ORANGE COUNTY
HEALTH DEPARTMENT
Improving health. Inspiring change.

GROUNDWATER PROTECTION RULES FOR ORANGE COUNTY

Adopted June 26th, 2008
Amended Effective August 23, 2012
Amended Effective February 26, 2015

SECTION I - PERMITTING AND INSPECTION OF WELLS

(A) Scope, Purpose, and General Provisions

(1). **AUTHORIZATION** - The North Carolina Environmental Management Commission is required, under the provisions of Chapter 87, Article 7, Section 87, General Statutes of North Carolina (short title: North Carolina Well Construction Act) to adopt appropriate rules governing the location, construction, repair, and abandonment of wells, and the installation and repair of pumps and pumping equipment. The Orange County Board of Health is authorized under the provisions of Chapter 130A-39 of the General Statutes of North Carolina to adopt more stringent rules in areas regulated by the Commission for Public Health or the Environmental Management Commission where, in the opinion of the Orange County Board of Health, a more stringent rule is required to protect the public health. Furthermore, the Orange County Board of Health is authorized in Chapter 87, Article 7 to adopt by reference rules adopted by the Environmental Management Commission and the Commission for Public Health and may adopt more stringent rules when necessary to protect public health.

(2). **PURPOSE** - The purpose of the rules of this Section is to set out standards for permitting, construction, and inspection of private drinking water wells as defined in G.S. 87-85 by local health departments pursuant to G.S. 87-97. In addition, standards are established for wells other than private drinking water wells. The groundwaters of Orange County serve a large portion of its citizens and continued growth in rural areas will increase these numbers. Consistent with the authorization and the responsibility to protect and promote public health, the Orange County Board of Health intends to ensure that the groundwaters of Orange County are developed and used in a manner which does not jeopardize its citizens or its natural resources.

Consistent with the duty to safeguard the public welfare, safety, health, and to protect and beneficially develop the groundwater resources of the county, it is declared to be the policy of the Orange County Board of Health to require that the location, construction, repair and abandonment of wells, and the installation of pumps and pumping equipment conform to such reasonable standards and requirements as may be necessary to protect the public welfare, safety, health, and ground water resources.

It is the finding of the Orange County Board of Health that the entire geographical area of the county is vulnerable to groundwater pollution from improperly located, constructed, operated, altered, or abandoned wells. Therefore, in order to ensure reasonable protection of the groundwater resources, permits shall be required for all well construction activities included in these rules and inspections by the OCHD must be conducted prior to placing a new or repaired well into use.

(3). **APPLICABILITY** – These rules shall apply to well permits issued after July 1, 2008. Wells constructed pursuant to permits issued prior to July 1, 2008, shall be subject to these construction standards however the requirement for sampling in NCGS 15A NCAC 18A .3800 shall not apply to those wells. These rules shall not apply to properly operating existing wells that are in use on the effective date of these rules.

(4). **COMPLIANCE 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. These rules shall not release any person, firm, or corporation from any responsibility as required in 15A NCAC 02C .0100, .0200, and .0300 (Well Construction Standards) and 15A NCAC 18C (Public Water Supplies).

(5). **APPEALS** – Appeals concerning the interpretation and enforcement of these rules by the local Health Department, shall be conducted in accordance with NCGS 130A-24:

(a) Appeals concerning the enforcement of rules adopted by the local board of health and concerning the imposition of administrative penalties by a local health director shall be conducted in accordance with this subsection and subsections (b) and (c) of this section. The aggrieved person shall give written notice of appeal to the local health director within 30 days of the challenged action. 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. 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.

(b) The local board of health shall hold a hearing within 15 days of the receipt of the notice of appeal. The board shall give the person not less than 10 days' notice of the date, time and place of the hearing. On appeal, the board 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.

(c) A person who wishes to contest a decision of the local board of health under subsection (a) of this section shall have a right of appeal to the district court having jurisdiction within 30 days after the date of the decision by the board. The scope of review in district court shall be the same as in G.S. 150B-51.

Nothing in this Section shall preclude an aggrieved person from seeking remedy prior to an appeal. Aggrieved persons are strongly encouraged to request a supervisory review prior to filing an appeal. When a supervisory review is requested: The aggrieved person shall give written notice of a request for review to the Environmental Health Director within thirty days of the challenged action. 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 Environmental Health Director may affirm, modify or reverse the original action. The Environmental Health Director shall issue a written decision based on evidence found during the review. The decision shall contain a concise statement of the reasons for this decision.

(6). **PENALTIES** - Pursuant to North Carolina General Statute 130A- 25(a), any person who violates a provision of the rules adopted by a local board of health shall be guilty of a misdemeanor. Pursuant to North Carolina General Statute 130A-18, the Orange County Health Director may institute an action for injunctive relief, irrespective of all other remedies

at law, in the superior court of the county where the violation occurred or where a defendant resides.

(7). **JURISDICTION** - These rules shall apply to all of Orange County and to all municipalities within Orange County.

(8). **EFFECTIVE DATE** - These rules shall become effective February 26, 2015 upon adoption by the Orange County Board of Health.

History Note: Substitute for NCAC 02C .0301
Eff. July 1, 2008.
Amended Eff. February26, 2015

(B) DEFINITIONS

The definitions in G.S. 87-85 apply throughout this Section. In addition, the following definitions apply throughout this Section:

(1). "Abandon" means to discontinue the use of and to seal the well according to the requirements of these rules.

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

(3). "Addition" means any structure that is constructed, altered or placed on property that contains one or more wells. This would not include replacement of existing equipment within the existing footprint 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 in his behalf in executing applications for permits. The agent may be either general agent or a limited agent authorized to do one particular act.

(5). "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.

(6). "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.

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

(8). "Board of Health" means the Orange County Board of Health or successor entity.

(9). "Casing" means pipe or tubing constructed of materials and having dimensions and weights as specified in these Rules, that is installed in a borehole, during or after completion of the borehole, 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 formations, and to prevent entry of contamination.

(10). "Certificate of Completion" means a certification by the Department that a private drinking water well has been constructed or repaired in compliance with the construction permit or repair permit.

(11). "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.

(12). "Closed loop geothermal heat exchange injection well" or "geothermal well" means an excavation that is drilled into which a sealed pipe loop is inserted through which fluid or gas is recirculated for the sole purpose of a vertical closed loop geothermal heat exchange system.

(13). "Closed loop geothermal heat exchange system" means a system of continuous piping, part of which is installed in the subsurface, through which moves a fluid or gas that does not exit the piping, and which is used to transfer heat energy to and from the fluid or gas.

(14). "Commission" means the North Carolina Environmental Management Commission or its successor, unless otherwise indicated.

(15). "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.

(16). "Construction of wells" means all acts necessary to construct wells for any intended purpose or use, including the location and excavation of the well, placement of casings, screens and fittings, development and testing.

(17). "Contaminate" or "Contamination" means the introduction of foreign materials of such nature, quality, and quantity into the groundwaters as to exceed the groundwater quality standards specified in 15A NCAC 2L (Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina). [Note: As specified in 15A NCAC 2L .0202(b)(3), where naturally occurring substances exceed the established standard, the standard shall be the naturally occurring concentration as determined by DENR.]

(18). "Department of Environment and Natural Resources (DENR)" or "Department" means the North Carolina Department of Environment and Natural Resources. The term also means the authorized representative of the Department.

(19). "Designed capacity" shall mean that capacity that is equal to the yield that is specified by the well owner or his agent prior to construction of the well.

(20). "Development" means the process of properly casing and lining of the well and of removing all drill cuttings, formation material, sediment, or other settled or suspended debris from a new or existing well.

(21). "Domestic use" means water used for drinking, bathing, cooking, or other household purposes.

(22). "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.

(23). "GPM" and "GPD" mean gallons per minute and gallons per day, respectively.

(24). "Grout" means a material approved in accordance with Rule .0107(e) of this Section for use in sealing the annular space of a well or liner or for sealing a well during abandonment.

(a)

(25). "Health Department" or "OCHD" means the Orange County Health Department or its successor.

(26). "Health Director" or "Director" means the Orange County Health Director or his/her authorized representative.

(27). "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.

(28). "Non-Domestic water supply well" means a type of water supply well for the sole purpose of withdrawing groundwater for use in irrigating plants, or providing water for livestock, agricultural, residential, open loop geothermal, or other commercial purposes that do not include water used for domestic purposes.

(29). "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.

(30). "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. 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 constructed solely for the purpose of determining groundwater levels.

(31). "Non-potable water" means water containing pathogens, organic chemicals, inorganic chemicals, or contamination of such quantity or type as to render the water unsafe, harmful, or generally unsuitable for human consumption or domestic use.

(32). "OCHD" means the Orange County Health Department, Environmental Health Services or its authorized representatives.

(33). "Owner" means any person who holds the fee or other property rights in the well being constructed. A well is real property and its construction on land rests ownership in the land owner in the absence of contrary agreement in writing.

(34). "Permit" means a permit issued by the OCHD authorizing or allowing the construction or repair of any well as defined in these rules.

(35). "Person" means all persons, including individuals, 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 any other state or country.

(36). "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.

(37). "Potable water" means water that meets water quality standards for biological, bacteriological, inorganic and organic chemical parameters as established by the Environmental Epidemiology Branch of the NC Department of Public Health.

(38). "Private drinking water well" means any excavation that is cored, bored, drilled, jetted, dug, or otherwise constructed to obtain groundwater for human consumption and that serves or is proposed to serve 14 or fewer service connections or that serves or is proposed to serve 24 or fewer individuals. The term "private drinking water well" includes a well that supplies drinking water to a transient non-community water system as defined in 40 Code of Federal regulations GS 141.2 (July 1, 2003 edition)

(39). "Public water system" means a water system as defined in G.S. 130A-313 (North Carolina Drinking Water Act)

(40). "Pumps" and "pumping equipment" means any equipment or materials utilized or intended for use in withdrawing or obtaining ground-water including well seals.

(41). "Recovery well" means any well constructed for the purpose of removing contaminated groundwater or other liquids from the subsurface.

(42). "Repair" means work involved in deepening, reaming, sealing, installing or changing casing depths, perforating, screening, cleaning, acidizing, hydro-fracturing, or redevelopment of a well excavation, or any other work which results in breaking or opening the well seal.

(43). "Repair permit" means a well repair permit issued by OCHD authorizing or allowing the repair of any well.

(44). "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.

(45). "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.

(46). "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.

(47). "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).

(48). "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 the land surface to the water level in the well.

(49). "Suspended solids" means the weight of those solid particles in a sample 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.

(50). "Temporary well" or "test well" means a well, other than a water supply well, that is constructed to determine aquifer characteristics, and which will be permanently abandoned or converted to a permanent well within seven days (168 hours) of the completion of drilling of the borehole.

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

(52). "Vent" means a protected opening in the well casing or well head, installed for the purpose of allowing changes in the water level in a well due to natural atmospheric changes or to pumping. A vent can also serve as an access port.

(53). "Water supply well" means any well intended or usable to withdraw water from the ground for domestic or non-domestic use.

(54). "Water supply system" means pump and pipe used in connection with or pertaining to the operation of a private drinking water well including pumps, distribution service piping, pressure tanks and fittings, and water treatment devices.

(55). "Well" means any excavation that is cored, bored, drilled, jetted, dug or otherwise constructed for the purpose of locating, testing, or withdrawing groundwater or for evaluating, 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.

(56). "Well capacity" shall mean the maximum quantity of water that a well will yield continuously as determined by methods outlined in Section II (O) of these Rules.

(57). "Well Contractor" means any person in trade or business who undertakes to perform a well contractor activity or who undertakes to personally supervise or personally manage the performance of a well contractor activity on the person's own behalf or for any person, firm, or corporation in accordance with the well contractor certification requirements of 15A NCAC 27.

(58). "Well contractor activity" means the construction, installation, repair, alteration or abandonment of any well.

(59). "Well head" means the upper terminal of the well including adapters, ports, valves, seals, and other attachments.

(60). "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, the purpose or function of which is to prevent pollutants from entering the well at the upper terminal.

(61). "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.

(62). "Yield" means the volume of water expressed in gallons per minute or other unit of time that can be produced by a well under a given set of conditions.

History Note: *Substitute for NCAC 02C .0302*
Eff. July 1, 2008; amended eff. October 23, 2009

(C) APPLICATION FOR WELL CONSTRUCTION PERMIT

An application for a permit to construct, repair, or abandon a well shall be submitted to the Orange County Health Department (OCHD) by a property owner or the property owner's agent. The application shall include:

(1) Name, address, phone number, and email address (if available) of the proposed well property owner or owner's agent;

(2) Signature of owner or agent;

(3) Address (if available) and parcel identification number of the property where the proposed well is to be located;

(4) A plat or site plan as defined in the rules of this Section that includes any known sources of potential contamination within 100 feet of the property on which the well is proposed to be located;

(5) Intended use(s) of the well;

(6) Other information deemed necessary by the OCHD to determine the location of the property and any site characteristics such as existing or permitted 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;

(7) An application for a public water supply well as defined in G.S. 130A-313 (North Carolina Drinking Water Act) shall also contain a pre-drill investigation document from the state Public Water Supply Section that indicates approval of the proposed well location.

(8) An application for a monitoring well or injection well permit shall also contain:

a. a map of the general site area, showing the location of:

i. all property boundaries, at least one of which is referenced to a minimum of two landmarks, such as identified roads, intersections, streams or lakes;

ii. all existing wells, identified by the type of use, within the property boundaries;

iii. all proposed wells, identified by type of use, within the property boundaries;

iv. all sources of known or potential groundwater contamination within the property boundaries.

v. a construction profile diagram of the proposed monitoring well or injection well showing the type of well and including detailed specifications describing all materials to be used and methods of construction.

vi. the well contractor company name, if known, and

b. Unless the well is deemed permitted per 15A NCAC 02C, an approval letter from the State indicating review and approval of the proposed well(s).

(9) An application for a closed-loop geothermal well shall also include:

a. The type of recirculation fluid or gas, and any additives to be used. Documentation from the State must be provided if the fluid or additive is not pre-approved,

b. A detailed site plan showing the locations of the well or wells and the horizontal piping routes, and,

c. A detailed profile diagram showing the components of the geothermal well system.

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

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

History Note: Substitute for NCAC 02C .0303
Eff. July 1, 2008.

(D) PERMITTING

(1). No person shall construct a well without first obtaining a well construction permit from the OCHD. However a permit shall not be required for monitoring or recovery wells that do not penetrate consolidated rock. No person shall repair a well without first obtaining a well repair permit except a well repair permit is not required for maintenance or pump repair or

replacement. Disinfection in accordance with Section II of these Rules is a maintenance activity that does not require a repair permit.

(2). In addition, to the requirements to obtain a permit from the State for the types of wells described in 15A NCAC 02C .0105, no person shall construct a well that penetrates consolidated rock without first obtaining a well permit from the OCHD.

(3). Before issuing a well construction permit, the OCHD shall receive an application for a permit and 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 private drinking water well is to be located. The OCHD shall issue a well construction permit after determining the site can be permitted for a well meeting the rules of this Section. Notwithstanding the above, the-OCHD 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.

(4). The Department shall issue a written notice of denial of a well construction permit if it determines a private drinking water well cannot be constructed in compliance with the rules of this Section. The notice of denial shall include reference to specific laws or rules that cannot be met and shall be provided to the applicant.

(5). A well construction permit is valid for a period of five years except that the Department may suspend or revoke a permit at any time under the following circumstances:

- (a) Upon finding that there has been a material change in any fact or circumstance upon which the permit is issued, or
- (b) Upon finding that the rules of this section or permit conditions have been violated,
- (c) Upon finding that site conditions have been altered which materially affect the permit.

(6). The validity of a well construction permit or a repair permit is not affected by a change in ownership of the site on which a well is proposed to be located.

(7). The OCHD shall give the permit holder a written notice of intent to revoke the permit by the Health Department stating the reason or reasons for revoking the permit. The permit holder may appeal the decision to revoke the permit to the Board of Health in accordance with the appeals section of these rules. If the permit holder does not appeal within 15 days of receipt of the notice, the permit shall be immediately revoked. When a permit is suspended, revoked, or becomes invalid, the well construction shall not be commenced or completed until a valid permit has been obtained.

(8). If the site contains a well(s) that is no longer in use or an improperly abandoned well(s), the construction permit shall be conditioned to require repair or abandonment of any out-of-use well(s) or improperly abandoned well(s) in accordance with Section IV of these Rules.

History Note: *Substitute for NCAC 02C .0304*
Eff. July 1, 2008.

(E) GROUT INSPECTION

(1). The well contractor shall notify the local health department to schedule a grout inspection before grouting any well. Notification shall include the location, permit number and anticipated day and time for grouting each well. The notice shall be given in sufficient time in accordance with OCHD policy and procedure to allow the Health Department to inspect

the well before the grout is emplaced. The grouting of any well shall not commence before a representative of the Health Department has inspected the annular space around the well. The driller shall give at least 24 hours prior notification if more than one well is to be grouted in a given day. No more than three wells per driller will be inspected in a given day unless unusual circumstances exist that necessitate the inspections.

(2). The well contractor shall submit a copy of the Well Construction Record (well log) to the local health department at the time of the grouting inspection.

Upon completion of a grout inspection, the Department shall provide a written certification on the well permit that a grout inspection was completed and that the grouting is in compliance with these rules.

History Note: *Substitute for NCAC 02C .0305*
Eff. July 1, 2008.

(F) WELL COMPLETION AND CERTIFICATION

(1). After receiving a permit to construct a private drinking water well, the property owner or his agent shall notify the health department prior to well construction if any of the following occur:

- (a) The separation criteria specified in Section II (A) of these Rules 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.

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

(3). The pump installer, property owner, or permittee shall notify the OCHD of the completion of the well so that a final inspection can be conducted. Notification shall occur after the completion of the well installation, grouting, installation of the pump, and assurance that all components and conditions required in Section II of these Rules have been met.

(4). Upon completion of construction of a water supply well, and prior to issuance of the Certificate of Completion the OCHD shall:

- (a) Complete an "as built" drawing of the well location;
- (b) Verify that the well was constructed in the designated area and according to the well construction permit and these rules, and;
- (c) Conduct a final inspection of the well after the pump installation and well seal is in place in order to verify compliance with these rules.

(5). No person shall place a water supply well into service without first having obtained a Certificate of Completion.

History Note: *Substitute for NCAC 02C .0306*
Eff. July 1, 2008.

(G) WELL DATA AND RECORDS

(1) Any person completing, abandoning or repairing any well shall submit a record of the construction, abandonment or repair to the OCHD and the Department within 30 days of completion of construction, abandonment or repair. The record submitted to the OCHD shall be on standard forms developed by NC DENR. Should the contractor fail to provide the completed form, the certificate of completion shall not be issued and the contractor shall not proceed with construction, repair or abandonment of any well in Orange County until the proper forms are provided.

(2) The local health department shall maintain a registry of all permitted water supply wells that is searchable by address or addresses served by the well, specifying the well location and the water quality test results until the well is permanently abandoned in accordance with this Subchapter.

History Note: *Substitute for NCAC 02C .0307*
Eff. July 1, 2008.: amended Effective February 26, 2015

(H) REGISTRATION OF WELL CONTRACTORS

(1). All persons, firms, or corporations engaged in the business of construction or repair of wells in Orange County shall register biennially with the OCHD.

(2). Registration shall be accomplished, during the period from July 1 to July 31 of every odd-numbered year, by completing and submitting to the Health Department a registration form provided by the department for this purpose.

(3). Upon receipt of a properly completed application form, and providing evidence of a valid certification from the North Carolina Well Driller Certification Commission, the applicant will be issued a certificate of registration.

(4). The Health Director is authorized to suspend or revoke the registration of any driller who fails to comply with these rules for a period of time specified by the Health Director. The Health Director shall give the driller a written notice of intent to suspend or revoke the registration stating the reason or reasons for suspending or revoking the registration. The driller may appeal the decision to suspend or revoke the registration to the Board of Health in accordance with the appeals section of these rules. If the driller does not appeal within 15 days of receipt of the notice, the registration shall be immediately suspended or revoked and the person shall not construct, repair, or abandon wells in Orange County.

(5). Any person or firm who drills or constructs closed loop geothermal heat exchange injection wells that do not meet all standards as specified in Section II of this Rule shall be certified for those installations by the International Ground Source Heat Pump Association or its equivalent.

History Note: *Substitute for NCAC 02C .0103*
Eff. July 1, 2008.

SECTION II - STANDARDS OF CONSTRUCTION FOR WATER SUPPLY WELLS

(A) LOCATION. The permitting or construction of a well shall comply with the following setbacks:

(1) A water supply well shall not be located in 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) The minimum horizontal separation between a water supply well and potential sources of groundwater contamination, shall be as follows unless otherwise specified:

(a)	Septic tank, pump tank, drainfield, repair area	100 ft
(b)	Other subsurface ground absorption waste disposal system	100 ft.
(c)	Biosolids application or wastewater-irrigation sites	100 ft.
(d)	Water-tight sewage or liquid-waste collection or transfer facility constructed to water main standards in accordance with 15A NCAC 02T .0305(g)(2) or 15A NCAC 18A .1950(e), as applicable	50 ft.
(e)	Other sewage and liquid-waste collection or transfer facility	100 ft.
(f)	Cesspools and privies	100 ft.
(g)	Animal feedlots, as defined by G.S. 143-215.10B(5), or manure piles	100 ft.
(h)	Fertilizer, pesticide, herbicide or other chemical storage areas	100 ft.
(i)	Non-hazardous waste storage, treatment or disposal lagoons	100 ft.
(j)	Sanitary landfills, solid waste landfill facilities, incinerators, construction and demolition (C&D) landfills and other disposal sites except Land Clearing and Inert Debris landfills	500 ft.
(k)	Land Clearing and Inert Debris (LCID) landfills	100 ft.
(l)	Animal barns	100 ft.
(m)	Building foundations subject to termite treatment	50 ft.
(n)	Surface water bodies, such as ponds, lakes and reservoirs	50 ft.
(o)	Surface water such as brooks, creeks, streams, rivers,	25 ft.
(p)	Chemical or petroleum underground storage tank systems regulated under 15A NCAC 02N and underground fuel oil storage tanks (except compressed gas)	
	(i) with secondary containment	50 ft.
	(ii) without secondary containment	100 ft.
(q)	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 ft.
(r)	All other petroleum or chemical storage tank systems	100 ft
(s)	Gravesites	50 ft
(t)	All other potential sources of groundwater contamination	50 ft.
(u)	Property lines	40 ft.
(v)	In-ground swimming pools	50 ft

(w) Land-based or subsurface waste storage or disposal systems 100 ft

(3) For a well on a lot serving a single-family dwelling where lot size or other fixed conditions preclude the separation distances specified in Subparagraph (A)(2) of this Rule, the required horizontal separation distances shall be the maximum possible but shall in no case be less than the following:

(a) Septic tank, pump tank, pretreatment components and drainfield including drainfield repair areas, except saprolite systems as defined in 15A NCAC 18A .1956(6) 50 ft.

(b) Water-tight sewage or liquid-waste collection or transfer facility constructed to water main standards in accordance with 15A NCAC 02T .0305(g)(2) or Orange County Regulations for Wastewater Treatment and Disposal Systems rule .1950(e), as applicable 25 ft.

(c) Animal barns 50 ft.

(d) Existing building foundations 25 ft

(e) Property lines 10 ft.

(f) Existing in-ground swimming pools 25 ft

(g) Land-based or subsurface waste storage or disposal systems 50 ft

Minimum separation distances from all other potential sources of groundwater contamination shall be those specified in Subparagraph (a)(2) of this Rule.

(4) No person shall cause a potential source of groundwater contamination as described in Section II (A)(2) or Section II (A)(3) of these Rules to be placed closer to a well site or an existing well than the referenced distances specified.

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008; amended eff. October 23, 2009

(B) SOURCE OF WATER

(1) The source of water for any water supply well shall not be from a water bearing zone or aquifer that is contaminated.

(2) If a well is constructed to obtain water from an unconsolidated rock formation, prior approval from the OCHD shall be required. The well shall be equipped with a screen or screens to prevent the entrance of formation material into the well after the well has been developed and completed by the well contractor. The well screen(s) shall meet the requirements of Section II (F) of these rules.

(3) All water supply wells shall be constructed so that a pump with a capacity equal to the well capacity (within the practical limits of pumps for a given diameter well) can be installed and operated without binding or without interference by contact with any part of the well.

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008; amended eff. October 23, 2009

(C) DRILLING FLUIDS AND ADDITIVES

Drilling Fluids and Additives shall not contain organic nor toxic substances nor include water

obtained from surface water bodies or water from a non-potable supply and may be comprised only of:

(1) the formational material encountered during drilling; or

(2) materials manufactured specifically for the purpose of borehole conditioning or water well construction.

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008.

(D) CASING

All newly drilled water supply wells in Orange County shall be cased with minimum 6" diameter steel casing unless otherwise specifically approved by the OCHD. The use of thermoplastic casing shall not be allowed except in monitoring wells and shallow observation wells that do not penetrate consolidated rock. The casing shall meet one of the following specifications:

(1) The casing shall be new, seamless or electric-resistance welded galvanized pipe. Galvanizing shall be done in accordance with requirements of ASTM A53/A53M-07, which is hereby incorporated by reference, including subsequent amendments and editions.

(2) The casing shall be new, seamless or electric-resistance welded black steel pipe. If black steel pipe is used, the well shall be lined with an approved thermoplastic liner prior to approval and placing the well into use.; or

(3) The casing shall be new, seamless or electric-resistance welded stainless steel pipe. 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 also shall conform to the specific requirements in the ASTM standard that best describes the chemical makeup of the stainless steel casing that is intended for use in the construction of the well. Stainless steel casing shall have a minimum wall thickness that is equivalent to standard schedule number 10S.

(4) The casing, threads and couplings shall meet or exceed the specifications of ASTM A53/A53M-07 or A589/589M-06, which is hereby incorporated by reference, including subsequent amendments and editions.

(5) All joints shall be water-tight and threaded with heavy recessed-type couplings. The coupling shall completely cover the threads when joined.

(6) The minimum wall thickness for a given diameter shall equal or exceed that specified in Table I;

Table I - Minimum Wall Thickness for Steel Casing

Nominal Diameter (inches)	Wall Thickness (inches)
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

(7) All casing shall be equipped with a drive shoe at the lowest terminus to protect the casing from damage during installation. The drive shoe shall be made of forged, high carbon, tempered seamless steel and shall have a beveled, hardened cutting edge. If a casing is not driven, a coupling may be used in lieu of the drive shoe when it meets or exceeds the specifications of paragraph (D)(4) above.

(8) The top of the casing shall be cut off smooth and level by the drilling contractor at least twelve inches above land surface and shall be free from dents and cracks. Prior to removing equipment from the site, the top opening of the well casing shall be sealed with a watertight cap or well seal to prevent the introduction of contaminants into the well.

(9) The casing in wells constructed to obtain water from a consolidated rock formation shall be:

- (a) adequate to prevent any formation material from entering the well in excess of the levels specified in Section II (H) of this Rule; and
- (b) firmly seated and sealed at least five feet into consolidated rock, and
- (c) cased to a depth of at least 62 feet below the natural ground surface. However, when it is not possible to achieve 62 feet of casing due to unstable obstructions of the borehole or collapse, less than 62 feet may be allowed with following provisions:
  - (i) consultation with and approval by the OCHD has been obtained, and
  - (ii) the casing shall extend at least 20 feet from the land surface, and
  - (iii) the casing shall be firmly seated and sealed at least five feet into consolidated rock, and
  - (iv) a grouted liner and sealing packer shall be installed to a depth of at least 62 feet from the land surface.

(10) 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.

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008; amended eff. October 23, 2009 Amended effective November 21, 2008

(E) GROUTING

(1) The annular space around the casing shall be filled with an approved grout to a depth of at least 20 feet from the land surface. The grout shall extend outward from the casing wall to a minimum thickness equal to either one-third of the diameter of the outside dimension of the casing or two inches, whichever is greater. The grout shall be placed in accordance with the requirements of this Paragraph.

(2) The casing shall be grouted as necessary to seal off, from the producing zone(s), all aquifers or zones with water containing organic or other contaminants of such type and quantity as to render water from those aquifers or zones unsafe or harmful or unsuitable for human consumption and general use.

(3) One of the following grouts shall be used wherever grout is required by a Rule of this Section. Where a particular type of grout is specified by a Rule of this Section, no other type of grout shall be used.

(a) "Neat cement grout" means a mixture of not more than six gallons of clear, potable water to one 94 pound bag of portland cement. Up to five percent, by weight, of bentonite clay may be used to improve flow and reduce shrinkage. If bentonite is used, additional water may be added at a rate not to exceed 0.6 gallons of water for each pound of bentonite.

(b) "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.

(c) "Concrete grout" means a mixture of not more than two parts gravel or rock cuttings to one part cement and not more than six gallons of clear, potable water per 94 pound bag of portland cement. One hundred percent of the gravel or rock cuttings must be able to pass through a one-half inch mesh screen.

(d) Bentonite slurry grout shall consist of a mixture of not more than 24 gallons of clear, potable water to one 50 pound bag of commercial sodium bentonite. Non-organic, non-toxic substances may be added to bentonite slurry grout mixtures to improve particle distribution and pumpability. Bentonite slurry grout may only be used in accordance with the manufacturer's written instructions.

(e) Specialty grout shall consist of a mixture of non-organic, non-toxic materials with characteristics of expansion, chemical-resistance, rate or heat of hydration, viscosity, density or temperature-sensitivity applicable to specific grouting requirements. Specialty grouts may not be used without prior approval by the Health Director. Approval of the use of specialty grouts shall be based on a demonstration that the finished grout has a permeability less than 10^{-6} centimeters per second and will not adversely impact human health or the environment.

(4) The liquid and solid components of all grout mixtures shall be blended prior to emplacement below land surface.

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

(6) Bentonite slurry grout may be used in that portion of the borehole that is at least three feet below land surface. That portion of the borehole from land surface to at least three feet below land surface shall be filled with a concrete or cement-type grout.

(7) 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 space 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; or

(c) Other. Grout may be emplaced in the annular space by gravity flow in such a way to ensure complete filling of the space. Gravity flow shall not be allowed if water or any obstruction is present in the upper 20 feet of annular space at the time of the grouting.

(8) If a Rule of the Section requires grouting of the casing to a depth greater than 20 feet below land surface, the pumping or pressure method shall be used to grout that portion of the borehole deeper than 20 feet below land surface.

(9) If an outer casing is installed, it shall be grouted by either the pumping or pressure method.

(10) The well shall be completely grouted upon completion of drilling and no later than seven working days after the casing is set.

(11) 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.

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008; amended eff. October 23, 2009

(F)WELL SCREENS

(1) The well screen shall be of a standard design with certification to Standard ANSI/NSF 61. and pre-manufactured to permit the optimum development of the aquifer with minimum head loss consistent with the intended use of the well. 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.

(2) 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.

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008.

(G) GRAVEL / SAND PACKED WELLS

Gravel or sand packed wells shall be constructed with prior approval from the OCHD and in accordance with NCAC 02C .

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008.

(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 milligrams per liter of settleable solids; and
(b) 10 NTUs of turbidity as suspended solids.

(3) Development shall not require efforts to reduce or eliminate the presence of dissolved constituents which are indigenous to the ground water quality in that area.

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008; amended eff. October 23, 2009

(I) WELL HEAD COMPLETION

(1) Every water supply well and such other wells as may be specified by the OCHD shall be equipped with a usable access port or air line. The access port shall be at least one half inch inside diameter opening so that the position of the water level can be determined at any time. The port shall be installed and maintained in such manner as to prevent entrance of water or foreign material.

(2) The surface of the ground shall be graded away from the well-head in all directions.

(3) All openings for piping, wiring, and vents shall enter into the well at least 12 inches above land surface and shall be adequately sealed to preclude the entrance of contaminants into the well.

(4) The well head shall be equipped with a screened vent to allow for the pressure changes within the well except if a suction lift pump or single-pipe jet pump is used or artesian, flowing well conditions are encountered.

(5) The person installing the pump shall install a threadless sampling tap at the wellhead for obtaining water samples except in the case of suction pump or offset jet pump installations the threadless sampling tap shall be installed on the return (pressure) side of the pump piping.

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

(7) The threadless sampling tap shall be turned downward, located a minimum of twelve inches above land surface, floor, or well pad, and positioned such that a water sample can be obtained without interference from any part of the wellhead. The spout of the sampling tap shall be smooth and free of jagged edges or burrs.

(8) The base plate of a pump placed directly over the well shall form a watertight seal with the well casing or pump foundation.

(9) 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 an approved well seal designed specifically for this purpose.

(10) A priming tee shall be installed at the well head in conjunction with offset jet pump installations.

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008; amended eff. October 23, 2009 Amended effective November 21st, 2008

(J) WELL CONTRACTOR IDENTIFICATION PLATE

(1) An identification plate shall be installed on the well within 72 hours after completion of the drilling.

(2) The identification plate shall be constructed of a durable weatherproof, rustproof metal, or equivalent material approved by the OCHD.

(3) The identification plate shall be securely attached to the aboveground portion of the well casing where it is readily visible and in a manner that does not obscure the identification plate.

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

(5) The identification plate shall be stamped with permanent legible markings to show the:

- (a) name and registration number of the drilling contractor;
- (b) total depth of well;
- (c) casing depth (ft.) and inside diameter (in.);
- (d) screened intervals of screened wells;
- (e) packing interval of gravel-or sand-packed wells;
- (f) yield, in gallons per minute (gpm), or specific capacity in gallons per minute per foot of drawdown (gpm/ft.-dd);
- (g) static water level and date measured; and
- (h) date well completed

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008; amended eff. October 23, 2009;
Amended Effective February 26, 2015

(K) PUMP INSTALLER INFORMATION PLATE

(1) An information plate, shall be securely attached to the aboveground portion of the well casing within 72 hours after completion of the pump installation;

(2) The information plate shall be constructed of a durable waterproof, rustproof metal, or equivalent material approved by the OCHD;

(3) The information plate shall not be removed by any person; and

(4) The information plate shall be stamped or engraved with permanent legible, markings to show the:

- (a) name of the well contractor and certification number of the person installing the pump;
- (b) date the pump was installed;
- (c) the depth of the pump intake; and
- (d) the horsepower rating of the pump.

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008; amended eff. October 23, 2009

(L) ARTESIAN WELLS

Every artesian well that flows under natural artesian pressure shall be equipped with a valve so that the flow can be completely stopped provided that the well casing and seal can not feasibly be extended above the static water level. Well owners shall be responsible for the operation and maintenance of the valve.

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008; amended eff. October 23, 2009

(M) PITLESS ADAPTERS

Pitless adapters or pitless units shall not be allowed as a method of well head completion.

History Note: *Substitute for NCAC 02C .0107*
Eff. July 1, 2008.

(N) PUMPS AND PUMPING EQUIPMENT

(1) The pumping capacity of the pump shall be consistent with the intended use and yield characteristics of the well.
(2) The pump and related equipment for the well shall be conveniently located to permit easy access and removal for repair and maintenance.
(3) Joints of any suction line installed underground between the well and pump shall be water-tight under system pressure.
(4) The piping and electrical wiring used in connection with the pump shall meet all applicable underwriters specifications and all other applicable state and local codes.
(5) Only potable water shall be used for priming the pump.

History Note: *Substitute for NCAC 02C .0109*
Eff. July 1, 2008.Amended effective November 21, 2008.amended eff. October 23, 2009

(O) WELL TESTS FOR YIELD

(1) Every water supply well shall be tested for capacity by one of the following methods:
  (a) Pump Method
    (i) select a permanent measuring point, such as the top of the casing;
    (ii) measure and record the static water level below or above the measuring point prior to starting the pump;
    (iii) measure and record the discharge rate at intervals of 10 minutes or less;
    (iv) measure and record water levels using a steel or electric tape at intervals of 10 minutes or less;
    (v) continue the test for a period of at least one hour, and
    (vi) make measurements within an accuracy of plus or minus one inch.
  (b) Air Rotary Drill Method
    (i) measure and record the amount of water being injected into the well during drilling operations;

(ii) measure and record the discharge rate in gallons per minute at intervals of one hour or less during drilling operations;

(iii) after completion of the drilling, continue to blow the water out of the well for at least 30 minutes and measure and record the discharge rate in gallons per minute at intervals of 10 minutes or less during the period, and;

(iv) measure and record the water level immediately after discharge ceases.

(c) Air Lift Method. Measurements shall be made through a pipe placed in the well. The pipe shall have a minimum inside diameter of at least five tenths of an inch and shall extend from top of the well head to a point inside the well that is below the bottom of the air line.

(i) Measure and record the static water level prior to starting the air compressor;

(ii) Measure and record the discharge rate at intervals of 10 minutes or less;

(iii) Measure and record the pumping level using a steel or electric tape at intervals of 10 minutes or less, and;

(iv) Continue the test for a period of at least one hour.

History Note: *Substitute for NCAC 02C .0110*
Eff. July 1, 2008; amended eff. October 23, 2009

(P) DISINFECTION OF WATER SUPPLY WELLS

(1) Any person constructing, repairing, testing, or 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

(2) Any person disinfecting a well shall perform disinfection in accordance with the following procedures:

(a) Chlorination

(i) Hypochlorite shall be placed in the well in sufficient quantities to produce a chlorine residual of at least 100 parts per million (ppm) in the well. Stabilized chlorine tablets or hypochlorite products containing fungicides, algaecides, or other disinfectants shall not be used. Chlorine test strips or other quantitative test methods shall be used to confirm the concentration of the chlorine residual.

(ii) The hypochlorite shall be placed in the well by one of the following or equivalent methods:

(A) Granular hypochlorite may be dropped in the top of the well and allowed to settle to the bottom; or

(B) Hypochlorite solutions 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 by using water or air.

(iii) The water shall be recirculated to:

(A) distribute the chlorine throughout the water column of the well, and;

(B) wash down the well casing, pump column and any other equipment above the water level in the well.

(iv) The chlorine solution shall stand in the well for a period of at least 24 hours.

(v) The well shall be pumped until the system is clear of the chlorine before the system is placed in use.

(b) Other materials and methods of disinfection may be used upon prior approval by the State and OCHD.

History Note: *Substitute for NCAC 02C .0111*
Eff. July 1, 2008; amended eff. October 23, 2009

SECTION III STANDARDS OF CONSTRUCTION: NON-DRINKING WATER SUPPLY WELLS

(A) Non-domestic Water Supply Wells

Non-domestic water supply wells shall meet all standards as specified in Section II. of this Rule.

(B) Monitoring Wells

(1) Monitoring wells that do not penetrate consolidated rock shall not be subject to these rules and do not require permits from the OCHD.

(2) Primary (outer) well casing shall meet the casing material and grouting requirements of Section II (D) and (E) of these Rules respectively, otherwise monitoring well construction shall meet the requirements of 15A NCAC 2C .0108 Alternative materials and grouting methods may be submitted to the OCHD and considered for approval based on evidence provided by the project licensed professional.

(3) Monitoring well locations shall meet the horizontal setback standards as required in Section II (A) of these Rules. Reduction of these setbacks may be allowed provided that a justification is submitted to OCHD establishing that the setbacks as required would adversely affect the site investigation. The justification may be submitted by either:

(a) the licensed professional (ex. engineer, geologist) overseeing the site investigation, or

(b) the state agency overseeing the site investigation.

(4) Monitoring wells and recovery wells shall be located, designed, constructed, operated and abandoned with materials and by methods which are compatible with the chemical and physical properties of the contaminants involved, specific site conditions and specific subsurface conditions.

(5) Monitoring well and recovery well boreholes shall not penetrate to a depth greater than the depth to be monitored or the depth from which contaminants are to be recovered. Any portion of the borehole that extends to a depth greater than the depth to be monitored or the depth from which contaminants are to be recovered shall be grouted completely to prevent vertical migration of contaminants.

(6) The well shall not hydraulically connect:

(a) separate aquifers; or

(b) those portions of a single aquifer where contamination occurs in separate and definable layers within the aquifer.

(7) The well construction materials shall be compatible with the depth of the well and any contaminants to be monitored or recovered.

(8) The well shall be constructed in such a manner that water or contaminants from the land surface cannot migrate along the borehole annulus into any packing material or well screen area.

(9) In monitoring wells, packing material placed around the screen shall extend at least one foot above the top of the screen. Unless the depth of the screen

necessitates a thinner seal; a one foot thick seal, comprised of chip or pellet bentonite or other material approved by the Department as equivalent, shall be emplaced directly above and in contact with the packing material.

(10) In monitoring wells, grout shall be placed in the annular space between the outermost casing and the borehole wall from the land surface to the top of the bentonite seal above any well screen or to the bottom of the casing for open end wells. The grout shall comply with Section II (E) of these Rules except that the upper three feet of grout shall be concrete or cement grout.

(11) If the well penetrates any water-bearing zone that contains contaminated or saline water, the well shall be grouted within one day after the casing is set but in no case shall any well remain ungrouted for more than seven days after the casing is set.

(12) All monitoring wells, including temporary wells, shall be secured with a locking well cap to ensure against unauthorized access and use.

(13) All monitoring wells shall be equipped with a steel outer well casing or flush-mount cover, set in concrete, and other measures sufficient to protect the well from damage by normal site activities.

(14) Any well that would flow under natural artesian conditions shall be valved so that the flow can be regulated.

(15) In monitoring wells, the well casing shall be terminated no less than 12 inches above land surface unless all of the following conditions are met:

- (a) site-specific conditions directly related to business activities, such as vehicle traffic, would endanger the physical integrity of the well; and
- (b) the well head is completed in such a manner so as to preclude surficial contaminants from entering the well.

(16) Each monitoring well shall have permanently affixed an identification plate. The identification plate shall be constructed of a durable waterproof, rustproof metal, or other material approved by the Department as equivalent and shall contain the following information:

- (a) well contractor name and certification number;
- (b) date well completed;
- (c) total depth of well;
- (d) a warning that the well is not for water supply and that the groundwater may contain hazardous materials;
- (e) depth(s) to the top(s) and bottom(s) of the screen(s); and
- (f) the well identification number or name assigned by the well owner.

(17) Each monitoring well shall be developed such that the level of turbidity or settleable solids does not preclude accurate chemical analyses of any fluid samples collected or adversely affect the operation of any pumps or pumping equipment.

(C) Geothermal Wells

(1) Geothermal well construction standards, installation standards and driller certification procedures adopted by the International Ground Source Heat Pump Association (IGSHPA) are hereby enacted by reference. A copy of the IGSHPA

standards and procedures is available at the Environmental Health Division of the Orange County Health Department.

(2) The well shall be constructed in such a manner that surface water or contaminants from the land surface cannot migrate along the borehole annulus either during or after construction. Prior to removing equipment from the site, the borehole shall be protected to prevent the introduction of contaminants into the well.

(3) Geothermal wells shall meet the horizontal setback standards as specified in Section II(A) of these rules.

(4) For closed loop geothermal wells that are fully grouted with an approved grout, the following setbacks shall apply as measured from any portion of the borehole to the potential source of contamination:

- (a) Building perimeters, including any attached structures.....15 ft.
- (b) Septic tanks and drainfields, including drainfield repair areas.....50 ft.
- (c) Sewer lines constructed to water main standards.....15 ft.
- (d) Sewer lines not constructed to water main standards.....25 ft.
- (e) Land-based or subsurface waste storage or disposal systems.....50 ft.

(5) Geothermal wells shall meet construction specifications in Section II of these rules, however closed loop geothermal heat exchange injection wells constructed and completed according to International Ground Source Heat Pump Association or equivalent standards shall not be required to be constructed with casing.

(6) Only additives that the Department determines not to adversely affect human health shall be used.

(7) Closed loop tubing used in Direct Expansion closed loop wells shall consist of refrigeration-grade copper pipe as defined/described in ASTM B280-08, which is hereby incorporated by reference, including subsequent amendments and editions.

(8) All Direct Expansion systems shall be constructed with cathodic protection unless testing conducted in accordance with Part C (9) (c) of this Section indicates that all pH test results are within the range of 5.5 to 11.0 standard units. Cathodic protection, if required, shall be maintained at all times in accordance with the manufacturer's specifications throughout the operating life of the well(s).

(9) Testing requirements are as follows:

- (a) Closed loop tubing shall pass a pressure test on-site prior to installation into the borehole. Any closed loop tubing that has a measurable leak shall either not be used or have the leaks located and repaired plus successfully pass a subsequent pressure test prior to installation.
- (b) The closed loop well system shall pass a pressure test after installation and prior to operation. Any pressure fluctuation other than that due to thermal expansion and contraction of the testing medium shall be considered a failed test. Any leaks shall be located and repaired prior to operating the system.
- (c) For Direct Expansion type wells, drilling cuttings shall be tested for pH at a frequency of at least every 10 feet of boring length using a pH meter that has been calibrated prior to use according to the manufacturer's instructions. A copy of the results of these tests shall be made available to the Orange County Health Department.

(10) The well shall be grouted within seven days after drilling is complete or before the drilling equipment leaves the site, whichever occurs first.

(11) The well(s) shall be operated and maintained in accordance with the manufacturer's specifications throughout the operating life of the well(s).

(12) When closed loop geothermal heat exchange injection wells are terminated below the ground surface:

(a) The well shall have a permanent monument at grade level directly above each well. The monument shall state

(i) well contractor name and certification number;

(ii) number and depth of the boring(s);

(iii) grout depth interval;

(iv) well construction completion date; and

(v) identification as a geothermal well/well field., or;

(b) The perimeter corners of each well field shall be marked at ground surface with a permanent monument that:

(i) Identifies the area as a geothermal well field, and;

(ii) Refers to the location of a recorded plat prepared by a Registered Land Surveyor that identifies the location, depth and date of each well. The plat shall be recorded at the Orange County Register of Deeds and a copy shall be retained by the property owner and the OCHD.

(c) The property owner is responsible for compliance with all other well identification requirements contained in 15A NCAC 02C .0222(f) and .0223(f)

History Note: *Substitute for NCAC 02C .0108*
Eff. July 1, 2008.

SECTION IV MAINTENANCE, REPAIR, AND ABANDONMENT OF WELLS

(A) WELL MAINTENANCE AND REPAIR

(1) 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 or pollution to the water supply or any aquifer, or the well shall be permanently abandoned in accordance with the requirements of these Rules and this Section.

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

(3) Broken, punctured or otherwise defective or unserviceable casing, screens, fixtures, seals, or any part of the well head shall be repaired or replaced, or the well shall be permanently abandoned pursuant to the requirements of this Section.

(4) PVC pipe meeting NSF International Standards and rated at least Schedule 40 shall be used for liner casing. The annular space around the liner casing shall be at least five-eighths inches and shall be completely filled with neat grout or sand-cement grout. All liner boots shall have at least 2 flanges and shall be installed in accordance with the manufacturer's instructions. The well liner shall be completely grouted within 10 working days after collection of water samples or completion of other testing to confirm proper placement of the liner or within 10 working days after the liner has been installed if no sampling or testing is performed.

(5) Water supply wells with the well head terminating below ground (buried seal) shall be repaired by adding a section to the well casing extending at least 12 inches above land surface. The extension shall be made as follows:

(a) A sleeve shall be installed inside or outside of the casing and shall overlap at least three inches down the existing casing. The extension casing shall be welded to the existing casing around the outside of the joint; or

(b) A sleeve shall be heated and swaged over the existing casing with at least six inches of overlap; or

(c) An approved coupling meeting ASTM C-564 (Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings) and ASTM C1540 (Standard Specification for Heavy Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings) may be utilized to extend the casing. Use of such a coupling requires prior approval of the OCHD.

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 shall have a minimum thickness of six inches extending horizontally from the casing. Other repairs to the well, or replacement may be necessary in addition to extension of the well head

(6) Well rehabilitation by noncontinuous chemical treatment shall be conducted using methods and materials approved by the Department based on a demonstration that the materials and methods used will not create a violation of groundwater

standards in 15A NCAC 2L or otherwise render the groundwater unsuitable for its intended best usage after completion of the rehabilitation.

History Note: *Substitute for NCAC 02C .0112*
Eff. July 1, 2008; amended eff. October 23, 2009

(B) ABANDONMENT OF WELLS

(1) Wells that have been taken out of service shall be abandoned in accordance with one of the following:

(a) **Temporary Abandonment**
Any well which is temporarily taken out of service shall be temporarily abandoned in accordance with the following.

(i) The well shall be protected with an approved casing, and;

(ii) sealed with a water-tight cap or seal compatible with casing that cannot be removed without the use of tools, and

(iii) the well shall be maintained whereby it is not a source or channel of contamination while out of service.

(b) **Permanent Abandonment**
Any well which is permanently taken out of service shall be permanently abandoned in accordance with the following procedures:

(i) Wells other than bored and hand dug wells:

(A) All casing and screen materials may be removed prior to initiation of abandonment procedures if such removal will not cause or contribute to contamination of the groundwaters. Any casing not grouted in accordance with Section II (E) of these Rules shall be removed or properly grouted.

(B) The entire depth of the well shall be sounded before it is sealed to ensure that there are no obstructions that may interfere with sealing operations.

(C) Except in the case of temporary wells and monitoring wells, chlorine shall be placed in the well in sufficient quantities to produce a chlorine residual of at least 100 parts per million (ppm) in the well as specified in Section II(P)(2)(a) of these rules.

(D) In the case of gravel-packed wells in which the casing and screens have not been removed, neat-cement, or bentonite slurry grout shall be injected into the well completely filling it from the bottom of the casing to the top. If bentonite slurry grout is used, it shall be capped by a one foot thick minimum concrete grout or cement grout plug from at least 12 inches below grade to the land surface;

(E) Wells constructed in unconsolidated formations shall be completely filled with grout by introducing it through a pipe extending to the bottom of the well which shall be raised as the well is filled. If bentonite slurry grout is used, it shall be

capped by a one foot thick minimum concrete grout or cement grout plug from at least 12 inches below grade to the land surface;

(F) Wells constructed in consolidated rock formations or that penetrate zones of consolidated rock may be partially filled with grout, sand, gravel or drill cuttings opposite the zones of consolidated rock. The top of any sand, gravel or cutting fill shall terminate at least 10 feet below the top of the consolidated rock or five feet below the bottom of casing. Grout shall be placed beginning 10 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 to land surface. If bentonite slurry grout is used, it shall be capped by a one foot thick minimum concrete grout or cement grout plug from at least 12 inches below grade to the land surface;

For any well in which the depth of casing or the depth of the bedrock is not known or cannot be confirmed, then the entire length of the well shall be filled with grout up to land surface.

(ii) Bored and hand dug wells:

(A) All plumbing and piping in the well, along with any obstructions inside the well shall be removed; and

(B) Well tile casing shall be removed to a depth of at least three feet below land surface;

(C) An excavation shall be made extending to the top of the casing and extending to a width of at least 12 inches outside of the casing on all sides;

(D) Chlorine shall be placed in the well in sufficient quantities to produce a chlorine residual of at least 100 parts per million (ppm) in the well as specified in Section II(P)(2)(a) of these rules.

(E) The well shall be filled to the top of the casing with either:

i. approved grout, or;

ii. dry clay, or material excavated during drilling of the well and then compacted in place in lifts of no more than five feet;

(F) A one foot thick minimum concrete grout or cement grout plug that fills the entire excavated area above the top of the casing shall be poured; and

(G) The remainder of the excavation above the cured concrete or cement plug shall be filled with additional grout, or soil.

(iii) Temporary wells or monitoring wells

(A) less than 20 feet in depth which do not penetrate the water table shall be permanently abandoned by filling the entire well up to land surface with cement grout or bentonite grout.

Dry clay or material excavated during drilling of the well may be used if compacted in lifts of five feet or less.

(B) Temporary or monitoring wells greater than 20 feet in depth or that penetrate the water table shall be permanently abandoned by completely filling with a bentonite or cement - type grout.

(iv) Geothermal Wells

(A) Geothermal wells shall be abandoned in accordance with one of the following procedures or other alternatives approved by the State Divison of Water Quality:

i. Procedures for temporarily or permanently abandoning wells other than closed-loop geothermal wells shall be the same as described in Section IV of these Rules.

ii. Procedures for abandoning closed-loop geothermal wells shall be as follows:

1. all casing, tubing or piping, and associated materials shall be removed prior to initiation of abandonment procedures if such removal will not cause or contribute to contamination of groundwater;
2. the boring shall be filled from bottom to top with grout through a hose or pipe which extends to the bottom of the well and is raised as the well is filled;
3. for tubing with an inner diameter of one-half inch or greater, the entire vertical length of the inner tubing shall be grouted;
4. for tubing with an inner diameter less than one-half inch, the tubing shall be refilled with potable water and capped or sealed at a depth not less than two feet below land surface in the event that the inner tubing cannot feasibly be grouted; and
5. any protective or surface casing not grouted in accordance with the requirements set forth in these Rules shall be removed and the bore grouted in accordance with the requirements of these Rules.

(B) Exploratory or test wells shall be permanently abandoned in accordance with Section IV of these Rules within two days after drilling or two days after testing is complete, whichever is less restrictive, unless they are properly grouted and are to be converted into an active well.

(2) Hand-dug wells and other wells not protected by a properly grouted casing shall be permanently abandoned when they are no longer in service.

(3) Any well which acts as a source or channel of contamination shall be repaired or permanently abandoned within 30 days of receipt of notice from the OCHD.

(4) The drilling contractor shall permanently abandon any well in which the casing has not been installed and grouted or from which the casing has been removed, prior to removing their equipment from the site.

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

(a) the well contractor is responsible for well abandonment if abandonment is required because the well contractor improperly locates, constructs, repairs or completes the well;

(b) the person who installs, repairs or removes the well pump is responsible for well abandonment if that abandonment is required because of improper well pump installation, repair or removal; or

(c) the well contractor (or individual) who conducts a test boring is responsible for its abandonment at the time the test boring is completed and has fulfilled its useful purpose.

(d) The person abandoning the well shall provide a minimum 24-hour notice to the OCHD prior to commencement of permanent abandonment procedures.

History Note: *Substitute for NCAC 02C .0113*
Eff. July 1, 2008; amended eff. October 23, 2009

(C) DATA AND RECORDS REQUIRED

(1) Any person completing, repairing or abandoning any well shall submit to the OCHD a record of the construction, repair, or abandonment. The record shall include:

(a) certification that construction, repair or abandonment was completed as required by these Rules;

(b) the owner's name and address;

(c) latitude and longitude of the well with a position accuracy of 100 feet or less;

(d) Diameter;

(e) Depth;

(f) Depth of water bearing zones

(g) Yield of each water bearing zone,

(h) Static water level and;

(i) any other information the OCHD may require as necessary to depict the location and construction details of the well.

(2) The certified record of completion repair or abandonment shall be submitted at the time of inspection unless other methods of submittal have been pre-approved.

(3) The furnishing of records to any person or agency other than the OCHD shall not constitute compliance with the reporting requirement and shall not relieve the well contractor of their obligation to the OCHD.

History Note: *Substitute for NCAC 02C .0118*
Eff. July 1, 2008; amended eff. October 23, 2009

SECTION V - WELL WATER SUPPLIES FOR RENTAL PROPERTIES

(A) It shall be unlawful for any person to offer for rent, to offer for lease, or to offer for occupation for non-monetary consideration any residence or place of business without a potable water supply.

(B) Any well that is found to have contaminant levels exceeding the safe levels established by the Environmental Epidemiological Division of North Carolina Department of Health and Human Services shall not be used by renters or lessees until the well has been repaired in a manner approved by the OCHD and water samples taken from the well after the repair is complete indicate the water to be safe for human consumption.

(C) If a well is contaminated and cannot be repaired or the repair is ineffectual, an approved alternate supply shall be provided except as provided for in (D) below.

(D) Repaired wells which have recurring bacteriological contamination may be approved for use when approved continuous disinfection methods are provided except when the well is contaminated with fecal coliform. Wells contaminated with fecal coliform shall not be approved for rental use and shall be repaired or abandoned.

ORANGE COUNTY BOARD OF HEALTH

A RESOLUTION CONCERNING THE ADOPTION OF RULES FOR GROUNDWATER PROTECTION AND WELL PERMITTING AND CONSTRUCTION IN ORANGE COUNTY

WHEREAS, the Orange County Board of Health is charged with protecting the health, safety, and welfare of all Orange County residents; and

WHEREAS, the Orange County Board of Health desires to protect the health of all residents of Orange County from exposure to contaminated groundwater and drinking water, and

WHEREAS, wells that are improperly constructed or maintained constitute a significant public health risk for residents living in the County; and

WHEREAS, wells that are improperly constructed or maintained may lead to groundwater contamination and detriment of groundwater resources, and

WHEREAS, the Orange County Board of Health is enabled by North Carolina General Statute §130A-39 to adopt rules more stringent than those set forth by the North Carolina Commission for Health Services where, in the opinion of the Orange County Board of Health, a more stringent rule is required to protect the public health; and

WHEREAS, it is the opinion of the Orange County Board of Health that these rules are necessary to ensure the proper construction of wells and protection of the groundwater resources and thereby protect the public health and natural resources of the County;

Now, therefore, be it resolved by the Orange County Board of Health that:

1. The Orange County Board of Health has adopted rules deemed to be more stringent and necessary to protect the public health of citizens in Orange County as contained in the Groundwater Protection Rules for Orange County; and

2. These rules shall be in full force and effect unless otherwise acted on by the Orange County Board of Health.

This day of February 25, 2015

Susan Elmore, DVM, Chair
Orange County Board of Health

Colleen L Bridger, MPH, ~~DrPH~~ PhD
Orange County Health Director