

CHAPTER II

CONSTRUCTION, REPAIR, AND ABANDONMENT FOR WATER SUPPLY WELLS

SECTION I REGISTRATION

- (A) The Owner of a water supply well installed prior to January 1, 2005 may voluntarily register a water supply well with the Department by submitting the following information:
1. Names, addresses and phone numbers of the water supply well Owner and/or legal agent of the property Owner.
 2. Address and tax parcel number of the property for the water supply well.
 3. Use of water (domestic, irrigation, etc.)
- (B) The Owner of a water supply well installed or repaired after January 1, 2005 must register a water supply well with the Department by completing the following Application and Permit process.

SECTION II APPLICATION

- (A) A complete application for a permit to construct, repair or abandon a water supply well shall be submitted to the Director by an Owner or legal agent of the property Owner who intends to construct repair or abandoned a water supply well within Mecklenburg County. The following information will be required.
1. Names, addresses and phone numbers of the proposed water supply well property Owner and/or Owner's legal agent.
 2. Signature of property Owner and/or legal agent.
 3. Address and tax parcel number of the property for the proposed water supply well.
 4. A plat or site plan as defined in these rules.
 5. Intended use(s) of the property

6. Proposed use of water (domestic, irrigation, etc.)
 7. Other information deemed necessary 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 water supply 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 water supply well construction.
 8. Any current or pending restrictions regarding groundwater use as specified in G.S. 87-88(a) and
 9. Any Variances regarding water supply well construction or location issued under 15A NCAC 02C .0118.
- (B) Applications for a water supply well construction, repair and abandonment shall be submitted on forms to be supplied by the Department.
- (C) A non-refundable fee as specified in the fee schedule shall be submitted with each permit application.
- (D) An application for a permit shall be submitted by the Owner or his legal agent. In the event that the permit applicant is not the Owner of the property on which the water supply well or water supply well system is to be constructed, the permit application must contain written approval from the property Owner and a statement that the applicant assumes total responsibility for ensuring that the water supply well(s) will be located, constructed, maintained and abandoned in accordance with these rules and regulations

*History Note : Authority G.S. 87-87; 87-97;
July 1,2008
Reference (15A NCAC 02C .0303)
Reference (15A NCAC 02C .0105)*

SECTION III PERMITS

(A) Water supply wells

1. It shall be unlawful for any Person to commence any water supply well contractor activities in Mecklenburg County without first obtaining a water supply well construction permit from the Department. The water supply well Owner or their authorized legal agent shall obtain the permit. The permit is valid for one year from date of issuance except that the Department may revoke a permit if it determines that there has been a material change in any fact or circumstance upon which the permit is issued or that incorrect information was included in the application. The validity of a construction permit or a repair permit is not affected by a change in ownership of the site on which a water supply well is proposed to be located. If construction or repairs have not been commenced within one year from the date of issuance of the permit, the permit then becomes invalid. When a permit has become invalid, construction or repairs may not be commenced until a new permit is issued.
2. It shall be unlawful for any Person to repair a water supply well in Mecklenburg County without first obtaining a water supply well repair permit from the Department. The water supply well Owner or their authorized legal agent shall obtain the permit. Except a water supply well repair permit is not required for maintenance or pump repair or replacement. Disinfection in accordance with 15A NCAC 02C .0113 is a maintenance activity that does not require a repair permit.
3. The location of all new proposed water supply wells in Mecklenburg County shall comply with these rules and regulations.
4. Before issuing a water supply well construction permit, the Department shall conduct a field investigation to evaluate the topography, landscape position, available space and potential sources for groundwater contamination on or around the site on which a water supply well is to be located.
5. The Department shall issue a water supply well construction permit after determining the site can be permitted for a water supply well meeting the rules of this section. Notwithstanding the above, the Department shall not issue a construction permit for a water supply well with a design capacity of 100,000 gal per day or greater. The construction permit shall include a site plan showing the location of potential sources of contamination and area(s) suitable for water supply well construction.

6. The Department 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 Section. The notice of Denial shall include reference to specific laws or rules that cannot be met and shall be provided to the applicant.
7. The water supply well contractor shall maintain a copy of the water supply well construction permit or repair permit on the job site at all times during the construction, repair or abandonment of the water supply well. The water supply well contractor shall meet all the conditions of the permit.
8. A Department representative is authorized to obtain a water/soil sample, witness any portion of the drilling or construction process, repair, or abandonment of any water supply well in Mecklenburg County as part of the inspection. Failure of the Owner or contractor to allow inspection of any material or observation of any drilling or construction, repair or abandonment of any water supply well in Mecklenburg County will be grounds for the revocation of the permit.
9. Failure to comply with the Regulations authorizes the Director to revoke any permits issued pursuant to these Regulations.
10. Only certified water supply well contractors shall perform water supply well contractor activities.
11. If there is an improperly abandoned water supply well(s) on site, the construction permit shall be conditioned upon repair or abandonment of any improperly abandoned water supply well(s) in accordance with the 15A NCAC 02C .0100.
12. No permit will be issued until all fees have been paid in accordance with Section II (C) of this Chapter.

*History Note : Authority G.S. 87-87; 87-97;
Reference (15A NCAC 02C .0304)*

SECTION IV STANDARDS OF CONSTRUCTION

(A) Location

1. The water supply 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. The water supply well shall not be located in the Community Special Flood Hazard area designated on the Flood Insurance Rate Maps (FIRMS).
2. The minimum horizontal separation between a water supply well and potential sources of groundwater contamination, which exist or have been permitted at the time the water supply well is constructed, shall be as follows unless otherwise specified:
 - a. Septic tank and drain field including drainfield repair area 100 ft.
 - b. Other sub-surface ground absorption waste disposal system 100 ft.
 - c. Industrial or municipal sludge-spreading or wastewater irrigation sites 100 ft.
 - d. 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) 50 ft.
 - e. Other sewage or liquid-waste collection or transfer facility 100 ft.
 - f. Cesspools and privies 100 ft.
 - g. Animal feed lots 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 /Hazardous Waste landfills/Construction & Demolition landfills/ municipal solid waste landfill facilities/ incinerators 500 ft.
 - k. Other non-hazardous solid waste landfills, such as Land Clearing and Inert
 - l. Debris (LCID) landfills (Permitted, Non permitted, Nonconforming) 100 ft.
 - m. Animal barns, watering troughs, or animal feeding areas 100 ft.
 - n. Building foundations, excluding the foundation of a structure housing a water supply well head 25 ft.
 - o. Surface water bodies 50 ft.

- p. Chemical or petroleum fuel underground storage tank systems regulated under 15A NCAC 02N:
 - i. with secondary containment 50 ft.
 - ii. without secondary containment 100 ft.
 - q. Aboveground or underground storage tanks which contain petroleum fuels used for heating equipment, boilers, or furnaces 50 ft
 - r. Interstate Petroleum Pipeline 100 ft.
 - s. Cemetery or Burial Ground 100 ft.
 - t. All other potential sources of ground water contamination 50 ft.
 - u. Property boundaries 10 ft
3. For a water supply well serving a single-family residence where lot size or other fixed conditions preclude the separation distances specified in Section IV (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 and drain field including drainfield repair areas, except saprolite systems as defined in 15A NCAC 18A .1956 (6) 50 ft.
 - b. 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) 25 ft.
 - c. Cesspools or privies 50 ft.
 - d. Animal barns, watering troughs or animal feeding areas 50 ft.
4. Separation distances as required in Section IV(A)2 or Section IV(A)3 of this Chapter apply to all additions. Additions of a type not covered by Section IV(A)2 or Section IV(A)3 of this Chapter shall be located the maximum distance possible from any existing water supply well but shall in no case be less than 25 feet.
5. The water supply well owner shall not place potential sources of groundwater contamination closer to the water supply well than the separation distances specified in Section IV (A)2 or Section IV (A)3 of this Chapter as applicable.
6. When water-tight public sewer lines are installed or extended, they shall maintain a minimum distance of 100 feet from any water supply well. In some cases, the Director may allow water tight sewer lines constructed of ductile iron pipe with mechanical joints or push-on joints equivalent to water main standards within 25 feet of a water supply well. Locating public water-tight sewer lines closer to a water

supply well shall necessitate proper abandonment of the water supply well according to these rules.

7. The water supply well shall not be located in any easement or right-of-way except for easements such as conservation easements.
8. Actual separation distances must conform with the most stringent of applicable federal, State or local requirements.
9. The water supply well location must allow access for maintenance, repair, treatment, testing and such other attention as may be necessary.
10. Additional restrictions apply for water supply wells located within an area of regulated groundwater usage. The additional restrictions are defined in Chapter VII.

(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 or water from a non potable supply 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 supply 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

(C) Source of Water

1. Shall be at least 40 feet below land surface.
2. Shall not be from a water bearing zone or aquifer that is known to be contaminated.

(D) Casing

1. In constructing any water supply well, all water bearing zones that are known to contain polluted, saline or other non-potable water shall be adequately cased and cemented so that the pollution of underlying or overlying groundwater zones shall not occur.
2. Every water supply well shall be cased with the bottom of the casing adequately seated and sealed to a minimum depth of at least forty feet below the surrounding land surface or at least 5 feet into the top of bedrock.
3. The top of the casing shall be terminated by the water supply well driller at least twelve inches above the surrounding land surface.
4. The casing in water supply wells constructed to obtain water from a consolidated rock formation shall be:
 - a. adequate to prevent any formation material from entering the water supply well in excess of the levels specified in paragraph (h) of these Regulations; and
 - b. firmly seated and sealed at least five feet into the rock.
5. The casing in water supply wells constructed to obtain water from an unconsolidated rock formation shall extend at least 12 inches into the top of the water bearing formation.
6. The Director may inspect the casing material before it is installed, as the casing is installed in a borehole and/or after the casing is set. The water supply well contractor shall contact the Department to schedule a casing inspection before casing a water supply well. Contact shall include the location, permit number and anticipated time for casing each water supply well. The inspection shall be scheduled during regular Mecklenburg County work hours on regular workdays according to the Well Regulation Notification Policy.

7. Galvanized Steel Water supply well Casing

- a. The casing shall be new, seamless or electric-resistance welded galvanized steel pipe. Galvanizing shall be done in accordance with requirements of ASTM A-53/A53M-07.
- b. The casing, threads and couplings shall meet or exceed the specifications of ASTM A53/A53M-07 or A589/A589M-06.
- c. The minimum wall thickness for a given diameter shall equal or exceed that specified in Table 1.
- d. Each length of galvanized steel water supply well casing shall be legibly marked by rolling, stamping or stenciling to show the name or brand of the manufacturer and ASTM designation number.
- e. 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.
- f. 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. A drive shoe shall not be required for water supply wells in which a cement or concrete grout surrounds and extends the entire length of the casing.

8. Thermoplastic Water supply well Casing

- a. The casing shall be new.
- b. The casing and joints shall meet or exceed all the specifications of ASTM F-480-06b, except that the outside diameters shall not be restricted to those listed in F-480-06b.
- c. Solvent cement used for joining sections of thermoplastic water supply 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 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 supply well casing pipe for a maximum depth of 185 feet. Galvanized steel water supply well casing as specified in subparagraph (D)(7) shall be required for the entire length of the casing for any water supply 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 consolidated rock.
9. Stainless Steel Water supply well Casing
- a. Stainless steel casing, threads and couplings shall conform in specifications to the general requirements in ASTM A530/A530M-04a 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 water supply well.
 - b. 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.
 - c. Stainless steel casing shall have a minimum wall thickness that is equivalent to standard schedule number 10S.

(E) Grouting

1. The water supply well contractor shall contact the Department to schedule a grout inspection before grouting a water supply well. Contact shall include the location, permit number and anticipated time for grouting each water supply well. The inspection shall be scheduled during regular Mecklenburg County work hours on regular workdays according to the Well Notification Policy.
2. Upon completion of a grout inspection, the Department shall provide a written certification on the water supply well permit that a grout inspection was completed and in compliance with the rules in Chapter II. When the Department is unable to conduct a grout inspection within one hour of the scheduled time, the water supply well contractor may grout a water supply well without a grout inspection by the Department. The water supply well contractor shall provide a written certification to the Department that the water supply well has been grouted in compliance with the rules in Chapter II. A completed water supply well construction record form GW-1 indicating the water supply well was grouted in compliance with the rules of Chapter II shall serve as the water supply well contractor's grout certification. For the purpose of issuing the certificate of completion, the water supply well contractor's grout certification shall be accepted by the Department as evidence the grout complies with the rules of this Section if the Department:
 - a. Was contacted by the water supply well contractor to schedule a grout inspection;
 - b. Was unable to inspect the grouting of the water supply well within the one hour following the scheduled time; and
 - c. Upon final inspection, finds no evidence to indicate the water supply well grout does not comply with the rules of this Section.
3. Allowable Grouts
 - a. 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.
 - i. "Neat cement grout" shall consist of 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.

- ii. "Sand cement grout" shall consist of 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.
- iii. "Concrete grout" shall consist of 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 percent of the gravel must pass through a one-half inch mesh screen.
- iv. "Gravel cement grout, sand cement grout or rock cutting cement grout" shall consist of a mixture of not more than two parts gravel and sand or rock cuttings to one part cement and not more than six gallons of clear, potable water per 94 pound bag of Portland cement.
- v. "Bentonite slurry grout" shall consist of a mixture of not more than 20 gallons of clear potable water to one 50 pound bag of commercial sodium bentonite. Non-organic, non-toxic substances may be added to improve particle distribution and pumpability. Bentonite slurry grout may only be used in those instances where specifically approved in this Section and only in accordance with the manufacturer's written instructions.
- vi. Bentonite Chips or pellets shall consist of pre-screened sodium bentonite chips or compressed sodium bentonite pellets with largest dimension of at least one-fourth (1/4) inch but not greater than one-fifth (1/5) of the width of the annular space into which they are being placed. Bentonite chips or pellets shall be hydrated in place. Bentonite chips or pellets may only be used in accordance with the manufacturer's written instructions.
- vii. "Specialty grout" means a mixture of non-organic, non-toxic materials with characteristics of expansion, chemical-resistance, rate of heat of hydration, viscosity, density or temperature-sensitivity applicable to specific grouting requirements. Specialty grouts may not be used without prior approval by the 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.

- b. With the exception of bentonite chips or pellets, the liquid and solid components of all grout mixtures shall be thoroughly blended prior to emplacement below land surface,
 - c. No fly ash, other coal combustion byproducts, or other wastes may be used in any grout.
4. Grout Emplacement
- a. Casing shall be grouted to a minimum depth of 20 feet below land surface.
 - b. Casing shall be grouted as necessary to seal off, from the producing zone(s), all aquifers or zones that are known to contain contaminated, saline or other non potable water so that contamination of the overlying and underlying aquifers or zones shall not occur.
 - c. 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 of the diameter of the outside dimension of the casing or two inches, whichever is greater; excepting, however, that large diameter bored water supply wells shall meet the requirement of Section IV (E)(10) of this Chapter.
 - d. Bentonite slurry grout may be used in that portion of the borehole 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 borehole from land surface to three feet below land surface shall be filled with a cement, concrete grout, or bentonite chips or pellets that are hydrated in place.
 - e. The grout shall be placed around the casing by one of the following methods:
 - i. 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.

- ii 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.
 - iii 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 used if water or any visible obstruction is present in the upper 20 feet of annular space at the time of grouting. If the grout contains bentonite clay it must be emplaced by either the pumping or pressure method.
- f. Where consolidated rock is encountered at a depth of less than twenty feet below land surface such that the annular space around the casing (as required by Section IV E(4) of this Chapter) may not be kept free of formation material from the drilling process to a minimum depth of twenty 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 water supply well casing.
 - g. If an outer casing is installed, it shall be grouted by either the pumping or pressure method.
- 5. The liquid and solid components of all cement grouts, concrete grouts and bentonite slurry grouts shall be thoroughly blended prior to emplacement below land surface.
 - 6. Bentonite chips or pellets shall be used in compliance with all manufacturer's instructions including pre-screening the material to eliminate fine-grained particles, installation rates, hydration methods, tamping and other measures to prevent bridging.
 - 7. Bentonite grout shall not be used to seal zones of water with chloride concentration of 1500 parts per million or greater,
 - 8. The water supply well shall be grouted within five working days after the casing is set.
 - 9. No additives which will accelerate the process of hydration shall be used in grout for thermoplastic water supply well casing.

10. For large diameter water supply wells cased with concrete pipe or ceramic tile of a pipe diameter equal to or greater than 20 inches the following shall apply:
 - a. The borehole shall have a minimum diameter of six 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 twenty feet below land surface.
 - c. The annular space around the casing below the grout shall be filled with sand or gravel.

(F) Water supply well Screen

1. The water supply 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 water supply well after the water supply well has been developed and completed by the water supply well contractor.
2. The water supply 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 water supply 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 water supply 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 Water supply wells

1. In constructing a gravel and/or sand-packed water supply 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 water supply well in concentrations above those permitted by Section IV (H) of this Chapter.

- c. The packing material shall be placed in the annular space around the screens and casing by a fluid circulation method to insure accurate placement and avoid bridging.
 - d. The packing material shall be disinfected.
 - e. Centering guides shall 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 contamination of any aquifer or zone.

(H) Water supply well Development

1. All water supply wells shall be developed by the water supply 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 groundwater quality in that area.
4. Upon completion of the water supply well, the water supply 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.

(I) Water supply well Contractor Identification Plate

1. An identification plate showing the water supply well contractor and his individual certification number shall be installed on the water supply well within 72 hours after the drilling is complete.
2. The identification plate shall be constructed of a durable waterproof, rustproof metal or equivalent material approved by the Director of the Division of Water Quality, NCDENR.
3. The identification plate shall be permanently attached to either the aboveground portion of the water supply well casing, surface grout pad, or enclosure floor around the casing where it is readily visible and easily readable. The method of attachment shall not obscure information on the identification plate.
4. The identification plate shall not be removed by any Person.
5. The identification plate shall be stamped or otherwise imprinted with a permanent legible marking to show the:
 - a. total depth of water supply well
 - b. casing or liner depth (ft.) and inside diameter (in.);
 - c. screened interval of screened water supply well
 - d. packing interval of gravel or sand-packed water supply 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 water supply well completed or lined.
 - h. the water supply well construction permit number or numbers, if such a permit is required

(J) Pump Installer Identification Plate

1. An identification plate showing the name and registration number or water supply well contractor certification number of the pump installation contractor shall be installed on the water supply well within 72 hours after completion of the pump installation.
2. The identification plate shall be constructed of a durable waterproof, rustproof, metal or equivalent material approved by the Director of the Division of Water Quality, NCDENR.
3. The identification plate shall be permanently attached to either the aboveground portion of the water supply well casing, surface grout pad or enclosure floor around the casing where it is readily visible and easily readable. The method of attachment shall not obscure information on the identification plate.
4. The identification plate shall not be removed by any Person.
5. The identification plate shall be stamped or otherwise imprinted with a permanent legible marking to show the:
 - a. date the pump was installed
 - b. the depth of the pump intake, and
 - c. the horsepower rating of the pump

(K) Water supply well Head Completion and Equipment

1. The water supply well pump must be installed in the water supply well and the water supply well head completed within 30 days of the date construction is begun on the water supply well, or the water supply 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 slab has been installed.
3. The Builder, water supply well contractor, pump installer or homeowner, as applicable shall provide assistance when necessary to gain access for inspection of the water supply well, pumps and pumping equipment.

4. The Water supply well Contractors identification plate, if removed or obscured during pump installation shall be relocated and permanently attached to the aboveground portion of the water supply well casing, surface grout pad or enclosure floor around the casing where it is readily visible and easily readable.
5. All piping, wiring, and vents shall enter the water supply well at least twelve inches above land surface, except where pitless adapters or pitless units are used, and shall be adequately sealed to preclude the entrance of contaminants into the water supply well.
6. Every water supply well shall be equipped by the Person completing the water supply well head with a useable access port or air line.
 - a. The access port shall be located directly on top of the water supply well if the pump is offset from the water supply well.
 - b. For water supply wells on which the pump is installed directly over the water supply well, an access port pipe shall be installed through the pump base or outside the water supply well casing, and terminate inside the water supply well casing at some point below the base of the pump.
 - c. The access port shall have a minimum inside diameter of one-half 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.
7. Every water supply well that flows under natural artesian pressure shall be properly 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 to prevent the loss of artesian hydraulic head and stop the flow of water. The water supply well will be equipped with a check valve sized to the overflow line diameter to prevent back siphonage. Water supply well owners shall be responsible for the operation, and maintenance of such equipment.

8. Pitless adapters or pitless units shall be allowed as a method of water supply well head completion under the following conditions:
 - a. The pitless device shall be manufactured specifically for the purpose of water supply well construction;
 - b. Design, installation and performance standards shall be those specified in PAS-1 (Pitless Adapter Standard No. 1) as adopted by the Water System Council's Pitless Adapter Division;
 - c. The pitless device shall be compatible with the water supply well casing;
 - d. The top of the pitless device shall extend at least 12 inches above land surface;
 - e. The excavation surrounding the casing and pitless device is filled with grout from the top of the casing grout to the land surface.
 - f. The pitless device shall have an access port.
 - g. If a pitless adapter or pitless unit is used as a method of water supply well head completion, the water supply well is not required to have a cover.
 - h. If a pitless adapter or pitless unit is used as a method of water supply well head 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.
9. Each new water supply well shall be equipped with a cover or enclosure, which is free of, cracks, holes, etc. and is determined to be approved by the Director. 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.
10. The pumping capacity of the pump shall be consistent with the intended use and yield characteristics of the water supply well.
11. The pump and related equipment for the water supply well shall be conveniently located to permit easy access and removal for repair and maintenance.

12. The base plate of a pump placed directly over the water supply well shall be designed to form a watertight seal with the water supply well casing or pump foundation.
13. In installations where the pump is not located directly over the water supply well, the annular space between the casing and pump intake or discharge piping shall be closed with a water tight seal preferably designed specifically for this purpose.
14. The water supply well shall be properly vented at the water supply well head to allow for the pressure changes within the water supply well except when a suction lift type pump is used.
15. 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. In the case of offset jet pump installations, the sample tap shall be installed on the return (pressure) side of the jet pump installations. To prevent the sample tap from being a possible conduit of contamination, a spring loaded check valve, sized to at least the diameter of the drop pipe, shall be installed at the head of the pump.
16. The sample tap must be located in the piping and positioned such that a sample may be obtained by placing the sample bottle underneath the sample tap or a minimum distance of eight inches without interference from the water supply well cover, enclosure, slab or any part of the water supply well head.
17. A priming tee shall be installed at the water supply well head in conjunction with offset jet pump installations.
18. Joints of any suction line installed underground between the water supply well and pump shall be tight under system pressure.
19. The drop piping and electrical wiring used in connection with the pump shall meet all applicable underwriters specifications.
20. Contaminated water shall not be used for priming the pump.

*History Note : Authority G.S. 87-87; 87-88;
Reference (15A NCAC 02C .0107)
Reference (15A NCAC 02C .0301)
Reference (15A NCAC 02C .0305)*

SECTION V DISINFECTION OF WATER SUPPLY WELLS

- (A) All water supply wells shall be disinfected upon completion of construction, maintenance, repairs, pump installation and testing as follows:
1. Chlorine shall be placed in the water supply well in sufficient quantities to produce a free chlorine residual of at least 100 parts per million in the water supply well. The chlorine shall be placed in the water supply well by one of the following or equivalent methods:
 - a. Chlorine granules or tablets shall be placed in the top of the water supply well and allowed to settle to the bottom of the water supply well.
 - OR
 - b. Chlorine solution shall be placed in the bottom of the water supply well by using a bailer or by pouring the solution through the drill rod, hose or pipe placed in the bottom of the water supply well. The solution shall be flushed out of the drill rod, hose or pipe using water or air.
 2. Agitate the water in the water supply well to ensure thorough dispersion of the chlorine
 3. The water supply well casing, pump column and any other equipment above the water level in the water supply well shall be thoroughly rinsed with the chlorine solution as a part of the disinfecting process.
 4. The chlorinated water shall stand in the water supply well for a period of at least twenty-four hours, then pumped until the system is free of any chlorine residual.
 5. The water supply well shall not be used as a source of drinking water supply until such time as water samples collected from the water supply well indicates that the water supply well is free of coliform bacteria.
 6. Other materials and methods of disinfection at least as effective as those in item (1) of this rule may be used upon prior approval by the Director.

*Authority G.S. 87-87; 87-88
Reference (15A NCAC 02C .0111)*

SECTION VI SAMPLING

- (A) Within 30 days of the completion of the water supply well for a newly constructed water supply well, the Department shall obtain water samples and submit them to a Certified Laboratory for analyses or ensure that the water obtained from the water supply well has been sampled and analyzed by a Certified Laboratory, in accordance with this Chapter.
- (B) Samples collected from water supply wells pursuant to the rules of this Chapter shall be collected by an employee of the 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.
- (C) The sample collectors shall be trained in accordance with guidance developed by the Department.
- (D) Water samples shall be collected from the sample tap at the water supply well or the closest accessible collection point to the water source with a tap capable of being disinfected, providing the sampling point shall precede any water treatment devices.
- (E) It is the responsibility of the water supply well Owner to provide access and a source of power for the purpose of collecting the required water sample.
- (F) For all new water supply wells, samples for total coliform and fecal coliform bacteria shall be collected after the disinfectant agent has been flushed from the water supply 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 water supply wells that are not constructed and located in accordance with the rules of this Chapter.

- (G) 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.
- (H) Additional or retest samples may be collected if:
1. during permitting, construction and sampling process, information indicates the potential for other contaminants to be present in the groundwater source;
or
 2. if necessary to confirm initial testing results.
- (I) The water supply well shall not be used as a source of drinking water supply until such time as a bacteria, nitrate and nitrite analysis collected from the water supply well indicates that the water supply well is absent of coliform bacteria and that the nitrate and nitrite analysis does not exceed the Maximum Contaminant levels (MCLs) for public drinking water, as defined in 40 Code of Federal Regulations 141.
- (J) Water samples shall be analyzed in the North Carolina State Laboratory of Public Health or a Certified Laboratory
- (K) 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.
- (L) A water supply well shall be analyzed for Arsenic, Barium, Cadmium, Chromium, Copper, Fluoride, Lead, Iron, Magnesium, Manganese, Mercury, Selenium, Silver, Sodium, Zinc, and pH. The Department shall provide information to the water supply 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.
- (M) The Department will randomly collect samples from a percentage of the repaired water supply wells for a bacteriological analysis.
- (N) Additional sampling requirements may apply for water supply wells located within an area of regulated groundwater usage. The additional restrictions are defined in Chapter VII.

SECTION VII WATER SUPPLY WELL MAINTENANCE AND REPAIR

- (A) Every water supply 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.
- (B) All construction and materials used in the maintenance, replacement or repair of any water supply well shall meet the requirements for new installations.
- (C) The Director 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 water supply well contractor shall contact the Department to schedule a liner inspection before lining a water supply well. Contact shall include the location, permit number and anticipated time for lining each water supply well. The inspection shall be scheduled during regular Mecklenburg County work hours on regular workdays according to the Well Regulation Notification Policy.
- (D) Broken, punctured or otherwise defective or unserviceable casing, screens, fixtures, seals or any part of the water supply well head shall be repaired or replaced, or the water supply well shall be abandoned pursuant to the requirements of 15A NCAC 02C .0013.
- (E) National Science Foundation (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 inches and shall be completely filled with neat-cement grout. Bentonite clay shall not be used in grouting a liner. The water supply well liner shall be completely grouted within ten working days after the liner has been installed.
- (F) The Director shall not approve any water supply well which has the uppermost end of the casing terminating below land surface.
- (G) All water supply well repairs shall be completed with the water supply wellhead terminating at least twelve inches above land surface

- (H) Repairs to any water supply well completed with the water supply well head terminating below ground (buried seal) shall include extending the water supply 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 twenty feet. In lieu of twenty feet of grout for those water supply 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 one foot into consolidated rock, shall be acceptable as meeting this requirement.
- (I) An accepted alternative method of water supply well repair is permitted only for water supply wells drilled prior to 1972. A sleeve shall be forced over the existing casing with at least six inches of overlap. 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 regulations. This alternative method of repair shall not apply to water supply wells drilled after January 1, 1972. This procedure involves extending the existing casing. It is therefore a water supply well contractor activity and may only be performed by a certified water supply well contractor. This repair does not meet the requirement of grouting to a depth of twenty feet and the water supply well shall not be considered a properly protected water supply well.
- (J) Prior to a repaired water supply well being returned to service, the water supply well shall be redeveloped to remove biofilm or formational material from the water supply well. The methods of water supply well redevelopment include, but are not limited to, the methods listed in Chapter I Section II "Repair". The method of water supply well redevelopment shall be listed on the water supply well's record of repair.
- (K) Any repair, pump maintenance, or pump replacement shall be completed by disinfection of the water supply well and water system in accordance with Section V of this Chapter and the water supply well head completed in accordance with Sections IV(J), IV(K) and IV(L) of this Chapter.
- (L) Water supply well contractors and pump installers will submit notification of chlorination within 10 working days.

Authority G.S. 87-87; 87-88
Reference (15A NCAC 02C .0112)

SECTION VIII ABANDONMENT OF WATER SUPPLY WELLS

(A) Temporarily abandoned water supply wells

1. Temporarily abandoned water supply wells shall be cased and grouted in accordance with these Regulations.
2. Temporarily abandoned water supply wells shall be sealed at the top of the casing with a watertight cap compatible with casing and installed such that it cannot be removed easily by hand.
3. Temporarily abandoned water supply wells shall be maintained such that they are not a source or channel of contamination to groundwater.
4. Temporarily abandoned water supply wells shall be equipped with a cover or enclosure free of cracks and holes determined to be approved by the Director.
5. The identification plate must be maintained as specified in Section IV (I) (3) of this Chapter.
6. Temporarily abandoned water supply wells shall be protected with a casing.

(B) Permanently Abandoned water supply wells

1. The casing in any water supply well to be permanently abandoned shall be grouted in accordance with these rules and regulations or removed.
2. The entire depth of the water supply well shall be sounded before it is sealed to ensure freedom from obstructions that may interfere with sealing operations.
3. The water supply well shall be thoroughly disinfected according to Section V(A) of this Chapter prior to sealing.
4. Procedures for permanent abandonment of water supply wells, other than bored or hand dug water supply wells

- a. Water supply wells constructed in consolidated rock formations or that penetrate zones of consolidated rock may be filled with cement grout, bentonite grout, sand, gravel or drill cuttings opposite the zones of consolidated rock. The top of the sand, gravel or cutting fill shall be at least ten feet below the top of the consolidated rock or five feet below the bottom of the casing. The remainder of the water supply well shall be filled with cement grout or bentonite grout only. For any water supply 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 water supply well shall be filled with cement grout or bentonite grout up to land surface.
 - b. water supply wells constructed in unconsolidated rock formations other than bored or hand dug shall be completely filled with neat cement grout or bentonite grout by introducing it through a pipe extending to the bottom of the water supply well which can be raised as the water supply well is filled.
 - c. Gravel packed water supply wells in which the casing and screen have not been removed shall be abandoned by injecting neat cement grout or bentonite grout into the water supply well filling it from the bottom of the casing to the top.
5. Procedures for permanent abandonment of bored water supply wells or cased hand dug water supply wells constructed into unconsolidated material.
- a. Remove all plumbing or piping into the water supply well, along with any obstructions inside the water supply well.
 - b. Remove as much of the water supply well tile casing as possible, but no less than to a depth of three (3) feet below land surface;
 - c. Remove all soil or other subsurface material present down to the top of the remaining water supply well casing, and extending to a width of at least twelve (12) inches outside of the water supply well casing on all sides
 - d. Fill the water supply well up to the top of the remaining casing with cement grout, concrete grout, or bentonite grout.
 - e. Pour a one (1) 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 twelve (12) inches on all sides.

- f. Complete the abandonment process by filling the remainder of the water supply well above the concrete or cement plug with additional concrete grout, cement grout, or soil.
6. Procedures for permanent abandonment of uncased hand dug water supply wells constructed into unconsolidated material.
 - a. Remove all plumbing or piping into the water supply well, along with any obstructions inside the water supply well.
 - b. Remove all soil or other subsurface material present down to a depth of three (3) feet below land surface and extending to a width of at least twelve (12) inches outside of the water supply well diameter on all sides.
 - c. Fill the water supply well up to the top of the original diameter with cement grout, concrete grout, bentonite grout, or dry clay compacted in place.
 - d. Pour a one (1) 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 twelve (12) inches on all sides.
 - e. Complete the abandonment process by filling the remainder of the water supply well above the concrete or cement plug with additional concrete grout, cement grout, or soil.
 7. Procedures for permanent abandonment of contaminated water supply 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 groundwater. Any casing not grouted in accordance with 15A NCAC 2C .0107(e) shall be removed or properly grouted.
 - b. The entire depth of the water supply well shall be sounded before it is sealed to ensure freedom from obstructions that may interfere with sealing operations.

- c. In the case of gravel-packed water supply wells in which the casing and screens have not been removed, neat-cement, or bentonite grout shall be injected into the water supply well completely filling it from the bottom of the casing to the top.
 - d. Water supply wells constructed in unconsolidated formations shall be completely filled with cement grout, or bentonite grout by introducing it through a pipe extending to the bottom of the water supply well which can be raised as the water supply well is filled.
 - e. Water supply wells constructed in consolidated rock formations or that penetrate zones of consolidated rock shall be filled with cement grout or bentonite grout by introducing it through a pipe extending to the bottom of the water supply well which can be raised as the water supply well is filled. The top of the cement grout or bentonite grout shall extend up to land surface.
- (C) The Owner shall be responsible for permanent abandonment of a water supply well except that:
- 1. The water supply well contractor is responsible for water supply well abandonment if abandonment is required because the water supply well contractor improperly locates, construct, repairs or completes the water supply well. The water supply well contractor shall permanently abandon any water supply 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 pump installer is responsible for water supply well abandonment if abandonment is required because of improper water supply well pump installation, repair, or removal. A certified water supply well contractor must abandon the water supply well.
- (D) Any water supply well not in compliance with the conditions for temporary abandonment shall be brought into compliance or permanently abandoned within thirty days of receipt of notice from the Director.
- (E) Any water supply 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 thirty days of receipt of notice from the Department. The person abandoning the water supply well shall provide a minimum 24 Hour notice

to the Department prior to commencement of permanent abandonment procedures.

- (F) Where a new water supply well or public water supply is replacing an old water supply well and the Owner wishes to continue using the old water supply well for irrigation or other uses, the old water supply well may not be connected to the primary water supply system in any way and must conform with Section VIII (E) of this Chapter.
- (G) Where a new water supply well or public water supply is replacing an existing water supply well in which contamination has been confirmed through analyses, the existing water supply well shall be permanently abandoned within thirty days of receipt of notice from the Department.
- (H) The Director shall have the right to enter any property for the purpose of determining whether or not there may be an improperly abandoned water supply well on the property.
- (I) The water supply well contractor shall contact the Department to schedule an abandonment inspection before abandoning a water supply well. Contact shall include the location, permit number and anticipated time for abandoning each water supply well. The inspection shall be scheduled during regular Mecklenburg County work hours on regular workdays according to the Well Regulation Notification Policy.

Authority G.S. 87-87; 87-88

Reference (15A NCAC 02C .0113)

SECTION IX RECORDS REQUIRED

(A) Reports

1. Any Person performing water supply well contractor activities in Mecklenburg County shall submit to the Director and to the water supply well Owner, a record of construction, repair, or abandonment to include the Owner's name, the water supply well's location, size and depth, the casing materials and depth, depth of water bearing zones, the method of finishing, the method of repairing, the method of abandoning, static water level, pumping water level, yield and pump type.

2. Any Person installing a pump or equipment in a water supply well must be registered with the Department and shall be listed separately on the record of construction as having installed the pump.
3. The reports required in this section shall be submitted within 15 days after completing construction, repair, abandonment, or pump installation.
4. Reports shall be certified by the water supply well contractor or pump installer completing the construction, repair, abandonment, or pump installation.

SECTION X WATER SUPPLY WELL COMPLETION AND CERTIFICATION

- (A) After receiving a permit to construct a water supply well, the property Owner or Owner's legal agent shall notify the Department prior to water supply well construction if any of the following occur:
1. The separation criteria specified in Chapter II Section IV cannot be met.
 2. The residence or other structure is located other than as indicated on the permit;
 3. The use of the structure is changed from the use as specified on the permit;
 4. The septic system needs to be changed from the location indicated on the permit;
 5. Landscaping changes have been made that may affect the integrity of the water supply well;
 6. There are current or pending restrictions regarding groundwater use as specified in G.S. 87-88(a);
 7. The water source of any water supply well intended for water supply is adjacent to any water-bearing zone suspected or known to be contaminated; or
 8. Any other changes occur in the information provided in the application for the water supply well permit.
- (B) The water supply well contractor shall maintain a copy of the water supply well construction permit or repair permit on the job site at all times during the

construction, repair or abandonment of the water supply well. The water supply well contractor shall meet all the conditions of the permit.

- (C) Upon completion of construction of a water supply well, the Department shall complete an “as built” drawing of the water supply well location. The water supply well contractor shall submit a copy of water supply well construction record to the Department. Upon completion of construction or repair of a water supply well for which a permit is required, the Department will inspect the water supply well and issue a Certificate of Completion. Prior to issuance of a Certificate of Completion, the Department shall:
1. verify that the water supply well was constructed in the designated area and according to the water supply well construction permit and the rules of this Chapter.
 2. inspect the grout around the casing
 3. inspect the water supply wellhead after the water supply well seal is in place
 4. obtain a water supply well construction record from the Certified Water supply well Contractor
 5. obtain a bacteriological analysis that is absent of coliform bacteria
 6. obtain a nitrate and nitrite analysis that does not exceed the Maximum Contaminant levels (MCLs) for public drinking water, as defined in 40 Code of Federal Register 141.
- (D) No person shall place a water supply well into service without first having obtained a Certificate of Completion

Authority G.S. 87-87; 87-88

Reference (15A NCAC 02C .0306)

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