raleigh, NC 27616**

PREPARED FOR: Mark Johnson, Client

REALTOR COPY: Danielle Verley, Long and Foster

PREPARED BY: Jordan Harris, Associate Soil Scientist

DATE: June 23, 2025

The well serving the home at 4804 Spring Forest Rd, was inspected by Jordan Harris and Connor Britt of Agri-Waste Technology, Inc., (AWT) on June 17, 2025. Only the surface components of the well that are visible above the ground were inspected, i.e. no underground components were inspected. A copy of pictures taken during the inspection can be found directly after this report. A detailed discussion of the inspection is below.

General well information can be found on the North Carolina State University Soil Science Department website. The address is www.soil.ncsu.edu. Additional routine well maintenance information is in Attachment 3 following this report.

The well is located underneath a woodshed cover. All surface components of the well were found to be operating properly and adequately sealed. The well is located the proper distance away from the septic system. The well specifications are included on the checklist in Attachment 2.

A water sample was obtained during the inspection. The sample returned “present” for Total coliforms and “absent” for Fecal coliforms/E. coli (bacteria). The levels of all the other parameters sampled for in the Full analysis were found to be not detectable or below the EPA’s standards, and are considered safe for drinking water (Attachment 4).

Conclusions

- 1) The sample returned “present” for total coliforms: therefore the well will need to be chlorinated.

We appreciate the opportunity to assist you. Please contact us with any questions, concerns, or comments.

As indicated in the AGREEMENT FOR PROFESSIONAL ENVIRONMENTAL SERVICES “Point of sale well/septic system inspections constitute a snapshot evaluation in time of the system(s) and do not guarantee future performance of the system(s) due to numerous factors including, but not necessarily limited to, the following: water use patterns of the inhabitants of the dwelling, occupancy of the dwelling (no occupancy for an extended period of time or occupancy in excess of the system design parameters), acts of God or natural disasters, lack of visibility of many of the system components, placement of inappropriate items into the system (non-degradable items, water softener brine, etc.), physical disturbance of or damage to the system or system components, etc. Furthermore, only the aboveground components of the well that are visible from the soil surface are inspected.”



ATTACHMENT 2: Well Inspection Checklist

Well Inspection Checklist (Surface Inspection Only, No Underground Components Evaluated)

Inspection Date: 6/17/2025 Inspected By: JH
Buyer: - Permit No.:
Address: 4804 Spring Forest Rd

Well Depth: -
Static Water Level: -
Flow Rate: -
Installer: -
Installation Date: -

Well Cover Condition: Good

Pad Condition: NA

Cap Condition: Good

Casing Condition (shake): Good
Only the visible portion of the casing aboveground inspected.

Pipe Condition: Good
Only the visible portion of the pipe aboveground inspected.

Electrical Components Condition: Good
Only the visible portion of the electrical components aboveground inspected.

Well Location/Landscape Position: Good

ATTACHMENT 3: Routine Well Maintenance Information

Protecting Water Supply

What shape is your well in?

One of the easiest ways to protect well water from pollution is to make sure that the well is in good shape and placed in the right location. A poorly built or maintained well can allow pollutants to enter water directly. The closer the well is to sources of pollution, the more likely the well will become polluted. For instance, if the well casing is cracked and pesticides that are being mixed near the well are spilled, the pesticides can easily leak into the well and pollute your drinking water.

How can we help?

We have prepared this publication to help you focus on potential problems with your drinking water that may be caused by a poorly placed, constructed, or maintained well. Read this publication before you begin answering the questions. Gather any records you have about your well. Walk around the area near the well and look at it closely. If you have more than one well, focus on the well that provides drinking water for your family and then on the others. Fill out a separate form for each well.

Each of the following sections deals with different topics. Next to each topic is a question for you to answer. Your answers will help you to see where you have potential problems.

- If you answer a question either a or b, you have few problems with your drinking water.
- If you answer a question either c or d, there may be potential problems with your drinking water.
- If you answer a question either c or d, you will want to consider making changes in order to protect your drinking water.

Employment and program opportunities are offered to all people regardless of race, color, national origin, gender, age, or disability. North Carolina State University, North Carolina A&T State University, U.S. Department of Agriculture, and local governments cooperating.



College of Agriculture & Life Sciences • NC State University
School of Agriculture and Environmental and Allied Sciences •
NC A&T State University

If you would like further help in assessing the condition of your well, please visit your nearest Cooperative Extension Service Center and talk with your Extension agent.

How safe is your drinking water?

If you drink water from a well or spring, the water comes from the ground. Most groundwater in North Carolina is safe to drink. If pollution gets into groundwater, your well or spring water may not be safe. Many things we all do at our homes and farms can pollute the groundwater.

If groundwater becomes polluted, it is nearly impossible to clean up. Then, the only ways to get safe drinking water are to treat the existing water, drill a new well, or get water from another source. All of these options are expensive and inconvenient.

The North Carolina Farm*A*Syst Program has a series of publications that can help you keep your drinking water safe. These publications will lead you through an evaluation of your farmstead to determine if your water is in danger of becoming or is already polluted with harmful substances from your farmstead area. If there is a problem or a potential problem, the Farm*A*Syst publications have information about how to solve the problems. The publications also list the North Carolina state agencies that can help you solve your drinking water problem.

The goal of the North Carolina Farm*A*Syst Program is to help you protect the groundwater that North Carolina residents depend on for drinking water.

North Carolina Farm*A*Syst Publications

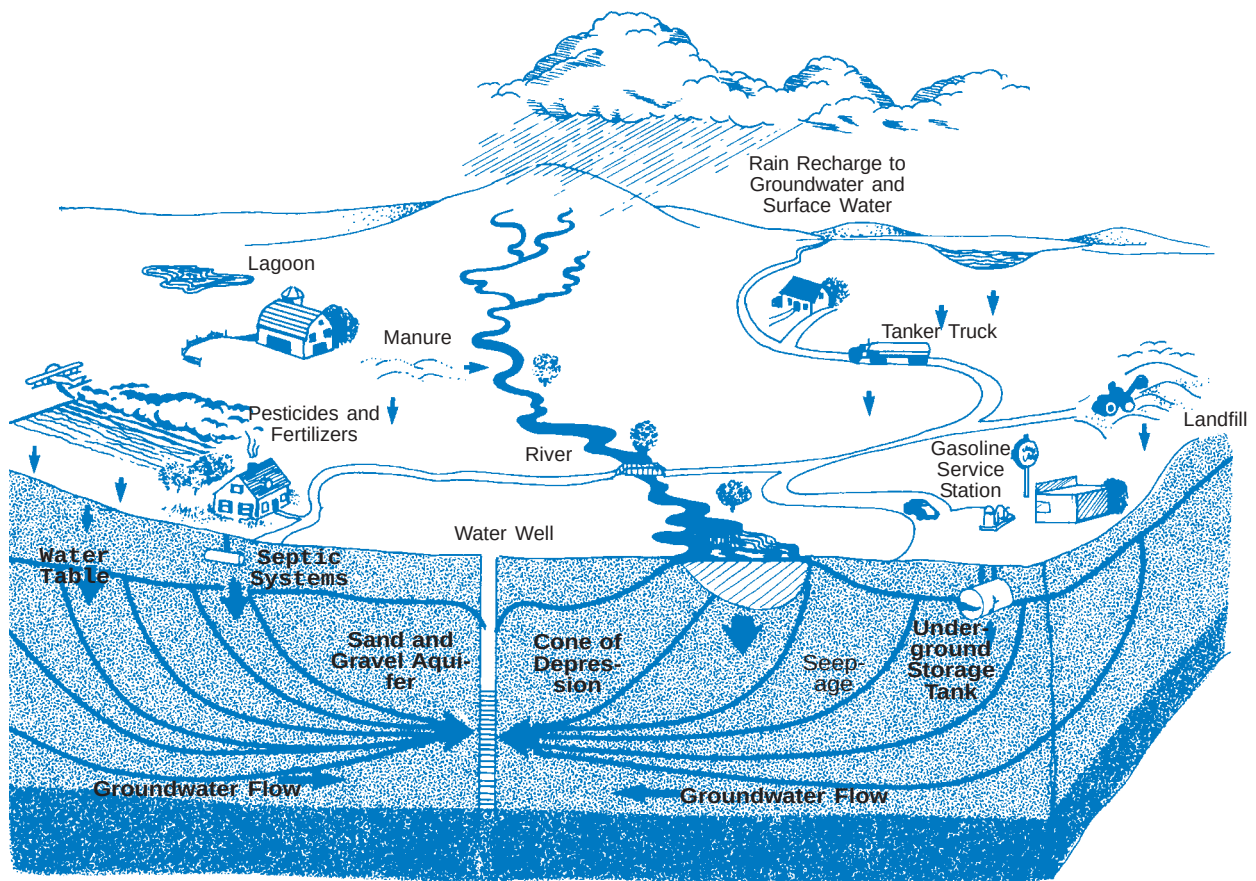
- *Protecting Water Supply*, #1
- *Improving Fuel Storage*, #2
- *Improving Storage and Handling of Hazardous Waste*, #3
- *Improving Septic Systems*, #4
- *Improving Storage and Handling of Pesticides*, #5
- *Improving Storage and Handling of Fertilizer*, #6
- *Improving Storage, Handling, and Disposal of Livestock Waste*, #7
- *Grazing Livestock and Water Quality*, #8
- *Stream Management in the Piedmont and Mountains*, #9
- *Agriculture and Natural Resource Protection*, #10
- *Protecting Your Wetlands*, #11
- *Wildlife on Your Farm*, #12
- *Christmas Tree Production Best Management Practices to Protect Water Quality and the Environment*, #13
- *Managing Pests*, #14

Drinking Water Well Condition

1. Where is the well located?

A well's location is important. Stormwater runoff (water that flows over the land during a storm) can carry pollutants such as bacteria, oil, and pesticides. Wells in the path of stormwater runoff can become polluted if stormwater runoff flows into a well that is not properly sealed. A well that is downhill from pollutants such as a livestock yard, a leaking gasoline tank, or a failing septic system runs a greater risk of becoming polluted than a well that is uphill from these sources of pollution.

1. **Circle the answer that best describes the position of your well.**
 - a. Uphill from all pollution sources. No surface water runoff reaches well. Surface water flows away from the well.
 - b. Uphill from most pollution sources. No surface water runoff reaches the well if drainage is working correctly.
 - c. Downhill from many pollution sources, or from any one especially hazardous source. Some surface runoff may reach well.
 - d. Settling or depression around casing. Surface water runoff from feedlot, pesticide or fertilizer mixing area, fuel storage or farm dump collects near the well; OR do not know.



Potential groundwater pollutants

2. How close is the well to sources of pollution?

North Carolina law does not allow wells to be built near sources of pollution. The state sets minimum allowable distances, which are called “separation distances.” These minimum distances are set in order to make use of the natural protection soil provides. However, state well codes do not mention every farm activity and structure.

When no

distances are mentioned for the specific activity or structure you have in mind, provide as much separation as possible between your well and any potential source of pollution. If your farmstead is located on soils that soak up water very quickly (such as sandy soils) or on thin soil that lies over bedrock, maximum separation is needed. If the source or activity presents a high risk of pollution, keep it as far away from your well as possible. The law requires that existing wells meet only the distance

requirements in effect at the time the well was built. For your own sake, you should meet current regulations and exceed them if you can.

2. Circle the answer that best describes the position of your well.

- All separation distances are greater than minimum requirements.
- All separation distances are at least 3/4 the minimum requirements.
- All separation distances are at least 1/2 the minimum requirements.
- Some separation distances are less than 1/2 the minimum requirements; OR do not know.

Minimum Separation Distances Between Well and Potential Farmstead Sources of Contamination

<u>Sanitary landfills</u>	<u>500 ft.</u>
<u>Any source of sewage</u> , such as septic tank and drainfield, cesspools and privies, sewer lines which are not watertight, and any sludge-spreading or wastewater irrigation operations	<u>100 ft.</u>
<u>Any source of animal waste</u> , such as animal feedlots or manure piles, animal barns, or lagoons	<u>100 ft.</u>
<u>Any source of chemical contamination</u> , including fertilizer, pesticide, herbicide (insect and weed killers), or other chemical storage areas; buried gasoline and oil tanks	<u>100 ft.</u>
<u>All other potential sources</u> of groundwater contamination not specifically listed	<u>100 ft.</u>
<u>Building foundations</u>	<u>50 ft.</u>
<u>Streams, lakes, ponds, etc.</u>	<u>50 ft.</u>

For a well serving a single-family dwelling, minimum North Carolina state separation distances can be reduced where lot size or other fixed conditions make this necessary. In this case, the distance should be as large as possible, but at least 50 feet from sources of sewage listed above, and 25 feet from building foundations and watertight sewage lines. Your county may require distances greater than these.

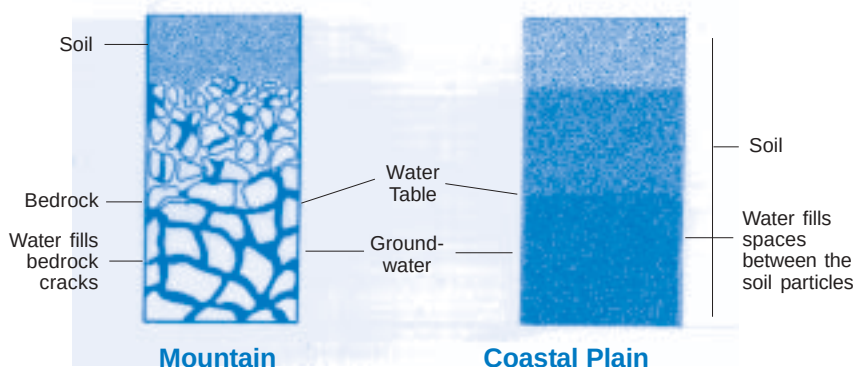


REMINDER

If you circle c or d for any question, there may be a problem with your drinking water caused by the condition or practice described in the question.

3. How well does the soil filter out pollutants?

Soil can filter pollutants picked up by stormwater runoff as it travels down to groundwater. The ability of soil to filter your water depends on the type of soil around the well. Water passes quickly through sand, so sandy soil cannot filter out pollutants. Water and pollutants move more slowly through clay, so clay soils have more time to filter out pollutants. Soils high in organic matter also filter pollutants.



Groundwater storage in different North Carolina soils

3. Circle the answer that best describes the soil near your well.
 - a. Fine-textured soils (clay loams, silty clay).
 - b. Medium textured soils (silt, loam) with high organic matter.
 - c. Medium or coarse textured soils with low organic matter.
 - d. Coarse textured soils (sands, sandy loam); OR do not know.

4. How quickly does water reach your well?

Another factor that influences groundwater pollution is the depth from the soil surface to the water table or to fractured bedrock. The water table is the top of the groundwater. Groundwater can be stored in soil or rock. Groundwater reaching fractured bedrock can move quickly down to wells. The farther water and pollutants have to move through the soil to reach the top of the water table, the longer the soil will have to filter the groundwater. Water table depth varies in North Carolina.

5. What is the condition of your well casing and cap?

When wells are drilled, the driller installs a steel or plastic lining pipe called a “casing” to keep the borehole from collapsing. Wells cased below the water table offer greater protection from pollution since they help ensure that surface water is filtered through soil, sand, or rock before entering the well.

You can inspect your well casing for holes or cracks at the surface and, using a light, check the inside of the casing. If the well casing moves when you push on it, the casing might not keep out pollutants. In areas of shallow (less than 20 feet from the surface), fractured bedrock, listen for water running down the well when the pump is not on. If you hear water running, there could be a crack or hole in the casing, or the well is not cased down into the water table. Both conditions are bad for your water quality because a poor casing may not keep out contaminants.

To prevent pollutants from flowing into the well, the driller should install a tight-fitting cap. This cap prevents insects or surface water from entering the well. A screened vent in the cap allows air to enter the well. The cap should be installed firmly so that children cannot remove it easily. Check the well cap to see that it fits tightly. Electrical wiring should be enclosed in the conduit to protect you from being shocked. If the well has a vent, make sure it faces the ground, is tightly connected to the well cap or seal, and is properly screened. The well code requires that all private wells have a seal.

Not all wells have caps. Some wells may have pumping equipment attached at the surface.

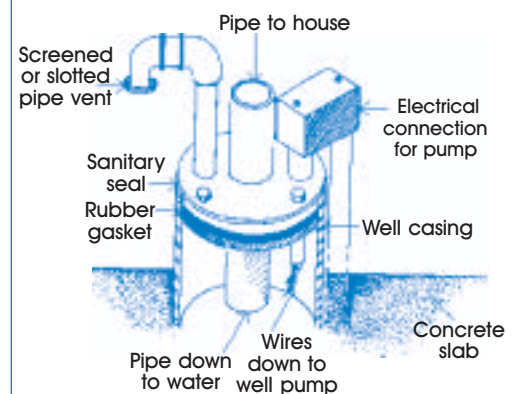
4. Circle the answer that best describes the depth of the water table.

- a. Water table or fractured bedrock deeper than 50 feet.
- b. Water table or fractured bedrock deeper than 25 feet.
- c. Water table or fractured bedrock deeper than 10 feet.
- d. Water table or fractured bedrock shallower than 10 feet; OR do not know.



5. Circle the answer that best describes the construction of your well.

- a. No holes or cracks. Cap tightly secured. Screened vent.
- b. No defects visible. Well vented but not screened.
- c. No holes or cracks visible. Cap easily removed.
- d. Holes or cracks visible. Cap loose or missing. Can hear water running; OR do not know.



Typical well cap

6. Are casing and grout deep enough?

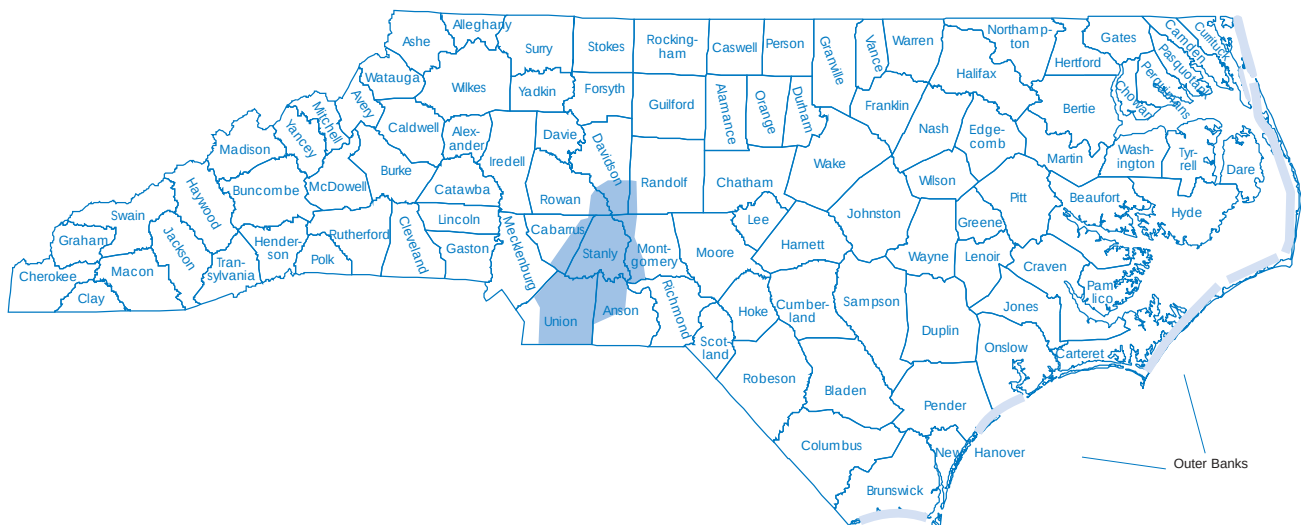
The space between the casing and the sides of the well hole provides a direct channel for stormwater runoff to reach the groundwater. To seal off that channel, the driller fills the space with grout, such as cement, concrete, or a special type of clay called bentonite. Both the grout and the casing prevent pollution from getting into the well.

In addition, grout must extend deep enough to seal off any layers of poorer quality water that make contact with the well casing. Because of the varied soil and geologic conditions in North Carolina, required well casing and grout depths will vary. In the Outer Banks, casing and grout depth must be at least 10 feet. In the shaded area, casing and grout depth must be 35 feet (see the following map). The remainder of the state has a depth requirement of 20 feet.

6. Circle the answer that best describes the casing and grouting of your well.

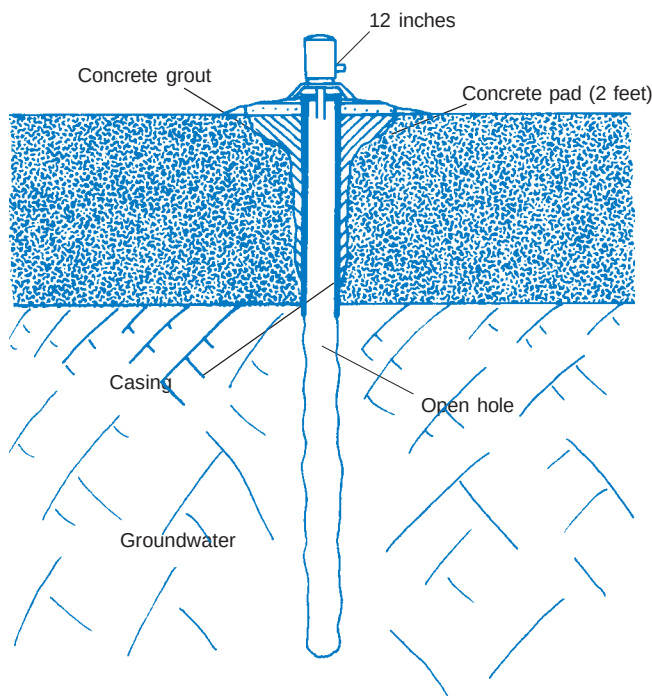
- a. Cased and grouted to required depth.
- b. Cased and grouted below water table of your well.
- c. Cased, but not grouted.
- d. No casing. No grout; OR do not know.

Below is a map that shows the required depths.



7. Is the well protected at the ground surface?

The well casing extends above the ground to prevent stormwater runoff from entering the well directly. The private well code requires that at least 12 inches of casing pipe extend above the ground after the final grading of the surrounding land. The wellhead should be surrounded 2 feet in all directions by a concrete pad, which should slope away from the well. The concrete pad stabilizes the casing and the soil around it, and the slope of the pad keeps stormwater runoff from entering the well.



Typical drilled well

7. Circle the answer that best describes your wellhead.

- a. Casing extends more than 12 inches above surface and concrete pad extends 2 feet in all directions.
- b. Casing above ground level and concrete pad 1 to 2 feet in all directions.
- c. Casing above ground level and no concrete pad.
- d. Casing below ground level or in pit or basement and no concrete pad; OR do not know.

We are discussing wells in this publication, but much of this information applies to springs. For more specific information about springs, see the Cooperative Extension fact sheet, "Protecting Water Supply Springs."

8. How old is your well?

The age of your well is an important factor in predicting whether your water might be polluted. A well constructed more than 60 years ago is likely to be located at the center of the farmstead, which means it is probably surrounded by many activities that can cause pollution. It may also be more shallow than a newer well and may have a thinner casing that can corrode more easily. (Even wells with modern casings that are 30 to 40 years old can be corroded.) Older well pumps are more likely to leak lubricating oils into the well. All of these characteristics of older wells can contribute to the pollution of your well water. If you have an older well, you might wish to have it examined by a county health department representative, Division of Water Quality (DWQ) regional groundwater specialist, or a qualified well driller.

8. Circle the answer that best describes the age of your well.

- a. Less than 15 years old.
- b. 15 to 30 years old.
- c. 30 to 60 years old.
- d. More than 60 years old; OR do not know.

9. Is your well drilled or dug?

Wells that have been dug rather than drilled pose the highest risk of pollution because they are shallow and often poorly protected from stormwater runoff. A dug well is a large-diameter hole (usually more than 2 feet wide), which often has been constructed by hand.

Driven wells, also known as sand point wells, pose a moderate to high risk of being polluted. They can only be installed in areas of relatively loose soils, such as sand, because they are constructed by driving a small-diameter pipe into the ground.

Other types of wells include jetted wells, in which water under high pressure washes away the soil, and bored wells, in which an earth auger removes the soil. Drilled wells are made either by rotary drilling or by percussion drilling. (Some people refer to drilled wells as "punched.") Drilled wells for farm use are commonly 4 to 8 inches in diameter. Bored wells are commonly 18-24 inches in diameter. Drilled, jetted, or bored wells are the safest types.

10. Are you preventing backflow?

Backflow occurs when water (and possibly pollution) flows backwards through the pipes from the house to the well. There should be anti-backflow devices, known as check valves, on all faucets with hose connections, or there should always be air gaps between hoses or faucets and the water level. Without anti-backflow devices, you risk having polluted water in laundry tubs, sinks, washing machines, pressure washers, outside hydrants, or swimming pools flow back through the plumbing into your well water.

If a vacuum forms in a water supply pipe, the backflow that can result is called backsiphoning. Backsiphoning from pesticide mixing tanks or pressure washers allows chemicals to flow back into the well through the hose. An anti-backflow device should be used when filling pesticide sprayer tanks, to prevent the chemical mixture from flowing back into the well and polluting groundwater. If you don't have an anti-backflow device, the hose must be kept out of the tank when filling the pesticide sprayer. Another option to use if you don't have an anti-backflow device is to use an inexpensive plastic container. The container is filled with water at the well and then used to fill the sprayer away from the farmstead and the well.

Water supplies that have cross connections between them (connections between two otherwise separate pipe systems) also put your drinking water at risk because the water in one pipe system can become polluted by the other system.

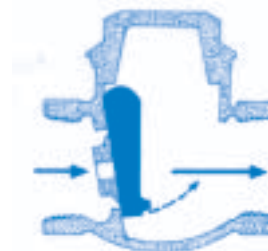
9. Circle the answer that best describes how your well was installed.

- a. Drilled
- b. Jetted or bored.
- c. Driven (sand point).
- d. Dug; OR do not know.



10. Circle the answer that best describes anti-flow devices attached to your well.

- a. Anti-backflow devices (such as check valves) installed on all faucets with hose connections and no cross-connections between water supplies.
- b. Anti-backflow devices installed on some faucets with hose connections.
- c. No anti-backflow devices. Air gap maintained.
- d. No anti-backflow devices. Air gap not maintained. Cross-connections between water supplies; OR do not know.



Examples of check valves

11. Do you have any unused wells?

Many farms have old, unused wells on the property. No one knows how many of these unused wells there are in North Carolina, but estimates range in the hundreds of thousands.

If unused wells are not properly filled and sealed, they can provide a direct route into the groundwater for stormwater runoff carrying pollutants. These wells can also allow pollutants to move from one groundwater system to another. Wells should also be filled so that children and animals cannot fall into them.

You cannot always see unused wells. A depression in the ground may indicate an old well. Pipes sticking out of the ground around existing or past farmsteads are the most obvious signs of an unused well. Other places to check for unused wells include in basements of houses, under front steps of houses, or near old cisterns.

A well that has been permanently closed by approved methods is considered an abandoned well. A license is not required to properly abandon a well, but you must meet the minimum well code requirements for abandonment. Use of unacceptable materials and methods can lead to well settling, well collapse, and groundwater pollution.

North Carolina regulations include the following requirements for well abandonment:

- The pump, piping, and any other obstructions must be removed from the well. Casings and screens should be removed if doing so will not cause or contribute to groundwater pollution.
- Any casing that is not properly grouted must either be removed or properly grouted.
- The well must be chlorinated to disinfect it before it is sealed.
- The entire depth of the well must be filled with cement, grout or clay. Specific requirements vary according to well type and local geological characteristics.

12. Has your well been tested recently?

Well water should be tested once a year. You can have your water tested by either a public or a private laboratory. A list of certified labs is available from the North Carolina Cooperative Extension Service Center. In some cases the North Carolina Department of Agriculture will test your water for a small fee. Although it would be expensive and difficult to test your water for every possible pollutant, some basic tests should be conducted. If you take the samples yourself, you must carefully follow the instructions that come with the collection bottle.

Water should be tested once a year for bacteria and nitrate, which can cause health problems. Yearly testing is necessary because groundwater travels and may pick up pollutants elsewhere. So even if you are doing everything you can to prevent your well from being contaminated, it may become polluted from other people's activities. If your water has high bacteria or nitrate levels, talk to a county health specialist. There may be problems with the location or construction of your well.

11. Circle the answer that best describes any abandoned wells located on your property.

- a. No unused, unsealed wells.
- b. Unused wells sealed and filled.
- c. Unused well on property more than 100 feet from supply well. Not capped or filled.
- d. Unused well less than 100 feet from supply well. Not capped or filled; OR do not know.



12. Circle the answer that best describes the tested water quality of your well.

- a. Consistent satisfactory water quality. Bacteria, nitrate, and other tests meet standards.
- b. Occasional deviation from standards with bacteria, nitrate, and other tests and no cross-connections.
- c. Bacteria, nitrate, and other tests most often do not meet standards and no cross-connections.
- d. No water tests done. Water discolored after rainstorms or during spring melt. Noticeable changes in color, clarity, odor, or taste; OR do not know.

If your well draws from sandy soil or granite bedrock, testing once for corrosivity is also important. The tests to check for corrosivity include hardness, alkalinity, pH, conductivity, and chloride. Test once to find out how corrosive the water may be to your plumbing system.

Test for pollutants that are most likely at your farmstead.

- Test for lead if you have lead pipes or soldered copper joints or brass fixtures.
- Test for volatile organic chemicals (VOCs) if you have an underground fuel storage tank, or if there has been a nearby use or spill of oil, petroleum, or solvent.
- Testing for pesticides can be expensive but it is important if the potential for pesticide pollution is high, such as after a spill or if your well is downhill from fields where pesticides have been applied. Testing for pesticides may also be justified if your well has high nitrate levels or if your well is shallow or not properly cased and grouted.

It is important to record test results and to note changes in water quality over time. In addition to water analysis results, you should keep records of your well construction and of maintenance done on the well and pump.

For More Information:

If your county has a well permit program, you should contact the county health department before beginning any well construction or repairs.

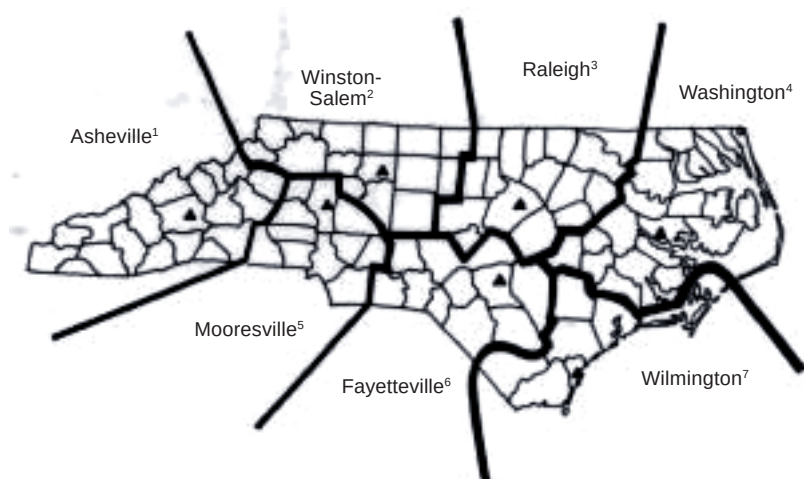
Your county health department or local Cooperative Extension Service Center can be a valuable source of information on the following topics:

- New well or spring construction and site selection
- Well inspection and maintenance
- Registered well drillers (or call the Division of Water Quality (DWQ) Groundwater Section, 919-733-3221)
- Unused well abandonment
- Construction records for existing wells (or call the DWQ, 919-571-4700)
- Well water testing:
 - Advice on appropriate tests to run
 - List of certified testing laboratories
 - Assistance interpreting test results
 - Health risks

Your local Cooperative Extension Service Center can also provide information on:

- Backflow prevention
- Water pollution and health risks
- Water treatment devices
- Groundwater (or call the DWQ regional office nearest you, listed as follows)

To Find Your State DWQ Location



¹Interchange Building, 59 Woodfin Place, Asheville, NC 28801; 828-251-6208

²505 Woughtown St., Winston-Salem, NC 27107; 910-896-7007

³3800 Barrett Drive, Suite 101, Raleigh, NC 27609; 919-571-4700

⁴1424 Carolina Avenue, Washington, NC 27889; 919-946-6481

⁵919 North Main Street, Mooresville, NC 28115; 704-663-1699

⁶Wachovia Building, Suite 714, Fayetteville, NC 28301; 910-486-1541

⁷127 Cardinal Drive Extension, Wilmington, NC 28405-3845; 910-395-3900

Other information sources:

Questions about:	Call or write:
Drinking water quality standard and health advisories	U.S. Environmental Protection Agency's Safe Drinking Water Hotline (between 8:30 - 5:00 Eastern time) 1-800-426-4791
Geological survey data (soil information)	NCDEHNR Division of Land Resources, 919-733-5291
Health Risks	NCDEHNR Division of Epidemiology, 919-733-3410

Related publications available from the Cooperative Extension Service Center:

- *Health Effects of Drinking Water Contamination.* HE-393
- *Home Drinking Water Treatment Systems.* HE-419/WQWM-136
- *Nitrate in Drinking Water.* AG-473-1/WQWM-5
- *Protecting Water Supply Springs.* AG-473-15/WQWM-73
- *Questions to Ask When Purchasing Water Treatment Equipment.* AG-473-3/WQWM-7
- *Should You Have Your Water Tested?* AG-473-2/WQWM-3
- *Your Water Supply: Well Construction and Protection.* AG-469/WQWM-10
- *Diseases Carried by Drinking Water.* WQWM-145
- *Groundwater in the Piedmont at Blue Ridge Provinces of North Carolina.* AG-473-6/WQWM-6
- *Groundwater in the Coastal Plain at North Carolina.* AG-450
- *Radon in Water.* HE-396/WQWM-13
- *Metals in Drinking Water.* AG-473-1/WQWM-6
- *Lead in Drinking Water.* HE-395/WQWM-8
- *Volatile Organic Chemicals (VOCs) in Drinking Water.* AG-473-5/WQWM-16
- *About Wells: What You Need to Know.*

These publications are available at your county Cooperative Extension Service Center. You may also order these publications from Communication Services, Campus Box 7603, North Carolina State University, Raleigh, NC 27695-7603.



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The concept for these materials was adapted from materials produced by the National Farm*A*Syst Program, University of Wisconsin, Madison, WI.

North Carolina's Farm*A*Syst and Home*A*Syst Program is coordinated by Deanna L. Osmond, North Carolina State University. Technical editing was provided by Judith A. Gale, and copy editing by Cathy Akroyd. Mary C. Wiggins, Frank J. Humenik, and Rhonda L. Sherman were the technical reviewers at North Carolina State University. Technical review was also provided by the following people within the North Carolina Department of Environment, Health and Natural Resources: Debra Owen, Environmental Services Branch, Environmental Biologist; Dennis Ramsey, Assistant Chief of Operations Branch; and Steve Zoufaly, Planning Branch Supervisor, Water Quality Standards and Classifications.

This project has been funded with Section 319 grant monies from the U.S. Environmental Protection Agency through the N.C. Department of Environment and Natural Resources, Division of Water Quality.

Published by

NORTH CAROLINA COOPERATIVE EXTENSION SERVICE

What's a Private Well Owner to do?



Eight Tips for Maintaining Your Well

By **Cliff Treyens**, Director of Public Awareness,
National Ground Water Association

Suppose you're a private well owner in Anywhere, USA. Perhaps you've moved out to the country to get away from urban sprawl and found yourself the proud owner of a water well for the first time. Or maybe you've relied upon a water well most your life.

Either way, you probably don't have an owner's manual that goes with your well. That seems okay until you need help. It's at times like those that you'll wish you knew some basics about water well system maintenance.

1 Don't try to service your own well.

When well owners try to service their own wells, they usually fail to solve the problem or make it worse. Qualified professional water well system contractors use specialized equipment, materials, and techniques to keep well systems operational and water supplies safe.

At the National Ground Water Association (NGWA), we've heard countless stories of well-intentioned homeowners fouling up their wells in an attempt to fix a problem. For instance, there's the gentleman who poured six gallons of bleach down his well to get rid of an odor in the water. After flushing thousands of gallons of water out of his well, the odor he was unable to eliminate was the bleach.

Moreover, every time a well owner removes a well cap and attempts to service the well in some way, there's the potential to unwittingly introduce bacterial

or other contamination into the well. There's also the potential for dropping objects (tools for instance) into the well, getting the pump stuck in an effort to replace it, or even electrocution when working with submersible pumps.

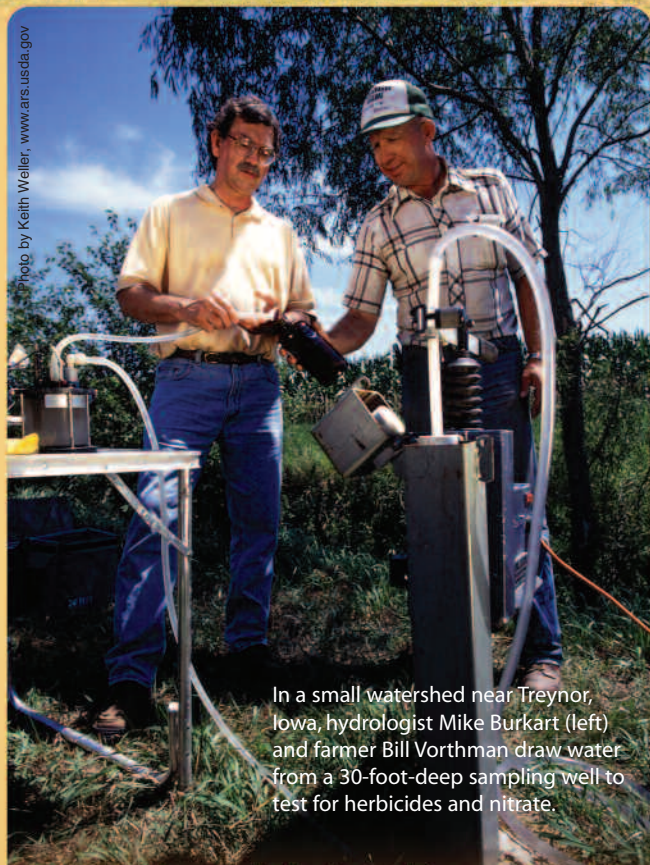
It's always best to contact a qualified professional water well systems contractor to conduct any kind of service on your well.

2 Preventive maintenance is less costly in the long run.

Often, it's human nature to be penny-wise and pound-foolish, particularly where privately owned water wells are concerned. The NGWA conducted a poll not too long ago, and the results confirmed what we expected: 80 percent of those responding had never had a well maintenance inspection.

What often happens is that a small, easily correctable problem becomes a large, inconvenient, much more expensive problem. Treating your water well system this way would be like never having an auto mechanic look under the hood of your car until a catastrophic breakdown.

Few people argue that preventive maintenance is unwise. The problem is that few people follow through on their own



In a small watershed near Treynor, Iowa, hydrologist Mike Burkart (left) and farmer Bill Vorthman draw water from a 30-foot-deep sampling well to test for herbicides and nitrate.

Test Your Water Regularly

The National Ground Water Association recommends that well owners test the water:

- annually for bacteria, nitrates/nitrites, and any contaminants of local concern;
- any time there is a change in the taste, odor, or appearance of the well water, or if a problem occurs such as a broken well cap or a new contamination source;
- if family members or houseguests have recurrent incidents of gastrointestinal illness;
- if an infant is living in the home; or
- if you wish to monitor the efficiency and performance of home water treatment equipment.

You should also check with your local health or environmental health department for recommendations regarding the type and frequency of testing best suited to your location. Many water well system contractors will take water samples for testing by a certified water-testing laboratory.

common sense when it comes to preventive maintenance for their water well system. What makes this doubly important for well owners is that you're consuming what comes out of that well. So, it's a matter of health as well as convenience and cost.

3 Do some homework before getting your water well system serviced.

This is a good idea whether you're getting a well maintenance check-up or service for a specific issue.

A well maintenance check-up should include four components. First, is a flow test to determine system output, along with a check of the water level before and during pumping (if possible), pump motor performance (check amp load, grounding, and line voltage), pressure tank and pressure switch contact, and general water quality (odor, cloudiness, etc.). Next, is an inspection of well equipment to assure that it is sanitary and meets local code requirements. Third, is a test of your water for coliform bacteria and nitrates, and anything else of local concern should be performed. Finally, a concise, clear, written report should be delivered to you following the check-up that explains results and recommendations and includes all laboratory and other test results.

4 Take some simple, ongoing steps to maintain your well.

Here's a homeowner's well maintenance checklist from the NGWA:

- Always use licensed or certified water well drillers and pump installers when a well is constructed, a pump is installed, or the system is serviced.
- An annual well maintenance check, including a bacterial test, is recommended. Any source of drinking water should be checked any time there is a change in taste, odor or appearance, or anytime a water supply system is serviced.
- Keep hazardous chemicals, such as paint, fertilizer, pesticides and motor oil away from your well.
- Periodically check the well cover or well cap on top of the casing (well) to ensure it is in good repair.



- Always maintain proper separation between your well and buildings, waste systems, or chemical storage facilities. Your professional contractor knows the rules.
- Don't allow back-siphonage. When mixing pesticides, fertilizers or other chemicals, don't put the hose inside the tank or container.
- When landscaping, keep the top of your well at least one foot above the ground. Slope the ground away from your well for proper drainage.
- Take care in working or mowing around your well. A damaged casing could jeopardize the sanitary protection of your well. Don't pile snow, leaves or other materials around your well.
- Keep your well records in a safe place. These include the construction report, as well as annual water well system maintenance and water testing results.
- Be aware of changes in your well, the area around your well, or the water it provides.
- When your well has come to the end of its serviceable life (usually more than 20 years), have your qualified water well contractor properly seal your well after constructing your new system.



Use qualified professionals.

When your well needs service, make the effort to find a qualified water well systems contractor. Here are some considerations:

- If you live in a state that licenses water well system contractors, make sure you select a licensed contractor to perform the work.
- Is the contractor certified through the National Ground Water Association (NGWA)? NGWA operates the only national certification program for water well drillers and pump installers, who must pass exams and take continuing education courses. Is the contractor a member of NGWA, the nation's leading association of ground water professionals?
- Does the contractor submit well logs? A well log is a document filed at completion of a new well that contains vital information on the history of the well and the ground surrounding it.

- Does the contractor have adequate equipment in good condition to do the job?
- Does the contractor have adequate liability and worker's compensation insurance to protect you?
- Is the contractor familiar with applicable health and safety codes?
- What is the contractor's reputation with previous customers? Don't be afraid to ask for references.
- Will the contractor furnish a written contract specifying the terms and conditions of the job?

This last point is very important. Unless you know what a contractor will do for his specified price, you cannot compare offers and decide which one to hire. Also, a written contract provides protection for you and the contractor should a disagreement arise over the scope or cost of the work.

For a drilled well, the contract may include:

- The liability insurance coverage held by both the owner and the contractor,
- A statement that all work will comply with applicable regulations and codes,
- The diameter and thickness of the casing used,
- The type of well development and yield evaluation procedures used,
- The type of screen installed, where needed,
- The type of well cap or seal used,
- The disinfection procedure,
- Clean-up procedures, including all material abandoned at the drill site,
- An anticipated start date for drilling,
- A guarantee of materials and workmanship, and
- A statement that the contractor will do the work and correct the initial work, if necessary.

Also, the contract should itemize charges. Itemization may include the cost of drilling per foot, casing per foot, other materials (i.e., the drive shoe, grout and well cap), other operations (i.e., grouting, development, test pumping and disinfection), drilling deeper and/or a second well to ensure an adequate water supply, abandonment and sealing should it prove necessary, and anything not included in the specification.

Continued on page 35.



Continued from page 17.



Understand the problem.

When your well needs maintenance, have the contractor explain the problem so that you understand it, then explore options for correcting the problem.

Sometimes well owners get frustrated because they don't understand their water well system and, therefore, don't understand what's wrong with it when service is required. Sometimes the well owner doesn't ask questions or the contractor doesn't adequately explain the problem and/or solutions.

Don't be afraid to ask questions until you're satisfied. Once you grasp the problem, explore options for fixing it with the contractor. This kind of dialogue is important because sometimes there can be different reasons for a water well system problem and, consequently, different solutions.

For example, over time the amount of water a well yields can decrease. Sometimes that is because the water table is dropping. Other times it can be caused by the plugging of holes in the well casing, mineral encrustation of the well screen or the filling of openings in the geologic formation around the well from which water flows. No one solution addresses all of these problems.

Working with your contractor to understand the correct cause or causes of problems can increase your confidence and comfort level in moving forward with solutions.



Find old wells.

Do an inventory of your property to determine if there are any old, unused well systems.

If you live in an area where people use water wells, there may be an old, unused well on your property. There are millions of them nationwide. Abandoned wells should be properly sealed by a qualified water well systems contractor for several reasons.

First, abandoned wells can provide a direct pathway for contamination into the aquifer, perhaps the same one you are using for drinking water. Often an abandoned well will have no well cap or the cap will be broken, allowing bugs, rodents or objects into the well. Other times, the grouting around the well casing has



Abandoned wells can provide a direct pathway for contamination into the aquifer

Photo courtesy of www.iowawaterquality.org

deteriorated to the point that contaminated surface water can infiltrate the well. Abandoned hand-dug wells not only present a contamination concern, they also can create a physical danger to people who can fall into them.

Landowners should find the location of any old or out-of-service wells. Clues to their location include:

- Pipes sticking out of the ground,
- Small buildings that may have been a well house,
- Depressions in the ground,
- The presence of concrete vaults or pits, perhaps covered by lumber or metal plates, and
- Out-of-use windmills are likely to be located near an old well.

Other clues can come from old maps, plans or property documents; information from neighbors; additions to old homes (in the past, wells were commonly constructed in basements or under porches to keep the water pumps from freezing and to ease access in the winter); and water utility history (what was the source of water for your home before utility water was available?).

Once a well is determined to have no current or potential future use, a qualified water well system contractor can properly seal it. Do not attempt to seal an abandoned well yourself! This requires special equipment and techniques to remove anything from the well and fill it with a special grout from the bottom up. Ordinary cement will not provide a sanitary seal for an abandoned well.

Approved well sealing procedures vary from state to state. In most cases, homeowners are required to notify their local Department of Environmental Protection or Water Quality Division to document the "decommissioning" of the well. Homeowners should contact these agencies to learn what procedures are required in their area.

8 Before getting your water tested, check to see if your well system is clean.

A common mistake homeowners make is to test their well water without first being sure the water well system is clean. Testing water from a dirty well can lead to false positives—the appearance of contamination even when the ground water is clean. A dirty well also can create an environment for contaminants such as certain types of bacteria.

A qualified water well systems contractor can determine if your water well system needs cleaning by conducting an anaerobic bacteria test, a positive coliform test, or other tests showing an accumulation of debris in the well.

Other possible indicators of a dirty well may be cloudy water, low water flow, or taste and odor problems.

If test results indicate the presence of anaerobic bacteria and/or coliform bacteria—or if you are experiencing cloudy water, low water flow, or taste and odor problems—the National Ground Water Association recommends your well be cleaned by a qualified water well systems contractor prior to any servicing of your well system.

A common misconception by homeowners is that chlorine alone will clean a well—the more chlorine the better. Chlorine can serve as an effective disinfectant only after debris and other solid material are removed from the well. Well cleaning must remove debris from the well bottom, and may require cleaning other components of the well if determined necessary by a qualified water well systems contractor.

To learn more about wells, visit the National Ground Water Association's Web site, at www.wellowner.org. This easy-to-understand site contains basic information on topics, including water well basics, well maintenance, water quality, finding a contractor, ground-water and more.

To find a certified water testing laboratory in your area, contact your state certification officer by visiting the U.S. Environmental Protection Agency Web site at: www.epa.gov/safewater/labs/index.html.



Cliff Treyens is the director of public awareness with the National Ground Water Association. Learn more about the NGWA by visiting their Web site at www.ngwa.org.



Related NESC Products

Assessing Drinking Water Well Conditions

About 95 percent of this country's rural residents use groundwater for their drinking water and farmstead needs. Wells are designed to provide clean water, but must be properly constructed and maintained to avoid contamination. This worksheet, part of the Farm*A*Syst series produced by the Vermont Natural Resource Conservation Districts, will take you step by step through your drinking water well condition and management practices.

Item # WFSPE338\$0.90

Radium in Your Drinking Water (A Homeowner's Guide)

What is radium? What are the health risks for radium ingestion? This fact sheet answers these questions and more for homeowners. Written in response to a recent pilot study of water quality in Maryland, that state's Department of the Environment produced this fact sheet to answer questions about radium, possible health risks, and water testing and treatment options.

Item # DWFSPE320\$0.90

What Can You Learn From Drinking Water Right to Know Reports?

This fact sheet offers tips on understanding the right to know reports like the CCRs. Offered by the Consumer Federation of America, this helpful fact sheet includes information about protecting vulnerable people from drinking water disease and illnesses.

Item # DWFSPE238\$0.30

This article is reprinted from *On Tap*, a free quarterly magazine published by the National Environmental Services Center (NESC). To learn more about services offered by the NESC visit www.nesc.wvu.edu or call toll free (800) 624-8301.

On tap



**ATTACHMENT 4: Laboratory Analysis Results for Well
Water**

ANALYTICAL REPORT

PREPARED FOR

Attn: Chris McGee
Agri-Waste Technology, Inc. (AWT)
501 N. Salem Street
Suite 203
Apex, North Carolina 27502

Generated 6/23/2025 11:12:57 AM

JOB DESCRIPTION

4804 Spring Forest Rd

JOB NUMBER

752-33628-1

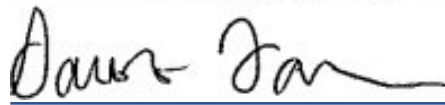
Eurofins Raleigh

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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Authorized for release by
Samantha Fallon, Project Manager
Samantha.Fallone@et.eurofinsus.com
(919)467-3090

Case Narrative

Client: Agri-Waste Technology, Inc. (AWT)
Project: 4804 Spring Forest Rd

Job ID: 752-33628-1

Job ID: 752-33628-1

Eurofins Raleigh

Job Narrative 752-33628-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The sample was received on 6/17/2025 11:26 AM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 24.2°C.

Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Biology

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Eurofins Raleigh

Sample Summary

Client: Agri-Waste Technology, Inc. (AWT)
Project/Site: 4804 Spring Forest Rd

Job ID: 752-33628-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
752-33628-1	4804 Spring Forest Rd	Drinking Water	06/17/25 08:30	06/17/25 11:26

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

Client Sample Results

Client: Agri-Waste Technology, Inc. (AWT)
Project/Site: 4804 Spring Forest Rd

Job ID: 752-33628-1

Client Sample ID: 4804 Spring Forest Rd

Lab Sample ID: 752-33628-1

Date Collected: 06/17/25 08:30

Matrix: Drinking Water

Date Received: 06/17/25 11:26

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Analyzed	Dil Fac	Analyst
Lead	0.0039		0.0018	0.00022	mg/L		06/19/25 14:18	1	EV

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Analyzed	Dil Fac	Analyst
Nitrate as N (Nitrate by calc)	0.95		0.10	0.025	mg/L		06/18/25 20:27	1	LEB
Nitrate Nitrite as N (SM 4500 NO3 F)	0.95		0.50	0.21	mg/L		06/19/25 14:32	5	ME
Nitrite as N (SM4500 NO2 F)	<0.017		0.10	0.017	mg/L		06/17/25 15:57	1	ME

Method: SM 9223B - Coliforms, Total, and E.Coli (Colilert - Presence/Absence)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Analyzed	Dil Fac	Analyst
Escherichia coli	ABSENT				NONE		06/17/25 16:01	1	ME
Coliform, Total	PRESENT				NONE		06/17/25 16:01	1	ME

Action Limit Summary

Client: Agri-Waste Technology, Inc. (AWT)
Project/Site: 4804 Spring Forest Rd

Job ID: 752-33628-1

Client Sample ID: 4804 Spring Forest Rd

Lab Sample ID: 752-33628-1

Compliance Check

The results obtained from the analytical testing of this data set were checked against compliance limits received from the client. Any results at or above the compliance limits have been highlighted for your convenience.

Analyte	Result	Qualifier	Unit	EPAMCL	RL	Method	Prep Type
				Limit			
Lead	0.0039		mg/L	0.015	0.0018	200.8	Total/NA
Nitrate as N	0.95		mg/L	10	0.10	Nitrate by calc	Total/NA
Nitrate Nitrite as N	0.95		mg/L	10	0.50	SM 4500 NO3 F	Total/NA
Nitrite as N	<0.017		mg/L	1	0.10	SM4500 NO2 F	Total/NA
Escherichia coli	ABSENT		NONE	Present		SM 9223B	Total/NA
Coliform, Total	PRESENT		NONE	Present		SM 9223B	Total/NA

Accreditation/Certification and Definitions Summary

Client: Agri-Waste Technology, Inc. (AWT)
Project/Site: 4804 Spring Forest Rd

Job ID: 752-33628-1

Laboratory: Eurofins Raleigh

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
North Carolina (DW)	State	37724	07-31-25
The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.			
Analysis Method	Prep Method	Matrix	Analyte
Nitrate by calc		Drinking Water	Nitrate as N
SM 4500 NO3 F		Drinking Water	Nitrate Nitrite as N
SM4500 NO2 F		Drinking Water	Nitrite as N
North Carolina (WW/SW)	State	591	12-31-25
The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.			
Analysis Method	Prep Method	Matrix	Analyte
Nitrate by calc		Drinking Water	Nitrate as N
SM 4500 NO3 F		Drinking Water	Nitrate Nitrite as N
SM 9223B		Drinking Water	Coliform, Total
SM 9223B		Drinking Water	Escherichia coli
SM4500 NO2 F		Drinking Water	Nitrite as N

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
North Carolina (DW)	State	12712	07-31-25
North Carolina (WW/SW)	State	699	12-31-25
The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.			
Analysis Method	Prep Method	Matrix	Analyte
200.8	200 Series	Drinking Water	Lead

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)

Accreditation/Certification and Definitions Summary

Client: Agri-Waste Technology, Inc. (AWT)
Project/Site: 4804 Spring Forest Rd

Job ID: 752-33628-1

Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
MRL	Method Reporting Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
SDL	Sample Detection Limit
SDL	Sample Detection Limit
SDL	Sample Detection Limit
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method Summary

Client: Agri-Waste Technology, Inc. (AWT)
Project/Site: 4804 Spring Forest Rd

Job ID: 752-33628-1

Method	Method Description	Protocol	Laboratory
200.8	Metals (ICP/MS)	EPA	EET ORL
Nitrate by calc	Nitrogen, Nitrate-Nitrite	SM	EET RAL
SM 4500 NO3 F	Nitrogen, Nitrate	SM	EET RAL
SM4500 NO2 F	Nitrogen, Nitrite	SM	EET RAL
SM 9223B	Coliforms, Total, and E.Coli (Colilert - Presence/Absence)	SM	EET RAL
200 Series	Turbidity Check	EPA	EET ORL

Protocol References:

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater"

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

EET RAL = Eurofins Raleigh, 104 Woodwinds Industrial Court, Suite A, Cary, NC 27511, TEL (919)467-3090

104 Woodwinds Industrial Court Suite A
Cary, NC 27511
Phone: 919-467-3090

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42

ATTACHMENT 5: Chlorination Instructions



HOW TO DISINFECT YOUR WATER WELL

Water Well Disinfection or Chlorination

For many of us, a water supply well represents the sole source of water for our home. Disinfecting your water supply well and piping system is an effective way to ensure that your water is sanitary and safe to drink. Disinfection of a water supply well is necessary if test results indicate bacterial contamination. Chlorination of your well, piping system, and water heater is also necessary if your well is contaminated by flood water. Disinfection may be used to control iron and sulfur bacteria to a limited degree. You may also wish to chlorinate your well as part of an annual well maintenance practice. In addition, all water wells are required to be disinfected upon completion of construction, maintenance, repairs or pump installation and testing.

The standard method of disinfection produces a 100 parts per million (or 100 milligrams per liter) chlorine concentration in your water. Another type of chlorination termed “shock chlorination” uses the same methods to introduce chlorine but achieves at least a 200 parts per million residual chlorine or more. Shock chlorination is typically recommended when test results indicate the presence of bacteria.

REMEMBER! The only people allowed to break a well seal are the well owner, plumbers installing or repairing well pumps, and certified well contractors.

How to Chlorinate Your Water Supply Well

To safely chlorinate your well, you should use safety goggles, gloves and appropriate clothing. Follow chlorine product manufacturer’s instructions. Concentrated chlorine can produce holes in clothing and skin burns. You can use household bleach or a solution made from high test calcium hypochlorite containing 65% - 75% available chlorine. High-test calcium hypochlorite, including trade names HTH and Chlor-Tabs, is available from home improvement stores, swimming pool product suppliers, and driller supply stores. Do not use stabilized chlorine tablets or any chlorine product that contains fungicides, algacides or other disinfectants; read the product label carefully. You

may wish to ask the well contractor that installed your well if they have these products available.

To determine the amount of chlorine or calcium hypochlorite needed to produce a 100 parts per million residual chlorine solution, you must follow these steps:

1) Determine the thickness of the water column in your well. To accomplish this, you must determine the depth to water from the ground surface and subtract this number from the total depth of the well. These numbers should be recorded by the well contractor on the well tag located on the well casing. If not, you can contact the well contractor that drilled the well. Example: The total well depth is 150 ft. and the water level is 20 ft. below ground surface. Therefore, the thickness of the water column is 130 ft.

2) Use the following table to determine how much chlorine compound is needed to dose 100 feet of a water-filled well to at least 100mg/l:

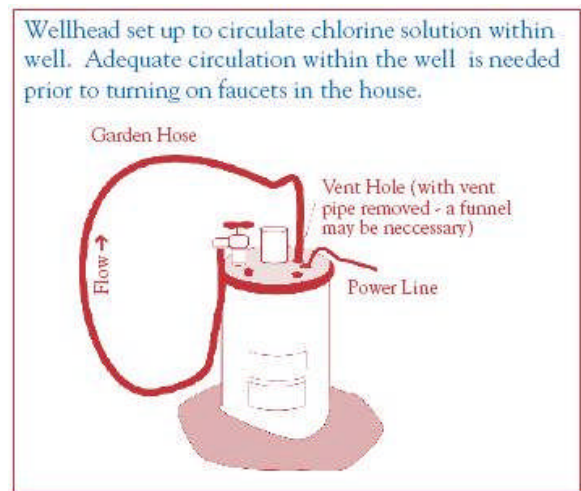
Borehole or Casing Diameter (inches)	Gallons of Water per 100 ft of Water Filled Well	Amount of Calcium Hypochlorite (65%-70% available chlorine)
2	16.3	0.5 oz.
4	65.3	2 oz.
6	146.9	4.4 oz.
8	261.1	7.8 oz.
10	408	12.2 oz.
12	587	1 lb. 2 oz.
18	1321	2 lb. 8 oz.
20	1632	3 lbs. 1 oz.
24	2350	4 lbs. 7 oz.
30	3672	6 lbs. 14 oz.
36	5287	9 lbs. 15 oz.

3) Begin by attaching a garden hose to the well's hose bibb or an outside faucet closest to your well. Fill a five gallon bucket about 3/4 full with water. Loosen the well seal at the top of your well. This is typically accomplished with a wrench and it may be necessary to bump the seal with a rubber mallet to loosen it. If you are unable to remove the well seal, you can introduce the chlorine solution through the vent hole using a funnel. The vent pipe is easily unscrewed. However, it is better to pour the chlorine solution directly into the well in order to wash down the sides of the casing with the chlorine solution.

4) Add the calculated amount of calcium hypochlorite to the five gallon bucket of water and mix to dissolve. Pour the chlorine solution into the vent opening using a funnel or in through the top of the well casing after removing the well seal. Special provisions will be required for introducing the chlorine solution into artesian wells (flowing well). Contact the appropriate regional office for more information. Place the end of the garden hose so the discharging water will flow into the well either through the top of the well casing or slowly through the funnel positioned in the vent hole. Turn the hose on and allow the water to run until a strong chlorine odor is noticed coming from the hose. Allow the hose to run water into the well for about an hour or enough time to thoroughly circulate the chlorinated water.

5) Once the chlorine has been placed in the well, turn on each discharge point of the system (faucet etc.) until a strong chlorine odor is noted then turn off the faucet. Let the chlorine solution sit in the system for at least 24 hours. Use chlorine test strips to determine the amount of residual chlorine in the system. Do not use the system during this time as chlorine will be flushed to your septic system. Before resuming use of your water system, you must rid the system of the chlorinated water. To flush the system, run water from an outside faucet until the chlorine odor no longer remains. When flushing the system, drain the chlorine water away from plants and animals.

Do not allow the chlorine rich water to enter any surface water body or storm sewer!



After Disinfection

If your well tested positive for bacteria before, it is important to get the water retested after disinfection. You can retest the well for bacteria about seven-to-ten days after disinfection. Remember that you must identify and remedy the source of the bacteria to keep the problem from recurring. The presence or absence of "indicator" bacteria such as total coliform determines if your water supply well is sanitary. Usually a properly constructed well can be effectively disinfected. However, if tests indicate that bacteria remain, you may need to have the well inspected. Foreign matter in the well such as animals, insects or bits of wood will have to be manually removed and the well disinfected again.

If you have questions about disinfection or other well issues, please contact your Department of Environment and Natural Resource (DENR) Aquifer Protection Section regional office.

For more information or a copy of the 15A NCAC 02C .0100 Well Construction Standards Criteria and Standards Applicable to Water Supply and Certain Other Wells, you can visit our webpage

<http://portal.ncdenr.org/web/wq/aps/gwpro>

or contact us at:

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