Guilford County Well Rules



Effective October 1, 2021

FOREWORD

The Guilford County Board of Health enacted these rules, effective June 1, 1989, on the need to protect the groundwater more responsibly in Guilford County. During the years that preceded local rule implementation, development escalated, resulting in an increase in density and in potential for groundwater contamination. While a state standard for well construction had been established, there was no active state program enforcing the standard, and Guilford County Health Department staff observed the existence of numerous newer wells not meeting the standard and many old poorly constructed wells which were out of use but not properly abandoned. This, along with the increased presence of bacteria in wells within developing areas, pointed to the need for more stringent local rules. The rules, as adopted, provided for permitting with local inspections of the well construction process and required the use of materials and sampling that would avail the citizens of Guilford County a higher standard of protection of their groundwater in the future. During the years that followed, the program/rules have been evaluated on a regular basis to determine where changes have been needed that would enhance the approach to well construction and keep pace with the ever-changing development industry.

Some specific milestones have included the following enhancements:

1. Increasing minimum casing depth requirement from twenty feet to forty feet and going from one foot into bedrock to five feet into bedrock, thus decreasing the possibility for encountering contaminated water zones.

2. Allowing the use of bentonite grout, thus providing another grout option which reduces the heat of hydration and reduces cracking, while providing increased sealing capabilities.

3. Allowing the use of a liner sand cement grout which reduces the heat of hydration, while providing a grout that would flow, seal, and set up properly when repairing wells.

4. Requiring that new wells located within a one-thousand-five-hundred-foot radius of a known contaminated soil or groundwater site be sampled for various parameters, thus identifying any possible contamination issues.

5. Establishing specific depth to yield requirements, thus providing the availability of water needed to accommodate the average residence.

6. Establishing standards for the construction and operation of wells with a daily use of more than 10,000 gallons, thus reducing the potential for adversely impacting surrounding wells.

7. Incorporating changes as required by new state rules 15A NCAC 02C .0300 and 15A NCAC 18A .3800, effective July 1, 2008. Adoption of these rules, as well as 15A NCAC 02C .0100, by reference on July 1, 2008.

Changes to these rules have always been preceded by conferences/meetings conducted with stakeholders who have been regulated or otherwise impacted by the rules. These periodic reviews and team efforts for improvement have resulted in rules affording greater protection to public health while achieving economic considerations.

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CHAPTER 1

GENERAL PROVISIONS, DEFINITIONS, REGISTRATION, AND VARIANCE

SECTION I GENERAL PROVISIONS

(A) Authorization - The Guilford County Board of Health is authorized under the provisions of Chapter 130A, Section 39 of the General Statutes of North Carolina to adopt appropriate rules and regulations for the protection of the public health.

(B) Purpose - Consistent with the responsibility to protect and advance the public health, it is declared to be policy of the Guilford County Board of Health to require that the following precepts conform to such reasonable standards and requirements as may be necessary to protect the public health and groundwater resources:

1. The location, construction, repair, and abandonment of water supply wells
2. The construction, repair, and abandonment of public water supply wells
3. The location, construction, repair, operation, and abandonment of wells in a DUMT 10K well system
4. The construction, repair, and abandonment of monitoring wells, air injection wells, air sparging wells, and recovery wells
5. The location, construction, repair, operation, and abandonment of ground source heat pump wells / geothermal boreholes

(C) Scope - No person shall construct, repair or abandon, or cause to be constructed, repaired, or abandoned, any well contrary to the provisions of these Rules. Previously adopted procedures and requirements of the Guilford County Department of Health and Human Services, Division of Public Health are superseded by these Rules.

(D) Conflict with other Laws and Regulations - The provisions of any federal, state, or municipal law or regulation establishing standards affording greater protection to the public welfare, safety, health, and the groundwater resources shall prevail within the jurisdiction of such agency or municipality over standards established by these Rules.

(E) Penalties and Remedies

1. Civil Penalties: Any person who willfully violates any provision of these Rules, or any other issued pursuant thereto, shall be subject to a fine not to exceed five hundred dollars ($500). G.S. § 130A-25

2. Criminal Penalties: Any person who willfully violates any provision of these Rules, or any other issued pursuant thereto, shall be punishable by a fine not to exceed five hundred dollars ($500). Gu. Co. Code of Ordinances § 1-14

3. Additional Remedies: As provided by G.S. 130A-18, the Guilford County Health Director may also institute an action in the Guilford County Superior Court for

injunctive relief. All other remedies provided by state law, including, but not limited to, Part 1 of Chapter 130A of the North Carolina Statutes shall be available to the Guilford County Health Director.

(F) Inspection - Before being used to supply water for human consumption, all newly constructed wells shall be inspected and found to comply with the provisions of this ordinance. Permanent abandonment of any well or any repair to a well shall be inspected by the Guilford County Health Director or their designee.

The Guilford County Health Director or their designee shall have the authority to enter upon the property at all reasonable times for the purposes of inspecting a well contractor activity or sampling of a water supply system or for the investigation of a complaint relating to a well contractor activity or the water supply system.

(G) Appeals - Appeals concerning the interpretation and enforcement of these rules by the local Health Department, shall be conducted in accordance with the following procedure:

1. The aggrieved person shall give written notice of appeal to the local Health Director within 30 days of the challenged action. Failure to give timely written notice constitutes a waiver of appeal rights. The notice shall contain the name and address of the aggrieved person, a description of the challenged action, and a statement of the reasons why the challenged action is incorrect. The Health Director may affirm, modify, or reverse the original action. The Health Director shall issue a written decision based on evidence presented at the meeting. The decision shall contain a concise statement of the reasons for this decision.

2. If the aggrieved person desires to pursue the appeal further, such party shall give written notice of the appeal to the local Health Director pursuant to N.C. Gen. Stat. § 130A-24. An appeal fee in an amount approved by the Board of Health and Board of Commissioners and a performance bond in the amount necessary to correct the duly noted violation may be charged. Upon filing of the notice, the local Health Director shall, within five working days, transmit to the local Board of Health the notice of appeal and the papers and materials upon which the challenged action was taken.

3. On appeal, the Board of Health shall have authority to affirm, modify, or reverse the challenged action. The local Board of Health shall issue a written decision based on the evidence presented at the hearing. The decision shall contain a concise statement of the reasons for the decision.

4. A person who wishes to contest a decision of the local Board of Health shall have the right of appeal by Writ of Certiorari to the Guilford County District Court within 30 days after the date of the decision by the Board. The scope of review in the District Court shall be the same as in G.S. 150 B-51.

SECTION II DEFINITIONS

The following definitions apply throughout these Rules:

(1) "Abandoned well" means a well whose use or construction has been discontinued, or which is in such a state of disrepair that continued use for obtaining groundwater or other useful purpose is impracticable.

a. "Temporarily abandoned well" means any usable well whose use has been temporarily discontinued because of well or pump maintenance problems and newly constructed wells not yet put into service.

b. "Permanently abandoned well" means any well removed from or not yet put into service; or whose use is impracticable because of faulty construction, location, water quality, insufficient yield, unserviceable casing or screen, or which has been removed from service because it no longer serves its intended use.

(2) "Access port" means an opening in the wellhead installed for the primary purpose of determining the water level in the well or to facilitate disinfection.

(3) "Addition" means any structure, whether free standing or attached to another (including swimming pools, oil tanks, signs, etc.) which is constructed, altered, or placed on property that contains one or more wells. This would not include replacement of existing equipment within the existing building perimeter of a structure and addresses only those situations for which a building permit is required.

(4) "Agent" means any person who by mutual and legal agreement with a well owner has authority to act on behalf of the well owner in executing application for well permits. The agent authorized may be either a general agent or a limited agent to do one particular act.

(5) "Air injection well" or "air sparging well" means a well that is used to inject uncontaminated air to the subsurface to promote volatilization and enhance bioremediation of contaminants in the soil and groundwater.

(6) "Annular Space" means the space between the casing and the walls of the borehole or outer casing, or the space between a liner pipe and well casing.

(7) "Artesian flowing well" means any well in which groundwater flows above the land surface without the use of a pump, where the static water level or hydraulic head elevation is greater than the land surface under natural conditions.

(8) "ASTM" means the American Society for Testing and Materials.

(9) "Biofilm" means a collection of microorganisms which may exist on solid surfaces within a water well. This collection includes, but is not limited to, slime-formers, iron related bacteria, sulfate reducing bacteria, pseudomonas, and coliforms.

(10) "Board of Health" means the Guilford County Board of Health or its official

representatives.

(11) "Casing" means pipe or tubing constructed of specified materials and having specified dimensions and weights, that is installed in a bore hole, during or after completion of the bore hole, to support the side of the hole and thereby prevent caving, to allow completion of a well, to prevent formation material from entering the well, to prevent the loss of drilling fluids into permeable formation, and/or prevent entry of contamination.

(12) "Certificate of Completion" means a certification by the Guilford County Health Director or their designee that a water well has been constructed or repaired in compliance with the construction permit or repair permit.

(13) "Certified laboratory" means the North Carolina State Laboratory of Public Health certified by the US Environmental Protection Agency or a laboratory certified by the Certification Section of the North Carolina Public Health Laboratory pursuant to 10A NCAC 42D to perform tests to determine the presence of coliform bacteria or the chemical constituents to be tested.

(14) "Certified Well Contractor" means a person certified as a well contractor with the State of North Carolina in accordance with 15A NCAC 27 (North Carolina Well Contractor Certification Commission Rules).

(15) "Clay" means a substance comprised of natural, inorganic, fine grained crystalline mineral fragments which, when mixed with water, forms a pasty moldable mass that preserves its shape when air dried.

(16) "Closed-Loop Geothermal Injection Well System" means a system of continuous piping, part of which is installed in the subsurface via vertical or angled borings, through which moves a fluid that does not exit the piping, and which is used to transfer heat energy between the subsurface and the fluid in association with a heating and cooling system. "Closed-Loop Geothermal Injection Well System" includes the following types of wells:

a. Geothermal Aqueous Closed-Loop Wells
b. Geothermal Direct Expansion Closed-Loop Wells

(17) "Coliform bacteria" or "total coliform" means aerobic or facultative anaerobic, gram-negative, non-spore forming, rod shaped bacteria included in the genera Klebsiella, Enterobacter, Escherichia, and Citrobacter. Coliform bacteria originate in soil, vegetation, or the intestinal tract of warm-blooded animals. The presence of coliform bacteria in a water sample indicates the presence of a pathway for bacteria and possibly pathogens to gain entry into a water supply system.

(18) "Community Water System" or "CWS" means a public water supply system which serves 15 or more service connections, or which regularly serves at least 25 year-round residents.

(19) "Cone of depression" means a cone-shaped lowering of the water table around a pumped well. Groundwater flow is diverted towards the well as it flows into the depression cone.

(20) "Consolidated rock" means rock that is firm and coherent, solidified or cemented, such as granite, gneiss, limestone, slate, or sandstone that has not been decomposed by weathering.

(21) "Construction of wells" means and includes all acts necessary to construct a well for any intended use, including the location and excavation of the well, placement of casing, grout, screens and/or fittings, development, and testing.

(22) "Contamination" means the introduction of foreign materials of such nature, quality, and quantity into the ground waters as to exceed the groundwater quality standards specified in 15A NCAC 2L (Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina).

(23) "Department of Environmental Quality" means the North Carolina Department of Environmental Quality. The term also means the authorized representative of the Department of Department of Environmental Quality.

(24) "Designed Capacity" shall mean that capacity that the well system and associated pumping system can extract from the ground.

(25) "Detritus" means the remains of something that has been destroyed or broken up.

(26) "Domestic use" means water used for drinking, bathing, household purposes, livestock, or gardens.

(27) "DUMT 10,000 well system" or "DUMT 10K well system" means a well or well system, with daily water use of more than 10,000 gallons. This shall not apply to Bona Fide farms or wells serving one Single Family Residence.

(28) "DUMT 10,000 well system Operation Permit" or "DUMT 10K well system Operation Permit" means a permit issued by the Guilford County Health Director or their designee to operate a DUMT 10,000 well system. This permit may include specific requirements for maintenance and operation, restrictions on water usage, responsibilities of the owner, and other requirements for the continued proper performance of a DUMT 10,000 well system.

(29) "Fecal coliform bacteria" or "fecal coliform" means a sub-group of coliform bacteria that are present in the intestinal tract and feces of warm-blooded animals. The presence of fecal coliform bacteria in a water sample indicates fecal contamination and the presumed presence of pathogens in the water supply.

(30) "Feedlot" means a lot or building, or combination of lots and buildings intended for the confined feeding, breeding, raising, or holding of animals and either specifically designed as a confinement area in which animal waste may accumulate or where the

concentration of animals is such that an established vegetative cover cannot be maintained. A building or lot is not a feedlot unless animals are confined for 45 or more days, which may or may not be consecutive, in a 12-month period. Pastures shall not be considered feedlots for purposes of these rules.

(31) "Formation material" means naturally occurring material generated during the drilling process that is composed of sands, silts, clays, or fragments of rock and which is not in a dissolved state.

(32) "Geothermal Aqueous Closed-Loop Wells" means wells that house a subsurface system of closed-loop pipe that circulates potable water only or a mixture of potable water and performance-enhancing additives such as antifreeze, corrosion inhibitors, or scale inhibitors for heating and cooling purposes. Only additives that the NC Department of Health and Human Services' Division of Public Health determines not to adversely affect human health in compliance with G.S. 130A-5 shall be used.

(33) "Geothermal borehole" means any hole in the earth which is drilled for the purpose of installing piping for heating and air conditioning systems through which water, antifreeze, water mixtures, Freon, or other media are circulated to exchange heat with the earth for the purpose of heating or cooling, or both.

(34) "Geothermal Direct Expansion Closed-Loop Wells" means wells used to house a subsurface system of closed-loop pipe that circulates refrigerant gas for heating and cooling purposes. Only gases that the NC Department of Health and Human Services' Division of Public Health determines not to adversely affect human health in compliance with G.S. 130A-5 shall be used.

(35) "Geothermal Heating/Cooling Water Return Well" means a well that reinjects groundwater used to provide heating or cooling for structures. These wells may be approved by the Director of the North Carolina Department of Environmental Quality Division of Water Resources only if the temperature of the injection fluid is not in excess of 30 degrees Fahrenheit above or below the naturally occurring temperature of the receiving groundwater. This includes wells using a geothermal fluid source. All Geothermal Heating/Cooling Water Return Wells require a permit issued by the Department of Environmental Quality.

(36) "GPM" and "GPD" means gallons per minute and gallons per day, respectively.

(37) "Grout" means and includes the following:

a. "Neat cement grout" means a mixture of not more than six gallons of clear potable water per 94-pound bag of Portland cement. Up to five percent by weight, of untreated 200 mesh Wyoming Sodium Bentonite, API 90 bbl/ton clay may be used to improve flow and reduce shrinkage. Use of bentonite clay shall require the use of motorized mechanical means to properly mix the grout.

b. "Liner sand cement grout" means a mixture of not more than one part sand and one part~~s~~ neat cement grout; the liquid and solid components of all grout mixtures

shall be thoroughly blended prior to emplacement below land surface.

c. "Sand cement grout" means a mixture of not more than two parts sand and one part cement and not more than six gallons of clear potable water per 94-pound bag of Portland cement.

d. "Concrete grout" means a mixture of not more than two parts gravel to one part cement and not more than six gallons of clear potable water per 94-pound bag of Portland cement. One hundred (100) percent of the gravel must pass through a one-half (½) inch mesh screen.

e. "Bentonite slurry grout" means a mixture of not more than 24 gallons of clear, potable water per 50-pound bag of commercial granulated Wyoming sodium bentonite to produce a grout weighing no less than nine-point-four (9.4) pounds per gallon of mixture. This grout shall consist of a minimum of 20 percent solids bentonite clay. Nonorganic, non-toxic substances may be added to improve particle distribution and pumpability. Bentonite slurry grout may be used on the outside of casing from bottom of the well up to within three feet below land surface and must be placed by the pumping or pressure method. Bentonite slurry grout may only be used in accordance with the manufacturer's written instructions.

f. "Bentonite chips" means pre-screened Wyoming sodium bentonite chips with largest dimension of at least one-fourth (¼) inch but not greater than three-eighths (⅜) inch. Bentonite chips shall be hydrated in place. Bentonite chips shall be used in compliance with all manufacturers' instructions including pre-screening the material to eliminate fine-grained particles, installation rates, hydration methods, tamping, and other measures to prevent bridging. When grouting a casing, bentonite chips may only be used within three feet of land surface. Bentonite chips or pellets may only be used in accordance with the manufacturer's written instructions.

g. "Thermally Enhanced Grout" is a grout is used to seal or grout geothermal ground source heat loops. It is engineered to provide efficient heat transfer and to create a low permeability seal. Thermally Enhanced Grout may only be used in accordance with the manufacturer's written instructions.

(38) "Health Director" means the administrative head of the Guilford County Department of Public Health appointed pursuant to Chapter 130A-40 of NC General Statutes, or their authorized representative.

(39) "Health Department" means the Guilford County Department of Health and Human Services, Division of Public Health.

(40) "Injection Well" means any excavation which is cored, bored, drilled, jetted, dug, or otherwise constructed, whose depth is greater than its largest surface dimension and which is used, or intended to be used, for the injection of fluids or solids into the

subsurface or groundwaters. "Injection Well" includes "Closed-Loop Geothermal Injection Well System" and "Geothermal Heating/Cooling Water Return Well".

(41) "Installing pumps and pumping equipment" means placing and preparing pumps and pumping equipment for operation, including all construction involved in making entrances to the well and establishing seals.

(42) "Known source of release of contamination" means a location where any of the following activities, facilities, or conditions have been documented by the Department of Environmental Quality or a local health department:

(a) Groundwater contamination incidents arising from agricultural operations, including application of agricultural chemicals pursuant to 15A NCAC 02L;
(b) Groundwater contamination associated with the construction or operation of injection, monitoring, and other wells subject to permitting under the Well Construction Act and 15A NCAC 02C;
(c) Groundwater contamination associated with the operation of non- discharge, discharge (NPDES) facilities, land application of animal waste, and other activities subject to permitting under G.S. 143-215.1;
(d) Releases of hazardous waste or constituents that currently exceed the Groundwater Quality Standards listed in 15A NCAC 02L at facilities governed under G.S. 130A-294;
(e) Dry-Cleaning Solvent Cleanup sites regulated under G.S. 143-215.104(A);
(f) Pre-regulatory landfills and Inactive hazardous substance or waste disposal sites governed under the Inactive Hazardous Sites Act of 1987, G.S. 130A-310;
(g) Solid waste facilities subject to 15A NCAC 13B that have monitoring wells with exceedances of the Groundwater Protection Standards as defined in 15A NCAC 13B .1634(g) and (h);
(h) Releases of petroleum and hazardous substances subject to G.S. 143-215.75 through 215.98;
(i) Sites that fall within the authority of the Brownfields Property Reuse Act as defined by G.S. 130A, Article 9 Part 5;
(j) Contamination associated with pollution sources in soils or other sites known or suspected to have exceeded the Groundwater Quality Standards listed in 15A NCAC 02L; or
(k) Contamination known to the local health department through experience with the property, surrounding properties, or information provided by the applicant.

(43) "Liner pipe" means pipe that is installed inside a completed and cased well for the purpose of preventing the entrance of contamination into the well or for repairing ruptured, corroded, or punctured casing or screens.

(44) "Monitoring well" means any well constructed for the primary purpose of obtaining samples of groundwater or other liquids for examination or testing or for the observation or measurement of groundwater levels. Any well using "Push Technology" shall be considered a monitoring well as defined herein if it is not permanently abandoned within 24 hours after initiation of construction. This definition excludes lysimeters, tensiometers, and other devices used to investigate the characteristics of the unsaturated zone but includes piezometers, a type of monitoring

well that is constructed solely for the purpose of determining groundwater levels.

(45) "Monitoring well, air injection well, air sparging well, and recovery well permit" means a permit issued by the Guilford County Health Director or their designee permitting the construction, repair, operation, or abandonment of monitoring wells, air injection wells, air sparging wells, or recovery wells.

(46) "Non-Transient Non-Community Water System" or "NTNC" means a public water supply system that is not a community water system and that regularly serves at least 25 of the same persons over six months per year.

(47) "Non-potable water" means water containing bacteria, minerals, organic or inorganic chemicals or petroleum products of such quantity as to render the water unsafe, harmful, or generally unsuitable for domestic use.

(48) "Owner" means any person who holds the fee or other property rights in the well being constructed. [Note: Absent a contrary agreement in writing, the Health Division will presume that the well owner and the landowner are the same person.]

(49) "Owner of a monitoring well, air injection well, air sparging well, or recovery well" means the well owner as recorded on the monitoring well, air injection well, air sparging well and recovery well permit".

(50) "Person" means any and all persons including individuals (natural persons), firms, partnerships, associations, public or private institutions, municipalities or political subdivisions, governmental agencies or private or public corporations organized or existing under the laws of this state or of any other state or county.

(51) "Pitless adapters" are devices specifically manufactured to the standards specified under Chapter II Section III Subparagraph (L)(7) of these rules for the purpose of allowing a subsurface lateral connection between a well and a plumbing appurtenance. It shall be designed to attach to one or more openings through a well casing and constructed to prevent the entrance of contaminants into the well or potable water supply through such opening(s), to conduct water from the well, to protect the water from freezing or extremes of temperature, and to provide access to water system parts within the well.

(52) "Plat" means a property survey prepared by a registered land surveyor, drawn to a scale of one inch equals no more than 60 feet, that includes: the specific location of all structures and proposed structures and appurtenances, including but not limited to decks, porches, pools, driveways, out buildings, existing and proposed wastewater systems, existing and proposed wells, springs, water lines, surface waters or designated wetlands, easements, including utility easements, and existing or proposed chemical or petroleum storage tanks above or below ground. "Plat" also means, for subdivision lots approved by the local planning authority and recorded with the county register of deeds, a copy of the recorded subdivisions plat that is accompanied by a site plan that is drawn to scale.

(53) "Potable water" means water of such quality that it is suitable for human consumption.

(54) "Private water supply system" means any potable water supply system that is not a public water supply system.

(55) "Public water supply system" means a system for the provision to the public of piped water for human consumption if the system serves 15 or more service connections or which regularly serves 25 or more individuals.

(56) "Pumps or pumping equipment" means the well pump, pump pipe and any other equipment or materials used or intended to be used for withdrawing or obtaining groundwater.

(57) "Recovery well" means any well constructed for the purpose of removing contaminated groundwater, other liquids, or vapor from the sub-surface.

(58) "Redevelopment" means work involved in acidizing, airlifting, chemical treatment, cleaning, deepening or changing depths, "dry icing", freezing, hydraulic fracturing, jetting, perforating, reaming, scrubbing, surging, or otherwise redeveloping a well excavation or any other work which requires breaking or opening the well seal. "Redevelopment" does not apply to routine pump maintenance or replacement; however, routine pump maintenance or replacement shall be followed by disinfection of the water supply system and proper replacement of the seal.

(59) "Repair" means work involved in deepening or changing depths, reaming, sealing, lining, perforating, screening, cleaning, acidizing, "dry icing", freezing, hydraulic fracturing, or otherwise redeveloping a well excavation or any other work which requires breaking or opening the well seal. "Repair" does not apply to routine pump maintenance or replacement; however, routine pump maintenance or replacement shall be followed by disinfection of the water supply system and proper replacement of the seal.

(60) "Responsible party" means the person or persons responsible for oil or chemical contamination resulting from a release from any storage tank or oil or chemical spill and, as such, is responsible for payment of all fees associated with permitting of all monitoring wells, air injection wells, air sparging wells, or recovery wells (both on and offsite) associated with the contamination incident. The responsible party shall remain liable for all monitoring well fees until such time as the contamination incident requires no further action as documented by the State of North Carolina. This definition shall also apply to any person or persons desiring to monitor soil and/or groundwater integrity for the purpose of quality assurance/quality control.

(61) "Rock Screenings" means an approved material used in concrete grout.

(62) "Sealed" means no detectable leakage under the casing be allowed to enter the borehole.

(63) “Seated” means a part or surface on or in which another part or surface rests; to fix firmly in place; to rest or fit into another part.

(64) “Settleable solids” means the volume of solid particles in a well-mixed one-liter sample which will settle out of suspension, in the bottom of an Imhoff Cone, after one hour. This measurement shall be reported in milliliters per liter.

(65) "Sewer Lateral" means the sewer pipe connecting a structure to a wastewater treatment collection system or a municipal or commercial sewer main line.

(66) “Single well step-down pumping test” (or pumping test) means a test made by pumping a well for a specified time and observing the change in the hydraulic head in the aquifer. A pumping test is used to determine the capacity of the well and the hydraulic characteristics of the aquifer. Pumping test is also called an “aquifer test”.

(67) “Site" means the land or water area where any facility, activity or situation is physically located, including adjacent or other land used in connection with the facility, activity, or situation.

(68) "Site plan" means a drawing, not necessarily drawn to scale, that shows the existing and proposed property lines with dimensions, and the specific location of all structures and proposed structures and appurtenances, including decks, porches, pools, driveways, out buildings, existing and proposed wastewater systems, existing and proposed wells, springs, water lines, surface waters or designated wetlands, easements, including utility easements, and existing or proposed chemical or petroleum storage tanks above or below ground.

(69) “Specific capacity” means the yield of the well expressed in gallons per minute per foot of draw-down of the water level (gpm/ft.-dd) per unit of time.

(70) “Spool-piece pipe” means a connecting (spool) section of pipe which can be easily removed and allow the immediate installation of a meter without further pipe modification.

(71) “Static water level” means the level at which the water stands in the well when the well is not being pumped and is expressed as the distance from a fixed reference point to the water level in the well.

(72) “Suspended solids” means the solid particles in a sample of water which are retained by a standard glass microfiber filter, with pore openings of one and one-half microns, when dried at a temperature of 103 to 105 degrees Fahrenheit.

(73) “Temporary well” means a well, other than a water supply well that is constructed to determine aquifer characteristics, and which will be properly abandoned or converted to a permanent well within five days (120 hours) of the completion of drilling of the borehole.

(74) "Transient Non-Community Water System" or "TNC" means a public water supply system that is not a community water system and does not regularly serve at least 25 of the same persons over six months per year.

(75) "Turbidity" means the cloudiness in water, due to the presence of suspended particles such as clay and silt that may create aesthetic problems or analytical difficulties for determining contamination. Turbidity measure in Nephelometric Turbidity Units (NTU) is based on a comparison of the cloudiness in the water with that in a specially prepared standard.

(76) "Unconsolidated rock" means those rock formations that are not firm and coherent, solidified or cemented, such as sand rock, sand, clay, shell, saprolite or decaying rock.

(77) "Vent" means a permanent opening in the wellhead installed for the purpose of allowing changes in the water level in a well due to natural atmospheric changes or to pumping. A vent may also serve as an access port.

(78) "Water supply" means any potable source of water.

(79) "Water supply system" means well, well pump and pipe used in connection with or pertaining to the operation of a water supply, including pressure tank and fittings.

(80) "Water supply wells other than for a single-family residence" means and includes water supply wells for industrial/commercial facilities, multiple connection residential wells, and community wells. These wells can be used for drinking, bathing, gardens, or industrial or commercial processing.

(81) "Water-tight" means put or fit together so tightly that water cannot enter or pass through. For example, water-tight pipe may be filled with water and tested under pressure between three and five pounds per square inch (psi) for several minutes to detect leaks.

(82) "Well" means any excavation that is cored, bored, drilled, jetted, dug, or otherwise constructed for the purpose of locating, testing, developing, draining, or recharging any groundwater reservoirs or aquifer, or that may control, divert, or otherwise cause the movement of water from or into any aquifer.

(83) "Well contractor" means a person in trade or business who undertakes to personally supervise or manage the performance of a well contractor activity on the person's behalf or for any person, firm, or corporation in accordance with the well contractor certification requirements of 15A NCAC 27. Also, "well contractor" shall be deemed to include a person who constructs, repairs, or abandons a well that is located on land owned or leased by that person.

(84) "Well contractor activity" means the construction, installation, redevelopment, repair, alteration, abandonment, or disinfection of any well. This also includes breaking the well seal and installation of a pump or other equipment in a well.

(85) "Wellhead" means the upper terminal of the well including adapters, ports, valves, seals, and other attachments.

(86) "Well operation permit" means a permit issued by the Guilford County Health Director or their designee to operate a well. This permit may include specific requirements for maintenance and operation, restrictions on water usage, responsibilities of the owner, and other requirements for the continued proper performance of the well.

(87) "Well permit" means a permit issued by the Guilford County Health Director or their designee permitting the construction, repair, or abandonment of any water supply well as defined in these rules.

(88) "Well seal" means an approved arrangement or device used to cap a well or to establish and maintain a junction between the casing or curbing of a well and the piping or equipment installed therein, to prevent contaminants from entering the well at the upper terminal.

(89) "Well system" means two or more wells connected to the same distribution or collection system or, if not connected to a distribution or collection system, two or more wells serving the same site.

(90) "Well system operations permit" means a permit issued by the Guilford County Health Director or their designee to the well owner to operate a well water supply system.

(91) "Well yield capacity" shall mean the maximum quantity of water that a well will yield continuously for one hour at the time of well completion.

(92) "Yield" means the volume of water or other fluid per time that can be discharged from a well under a given set of circumstances.

SECTION III REGISTRATION

(A) Well Contractor Registration

Every person, firm, or corporation that employs persons performing Well Contractor activities in Guilford County should provide contact information to the Guilford County Health Department. A referral list may be maintained by the Guilford County Health Director or their designee for notification purposes.

(B) North Carolina Well Contractor Certification

No person shall perform, manage, or supervise any well contractor activity without being certified according to the well contractor certification requirements of 15A NCAC 27.

According to North Carolina General Statute § 87-98.4. Well contractor certification required;
(a) Certification Required. – No person shall perform, manage, or supervise any well contractor activity without being certified under this Article. A person who is not a certified well contractor or who is not employed by a certified well contractor shall not offer to perform any well contractor activity unless the person utilizes a certified well contractor to perform the well contractor activity and, prior to the performance of the well contractor activity, the person discloses to the landowner in writing the name of the certified well contractor who will perform the well contractor activity, the certification number of the well contractor, and the name of the company that employs the certified well contractor.

SECTION IV VARIANCE

The Guilford County Health Director may grant a variance from any construction standard in these rules provided such variance is not in conflict with a requirement of NCAC 15A 2C .0100, NCAC 15A 2C .0200, NCAC 15A 2C .0300, or 15A NCAC 18A .3800. When a conflict exists, a variance must first be issued by the agency enforcing the state rule before a local variance may be issued. Any variance will be in writing and may be granted upon oral or written application to the Guilford County Health Director by the person responsible for the construction of the well or the property owner responsible for the proposed addition for which the variance is sought, if the Guilford County Health Director finds facts to support the following conclusions:

1. That the use of the well or the location of the proposed addition will not endanger human health and welfare of the groundwater.

2. That construction in accordance with the standards was not technically feasible in such a manner as to afford a reasonable water supply at a reasonable cost.

The Guilford County Health Director may grant a variance for conditions such as separation from a property line or allow use of less than 44 feet of casing or liner pipe for new well construction or well repair. For wells constructed with separation distances less than those specified in Chapter 2 Section III Subparagraph (A)(3) of these Rules based on lot size or other fixed conditions as specified in Chapter 2 Section III Subparagraph (A)(4) of these Rules, the source shall be greater than 43 feet below land surface.

The Guilford County Health Director may require the variance applicant to submit such information as they deem necessary to make a decision to grant or deny the variance. The Guilford County Health Director may impose such conditions on a variance, or the use of a well or proposed addition for which a variance is granted as they deem necessary to protect human health and welfare and the groundwater resources. The brief findings of fact supporting any variance under this rule shall be in writing and made part of the variance.

CHAPTER 2

WELL CONSTRUCTION, REPAIR, AND ABANDONMENT FOR WATER SUPPLY WELLS

SECTION I APPLICATION

(A) A complete application shall be submitted to the Guilford County Health Director or their designee by an owner or authorized agent who intends to construct a water supply well. The following information will be required:

1. Names, addresses, e-mail addresses, and phone numbers of the proposed well property owner and/or authorized agent;

2. Signature of owner or agent, including an authorized digital signature;

3. Address and Guilford County Real Estate Identification Number of the property where the proposed well is to be located;

4. A plat or complete site plan as defined in these rules;

5. Proposed use of water (domestic, irrigation, etc.);

6. Intended use(s) of the property;

7. Other information deemed necessary by the Guilford County Health Director or their designee to determine the location of the property and any site characteristics such as existing sewage disposal systems, easements or rights of way, existing wells or springs, surface water or designated wetlands, chemical or petroleum storage tanks, landfills, waste storage, known underground contamination and any other characteristics or activities on the property or adjacent properties that could impact groundwater quality or suitability of the site for well construction;

8. Any current or pending restrictions regarding groundwater use as specified in G.S. 87-88(a); and

9. Any variances regarding well construction or location issued under 15A NCAC 02C .0118.

SECTION II WELL PERMITS

(A) Before issuing a well construction permit, the Guilford County Health Director or their designee shall conduct a field investigation to evaluate the topography, landscape position, available space, and potential sources of groundwater contamination on or around the site on which a water well is to be located. The Guilford County Health Director or their designee shall issue a water well construction permit after determining the site can be permitted for a well meeting the

rules of this chapter. Notwithstanding the above, the Guilford County Health Director or their designee shall not issue a construction permit for a well in violation of restrictions regarding groundwater use established pursuant to G.S. 87-88(a). The construction permit shall include a site plan showing the location of potential sources of contamination and area(s) suitable for well construction.

The Guilford County Health Director or their designee shall issue a written notice of denial of a construction permit if it determines a water supply well cannot be constructed in compliance with the rules of this chapter. The notice of denial shall include reference to specific laws or rules that cannot be met and shall be provided to the applicant.

(B) No person shall construct, repair, or abandon a water well without first obtaining a well permit from the Director or their designee. A well repair permit is not required for repairs involving only pumps, pumping equipment, or well disinfection.

(C) If there is an improperly abandoned well(s) on the site the construction permit shall be conditioned upon permanent abandonment of any improperly abandoned well(s) in accordance with the rules of this chapter.

(D) Water Supply Wells

1. It shall be unlawful for any person to commence any well contractor activities in Guilford County without first obtaining a well permit from the Guilford County Health Director or their designee. The well permit shall be obtained by the well owner or their authorized agent. The well permit is valid for one year from date of issuance. If construction or repairs have not been commenced within one year from the date of issuance of the well permit, the well permit then becomes invalid. When a well permit has become invalid, construction or repairs may not be commenced until a well permit has been updated and/or modified by the Guilford County Health Director or their designee or a new well permit is issued.

2. The location of all new proposed well water supplies in Guilford County shall comply with these Rules. Well owners or their authorized agents may want to confer with the Guilford County Health Director or their designee, prior to any construction activity on the lot, to inspect the location of the water supply well. Any well site for a Community Water System or a Non-Transient Non-Community Water System shall be approved by a representative of the NC Department of Environmental Quality, Division of Water Resources, Public Water Supply Section.

3. The well contractor shall maintain a copy of the well construction permit, well repair permit, or well abandonment permit on the job site at all times during the construction, repair, or abandonment of the well and shall meet all the conditions of the permit.

4. A Guilford County Health Department representative is authorized to witness any well contractor activity or pump installation in Guilford County as part of his

inspection. Failure of the owner or contractor to permit inspection of any material or observation of any well contractor activity or pump installation in Guilford County will be grounds for the revocation of the well permit.

5. The Guilford County Health Director or their designee is authorized to revoke or suspend any well permits issued pursuant to these Rules, upon the determination that these Rules are not being fully complied with.

SECTION III STANDARDS OF CONSTRUCTION

According to North Carolina General Statute § 87-98.4. Well contractor certification required;
(a) Certification Required. – No person shall perform, manage, or supervise any well contractor activity without being certified under this Article. A person who is not a certified well contractor or who is not employed by a certified well contractor shall not offer to perform any well contractor activity unless the person utilizes a certified well contractor to perform the well contractor activity and, prior to the performance of the well contractor activity, the person discloses to the landowner in writing the name of the certified well contractor who will perform the well contractor activity, the certification number of the well contractor, and the name of the company that employs the certified well contractor.

(A) Location

1. The well shall not be located in an area generally subject to flooding. Areas which have a propensity for flooding include those with concave slope, alluvial or colluvial soils, gullies, depressions, and drainage ways. A water supply well shall not be located within a wetland as defined in 15A NCAC 2B .0202 or any area where surface water or runoff will accumulate around the well due to depressions, drainage ways, and other landscapes that will concentrate water around the well.

2. Special consideration shall be given for wells located within a one-thousand-five-hundred-foot radius around a known source of release of contamination. Detailed information must be obtained from the Guilford County Health Department prior to issuance of a well permit. Well permit requirements will be based upon this information.

3. The minimum horizontal separation between a well and potential sources of groundwater contamination which exist or have been permitted at the time the well is constructed, shall be as follows unless otherwise specified:

    a. Septic tank and drainfield, including the drainfield repair area, with the well serving a single-family dwelling----------50 feet
    b. Septic tank and drainfield, including the drainfield repair area. that is a saprolite system as described in 15A NCAC 18A .1956, with the well serving a single-family dwelling----------100 feet
    c. Septic tank and drainfield, including the drainfield repair area, with the well

serving any other facility ----------100 feet
d. Other sub-surface ground absorption waste disposal system ----------100 feet
e. Industrial or municipal residuals disposal or wastewater irrigation sites ----------100 feet
f. Industrial or municipal sewage or liquid-waste collection or sewer main, constructed to water main standards as stated in the American Water Works Association (AWWA) Standards C600 and/or C900.----------50 feet
g. Water-tight sewer lateral lines from a residence or other non-public system to a sewer main or other wastewater disposal system----------25 feet
h. Other sewage or liquid-waste collection or transfer facility ----------100 feet
i. Cesspools and privies ----------100 feet
j. Animal feed lots, as defined by G.S. 143-215.10B(5), or manure piles ---------- ----------100 feet
k. Fertilizer, pesticide, herbicide, or other chemical storage areas----------100 feet
l. Non-hazardous waste storage, treatment, or disposal lagoons ----------100 feet
m. Sanitary landfills, hazardous waste landfills, municipal solid waste landfill facilities, incinerators, construction and demolition (C&D) landfills, and other disposal sites except Land Clearing and Inert Debris landfills ----------500 feet
n. Land Clearing and Inert Debris (LCID) landfills ----------100 feet
o. Animal barns ----------100 feet
p. Building perimeters, including any attached structures such as garages or decks, regardless of foundation construction type----------50 feet
q. Surface water bodies----------50 feet
r. Chemical or petroleum fuel underground storage tanks systems regulated under 15A NCAC 2N:
    (I) with secondary containment----------50 feet
    (II) without secondary containment ----------100 feet
s. Aboveground or underground storage tanks which contain petroleum fuels used for heating equipment, boilers, or furnaces with the exception of tanks used solely for storage of propane, natural gas, or liquefied petroleum gas ----------100 feet
t. Aboveground or underground propane or liquefied petroleum gas storage tanks----------15 feet
u. All other petroleum or chemical storage tank systems ----------100 feet
v. Cemetery or Burial Ground ----------100 feet
w. All other potential sources of ground water contamination----------100 feet
x. Property boundaries ----------10 feet
y. Installation or extension of water-tight sewer lines near an existing well ----------See Subparagraph (A)(6) below

4. For a well on a lot serving one single-family residence where lot size or other fixed conditions preclude the separation distances specified in Subparagraph (A)(3) of this section, the required horizontal separation distances shall be the maximum possible but shall in no case be less than the following:

a. Other sewage or liquid waste collection or transfer facility ----------50 feet
b. Industrial or municipal sewage or liquid-waste collection or sewer main, constructed to water main standards as stated in the AWWA Standards C600

and/or C900. ----------25 feet
c. Building perimeters, including any attached structures such as garages or decks, regardless of foundation construction type----------25 feet
d. Animal barns----------50 feet
e. Aboveground or underground storage tanks which contain petroleum fuels used for heating equipment, boilers, or furnaces with the exception of tanks used solely for storage of propane, natural gas, or liquefied petroleum gas ----------50 feet
f. All other potential sources of ground water contamination ----------50 feet
g. Installation or extension of water-tight sewer lines near an existing well ----------See Subparagraph (A)(6) below

5. Separation distances as required in Subparagraphs (A)(3) or (A)(4) of this section apply to all additions. Additions of a type not covered by Subparagraphs (A)(3) or (A)(4) of this section shall be located the maximum distance possible from any existing well but shall not be located less than 25 feet. No person shall place any new potential sources of groundwater contamination closer to the well than the separation distances specified in these rules.

6. When water-tight sanitary sewer lines are installed or extended, they shall maintain a minimum distance of 100 feet from any existing private or public water supply well. When this separation will not be maintained, water-tight sewer piping material, testing methods, and acceptability standards meeting water main standards shall be required, in which case the minimum separation distance may be reduced to 25 feet from an existing private water supply well and 50 feet from an existing public water supply well. Locating water-tight sewer lines closer to an existing water supply well shall necessitate proper abandonment of the well according to these rules. All appurtenances shall be outside the 100-foot radius.

7. Relation of Water Lines to Sewage

   a. Lateral separation of sewage and water lines

      Water lines shall be laid at least ten feet laterally from existing or proposed septic systems, septic tank, drainfield, and water-tight sewage or liquid waste collection or transfer pipes. Water lines may be installed less than ten feet laterally from water-tight sewage or liquid waste collection or transfer pipes when both the water line and the water-tight sewage or liquid waste collection or transfer pipes are encased in pipes constructed of ferrous materials with joints that are equivalent to water main standards. Both the water line and the water-tight sewage or liquid waste collection or transfer pipes must remain encased until the horizontal separation distance is at least ten feet.

   b. Crossing a water line over a water-tight sewage or liquid waste collection or transfer pipe

      When it is necessary for a water line to cross over a water-tight sewage or liquid waste collection or transfer pipe, the water line shall be laid at such

elevation that the bottom of the water line is at least 18 inches above the top of the water-tight sewage or liquid waste collection or transfer pipe, unless local conditions or barriers prevent an 18 inch vertical separation - in which case both the water line and water-tight sewage or liquid waste collection or transfer pipe shall be encased in pipes constructed of ferrous materials with joints that are equivalent to water main standards for a distance of ten feet on each side of the point of crossing. A section of encasing pipe shall be centered at the point of crossing.

c. Crossing a water line under a water-tight sewage or liquid waste collection or transfer pipe

Whenever it is necessary for a water line to cross under a water-tight sewage or liquid waste collection or transfer pipe, both the water line and water-tight sewage or liquid waste collection or transfer pipe shall be encased in pipes constructed of ferrous materials with joints that are equivalent to water main standards for at least ten feet on each side of the point of crossing. A section of encasing pipe shall be centered at the point of crossing.

8. The well shall not be located in any public or private easement or right-of-way. This shall not apply to well easements.

9. A well or well system, serving more than one single-family dwelling but with a designed capacity of less than 10,000 GPD, must meet the separation requirements specified in Subparagraph (A)(3) of this section.

10. A well or well system with a designed capacity of 10,000 GPD or greater must be located a sufficient distance from known or anticipated sources of groundwater contamination so as to prevent a violation of applicable ground water quality standards, resulting from the movement of contaminants, in response to the operation of the well or well system at the proposed rate and schedule of pumping.

11. Wells drilled for Community Water Systems or Non-Transient Non-Community Water Systems regulated by the NC Department of Environmental Quality Division of Water Resources, Public Water Supply Section shall meet the siting and all other requirements of that Section.

12. Actual separation distances must conform with the most stringent of applicable federal, state, or local requirements.

13. A well must be at a site that permits access for maintenance, repair, treatment, testing and such other attention as may be necessary. When a well easement is necessary, the access easement shall have a minimum width of ten feet and the easement shall extend a minimum of ten feet beyond the outside diameter of the casing.

14. After receiving a permit to construct a well, the property owner or his agent shall notify the Guilford County Health Director or their designee prior to well construction if any of the following occur:
    a. The separation criteria specified in this section cannot be met;
    b. The residence or other structure is located other than indicated on the permit;
    c. The use of the structure is changed from the use specified on the permit;
    d. The septic system needs to be changed from the location indicated on the permit;
    e. Landscaping changes have been made that may affect the integrity of the well;
    f. There are current or pending restrictions regarding groundwater use as specified in G.S. 87-88(a);
    g. The water source for any well intended for domestic use is adjacent to any water-bearing zone suspected or known to be contaminated; or
    h. Any other changes occur in the information provided in the application for the well permit.

(B) Drilling Fluids and Additives

1. Drilling fluids and additives shall not contain organic or toxic substances or include water obtained from surface water bodies and may be comprised only of:

    a. the formational material encountered during drilling; or

    b. materials manufactured specifically for the purpose of borehole conditioning or water well construction.

2. Lubricants used on drill pipe and down hole hammers and lubricating liquids injected into the air flowing through the drill stem shall be designed and approved for use in potable water supply wells.

3. Drilling fluids shall be obtained from a potable source or shall be disinfected by adding chlorine to produce a 100-parts-per-million residual in the drilling fluids prior to use.

(C) Source of Water

1. Shall be at least 43 feet below land surface.

2. Shall be from a water bearing zone that does not contain non-potable water.

(D) Casing

1. All water bearing zones that contain non-potable water shall be adequately cased and grouted so that the contamination of underlying or overlying zones shall not occur.

2. Every well shall be cased with the bottom of the casing adequately seated and sealed to a minimum depth of at least 43 feet below the surrounding land surface.

3. The top of the casing shall be terminated by the well contractor at least 12 inches above the surrounding land surface. Prior to removing his equipment from the site, the well contractor shall seal the top of the casing with a water-tight cap or well seal to preclude the entrance of contaminants into the well.

4. The well shall be adequately cased to prevent formational material from entering the well after the well has been developed and completed by the well contractor.

5. The casing in wells constructed to obtain water from a consolidated rock formation shall be:

    a. adequate to prevent any formational material from entering the well in excess of the levels specified in Paragraph (H) of this section; and

    b. firmly seated and sealed at least five feet into the rock.

6. When non-rotary equipment is used to construct a well in a consolidated rock formation an outer casing shall be used down to the consolidated rock. The inside diameter of the outer casing shall be at least 1¼ inches greater than the outside diameter of the finish casing used to construct the well. The minimum inside nominal diameter of the finish casing shall be 6.125 inches. If the outer casing is not removed, it must be grouted according to Subparagraphs (E)(3), (E)(5), and (E)(9) of this section and the annular space between the finish casing and outer casing shall be filled completely with neat-cement grout or liner sand cement grout.

7. The casing in wells constructed to obtain water from an unconsolidated rock formation (such as gravel, sand, or shells), shall extend at least one foot into the top of the water bearing formation.

8. The Guilford County Health Director or their designee may inspect the casing material before it is installed, as the casing is installed in a bore hole and/or after the casing is set. The well contractor shall strictly comply with the inspections scheduling guideline as outlined in the most recent Guilford County "Inspection of Wells That Supply Water for Human Consumption" guideline.

9. Galvanized Steel Well Casing

    a. The casing shall be new.

    b. The casing shall be new, seamless, or electric-resistance welded galvanized steel pipe. Galvanizing shall be done in accordance with requirement of ASTM A53/A53M-07, which is hereby incorporated by reference, including subsequent amendments and editions, and can be obtained from ASTM International.

    c. The casing, threads and couplings shall meet or exceed the specifications of

ASTM A53/A53M-07 or A589/A589M-06, which is hereby incorporated by reference, including subsequent amendments and editions, and can be obtained from ASTM International.

d. The minimum wall thickness for a given diameter shall equal or exceed that specified in Table 1.

e. Each length of galvanized steel well casing shall be legibly marked by rolling, stamping, or stenciling to show the name or brand of the manufacturers and ASTM designation number.

f. Shall have water-tight joints that are electrically welded or threaded and coupled with heavy recessed-type couplings. The couplings should cover the threads when power tight.

g. Shall be equipped with a drive shoe if the casing is driven in a consolidated rock formation. The drive shoe shall be made of forged, high carbon, tempered seamless steel and shall have a beveled, hardened cutting edge.

10. Thermoplastic Well Casing

a. The casing shall be new.

b. The casing and joints shall meet or exceed all the specifications of ASTM F480-06b, except that the outside diameters shall not be restricted to those listed in ASTM F480-06b, which is hereby incorporated by reference, including subsequent amendments and editions, and can be obtained from ASTM International.

c. Solvent cement used for joining sections of thermoplastic well casing, liner pipe, pump pipe or any connections thereto shall bear the National Sanitation Foundation (NSF) seal of approval for use on potable water supply systems and shall be marked with the designation ASTM D-2564 as meeting all the requirements of ASTM D-2564, requirements and recommendations of ANSI/ASTM.

d. Shall have a minimum wall thickness and tolerance which meets or exceeds requirements for SDR-21 thermoplastic water well casing pipe for a maximum depth of 185 feet. Galvanized steel well casing as specified in Subparagraph (D)(9) of this section shall be required for the entire length of the casing for any well in which the casing depth exceeds 185 feet.

e. Shall be equipped with a coupling or other device approved by the manufacturer of the casing that is sufficient to protect the physical integrity of the thermoplastic casing during the processes of seating and grouting the casing and subsequent drilling operations.

f. Shall be installed in straight, obstruction free bore holes only.

g. Thermoplastic casing shall not be driven into any formation by impact but may be pushed.

11. Stainless Steel Well Casing

a. The casing shall be new.

b. Stainless steel casing, threads and couplings shall conform in specifications to the general requirements in ASTM A530/A530M-04a, which is hereby incorporated by reference, including subsequent amendments and editions, and can be obtained from ASTM International and also shall conform to the specific requirements in the ASTM standard that best describes the chemical make-up of the stainless steel casing that is intended for use in the construction of the well.

c. Stainless steel casing shall be equipped with a drive shoe if the casing is driven in a consolidated rock formation. The drive shoe shall be made of forged, high carbon, tempered seamless steel and shall have a beveled, hardened cutting edge.

d. Stainless steel casing shall have a minimum wall thickness that is equivalent to standard schedule number 10S.

(E) Grouting

1. The well contractor shall contact the Guilford County Health Director or their designee to schedule a grout inspection before grouting a water well. Contact shall include the location, permit number and anticipated time for grouting each water well. The Guilford County Health Director or their designee may inspect the grout and annulus before the grout is placed around the casing and observe as the grout is placed around the casing. The well contractor shall strictly comply with the inspections scheduling guideline as outlined in the Guilford County "Inspection of Wells That Supply Water for Human Consumption" guideline.

2. Upon completion of a grout inspection, the Guilford County Health Director or their designee shall provide a written certification on the well permit that a grout inspection was completed and is in compliance with these rules. When the Guilford County Health Director or their designee is unable to conduct a grout inspection within one hour of the scheduled time, the well contractor may grout a well without a grout inspection by the Guilford County Health Director or their designee. The well contractor shall provide a written certification to the Guilford County Health Director or their designee that the well has been grouted in compliance with the rules of this chapter. A completed Residential Well Construction Record form GW-1a indicating the well was grouted in compliance with the rules of this chapter shall serve as the well contractor's grout certification. For purposes of issuing a certificate of completion, the well contractor's grout certification shall be accepted by the Guilford County Health

Director or their designee as evidence the grout complies with these rules if the Guilford County Health Director or their designee:

a. was contacted by the well contractor to schedule a grout inspection;

b. was unable to inspect the grouting of the well within one hour following the scheduled time; and

c. upon final inspection, finds no evidence to indicate the well grout does not comply with these rules.

3. Casing shall be grouted to a minimum depth of 20 feet below land surface.

4. Casing shall be grouted as necessary to seal off, all aquifers or zones that contain contaminated, saline, or other non-potable water so that contamination of overlying and underlying aquifers or zones shall not occur.

5. Where grouting is required by the provisions of this section, the grout shall extend outward from the casing wall to a minimum thickness equal to either one-third (⅓) of the diameter of the outside dimension of the casing or two inches, whichever is greater (see Table 2); excepting, however, that large diameter bored wells shall meet the requirement of Subparagraph (E)(14) of this section. In no case shall a well be required to have an annular grout seal thickness greater than four inches.

6. Bentonite slurry grout may be used in that portion of the bore hole that is at least three feet below land surface. Bentonite slurry grout must be placed in the annular space by use of either the pumping or pressure method. That portion of the bore hole above the bentonite slurry grout up to land surface shall be filled with a cement or concrete grout or bentonite chips that are hydrated in place. Bentonite chips may only be used in accordance with the manufacturer's written instructions.

7. The grout shall be placed around the casing by one of the following methods:

a. Pressure - grout shall be pumped or forced under pressure through the bottom of the casing until it fills the annular area around the casing and overflows at the surface.

b. Pumping - grout shall be pumped into place through a hose or pipe extended to the bottom of the annular space which can be raised as the grout is applied. The grout hose or pipe shall remain submerged in grout during the entire application.

c. Other - the annular space shall be completely filled with cement grout by any other method that will ensure complete filling of the space, provided that the annular area is clean, dry and does not contain water. Gravity flow shall not be used if water or any visible obstruction is present in the annular space

within the applicable minimum grout depth specified in these rules at the time of grouting. If the grout is bentonite slurry it must be emplaced by either the pumping or pressure method.

8. Where consolidated rock is encountered at a depth of less than 20 feet below land surface such that the annular space around the casing (as required by E(5) of this section) may not be kept free of formation material from the drilling process to a minimum depth of 20 feet, the grout shall be placed around the casing immediately following the placement of the casing in the bore hole. Subsequent drilling operations may not continue until such time as the grout remains permanently in place around the well casing.

9. If an outer casing is installed, it shall be grouted by either the pumping or pressure method. The grout shall extend outward from the casing wall to a minimum thickness equal to either one-third (⅓) of the diameter of the outside dimension of the casing or two inches, whichever is greater.

10. With the exception of bentonite chips, the liquid and solid components of all grout mixtures shall be thoroughly blended prior to emplacement below land surface.

11. The well shall be grouted within seven days after the casing is set.

12. No additives which will accelerate the process of hydration shall be used in grout for thermoplastic well casing.

13. No fly ash, other coal combustion byproducts, or other wastes may be used in any grout.

14. For large diameter wells cased with concrete pipe or ceramic tile, the following shall apply:

    a. The bore hole shall have a minimum diameter of ~~six~~ eight inches larger than the outside diameter of the casing.

    b. The annular space around the casing shall be filled with grout to a depth of at least 20 feet below land surface.

    c. The annular space around the casing below the grout shall be filled with sand or gravel.

15. For wells constructed in locations where flowing artesian conditions are encountered or expected to occur, the well shall be adequately grouted to protect the artesian aquifer, prevent erosion of overlying material, and confine the flow within the casing.

(F) Well Screen

1. The well, if constructed to obtain water from an unconsolidated rock formation,

shall be equipped with a screen that will prevent the entrance of formation material into the well after the well has been developed and completed.

2. The well screen shall be of a design to permit the optimum development of the aquifer with minimum head loss consistent with the intended use of the well and with screen placement at intervals which allow for optimal water movement. The openings shall be designed to prevent clogging and shall be free of rough edges, irregularities or other defects that may accelerate or contribute to corrosion or clogging.

3. Multi-screen wells shall not connect aquifers or zones which have differences in water quality which would result in contamination of any aquifer or zone.

(G) Gravel and/or Sand-Packed Wells

1. In constructing a gravel and/or sand-packed well:

   a. The packing material shall be composed of quartz, granite, or similar mineral or rock material and shall be clean, of uniform size, water-washed and free from clay, silt, or other deleterious material.

   b. The size of the packing material shall be determined from a grain size analysis of the formation material and shall be of a size sufficient to prohibit the entrance of formation materials into the well in concentrations above those permitted by Paragraph (H) of this section.

   c. The packing material shall be placed in the annular space around the screens and casing by a fluid circulation method, to ensure accurate placement and avoid bridging.

   d. The packing material shall be disinfected.

   e. Centering guides must be installed within five feet of the top packing material to insure even distribution of the packing material in the bore hole.

2. The packing material shall not connect water bearing or zones which have differences in water quality that would result in deterioration of the water quality in any water bearing zone.

(H) Well Development

1. All water supply wells shall be developed by the well contractor.

2. Development shall include removal of formation materials, mud, drilling fluids and additives such that the water contains no more than:

   a. Five milliliters per liter of Settleable solids; and

b. Ten NTUs of turbidity as suspended solids.

3. Development does not require efforts to reduce or eliminate the presence of dissolved constituents which are indigenous to the ground water quality in that area. Typical dissolved constituents include, but are not limited to aluminum, calcium, chloride, iron, magnesium, manganese, sodium, and sulfate.

4. Upon completion of the well, the well shall be sufficiently free of obstacles including formation material as necessary to allow for the installation and proper operation of pumps and associated equipment.

5. The finished nominal diameter of the well at the depth of pump placement shall be a minimum $1^{7}/_{8}$ inches greater than the nominal diameter of the pump and/or motor. This shall not apply to wells which have a liner installed according to Section VI of this chapter.

(I) Well Yield

Well yield shall be reported in whole numbers to the nearest gallon per minute(gpm) for wells with one or more full gallon(s) per minute. Well yield shall be reported to the nearest one-half (½) (gpm) for wells with a yield of less than one full (gpm). The following scale shall be used to determine minimum well depths approved for specified amounts of yield for a well serving one single family dwelling.

GPM	Minimum Well Depth
½ or less	440’
1	360’
2	320’
3	280’
4	240’
5	200’
6	180’
7	160’
8	140’
9	120’
10-19	100’
20 or more	80’

In determining compliance with this chart, it shall be confirmed that the static water level is 50 feet or less from the surface of the ground. If the static water level exceeds 50 feet from the surface of the ground and the yield is less than eight (gpm), the total well depth shall be increased by the amount of static water level in excess of 50 feet from the surface of the ground. In cases where an individual property owner is drilling a well for his/her personal and immediate family use, a waiver may be signed, notarized, and recorded with the deed which would allow the well to be drilled less

than the required depth. However, such a waiver shall specify and require that the subject well be drilled meeting the depth/yield requirements as specified by Guilford County Well Rules in effect at the time ownership of the property changes. In cases where property owners/authorized agents indicate that a well is not producing according to the Record of Construction within one year of completion, the well contractor shall perform a pump test in the presence of the Guilford County Health Director or their designee to determine the yield. The Guilford County Health Director or their designee shall take appropriate actions upon observing such a well, if they deem the well accessible to equipment needed to complete any necessary repairs.

In cases where a well or well system is being constructed for the purpose of serving multiple family residences or other operations requiring high water usage, the well yield shall be consistent with the planned use as outlined on the well permit. The depth/yield requirements shall meet or exceed the requirements for a well serving one single family dwelling.

When submitting the Record of Construction for non-public water supply wells serving facilities other than one single family dwelling, the pump installer shall submit the specific brand and model information for the pump that is installed in the well. The Guilford County Health Director or their designee shall review the well Record of Construction, the Pump Record of Construction, and other data.

(J) Well Contractor Identification Plate

1. An identification plate showing the individual certification number of the well contractor shall be installed on the well within 72 hours after well construction or repair is complete.

2. The identification plate shall be constructed of a durable waterproof, rustproof metal or other material approved as equivalent by the Department of Environmental Quality.

3. The identification plate shall be permanently attached to either the aboveground portion of the well casing, surface grout pad, or enclosure floor around the casing where it is readily visible, easily readable, and in a manner that does not obscure the information on the identification plate. When attaching the identification plate to the aboveground portion of the well casing, rivets, non-removable fasteners, or permanent type adhesive shall be used. Self-tapping screws shall not be used to attach the identification tag to PVC casing.

4. The identification plate shall not be removed by any person.

5. The identification plate shall be stamped with a permanent legible marking to show the:

    a. total depth of well;
    b. casing or liner depth (ft.) and inside diameter (in.);
    c. screened interval of screened wall;

d. packing interval of gravel or sand-packed wells;
e. yield, in gallons per minute (gpm) or specific capacity in gallons per minute per foot of drawdown (gpm/ft-dd);
f. static water level and date measured; and
g. date well was completed or repaired.

(K) Pump Installation Information Plate

1. An information plate showing the individual certification number of the well contractor installing the pump shall be installed on the well within 72 hours after completion of the pump installation.

2. The information plate shall be constructed of a durable waterproof, rustproof, metal or other material approved as equivalent by the Department of Environmental Quality.

3. The information plate shall be permanently attached to either the aboveground portion of the well casing, surface grout pad or enclosure floor around the casing where it is readily visible, easily readable, and in a manner that does not obscure the information on the identification plate. When attaching the identification plate to the aboveground portion of the well casing, rivets, non-removable fasteners, or permanent type adhesive shall be used. Self-tapping screws shall not be used to attach the identification tag to PVC casing.

4. The information plate shall not be removed by any person.

5. The information plate shall be stamped with a permanent legible marking to show the:

   a. date the pump was installed;
   b. depth of the pump intake; and
   c. horsepower rating of the pump.

(L) Wellhead Completion and Equipment

1. The well pump must be installed in the well and the wellhead completed within 30 days of the date construction is begun on the well, or the well must be temporarily or permanently abandoned.

2. The top of the casing shall be cut off smooth and level, be free from dents and cracks, and shall terminate at least eight inches above the concrete slab around the casing where a four-inch-thick slab has been installed (the top of the casing shall be at least 12 inches above the surrounding land surface).

3. The well contractor identification plate, if removed or obscured during pump installation shall be relocated and permanently attached to the aboveground portion of the well casing, surface grout pad or enclosure floor around the casing where it is readily visible, easily readable, and in a location that does not obscure

the information on the identification plate.

4. All piping, wiring, and vents shall enter the well at least 12 inches above land surface, except where pitless adapters are used, and shall be adequately sealed to preclude the entrance of contaminants into the well. Waterproof caulk shall be used at the wiring penetration through the well seal.

5. Every well shall be equipped by the person completing the wellhead with a useable access port.

    a. The access port shall be located directly on top of the well if the pump is offset from the well.

    b. For wells on which the pump is installed directly over the well, an access port pipe shall be installed through the pump base or outside the well casing and terminate inside the well casing at some point below the base of the pump.

    c. The access port shall have a minimum inside diameter of one-half (½) inch, so that the position of the water level may be determined at any time.

    d. The access port shall be installed and maintained in such a manner as to prevent the entrance of water, dust, insects, or other foreign material, and to permit ready access for water level measurements.

6. Every artesian flowing well shall be constructed, equipped, and operated to prevent the unnecessary discharge of water. Flow shall be completely stopped unless the discharge is for beneficial use and only for the duration of that beneficial use. Flow discharge control shall be provided to conserve the groundwater resource and prevent or reduce the loss of artesian hydraulic head. Flow control may consist of valved pipe connections, watertight pump connections, receiving tank, flowing well pitless adapter, packer or other methods approved by the Department of Environmental Quality to prevent the loss of artesian hydraulic head and stop the flow of water as referenced in G.S. 87-88(d). Well owners shall be responsible for the installation, operation, and maintenance of such equipment.

7. Pitless adapters are allowed as a method of wellhead completion under the following conditions:

    a. The pitless adapter is manufactured specifically for the purpose of water well construction;
    b. Design, installation, and performance standards are those specified in ASSE Standard #1093-2019 PAS-97(2019) “Performance Requirements for Pitless Adapters, Pitless Units, and Well Caps” as adopted by the Water System Council’s Pitless Adapter Division, which is hereby incorporated by reference, including subsequent amendments and editions;
    c. The pitless adapter is compatible with the well casing;
    d. The top of the casing extends at least 12 inches above land surface; and

e. The pitless device has an access port.
f. If a pitless adapter is used as a method of wellhead completion, a sample tap shall be installed between the pump and the pressure tank by the person installing the pump for the purpose of obtaining water samples.

8. Each new well shall be equipped with a cover or enclosure which is free of cracks, holes, etc. and is determined to be approved by the Guilford County Health Director or their designee. No single dimension of the cover or enclosure shall exceed seven feet in length, and it should be secured firmly to the ground surface, while still being easily accessible for inspection. If a concrete floor is poured within the cover or enclosures, a drain hole must be provided to allow water to drain out.

   A new well designed to serve a water supply system where system components will require an area with an enclosure having a single dimension exceeding seven feet in length, shall have a four-inch-thick concrete floor. The enclosure shall be anchored to the floor and shall have a drain hole provided to allow water to drain out, with the well accessible for inspections.

9. The pumping capacity of the pump shall be consistent with the intended use and yield characteristics of the well.

10. The finished nominal diameter of the well at the depth of pump placement shall be a minimum $1^{7}/_{8}$ inches greater than the nominal diameter of the pump and/or motor. This shall not apply to wells which have a liner installed according to Section VI of this chapter.

11. The pump and related equipment for the well shall be located to permit easy access and removal for repair and maintenance.

12. The base plate of a pump placed directly over the well shall be designed to form a watertight seal with the well casing or pump foundation.

13. In installations where the pump is not located directly over the well, the annular space between the casing and pump intake or discharge piping shall be closed with a watertight seal preferably designed specifically for this purpose.

14. The wellhead shall be equipped with a screened vent to allow for the pressure changes within the well except when a suction lift type pump is used.

15. A threadless sample tap shall be installed between the pump and the pressure tank by the person installing the pump for the purpose of obtaining water samples. In the case of offset jet pump installations, the threadless sample tap shall be installed on the drive (pressure) side of the jet pump installations.

16. The threadless sampling tap shall be turned downward, located a minimum of 12 inches above land surface, floor, or well pad, and positioned such that a water

sample can be obtained without interference from the well cover, enclosure, slab, or any part of the wellhead.

17. If the wellhead is also equipped with a threaded hose bibb in addition to the threadless sampling tap, the threaded hose bibb shall be fitted with a backflow preventer or vacuum breaker.

18. A priming tee shall be installed at the wellhead in conjunction with offset jet pump installations.

19. Joints of any suction line installed underground between the well and pump shall be tight under system pressure.

20. The drop piping and electrical wiring used in connection with the pump shall meet all applicable underwriters' specifications. Waterlines running from the well to the pressure tank shall be a minimum 160 psi @ 73.4^{O} Fahrenheit rating, installed at least 24 inches below land surface, and shall be sleeved when passing through or under the building foundation or footing. When waterlines enter a basement, they shall meet the requirements of the North Carolina Plumbing Code for water distribution pipe. When the pressure tank is not located within the structure where the water distribution system is constructed, the waterlines running from the pressure tank to a point five feet from the structure housing the distribution system shall be a minimum 160 psi @ 73.4^{O} Fahrenheit rating, installed at least 24 inches below land surface, and shall be sleeved when passing through or under the building foundation or footing.

21. Contaminated water shall not be used for priming the pump.

SECTION IV DISINFECTION OF WELLS

(A) Any person constructing, repairing, testing, performing maintenance, or installing a pump in a water supply well shall disinfect the well upon completion of construction, repairs, testing, maintenance, or pump installation as follows:

1. Chlorine shall be placed in the well in sufficient quantities to produce a free chlorine residual of at least 100 parts per million in the well. The chlorine shall be placed in the well by one of the following or equivalent methods:

   a. Chlorine granules or tablets shall be placed in the top of the well and allowed to settle to the bottom of the well; or

   b. Chlorine solution shall be placed in the bottom of the well by using a bailer or by pouring the solution through the drill rod, hose or pipe placed in the bottom of the well. The solution shall be flushed out of the drill rod, hose or pipe using water or air.

2. The chlorinated well water shall then be pumped through a hose attached to a

hose bibb back into the top of the well to rinse the well casing, pump column and any other equipment above the water level with chlorine as a part of the disinfecting process.

3. The chlorinated water shall stand in the well for a period of at least 24 hours, and then be pumped until there is no detectable total chlorine residual in water pumped from the well.

4. The Guilford County Health Department recommends that the well not be used as a source of drinking water supply until such time as water samples collected from the well indicate that the well is of potable quality.

5. Other materials and methods of disinfection, at least as effective as those in Subparagraph (A)(1) of this section may be used upon prior approval by the Guilford County Health Director or their designee.

SECTION V FINAL INSPECTION AND SAMPLING

(A) Upon completion of construction of a water well, the Guilford County Health Director or their designee shall complete an "as built" drawing of the well location. The well contractor shall submit a well Record of Construction to the Guilford County Health Director or their designee. Upon completion of construction or repair of a water well, the Guilford County Health Director or their designee shall inspect the well and issue a Certificate of Completion. Prior to the issuance of a Certificate of Completion, the Guilford County Health Director or their designee shall: verify that the well was constructed in the designated area and according to the well construction permit and these rules. The Guilford County Health Director or their designee shall inspect the grout around the casing, inspect the wellhead after the well seal is in place and obtain a well construction record from the Certified Well Contractor. No person shall place a water well into service without first having obtained a Certificate of Completion.

(B) Sample Collection

1. Within 30 days after issuing a certificate of completion for a newly constructed or repaired water well, the Guilford County Health Director or their designee shall obtain water samples and submit them to a certified laboratory for analyses or ensure that the water obtained from the well has been sampled and tested by a certified laboratory, in accordance with these rules.

2. Upon final approval of a new or repaired well that will serve an establishment regulated by 15A NCAC 18A Section .1700 - Protection of Water Supplies, analysis for volatile and semi-volatile organic compounds, pesticides, inorganic compounds, or nitrates shall be performed by the State Public Health Laboratory or other laboratory certified by the State of N.C.

3. Samples collected from water wells pursuant to the rules of this chapter shall be collected by an employee of the Guilford County Health Department, or a certified laboratory. The sample collector shall use aseptic sampling techniques for collection of coliform bacteria and sampling techniques and containers for chemical constituents following methods described in 40 Code of Federal Regulations 141.23 Inorganic Chemical Sampling and Analytical Requirements and 40 Code of Federal Regulations 143.4 Monitoring, which are incorporated by reference including any subsequent amendments, additions, or editions. A copy may be obtained from the National Archives and Records Administration through their website at https://www.ecfr.gov/ .

4. Sample collectors shall be trained in accordance with guidance developed by the North Carolina Department of Health and Human Services, Division of Public Health, Environmental Health Section, On Site Water Protection Branch.

5. Water samples shall be collected from the sample tap at the well or the closest accessible collection point to the water source with a tap capable of being disinfected, provided the sampling point shall precede any water treatment devices.

6. It is the responsibility of the well owner to provide access and a source of power for the purpose of collecting the required water samples.

7. For all newly constructed or repaired water wells, samples for total coliform and fecal coliform bacteria shall be collected after the disinfectant agent has been flushed from the well and water supply system. The water shall be determined to be free of disinfectant before collection of samples for bacteria. Required water samples shall not be collected from wells that are not constructed and located in accordance with the rules of 15A NCAC 02C .0100 and .0300.

8. Samples shall be transported to the laboratory following the procedures for sample preservation and within holding times required in 40 Code of Federal Regulations 141.21(f) Analytical Methodology, 141.23 Inorganic Chemical Sampling and Analytical Requirements, and 143.4 Monitoring, which are hereby incorporated by reference including any subsequent amendments, additions, or editions. Copies may be obtained from the National Archives and Records Administration through their website at https://www.ecfr.gov/ .

9. Additional or retest samples may be collected if:

    a. during the permitting, construction and sampling process, information indicates the potential for other contaminants to be present in the groundwater source; or

    b. it is necessary to confirm initial testing results.

(C) Sample Analysis

1. Water samples shall be analyzed in the North Carolina State Laboratory of Public Health or a certified laboratory.

2. A water sample shall be tested for total coliform bacteria and if present, further analyzed for the presence of fecal coliform bacteria or E. coli.

3. A water sample from a newly constructed well shall be analyzed for Alkalinity, Arsenic, Barium, Cadmium, Calcium, Chloride, Chromium, Copper, Fluoride, Hardness, Iron, Lead, Magnesium, Manganese, Mercury, Nitrate, Nitrite, pH, Selenium, Silver, Sodium, Sulfate, and Zinc.

4. Testing protocols shall follow EPA methods as published in the applicable sections of the most recent 40 CFR 141 and 143, Federal Register updates and the North Carolina Drinking Water Laboratory Certification rules of Section 10A NCAC 42D. Copies may be obtained from the National Archives and Records Administration through their website at https://www.ecfr.gov/ .

(D) Reporting

1. Laboratories shall report results of chemical and bacteriological water sample analyses for each new water well to:

   a. the Guilford County Health Department;

   b. the North Carolina Department of Health and Human Services, Division of Public Health, Environmental Health Section, On Site Water Protection Branch; and

   c. the DHHS Division of Public Health, Epidemiology Section, Occupational and Environmental Epidemiology Branch.

2. Certified laboratories reporting results of sampling required by the rules of this section shall use the reporting format developed by the North Carolina State Laboratory of Public Health for reporting well water sample results and shall include well identification information and a guide for interpreting sample results.

3. For the purposes of any notices required pursuant to the rules of this chapter, notice shall be mailed to "NC DHHS/Division of Public Health, Environmental Health Section, On-Site Water Protection Branch" 1642 Mail Service Center, Raleigh, NC 27699-1642.

(E) Data Review

For all well sampling data where chemical or biological contaminants are detected exceeding the Maximum Contaminant Levels (MCLs) for public drinking water, as defined in 15A NCAC 18C, the North Carolina Occupational and Environmental Epidemiology Branch (OEEB) shall provide the following to the Guilford County Health Department:

1. Information about the contaminant(s) exceeding public drinking water MCLs;

2. Recommendations for water use limitations or treatment options to reduce exposure to a level comparable to meeting public drinking water MCLs; and

3. Recommendations about the need for and the frequency of repeat sampling. The Guilford County Health Director or their designee shall provide information to the well owner or respective lease holder concerning chemical and biological contaminants exceeding public drinking water MCLs and the need for exposure limitation, remediation, and/or future sampling.

SECTION VI WELL MAINTENANCE AND REPAIR

(A) Every well shall be maintained by the owner in a condition whereby it will conserve and protect the groundwater resources, and whereby it will not be a source or channel of contamination to the groundwater, or the well shall be permanently abandoned in accordance with the requirements of Section VII(B) of this chapter.

(B) Any work that necessitates breaking the seal of a well that has the wellhead terminating below ground (buried seal) shall include extending the well casing above land surface.

No well shall be repaired or altered such that the wellhead is completed less than 12 inches above land surface. Any grout excavated or removed as a result of the well repair shall be replaced in accordance with Section III(E) of this chapter.

(C) All materials used in the maintenance, replacement, or repair of any well shall meet the requirements for new installations.

(D) The Guilford County Health Director or their designee may inspect the liner and packer materials before they are installed, as they are installed in the casing and bore hole, and/or after the liner is set. The well contractor shall strictly comply with the inspections scheduling guideline as outlined in the most recent Guilford County "Inspection of Wells that Supply Water for Human Consumption" guideline where casing (liner) and grout inspections are addressed.

(E) ANSI/NSF International (NSF) approved PVC pipe rated at 160 psi or greater may be used for liner pipe. The annular space around the liner pipe shall be at least five-eighths (⅝) inches and shall be completely filled with neat-cement grout or liner sand cement grout. Bentonite slurry or bentonite chips shall not be used in grouting a liner. The grout shall be mixed until it is capable of being poured through a screen or strainer which will not permit particles of greater than one-half (½) inch to pass through. The well liner shall be completely grouted within ten working days after the liner has been installed.

(F) The Guilford County Health Director or their designee shall not approve any well which has the uppermost end of the casing terminating below land surface.

(G) All well repairs shall be completed with the wellhead terminating at least 12 inches above land surface.

(H) Repairs to any well completed with the wellhead terminating below ground (buried seal) shall include extending the well casing above land surface. The extension shall be made as follows:

1. The extension casing shall be welded or bonded to the existing casing around the outside of the joint, providing a watertight seal; or
   A sleeve shall be forced over the existing casing with at least six inches of overlap, providing a watertight seal.

2. Grout shall be placed around the casing, extending from land surface to a depth of 20 feet. The grout thickness shall be as specified in these Rules. In lieu of 20 feet of grout for those wells drilled prior to 1972 only, a liner properly installed and grouted inside the existing casing, extending below the bottom of the existing casing, and firmly sealed a minimum of five feet into consolidated rock, shall be acceptable as meeting this requirement.

(I) An alternative method of well repair is permitted only for wells drilled prior to 1972 that are the primary water supply source. A sleeve shall be forced over the existing casing with at least six inches of overlap. A cement grout shall be placed around the casing, extending from land surface to a depth of at least one foot below the joint formed by the casings. The grout thickness shall be as specified in these Rules. This alternative method of repair shall not apply to wells drilled after January 1, 1972. This procedure involves extending the existing casing. It is therefore a well contractor activity and may only be performed by a Certified Well Contractor with a Level C or higher certification. This repair does not meet the requirement of grouting to a depth of 20 feet and the well shall not be considered a properly constructed water supply well.

(J) Broken, punctured or otherwise defective or unserviceable casing, screens, fixtures, seals, or any part of the wellhead shall be repaired or replaced within 30 days of notification by the Guilford County Health Director or their designee or the well shall be permanently abandoned.

(K) Prior to a repaired well's return to service, the well shall be redeveloped to remove biofilm detritus or formational material detritus from the well. The methods of well redevelopment include, but are not limited to, the methods listed in Chapter I Section II (58) "Redevelopment". The method of well redevelopment shall be listed on the well's record of repair.

(L) Any repair, pump maintenance, or pump replacement shall be completed by disinfection of the well and water supply system in accordance with Section IV(A) of this chapter and the wellhead completed in accordance with Sections III(J), III(K) and III(L) of this chapter.

SECTION VII ABANDONMENT OF WELLS

(A) Temporarily Abandoned Wells

1. Temporarily abandoned wells shall be cased and grouted in accordance with this chapter.

2. Temporarily abandoned wells shall be sealed at the top of the casing with a watertight cap or well seal compatible with casing and installed such that it cannot be removed without the use of hand tools or power tools.

3. Temporarily abandoned wells shall be maintained such that they are not a source or channel of contamination to groundwater.

(B) Permanently Abandoned Wells

1. Procedures for permanent abandonment of wells, other than bored or hand dug wells:

   a. The entire depth of the well shall be sounded before it is sealed to ensure freedom from obstructions that may interfere with sealing operations.

   b. The well shall be thoroughly disinfected according to Section IV(A) of this chapter prior to sealing.

   c. Wells constructed in consolidated rock formations or that penetrate zones of consolidated rock may be filled with an approved grout, sand, gravel, or drill cuttings within the zones of consolidated rock. The top of the sand, gravel or cuttings fill shall be at least ten feet below the bottom of the casing. The remainder of the well shall be filled with an approved grout only in a manner to ensure complete filling of the casing and extend up to land surface. For any well in which the depth of casing or the depth to the bedrock is not known or cannot be confirmed, the entire depth of the well shall be filled with an approved grout only up to land surface.

   d. Wells constructed in unconsolidated rock formations other than bored or hand-dug shall be completely filled with an approved grout by introducing it through a pipe extending to the bottom of the well which can be raised as the well is filled.

   e. Test wells less than 20 feet in depth which do not penetrate the water table shall be abandoned in such a manner as to prevent the well from being a channel allowing the vertical movement of water or source of contamination to the groundwater supply.

   f. Test wells or borings that penetrate the water table shall be abandoned by completely filling with an approved grout only.

g. Gravel packed wells in which the casing and screen have not been removed shall be abandoned by injecting neat cement grout or bentonite slurry grout into the well filling it from the bottom of the casing to the top.

2. Procedures for permanent abandonment of bored wells or cased hand dug wells constructed into unconsolidated material:

   a. Remove all plumbing or piping into the well, along with any obstructions inside the well.

   b. The well shall be thoroughly disinfected according to Section IV(A) of this chapter prior to sealing.

   c. Remove as much of the well tile casing as possible, but not less than to a depth of three feet below land surface.

   d. Remove all soil or other subsurface material present down to the top of the remaining well casing, including material extending to a width of at least 12 inches outside of the well casing on all sides.

   e. Fill the well up to the top of the remaining casing with an approved grout.

   f. Pour a one-foot-thick concrete grout or cement grout plug that fills the entire excavated area above the top of the casing, including the area extending on all sides of the casing out to a width of at least 12 inches on all sides.

   g. Complete the abandonment process by filling the remainder of the well above the concrete or cement plug with additional grout, or soil.

3. Procedures for permanent abandonment of uncased hand dug wells constructed into unconsolidated material:

   a. Remove all plumbing or piping into the well, along with any obstructions inside the well.

   b. The well shall be thoroughly disinfected according to Section IV(A) of this chapter prior to sealing.

   c. Remove all soil or other subsurface material present down to a depth of three feet below land surface and extending to a width of at least 12 inches outside of the well diameter on all sides.

   d. Fill the well with an approved grout, or dry clay compacted in place.

   e. Pour a one-foot-thick concrete grout or cement grout plug that fills the entire excavated area above the top of the original diameter, including the area extending on all sides of the original diameter out to a width of at least 12

inches on all sides.

f. Complete the abandonment process by filling the remainder of the well above the concrete or cement plug with additional grout, or soil.

(C) The owner shall be responsible for permanent abandonment of a well except that:

1. The well contractor is responsible for well abandonment if abandonment is required because the well contractor improperly locates, constructs, repairs or completes the well. The well contractor shall permanently abandon any well in which the casing has not been installed or from which the casing has been removed prior to removing his equipment from the site.

2. The person who installs, repairs, or removes the well pump is responsible for well abandonment if abandonment is required because of improper well pump installation, repair, or removal.

(D) Any well not in compliance with the conditions for temporary abandonment shall be brought into compliance or permanently abandoned within 30 days of receipt of notice from the Guilford County Health Director or their designee.

(E) Any well whose construction would have a propensity to transfer contamination to the groundwater shall be repaired so that it will not act as a source or channel of contamination to the groundwater, or permanently abandoned within 30 days of receipt of notice from the Guilford County Health Director or their designee. An~~y~~ uncased well cannot be repaired and shall be abandoned.

(F) Where a new well or public water supply is replacing an old well and the owner wishes to continue using the old well for irrigation or other uses, the old well may not be connected to the primary water supply system in any way and must conform with Section VII(E) of this chapter.

(G) Where a new private well or public water supply is replacing an existing water supply well in which contamination has been confirmed through analyses, the existing well shall be permanently abandoned.

(H) When water-tight sanitary sewer lines are installed or extended, they shall maintain a minimum distance of 100 feet from any existing private or public water supply well. When this separation will not be maintained, water-tight sewer piping material, testing methods, and acceptability standards meeting water main standards shall be required, in which case the minimum separation distance may be reduced to 25 feet from an existing private water supply well and 50 feet from an existing public water supply well. Locating water-tight sewer lines closer to an existing water supply well shall necessitate proper abandonment of the well according to these rules. All appurtenances shall be outside the 100-foot radius.

(I) The Guilford County Health Director or their designee shall have the right to enter any property for the purpose of determining whether there may be an abandoned well

on the property.

(J) The Guilford County Health Director or their designee may inspect the well to be abandoned before any abandonment material is placed in the well and observe as the material is placed in the well. The Certified Well Contractor, or an exempt person according to General Statute § 87-98.4 (b) and approved by the Guilford County Health Department, abandoning the well shall strictly comply with the inspections scheduling guideline as outlined in the most recent Guilford County "Abandonment of Water Wells and Septic Tank Systems" guideline.

SECTION VIII RECORDS REQUIRED

(A) Reports

1. Any person performing well contractor activities in Guilford County shall submit to the Guilford County Health Director or their designee and to the well owner, a Record of Construction, Repair, or Abandonment to include the well's location, diameter and depth, the casing materials and depth, depth of water bearing zones, the method of finishing, the method of repairing or the method of abandoning, formation log, static water level, yield, and date of construction, repair, or abandonment.

2. Any person installing a pump or pumping equipment in a well shall submit to the Guilford County Health Director or their designee and to the well owner, a Record of Construction, Repair, or Abandonment to include the well's location, date of pump installation, depth of pump intake, horsepower rating of pump, gpm rating of pump, and static water level.

3. The reports required in this section shall be submitted within 30 days after completing construction, repair, abandonment, or pump installation.

4. Reports shall be certified by the well contractor completing the construction, repair, abandonment, or pump installation. Certification shall be by signature, including an authorized digital signature.

5. Upon final approval of a new or repaired well, the Guilford County Health Director or their designee shall issue a well Certificate of Completion.

6. Where a well is to be a source of water for human consumption, no person shall allow permanent electrical service to a facility upon construction, location, or relocation until the official electrical inspector with jurisdiction as provided in N.C.G.S. 143-143.2 certifies to the electrical supplier that the required permit for well construction and a well Certificate of Completion have been issued.

(B) Registry

The Guilford County Health Department shall maintain a registry of all permitted private drinking water wells, specifying the well location and the water quality test results until the well is permanently abandoned in accordance with this chapter.

TABLE 1

MINIMUM WALL THICKNESS FOR STEEL CASING:

Nominal Diameter (inches)	Wall Thickness (inches)
For 3 ½" or smaller pipe	schedule 40 is required
4	0.142
5	0.156
5 ½	0.164
6	0.185
8	0.250
10	0.279
12	0.330
14 and larger	0.375

TABLE 2

MINIMUM BOREHOLE DIAMETER FOR GROUTING:

Outside Casing Diameter (inches)	Diameter of Grout Hole (inches)
4.5" OD	8.5"
6.625" OD Steel	11.04"
6.9" OD PVC	11.50"
8.625" OD	14.37"
10.75" OD	17.92"

CHAPTER 3

RULES GOVERNING WELL CONSTRUCTION AND OPERATION FOR DUMT 10,000 WELL SYSTEMS

SECTION I PURPOSE

The rules for construction and operation for DUMT 10K wells systems in this chapter are established for better groundwater management practice to avoid an adverse effect on the public health by protecting groundwater quality and the surrounding water supply wells.

SECTION II APPLICATION

A complete application shall be submitted to the Guilford County Health Director or their designee by any person or entity that intends to construct a DUMT 10K well system, expand or increase an existing DUMT 10K well system, or upgrade an existing well system to meet the definition of a DUMT 10K well system.

(A) The following items are required of DUMT 10K well systems for the Guilford County Health Director or their designee to process the application:

1. Names, addresses, e-mail addresses, and phone numbers of the proposed well owner and or operator;
2. Names, addresses, e-mail addresses, and phone numbers of the authorized agent or applicant for the proposed well owner and or operator;
3. Address and Guilford County Real Estate Identification Number of the property of the proposed well;
4. Site plan as defined in Chapter 1 Section II (68) of these rules;
5. Land surface (i.e., pavement, gravel, or grass) and other recharge characteristics of the property;
6. A tax map showing the property addresses, Guilford County Real Estate Identification Numbers, and property owners within a one-thousand-foot radius of the proposed well, identifying properties where wells are known or suspected to exist;
7. Proposed diameter of the well;
8. Proposed depth range of the well;
9. Gallons per day desired and estimate of required sustainable yield;
10. Proposed use of water (industrial/commercial processing, irrigation, drinking, bathing, etc.);
11. Number of employees and number of connections; and, if applicable,
12. Public Water Supply Section Pre-Drill Investigation Letter, if the well will supply a Community Water System or a Non-Transient Non-Community Water System

SECTION III PERMIT FOR WELL CONSTRUCTION

(A) After reviewing the application, the Guilford County Health Director or their designee may issue a well permit with or without some modifications for well construction. The well permit is valid for one year from date of issuance. If construction has not commenced within one year from the date of issuance of the well permit, the well permit becomes invalid. When a well permit has become invalid, construction may not be commenced until the well permit has been updated and/or modified by the Guilford County Health Director or their designee or a new well permit is issued. In addition, a site for a Community Water System or a Non-Transient Non-Community Water System governed by these rules shall be approved by a representative of the NC Department of Environmental Quality, Division of Water Resources, Public Water Supply Section, and the Public Water Supply Section Pre-Drill Investigation Letter shall be included with the application.

(B) The Guilford County Health Director or their designee shall approve the application if he finds that the usage of the proposed well will not adversely affect water quality and/or quantity within 1000 feet, or otherwise pose a threat to public health or the environment.

SECTION IV WELL CONSTRUCTION STANDARDS

Construction of DUMT 10K wells shall comply with all applicable requirements of North Carolina Administrative Code (NCAC) Title 15A Subchapter 2C (WELL CONSTRUCTION STANDARDS), Guilford County Well Rules, and other applicable laws. Any DUMT 10K well which falls under the jurisdiction of NCAC Title 15A, Subchapter 18C (RULES GOVERNING PUBLIC WATER SYSTEMS) shall conform with all applicable requirements of those rules.

SECTION V PUMPING TEST AND GROUNDWATER TESTING

(A) A single well step drawdown pumping test shall be performed on each DUMT 10K well by a competent and reputable firm with experience in conducting such tests for 24 hours to obtain information on radius and depth of the cone of depression. The pumping test shall begin and end during the normal scheduled working hours of the Guilford County Health Department. Any existing water supply and/or monitoring wells on the property and/or adjacent properties can be used as observation wells during the pumping tests. The Guilford County Health Director or their designee shall also analyze the pumping test results and evaluate the information on radius and depth of the cone of depression from the well owner. When the well owner is not satisfied with the Guilford County Health Director or their designee's determination of the cone of depression or sustainable yield, he may perform a longer pumping test, install observation wells to provide additional information to be evaluated, or provide additional information from an outside consultant for consideration.

(B) The pumping test may be waived if some or all of the following conditions are met:

1. The well is located within the city limits.

2. There are no water supply wells within a one-thousand-foot radius of the well.

3. The property and adjacent properties are on municipal water.

(C) If the new well is located within a one-thousand-five-hundred-foot radius of a known contaminated soil or groundwater site, water samples shall be collected from the well after the pumping test for analyses performed by the North Carolina State Laboratory of Public Health or other laboratory certified by the State of North Carolina for volatile and semi-volatile organic compounds, inorganic compounds, pesticides, and nitrates. These analytical results shall be used to determine the water quality of the well and/or establish~~ing~~ the baseline of water quality.

SECTION VI PERMIT FOR SYSTEM OPERATION

(A) It shall be unlawful for any person to operate a DUMT 10K well system without a well system Operations Permit issued by the Guilford County Health Director or their designee. The Guilford County Health Director or their designee may assess a penalty or pursue any other remedy allowed by law for enforcement of health rules for violation.

(B) After reviewing the information from the well owner/operator, the Guilford County Health Director or their designee shall:

1. Issue a system Operation Permit if, based on the provided information, they determine that the operation of the well system shall not adversely affect groundwater quality and water supply to other wells in the area and not otherwise adversely affect the public health.

2. Issue a system Operation Permit with any of the following restrictions if they determine that the operation of the well system may affect the water supply to other wells in the area:

    a. A reduction of daily usage
    b. A requirement to install a water holding tank/pond and to restrict pumping to permitted hours
    c. The approval of the use of new technology which the Guilford County Health Director or their designee determines will negate the effect on other wells

3. Issue a system Operation Permit without restrictions if the owner supplies adequate and potable quality water to those users of wells affected by the DUMT 10K well system.

4. Deny a system Operation Permit if:

    a. Groundwater quality is not suitable for human consumption if the well is used for drinking purposes and the well owner/operator does not install and

maintain a water treatment system, or

b. The usage of the well will substantially affect water supply to any other water supply wells within 1000 feet or cause these wells to be unusable and the owner does not mitigate the issue as outlined in Subparagraphs (B)(2) and (B)(3) of this section.

(C) Water meter

1. All DUMT 10K well systems are required to install a spool-piece pipe for a water usage monitoring meter. If the Guilford County Health Director or their designee determines a well system must be monitored for any time period, the Guilford County Health Director or their designee shall install a water meter in the place of the spool-piece section of the pipe. Public water supply wells regulated by 15A NCAC 18C shall be metered according to those rules.

2. If the Guilford County Health Director or their designee determines the daily usage for a well to be restricted, he or she may install a water meter for monitoring, at the owner's cost.

(D) The Guilford County Health Director or their designee may suspend or revoke the system Operation Permit following a ten-day's notice and hearing, if:

1. Any other water supply wells, which were constructed according to the existing well construction standards at the time of construction, are affected substantially due to the operation of a DUMT 10K well system within one year of issuance of the well Operation Permit, and the issue cannot be corrected as outlined in Subparagraphs (B)(2) and (B)(3) of this section; or

2. The use of the well degrades the groundwater quality in the area.

In each case the burden of proof will be placed upon the complaining party by a preponderance of the evidence.

(E) The owner of the DUMT 10K well system shall request a revision of an Operation Permit for an increase in water usage due to the expansion of business, an increase in number of employees, or other reasons. The Guilford County Health Director or their designee may suspend or revoke the Operation Permit if the well owner increases water usage without a revision of the permit.

SECTION VII RECORDS REQUIRED

(A) Reports

1. Any person performing well contractor activities in Guilford County shall submit to the Guilford County Health Director or their designee and to the well owner, a Record of Construction, Repair, or Abandonment to include the well's location, diameter and depth, the casing materials and depth, depth of water bearing zones,

the method of finishing, the method of repairing, or the method of abandoning, formation log, static water level, yield, and date of construction, repair, or abandonment.

2. Any person installing a pump or pumping equipment in a well shall submit to the Guilford County Health Director or their designee and to the well owner, a Record of Construction, Repair, or Abandonment to include the well's location, date of pump installation, depth of pump intake, horsepower rating of pump, gpm rating of pump, and static water level.

3. The reports required in this section shall be submitted within 30 days after completing construction, repair, abandonment, or pump installation.

4. Reports shall be certified by the well contractor completing the construction, repair, abandonment, or pump installation. Certification shall be by signature, including an authorized digital signature.

5. Upon final approval of a new or repaired well, the Guilford County Health Director or their designee shall issue a DUMT 10K well system Operation Permit.

6. Where a DUMT 10K well system is to be a source of water for human consumption, no person shall allow permanent electrical service to a facility upon construction, location, or relocation until the official electrical inspector with jurisdiction as provided in N.C.G.S. 143-143.2 certifies to the electrical supplier that the required permit for well construction and a DUMT 10K well system operation permit have been issued.

CHAPTER 4

WELL CONSTRUCTION, REPAIR, AND ABANDONMENT FOR MONITORING WELLS, AIR INJECTION WELLS, AIR SPARGING WELLS, AND RECOVERY WELLS

SECTION I MONITORING WELL, AIR INJECTION WELL, AIR SPARGING WELL, AND RECOVERY WELL PERMITS

(A) It shall be unlawful for any person to commence, operate, and/or maintain any monitoring well, air injection well, air sparging well, or recovery well contractor activities in Guilford County without first obtaining a monitoring well, air injection well, air sparging well, and recovery well permit from the Guilford County Health Director or their designee. The monitoring well, air injection well, air sparging well, and recovery well permit shall be obtained by the responsible party or his authorized agent. The monitoring well, air injection well, air sparging well, and recovery well permit shall be valid for 12 months from date of issuance.

(B) Monitoring well, air injection well, air sparging well, and recovery well permits must be renewed every 12 months from the date of initial issuance for so long as they may remain in operation.

(C) One monitoring well, air injection well, air sparging well, and recovery well permit, only, shall be required for each site regardless of the number of monitoring wells, air injection wells, air sparging wells, and/or recovery wells to be placed on that site.

(D) An application for a monitoring well, air injection well, air sparging well, and recovery well permit shall be submitted to the Guilford County Health Department by the responsible party or his agent. The application shall include the following:

1. the site name;
2. the owner's name (facility name);
3. the owner's mailing address, e-mail address, and phone number;
4. the name, address, e-mail address, and phone number of the responsible party or authorized agent;
5. the site address and Guilford County Real Estate Identification Number;
6. a map of the general site area, showing the location of:
    a. all property boundaries, within 250 feet of the parcel on which the proposed wells are located;
    b. all existing wells, identified by the type of use, within the property boundaries;
    c. all proposed wells, identified by type of use, within the property boundaries;
    d. all sources of known or potential groundwater contamination within the property boundaries;
7. a construction diagram of the proposed monitoring well, air injection well, air sparging well, and/or recovery well showing type of well and including specifications describing all materials to be used and methods of construction; and
8. the well contractor company's name, if known.

(E) When it becomes necessary to construct additional monitoring wells, air injection wells, air sparging wells, or recovery wells on a previously permitted site, no construction may be initiated until such time as an application for the additional wells has been received by the Guilford County Health Department and found in compliance with Paragraph (D) of this section.

(F) Any monitoring well, air injection well, air sparging well, or recovery well no longer serving its intended use shall be permanently abandoned in accordance with Section IV of this chapter.

(G) A copy of the monitoring well, air injection well, air sparging well, and recovery well permit must be on site during the construction of any monitoring well, air injection well, air sparging well, and/or recovery well.

(H) Only Certified Well Contractors shall perform well contractor activities.

(I) The Guilford County Health Director or their designee is authorized to revoke any monitoring well, air injection well, air sparging well, and recovery well permits issued pursuant to these Rules upon the determination that these Rules are not being fully complied with.

SECTION II STANDARDS OF CONSTRUCTION

(A) Monitoring wells, air injection wells, air sparging wells, and recovery wells shall be located, designed, constructed, and operated in accordance with 15A NCAC 2C, Well Construction Standards, Sections .0108(c) and .0108(d).

(B) Drilling equipment shall be decontaminated using accepted methods prior to each boring to minimize the potential for cross contamination of the groundwater resources from one boring location to another.

(C) The geographical coordinates of all monitoring wells, air injection wells, air sparging wells, and recovery wells shall be established with an accuracy to within three feet (using decimal degrees) at the time of well construction and the coordinates shall be recorded on the record of construction as required by Section V of this chapter.

SECTION III WELL MAINTENANCE AND REPAIR

(A) Every monitoring well, air injection well, air sparging well, and recovery well shall be maintained in a condition whereby it will conserve and protect the groundwater resources, and whereby it will not be a source or channel of contamination to the groundwater.

(B) All construction and materials used in the maintenance, replacement, or repair of any monitoring well, air injection well, air sparging well, or recovery well shall meet the

requirements for new installations.

(C) Broken, punctured or otherwise defective or unserviceable casing, screens, fixtures, seals, or any part of the wellhead shall be repaired or replaced within 30 days of notification by the Guilford County Health Department, or the well shall be permanently abandoned.

SECTION IV PERMANENT ABANDONMENT OF MONITORING WELLS, AIR INJECTION WELLS, AIR SPARGING WELLS, AND RECOVERY WELLS

(A) Monitoring wells, air injection wells, air sparging wells, or recovery wells constructed in consolidated rock formations or that penetrate zones of consolidated rock may be filled with neat cement, bentonite slurry grout, sand, gravel, or drill cuttings within the zones of consolidated rock. The top of the sand, gravel or cuttings fill shall be at least ten feet below the top of the consolidated rock. Neat cement or bentonite slurry grout shall be placed beginning ten feet below the top of the consolidated rock or five feet below the bottom of casing in a manner to ensure complete filling of the casing and extend up to the land surface.

(B) Monitoring wells, air injection wells, air sparging wells, or recovery wells constructed in unconsolidated rock formations shall be filled completely with neat cement grout or bentonite slurry grout by introducing it through a pipe extending to the bottom of the well which can be raised as the well is filled.

(C) Monitoring wells, air injection wells, air sparging wells, or recovery wells less than 20 feet in depth which do not penetrate the water table shall be abandoned in such a manner as to prevent the well from being a channel allowing the vertical movement of water or source of contamination to the groundwater supply.

(D) Any monitoring well, air injection well, air sparging well, or recovery well which acts as a source or channel of contamination to the groundwater shall be repaired or permanently abandoned within 30 days of receipt of notice from the Guilford County Health Director or their designee.

(E) The Guilford County Health Director or their designee shall have the right to enter any property for the purpose of determining whether there may be an abandoned monitoring well, air injection well, air sparging well, or recovery well on the property.

(F) Monitoring wells, air injection wells, air sparging wells, and recovery wells shall be permanently abandoned by the well contractor in accordance with this rule within two days after drilling or two days after testing is complete, whichever is less restrictive.

(G) In the case that any monitoring well, air injection well, or air sparging well is being converted to a recovery well, the conversion shall be completed within 30 days or the monitoring well, air injection well, or air sparging well shall be permanently

abandoned.

SECTION V RECORDS REQUIRED

(A) Any person constructing or abandoning any monitoring well, air injection well, air sparging well, or recovery well in Guilford County shall submit to the Guilford County Health Director or their designee and to the responsible party, a Record of the Construction, Repair, or Abandonment to include the owner's name, the type of well (monitoring, air injection, air sparging, or recovery), the well's location, diameter and depth, the geographical coordinates of the well using decimal degrees, the casing materials and depth, static water level, depth of water bearing zones, the method of finishing, repairing, or abandoning, formation log, pumping water level if applicable. and date of construction, repair, or abandonment.

(B) The reports required in this section shall be submitted within 15 days after completing construction, repair, or abandonment.

(C) Reports shall be certified by the Certified Well Contractor completing the construction, repair, or abandonment of the monitoring well, air injection well, air sparging well, or recovery well. Certification shall be by signature, including an authorized digital signature.

(D) Copies of the results of all analyses performed on water samples taken from any monitoring well, air injection well, air sparging well, or recovery well shall be submitted to the Guilford County Health Department within 15 days after completion of analysis.

CHAPTER 5

WELL CONSTRUCTION, REPAIR, OPERATION, AND ABANDONMENT FOR GROUND SOURCE HEAT PUMP WELLS / GEOTHERMAL BOREHOLES

SECTION I PURPOSE

The rules for construction and operation of Ground Source Heat Pump Well systems in this chapter are established to avoid an adverse effect on the public health by protecting groundwater quality and the surrounding water supply wells. The rules in this chapter are established to ensure that Ground Source Heat Pump Wells and Geothermal Borehole locations comply with well and septic system standards. Borehole locations are to be recorded for future reference.

SECTION II GROUND SOURCE HEAT PUMP WELL PERMITS

(A) It shall be unlawful for any person to construct, repair, or perform ground source heat pump well contractor activities in Guilford County without first obtaining a ground source heat pump well permit from the Guilford County Health Director or their designee. The ground source heat pump well permit shall be obtained by the property owner. The ground source heat pump well permit shall be valid for 12 months from date of issuance.

(B) One ground source heat pump well permit, only, shall be required for each application regardless of the number of ground source heat pump wells to be placed on that site.

(C) An application for a ground source heat pump well permit shall be submitted to the Guilford County Health Department by the property owner. The application shall include the following:

1. The property owner's name, mailing address, telephone number, and email address;
2. The property address and Guilford County Real Estate Identification Number;
3. A description of the proposed injection activities;
4. A scaled, site-specific map of the general site area, showing the location of:
   a. All property boundaries, within 250 feet of the parcel on which the proposed wells are located;
   b. All existing wells, identified by the type of use, within the property boundaries;
   c. All proposed wells, identified by type of use, within the property boundaries; and
   d. All sources of known or potential groundwater contamination listed in Section III Subparagraph (C)(1) of this Chapter located within 250 feet of the proposed injection well(s);
5. A construction diagram of the proposed ground source heat pump well or wells and including specifications describing all materials to be used and methods of

construction;

6. The type of recirculation fluid or gas and the types and concentrations of any additives to be used. Only additives approved by the Department of Health and Human Services and determined not to adversely affect human health in compliance with G.S. 130A-5 shall be used in any Aqueous Closed Loop geothermal well system. Only approved gases shall be used in any Direct Expansion Closed-Loop geothermal well system; and
7. The well contractor company's name, if known.

The permit application shall be signed as follows:

i. For a corporation: by a responsible corporate officer
ii. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively
iii. For a municipality or a state, federal, or other public agency: by either a principal executive officer or ranking publicly elected official
iv. For all others: by the well owner (which means all persons listed on the property deed)

(D) At time of application, the property owner shall also submit all forms and permits that are required by the North Carolina Department of Department of Environmental Quality Division of Water Resources Groundwater Resources Section prior to construction of a ground source heat pump well. These forms shall include:

1. For Geothermal Heating/Cooling Water Return Wells:
   a. "APPLICATION FOR A PERMIT TO CONSTRUCT OR OPERATE INJECTION WELL(S)" in accordance with the provisions of 15A NCAC 02C .0224
   b. "Permit to construct a Geothermal Heating/Cooling Water Return Well" Injection Well System"

2. For a Closed Loop Geothermal Injection Well System:
   a. "NOTIFICATION OF INTENT TO CONSTRUCT OR OPERATE INJECTION WELLS" as described in 15A NCAC 02C .0222 or as described in 15A NCAC 02C .0223
   b. "Acknowledgement of Intent to Construct Type Injection Well System"

(E) If it becomes necessary to construct additional ground source heat pump wells on a previously permitted site after the initial permit has been completed, no construction may be initiated until such time as an application for the additional wells has been received by the Guilford County Health Department and found in compliance with (C) of this section.

(F) Any ground source heat pump well no longer serving its intended use shall be permanently abandoned in accordance with Section V of this chapter.

(G) A copy of the ground source heat pump well permit must be on site during the construction of any ground source heat pump well.

(H) Only Certified Well Contractors shall perform well contractor activities.

(I) The Guilford County Health Director or their designee is authorized to revoke any ground source heat pump well permit issued pursuant to these Rules upon the determination that these Rules are not being fully complied with.

SECTION III STANDARDS OF CONSTRUCTION

(A) Ground source heat pump wells / Geothermal boreholes shall be located, designed, constructed, and operated in accordance with 15A NCAC 2C, Section .0100 (Criteria And Standards Applicable To Water-Supply And Certain Other Type Wells) and 15A NCAC 2C, Section .0200 (Criteria And Standards Applicable To Injection Wells).

(B) Geothermal Heating/Cooling Water Return Wells injection wells shall be located and constructed according to Chapter 2 of these Rules and 15A NCAC 02C .0224.

(C) Closed Loop Geothermal Injection Well System injection wells shall be located and constructed according to this section and 15A NCAC 02C .0222 and .0223.

1. The minimum horizontal separation between a Closed Loop Geothermal Injection Well System injection well and potential sources of groundwater contamination which exist or have been permitted at the time the well is constructed, shall be as follows unless otherwise specified:

    a. Septic systems including septic tank, drainfield, waste application area, and drainfield repair area----------50 feet
    b. Building perimeters, including any attached structures----------15 feet
    c. Industrial or municipal sewage or liquid waste collection or transmission sewer mains constructed to water main standards as stated in the American Water Works Association (AWWA) Standards C600 and/or C900-------15 feet
    d. Other industrial or municipal sewage or liquid-waste collection or transfer facilities----------25 feet
    e. Water-tight sewer lateral lines from a residence or other non-public system to a sewer main or other wastewater disposal system----------15 feet
    f. Chemical or petroleum fuel underground storage tank systems regulated under 15A NCAC 02N with secondary containment ----------50 feet
    g. Chemical or petroleum fuel underground storage tank systems regulated under 15A NCAC 02N without secondary containment----------100 feet
    h. Above ground or underground storage tanks which contain petroleum fuels used for heating equipment, boilers, or furnaces, with the exception of tanks used solely for storage of propane, natural gas, or liquefied petroleum gas----------50 feet
    i. Aboveground or underground propane or liquefied petroleum gas storage tanks systems ----------15 feet
    j. Land-based or subsurface waste storage or disposal systems----------50 feet
    k. Gravesites ----------50 feet
    l. All other potential sources of ground water contamination ----------50 feet

m. Property boundaries ----------10 feet

2. All Geothermal boreholes / Closed Loop Geothermal injection wells shall be grouted from bottom to top by pumping the grout into place through a hose or pipe extended to the bottom of the borehole which can be raised as the grout is applied. The grout hose or pipe shall remain submerged in grout during the entire application. A bentonite-based thermally enhanced grout shall be used to grout the borehole.

3. If a casing is installed, it shall be grouted according to Chapter 2 of these Rules.

(D) The geographical coordinates of all ground source heat pump wells shall be established with accuracy to within three feet (using decimal degrees) at the time of well construction and the coordinates shall be recorded on the record of construction as required by Section VI of this chapter.

SECTION IV WELL MAINTENANCE AND REPAIR

(A) Every ground source heat pump well shall be operated and maintained in a condition whereby it will conserve and protect the groundwater resources, and whereby it will not be a source or channel of contamination to the groundwater.

(B) Only potable water or other approved fluids or gases which will not have an adverse effect on human health when released into the groundwater may be used in a ground source heat pump well / geothermal borehole. Ethanol and ethylene glycol shall not be used as a fluid or additive.

(C) All construction and materials used in the maintenance, replacement or repair of any ground source heat pump well shall meet the requirements for new installations.

(D) Broken, punctured or otherwise defective or unserviceable casing, screens, fixtures, seals, or any part of the wellhead shall be repaired or replaced within 30 days of notification by the Guilford County Health Department or the well shall be permanently abandoned.

SECTION V PERMANENT ABANDONMENT OF GROUND SOURCE HEAT PUMP WELLS

(A) "Geothermal Heating/Cooling Water Return Well" injection wells shall be abandoned according to Chapter 2 of these Rules.

(B) "Closed-Loop Geothermal Injection Well System" injection wells according to the following procedure:

1. Remove all fluids or gases from the piping in the well.

2. Remove as much of the piping in the well as possible, but not less than to a depth of three feet below land surface.

3. Remove all soil or other subsurface material present to a depth of not less than three feet below land surface and extending to a width of at least 12 inches outside of the well borehole on all sides.

4. Fill the well up to the top of the remaining borehole with cement grout, concrete grout, or bentonite slurry grout.

5. Pour a one-foot-thick concrete grout or cement grout plug that fills the entire excavated area, including the area extending on all sides of the well out to a width of at least 12 inches on all sides.

6. Complete the abandonment process by filling the remainder of the well above the concrete or cement plug with additional concrete grout, cement grout, or soil.

(C) Any ground source heat pump well which acts as a source or channel of contamination to the groundwater shall be repaired or permanently abandoned within 30 days of receipt of notice from the Guilford County Health Director or their designee.

(D) The Guilford County Health Director or their designee shall have the right to enter any property for the purpose of determining whether there may be an abandoned ground source heat pump well on the property.

SECTION VI RECORDS REQUIRED

(A) Any person constructing or abandoning any ground source heat pump well in Guilford County shall submit to the Guilford County Health Director or their designee and to the well owner, a record of the construction or abandonment to include the type of well (Geothermal Heating/Cooling Water Return Well, Closed-Loop Geothermal Injection Well System), the well's location, diameter and depth, the geographical coordinates of the well using decimal degrees, the casing materials and depth, static water level, depth of water bearing zones, the method of finishing or abandoning, formation log and pumping water level, if applicable.

(B) The reports required in this section shall be submitted within 30 days after completing construction, repair, or abandonment.

(C) Reports shall be certified by the Certified Well Contractor completing the construction, repair, or abandonment of the ground source heat pump. Certification shall be by signature, including an authorized digital signature.

CHAPTER 6

SEVERABILITY AND HISTORY

SECTION I SEVERABILITY

If any provisions of clause of these rules shall be declared invalid, void, or unconstitutional, such declaration shall not invalidate any other provisions or clause of said rules.

SECTION II EFFECTIVE PLAN

Chapters 1, 2 and 6

These rules adopted by the Guilford County Board of Health on November 9, 1988, Section III(D)(9)(A-E) adopted by the Guilford County Board of Health on May 24, 1989, shall be in full force and effective on June 1, 1989.

Amended and readopted by the Guilford County Board of Health on September 27, 1989.

Amended and readopted by the Guilford County Board of Health on January 31, 1990.

Amended and readopted by the Guilford County Board of Health on May 26, 1992.

Amended and readopted by the Guilford County Board of Health on April 26, 1993 shall be in full force and effective June 1, 1993.

Amended and readopted by the Guilford County Board of Health on January 24, 1996 shall be in full force and effective February 1, 1996.

Amended and readopted by the Guilford County Board of Health on June 9, 1997 shall be in full force and effective July 1, 1997.

Amended and readopted by the Guilford County Board of Health on September 28, 1998 shall be in full force and effective October 1, 1998.

Amended and readopted by the Guilford County Board of Health on November 15, 1999 shall be in full force and effective January 1, 2000.

Amended and readopted by the Guilford County Board of Health on February 19, 2001 shall be in full force and effective April 1, 2001.

Amended and readopted by the Guilford County Board of Health on May 20, 2002 shall be in full force and effective August 1, 2002.

Amended and readopted by the Guilford County Board of Health on December 15, 2003 shall be in full force and effective January 1, 2004.

Amended and readopted by the Guilford County Board of Health on June 20, 2005 shall be in full force and effective July 1, 2005.

Amended and readopted by the Guilford County Board of Health on August 15, 2005 shall be in full force and effective August 16, 2005.

Amended and readopted by the Guilford County Board of Health on May 21, 2007 shall be in full force and effective July 1, 2007.

Amended and readopted by the Guilford County Board of Health on June 16, 2008 shall be in full force and effective July 1, 2008.

Amended and readopted by the Guilford County Board of Health on May 16, 2011 shall be in full force and effective July 1, 2011.

Amended and readopted by the Guilford County Board of Health on September 16, 2021 shall be in full force and effective October 1, 2021.

Chapter 3

Adopted by the Guilford County Board of Health on November 15, 1999 shall be in full force and effective January 1, 2000.

Amended and readopted by the Guilford County Board of Health on February 19, 2001 shall be in full force and effective April 1, 2001.

Amended and readopted by the Guilford County Board of Health on June 20, 2005 shall be in full force and effective July 1, 2005.

Amended and readopted by the Guilford County Board of Health on May 21, 2007 shall be in full force and effective July 1, 2007.

Amended and readopted by the Guilford County Board of Health on June 16, 2008 shall be in full force and effective July 1, 2008.

Amended and readopted by the Guilford County Board of Health on May 16, 2011 shall be in full force and effective July 1, 2011.

Amended and readopted by the Guilford County Board of Health on September 16, 2021 shall be in full force and effective October 1, 2021.

Chapter 4

Adopted by the Guilford County Board of Health on January 24, 1996 shall be in full force and effective February 1, 1996.

Amended and readopted by the Guilford County Board of Health on November 15, 1999 shall be in full force and effective January 1, 2000.

Amended and readopted by the Guilford County Board of Health on June 20, 2005 shall be in full force and effective July 1, 2005.

Amended and readopted by the Guilford County Board of Health on May 21, 2007 shall be in full force and effective July 1, 2007.

Amended and readopted by the Guilford County Board of Health on June 16, 2008 shall be in full force and effective July 1, 2008.

Amended and readopted by the Guilford County Board of Health on May 16, 2011 shall be in full force and effective July 1, 2011.

Amended and readopted by the Guilford County Board of Health on September 16, 2021 shall be in full force and effective October 1, 2021.

Chapter 5

Adopted by the Guilford County Board of Health on May 16, 2011 shall be in full force and effective July 1, 2011.

Amended and readopted by the Guilford County Board of Health on September 16, 2021 shall be in full force and effective October 1, 2021.

Pursuant to North Carolina General Statute 130A-39(f), a local board of health may, in its rules, adopt by reference any code, standard, rule, or regulation which has been adopted by any agency of this State, another state, any agency of the United States or by a generally recognized association. Copies of any material adopted by reference shall be filed with the rules. Therefore, incorporated by reference:

North Carolina Administrative Code Title 15A Department of Environmental Quality
Subchapter 2C – WELL CONSTRUCTION STANDARDS
Section .0100 - Criteria and Standards Applicable to Water Supply and Certain Other Type Wells

North Carolina Administrative Code Title 15A Department of Environmental Quality
Subchapter 2C – WELL CONSTRUCTION STANDARDS
Section .0200 - Criteria and Standards Applicable to Injection Wells

North Carolina Administrative Code Title 15A Department of Environmental Quality
Subchapter 2C – WELL CONSTRUCTION STANDARDS
Section .0300 - Permitting and Inspection of Private Drinking Water Wells

North Carolina Administrative Code Title 15A Department of Environment and Natural Resources
Subchapter 18A – SANITATION
Section .3800 - Private Drinking Water Well Sampling

Amended and readopted by the Guilford County Board of Health on June 16, 2008 shall be in full force and effective July 1, 2008.

Amended and readopted by the Guilford County Board of Health on May 16, 2011 shall be in full force and effective July 1, 2011.

Amended and readopted by the Guilford County Board of Health on September 16, 2021 shall be in full force and effective October 1, 2021.

Julia Vann, MD, MPH
Public Health Director

10/1/2021
Date