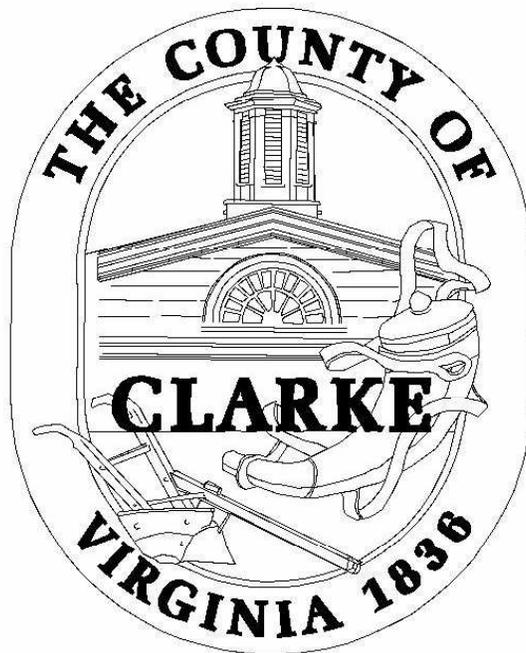


CLARKE COUNTY WATER WELL ORDINANCE



Adopted: March 20, 1990
Amended: February 17, 2009

Date of Implementation: May 1, 1991

Chapter 184 Wells

[HISTORY: Adopted by the Board of Supervisors of Clarke County 3-20-1990, implemented 5-1-1991; amended through 10-18-1994. Subsequent amendments noted where applicable.]

General References

Chapter 71 Building Construction
Chapter 143 Septic Systems
Chapter 180 Water And Wastewater

Code Of Virginia References

§ 32.1-176.5. - Construction permit; local government authority to require analysis of water.
§ 62.1-254 et seq. - Ground Water Management Act of 1992

§ 184-1. Definitions.

[Amended 03-08-03;
04-04-20; 05-03-15; 08-12-16]

When used in this chapter, the following terms shall have the meanings given to them:

ADEQUATE WATER -- The water supply system shall be capable of supplying water in an adequate quantity for its intended usage and meet the standards in Appendix III.¹

ALTERNATIVE WATER SUPPLY SYSTEM -- A water supply system which is not a well as defined by this chapter. This includes but is not limited to cisterns, springs and surface waters.

APPROVED WATER SUPPLY -- A system in which an application to construct or repair has been submitted to the Clarke County Health Department and a permit for construction issued; construction/repairs made according to Virginia Waterworks Regulations and the Virginia Private Well Regulations and/or this chapter; inspections performed; supply found to meet all applicable regulations; construction found to meet all applicable standards; final approval (record of inspection) issued by Clarke County Health Department to owner of supply.

BORED WELL -- A well that is excavated by means of a soil auger (hand or power), as distinguished from one that is dug or drilled.

CONFINED GROUNDWATER -- A body of groundwater overlain

¹ Editor's Note: Appendix III is included at the end of this chapter.

by material sufficiently impervious to sever free hydraulic connection with overlying groundwater.

CONTAMINATION -- The addition of sewage, industrial waste, chemicals or other material harmful to water, whether intentional or not. Sources of sewage may be privies, sanitary sewers, septic tanks, subsurface irrigation or drainfields, seepage pits, sink drains, barnyard wastes, chemical storage tanks, fertilizer stockpiles and like sources by whatever name.

COUNTY -- The County of Clarke, Virginia.

DRILLED WELL -- A well that is excavated wholly or in part by means of a drill (percussion or rotary) operated by cutting or abrasion or by use of a water jet.

DRIVEN WELL -- A well that is constructed by driving a casing, at the end of which there is a drive point and screen, without the use of any drilling, boring or jetting device.

DUG WELL -- A well that is excavated by means of picks, shovels or other hand tools or by means of a power shovel or other dredging or trenching machinery, as distinguished from one put down by a drill or auger.

FLOODWAY -- The ten-year floodway.

FOUNDATION -- any structural support that includes masonry footings or pier construction, such as for use to support decks and buildings.

FREE GROUNDWATER -- Groundwater in the zone of saturation extending down to the first impervious barrier.

GROUND-SOURCE HEAT PUMP WELL -- [Added 03-08-03]

Closed-looped: a ground-source heating/cooling pump system that utilizes a sealed pipe buried in the ground that circulates an antifreeze solution with no discharge.

Open-looped: a ground-source heating/cooling pump system that transfers heat to and from ground water pumped from a conventional well after which the water is

² Editor's Note: Appendix II is included at the end of this chapter.

discharged into a water body, drainage ditch, or directly onto the ground.

GROUND WATER -- Subsurface water occupying the zone of saturation. (NOTE: Clarke County exhibits karst geomorphology, and surface water and groundwater rapidly interact.)

HEALTH DEPARTMENT -- The same as Health Director for the Clarke County Health Department.

HEALTH DIRECTOR -- The Director of the Lord Fairfax Health District or his/her duly authorized agent. The county Health Officer (Environmental Health Specialist) is a duly authorized agent. In all subsequent sections this person will be referred to as the "Agent".

NEGATIVE COLIFORM TEST -- A negative test as described in the latest edition of Standard Methods for Examination of Water and Wastewater.

PERSON -- Any individual, firm, corporation, partnership or other entity, singular or plural.

PITLESS ADAPTER -- A mechanical, gasketed device which is attached through a hole drilled or cut in the well casing, connecting the pressure tank influent pipe to the pump drop pipe, which is approved for such use by the Water Systems Council, Pitless Adaptor Standard No. 1 (PAS-1), or the National Sanitation Foundation.

POTABLE WATER -- Water that is safe for human consumption and culinary purposes, free from pathogenic bacteria, protozoa, cysts and other disease producing organisms and free from physiologically harmful chemical and mineral substances.

PRIVATE WATER SUPPLY SYSTEM -- A water supply system from which water is not available to the public, its location and outlets being on private property and serving not more than one single family dwelling and one dwelling less of than 600 square feet, or an agricultural unit. For the purpose of this chapter, an agricultural unit shall be comprised of the main dwelling, tenant houses for the farm employees and other related farm buildings. Commercial and industrial units

referred to herein are those employing fewer than 25 persons where water is not available to the public.

PUBLIC INDIVIDUAL WELL -- A well serving one commercial or industrial unit.

PUBLIC WATER SUPPLY SYSTEM -- A water supply system serving three or more dwellings, commercial, agricultural or industrial units, or any system serving more than 25 persons or the public.

SAFE WATER -- Potable water meeting the quality standards included and described as primary maximum contaminant levels in the Virginia Waterworks Regulations, Virginia Department of Health, as specified in Appendix II (as evidenced by analytic test results certified by a laboratory approved to conduct such tests by the Virginia Department of Health).²

SPRING – Refer to Chapter 143 Septic Systems § 143-7. Definitions.

TERMINUS CAP -- A well terminus cap which is approved for such use by the Water System Council, Pitless Adaptor Standard No. 1 (PAS-1), or the National Sanitation Foundation.

UNCONSOLIDATED FORMATIONS -- A formation composed of mud, silt, clay, soft shale sand or gravel or creviced rock.

WATER SERVICE CONNECTION -- The water service connection of a public water supply and shall be considered the effluent connection of the water meter or the effluent pipe of the pressure tank where there is no water meter. The water service connection of a private water supply shall be considered the effluent pipe of the pressure tank.

WATER SUPPLY SYSTEM -- The source, works and auxiliaries for collection, treatment and distribution of potable water from the source of supply to the water service connection.

WELL -- An artificial excavation that derives water from the interstices of the rocks or soil that it penetrates. Wells referred to are "shallow" or "deep" depending upon whether they derive water from free or confined groundwater respectively.

However, wells of depths greater than 50 feet in unconsolidated formations shall be classified as deep wells. Any exploration, testing or production well for whatever purpose constructed is considered a water well and is subject to this chapter, since improper construction can lead to groundwater contamination.

WELL GROUTING -- The filling of the annular space between the well casing and the natural earth or rock with a mixture of neat portland cement or bentonite clay and water applied under pressure from the lower terminus of the grouting to the top of the well.

WELL LOT -- A parcel of land extending at least 100 feet in a radius about the well location, attached in fee simple and protected by covenants running with the land for the life of the structure the well serves.

§ 184-2. Applicability; responsibility for compliance; more stringent requirements to prevail.

- A. The requirements of this chapter shall apply to all new water supply systems, both private and public, and they shall also apply to repairs to, replacements of or additions to existing systems.
- B. Building contractors, plumbers, well diggers, well drillers, property owners and all persons constructing and/or repairing new or existing water supply systems shall be responsible for compliance with applicable sections of this chapter.
- C. Where requirements of this chapter are more stringent than those of the State Health Department, the requirements of this chapter shall prevail.

§ 184-3. Permit required for all repairs; exemption and criteria for approval.

- A. As of the effective date of this chapter, no person shall be allowed to repair a new or existing water supply without a written permit from the Clarke County Health Department. The location, source and construction of water supply systems shall conform to the requirements of this chapter and specifications therein pertinent to the type of supply.
- B. Water supply systems for which application for construction permits to the Clarke County Health Department had been made prior to the effective date of this chapter (May 1, 1991) shall be exempt under this provision.
- C. Systems permitted and under construction on or prior to the

contaminant levels established in Appendix II.³ No test is required for private water supplies at the time of applying for a building permit. A copy of all test results shall be provided to the Health Department and the building permit applicant.

B. For any structure to be served by an existing public water supply system, the building permit applicant must first obtain a statement from the system owner that such public water supply system is in compliance with state and county regulations and that capacity will be available for the applicant at the anticipated time of connection.

§ 184-7. Permit procedure and conditions.

[Amended 05-03-15]

A. Application for permit. Application for a permit shall be made on forms furnished by the Health Department and shall contain a description of the location and dimensions of the land on which the water supply system is to be constructed. The Department may require such plans and/or specifications as are necessary to determine the adequacy and safety of the system, and such information shall be made a part of the records of the Department. Applications for a permit to construct a public water supply system which will have 15 or more connections can be made through the county Health Department, or the applications can be made concurrently to the Division of Water Programs, Lexington Regional Office, Virginia Department of Health.

B. Approval or denial of permit. When the Agent is satisfied that a proposed water supply system can be constructed in accordance with provisions of this chapter, he shall issue a written permit to proceed with construction. When the Agent determines that a proposed water supply system cannot meet the requirements of this chapter and there are no other adequate alternatives, he shall deny, in writing, a permit and specify therein the reason for denial.

C. Construction of system. No construction of and/or repairs of or replacements to a water supply system may take place without a valid signed permit from the Clarke County Health Department, upon which measurements and construction standards have been specified.

D. Changes in conditions. Material changes in site conditions,

³Editor's Note: Appendix II is included at the end of this chapter.

such as site grading, sewage disposal system location changes, etc., under which a permit was issued shall void such permit. No person shall proceed with construction until such time as written approval for the changes has been obtained from the Health Department, provided that such changes can be approved in accordance with the provisions of this chapter.

- E. Voidance of permit. Permits shall be null and void after 18 months from the date of issuance, unless extended for additional periods not to exceed 18 months, in writing, by the Health Director.

§ 184-8. Fees.⁴

The Board of Supervisors shall set by resolution such fees as it deems necessary and reasonable to defray the cost of permits and/or licenses, inspections and testing as are required to be issued under this chapter.

§ 184-9. Location of water supplies.

All water supply systems shall conform to the following site requirements:

[Amended 99-08-17;
08-12-16]

- A. No water supply for human consumption shall be located within any building except a separate structure housing pumping equipment.
- B. New water supplies shall be protected from surface wash or flooding by suitable sloping or ditching of ground surfaces or by suitable dikes or curbs. Positive surface drainage should be provided away from the well to prevent surface runoff from entering the wellborne hole prior to grouting the well casing. Water supply systems shall not be located in ground swale areas or floodways which are subject to surface runoff and/or flooding.
- C. All water supplies shall be located at minimum distances from known sources of contamination as set forth in Appendix I Table I Minimum Safe Distances.⁵
- D. All water supplies shall be located on the premises consistent with the general layout, topography and surroundings, including abutting lots.

⁴Editor's Note: Fees are on file in the office of the County Administrator.

⁵Editor's Note: Table I is included at the end of this chapter.

- E. Any new well which is the water source for a private water supply system shall be located within the boundary of the lot it serves.
- F. Any well which is the water source for a public water supply system shall be located on a well lot with lot maintenance provided by the entity or person operating the water system. No fertilizer, insecticide, herbicide or other chemical may be applied to any well lot.
- G. No well shall be located in drainageways or sinkholes. (See Appendix I Table I Minimum Safe Distances.)
- H. Replacement and repairs of existing wells, may encroach on minimum separation distances for site features listed in Table I, so long as they are no closer to those features than the existing well, and so long as the encroachment is not likely to cause a significant threat to public health or the environment as determined by the Lord Fairfax Health District Environmental Health Manager. [Amended 99-08-17]
- I. Existing Wells may not be encroached upon by know contamination sources as set forth in Table I in such a manner which exceeds current location conditions.
- J. Well Separation. Any new well installed shall be a located a minimum of 100 feet from any other well. This requirement shall not apply to any lot or parcel recorded prior to December 16, 2008, if such lot or parcel is not sufficient to accommodate this separation distance, as determined by the Clarke County Health Department. However, the maximum amount of separation possible shall be provided.

§ 184-10. General requirements.

[Amended 03-08-19; 05-03-15; 08-12-16]

- A. Report on completed well/water system required. A complete report shall be made on each well, including dry and those not meeting yield requirements, and such a report shall be supplied to the owner and the Clarke County Health Department by the well driller. In complete reports will not be accepted. Such report shall include at minimum the following:
 - (1) The type, diameter and length of the casing.
 - (2) The total depth of the well.

- (3) The standing (static) water level; measured with an electric tape; that is, the water depth below the ground surface when not pumping.
- (4) The yield of the well in gallons per minute and the level of the water surface when pumped at the designated rate (production level).
- (5) The number of hours the pump is operated at a stipulated rate during the pumping test.
- (6) A record of any other pumping performance.
- (7) A log of materials encountered during drilling.
- (8) The physical appearance of the water at the end of the final pumping test.
- (9) The depth in feet where the pump is set in the well.
- (10) Depth of the water zones
- (11) Depth of bedrock
- (12) Depth of grout and grout material
- (13) Amount of water per water zone

- B. When required, pump test results shall be supplied to the owner and the Clarke County Health Department by the drawdown tester.
- C. Wells under construction or repair shall be protected at all times so as to prevent any drainage or foreign matter from entering the casing. When drilling operations are suspended, as overnight, the casing shall be securely covered or capped. Upon completion of drilling, a secure cap or plug shall be placed on or in the top of the casing. Water used for drilling operations or for tempering or cooling of well tools shall be clean and free of contamination.
- D. Disinfection and flushing. Upon completion of construction and/or repairs of any water supply system or following repairs

to the pumping equipment, it shall be disinfected and flushed.

- E. Nonacceptable equipment. No pitcher, split-base or chain bucket pump shall be installed on any water supply system.
- F. Cross-connections. Where frostproof hydrants are used, installed adequate draining shall be provided to prevent possible backflow. Backflow preventers are required. There shall be no cross-connection between a private water supply system and a public water supply system.⁶
- G. Abandoned wells. No person shall use an abandoned or unused well for the purpose of disposal of sewage, sewage effluent or other contaminating material. The owner of any permanently abandoned well shall immediately fill and/or seal the well with cement or bentonite clay or other equally suitable material under supervision of the Agent. Permanent abandonment occurs when a well is not used for a period of two years and/or when the construction of the well no longer meets criteria in this chapter. "Immediately" as used above means within 48 hours of drilling completion if the well to be abandoned yields insufficient water or within 30 days if a previously constructed and operational well is abandoned. Any person who abandons or intends to abandon a well shall obtain a permit from the Clarke County Health Department.
- H. Chemical or physical alteration of wells after drilling.
 - (1) Hydraulic fracturing of wells is prohibited.
 - (2) The use of explosives in wells is prohibited.
 - (3) The use of chemical and biologic additives to remove contaminants and/or to improve well yields may be permitted by the Agent under the provisions of this chapter and shall be considered on a case-by-case basis.
- I. Drilled wells constructed in the bottom of a dug or bored well shall not be approved.

⁶Editor's Note: See Ch. 180, Water and Wastewater, Art. III, Cross-Connection and Backflow Prevention.

- J. Ground-source heat pumps
 - a. Open-looped ground-source heat pump wells are prohibited.
 - b. Closed-loop ground source heat pump system (GSHP) shall:
 - i) be installed by a contractor who has current International Ground Source Heat Pump Association (IGSHPA) certification, having completed an IGSHPA training course in the fundamentals of design, installation, and operation of ground source systems, and having passed the IGSHPA certification examination and pipe fusion tests.
 - ii) The installation specifications for the GSHP system shall conform to the IGSHPA installation standards.
 - iii) Only biodegradable mixtures such as food grade propylene glycol may be used as the circulating fluid for GSHP systems.

§ 184-11. Specifications for construction of deep wells.

[Amended 05-03-15]

- A. Construction requirements.
 - (1) All casing shall be made up and placed so as to be watertight throughout the depth used. When water is derived from rock formations, the casing shall extend sufficiently far into the rock as to be firmly seated on solid rock, plus a minimum of 10 feet.
 - (2) The well casing shall terminate at least 12 inches above the natural grade surface (preferably 18 inches), and no well casing shall terminate in a pit, provided that this shall not apply to private wells where proper topographical conditions exist so as to permit a four-inch gravity flow drain and where the pit walls and floor and ceiling are constructed so as to be waterproof and preclude entrance of groundwater or surface water.
 - (3) Separate structures which are constructed to house the water supply system and/or pumping equipment shall have an impervious floor, raintight walls and roof and adequate ventilation. The floors shall be four inches in thickness and shall be sloped away from the well casing with a slope of not less than one inch in eight feet. Where necessary, such structures shall be provided with an adequate drain. The well terminus shall be sealed with a sanitary seal, gasketed and protected from insects or, if

utilizing a pitless adapter, shall use an approved pitless adapter and terminus cap.

B. Specifications and classes of drilled wells. All drilled wells shall be cased and grouted in accordance with the following classifications. Grouting shall conform to hereinbelow prescribed grouting procedures. No work shall be considered completed in accordance with the provisions of this chapter unless and until grouting is complete, and such shall be done within 10 days after setting of the casing.

- (1) Class I wells shall be cased and grouted to solid rock with a minimum casing and grout of 100 feet.
- (2) Class IIIA wells shall be cased to solid rock with a minimum casing of 100 feet and a minimum grout of 20 feet and shall only be used where the formation encountered precludes the use of 50 feet of grout.
- (3) Class IIIB wells shall be cased and grouted to solid rock with a minimum casing and grouting of 50 feet.

C. Material specifications.

- (1) The minimum standard of quality for steel casing pipe shall conform to the requirements set forth in Appendix I Table I Minimum Safe Distances, included at the end of this chapter. Only steel casing shall be permitted. For percussion drilled wells, the casing pipe shall be assembled watertight by means of joints welded in accordance with approved practice or by correctly mated drive couplings. Those pipes (ten- and twelve-inch) marked with an asterisk in Appendix I Table II may be used for casing rotary drilled wells, where the casing does not have to be driven, and may be assembled watertight by means of joints welded in accordance with good practice or by correctly mated standard couplings.
- (2) No secondhand or reclaimed pipe shall be used as protective casing in the permanent construction of a well.
- (3) Well casing pipe shall be installed so that there will be no adverse effect on water quality.

- D. Free-flowing artesian wells. Every artesian well that flows under natural artesian pressure shall be equipped with a valve which will shut off the flow completely or be plugged for permanent abandonment.
 - (1) The water well contractor completing such well shall be responsible for installation of a valve to control natural artesian flow or for other means of preventing waste of groundwater.
 - (2) Subsequent to construction, the well owner shall be responsible for maintenance of the valve or other means of preventing waste of groundwater.

- E. Applicability of well classes. Wells for the following uses shall, at minimum, be constructed to the following classifications unless unique site and geologic conditions approved by the Health Director prevent such construction.
 - (1) Private water supply system: Class IIIB or Class IIIA.
 - (2) Public water supply system and private water supply systems: Class IIIB or Class IIIA.
 - (3) Public multiuser water supply system: Class I.

**§ 184-12.
Appurtenances.**

- A. Each well installation shall be provided with the following appurtenances or their equivalent:
 - (1) A sample tap.
 - (2) A well vent.
 - (3) A pressure-relief valve.
 - (4) A gate valve.
 - (5) A check valve where required.
 - (6) An electrical disconnect switch on the pump power supply; a plug receptacle connection will not be considered a disconnect switch.

§ 184-13. Grouting procedure.

- B. Public wells shall be equipped with a water meter and the remote meter indicator shall be located on the exterior of the building in an easily accessible location.
- A. The annular space or any opening surrounding a well casing shall be completely filled with neat portland cement grout or with approved bentonite clay/cement grout from an elevation above the established grade of the surface at the well into a continuous impervious formation or to a safe depth below the probable present or future operating water level. The minimum width of the annular space for grouting shall provide a clearance of at least 1 1/2 inches. Grouting space shall be at least three inches larger than the outside diameter of the casing.
- B. The annular space between the inner or protective casing and the outer casing or hole shall be filled with cement or approved bentonite grout. Any outer casing installed shall be removed during the grouting procedure unless approved by the Health Director prior to the grouting procedure.
 - (1) Cement grout shall be proportioned of cement and the minimum quantity of water (five to 6 1/2 gallons per cubic feet of cement) required to give a mixture of such consistency that it can be forced through the grout pipe.
 - (2) Bentonite clay grout may be used when installed by a method approved by the Virginia Department of Health. Bentonite clay must be specified by the manufacturer for the purpose of grouting water wells.
- C. Grouting shall be done by a method which forces the grout from the bottom of the space to be grouted towards the surface. The method of mixing and the consistency of the grout shall ensure that the grout fills the annular space. A suitable retainer, packer or plug shall be provided at the lower terminus of the grouting so that grout will not leak through into the water-bearing formation. The grouting shall be done continuously and in such a manner as will ensure the entire filling of the annular space in one operation. No drilling operation or other work in the well shall be permitted within 72 hours after the cement grouting of casings. If high early strength portland cement is used, this period may be reduced to 24 hours.

§ 184-14. Disinfection and testing prior to use.

General specifications for disinfecting wells, water service pipelines, pneumatic storage tanks and other water conveying or storage devices shall be as follows:

- A. Disinfection of the entire water system, per Clarke County Health Department standards, shall be performed upon completion of plumbing fixture installation and after final plumbing inspection by the Clarke County Building Department when water system and plumbing system installation are not concurrent.
- B. After operating the pump and after removal of disinfection residual, a sample shall be collected for examination by a state-certified laboratory for coliform bacteria and nitrates and, prior to placing the system into service, shall be found negative for coliform bacteria and have nitrate levels below the Environmental Protection Agency (EPA) standard.
- C. Property owners or the person taking the sample shall be required to submit an affidavit that he/she has followed proper sampling procedures as defined by the Clarke County Health Department and has submitted a sample from the well for which approval of operation from the Clarke County Health Department is requested.
- D. If testing for safe water after drilling the well identified the presence of primary (harmful) contaminants, a test for that contaminant shall be conducted to confirm the adequacy of treatment and the treatment method found to reduce the occurrence of the contaminant below maximum acceptable levels prior to placing the system into service. Private wells shall be considered contaminated if coliform is present or nitrate levels exceed EPA standards. Public wells shall be considered contaminated if any of the substances tested for exceed EPA standards.

§ 184-15. Appeals and variances.
[Amended 00-04-18]

Refer to Chapter 143 Septic Systems § 143-11. Appeals & variances of the Code of Clarke County.

§ 184-16. Notice to correct.

If upon any inspection the Health Director or his authorized agent finds a violation of any of the provisions of this chapter and/or the provisions of the permit issued under it, he shall direct the person

to whom the permit was issued and/or the installer of the system and/or the current owner, by written notice, to make the necessary corrections within such reasonable period as is specified therein. No person shall fail to comply with such notice within such period.

§ 184-17. Equitable remedies.

In addition to the penalty provided by local code or state statute, the Health Director may initiate injunction, mandamus, abatement or any other appropriate action to prevent, enjoin, abate or remove a violation of any of the provisions of this chapter.

§ 184-18. Violations and penalties.

Fines and other penalties may be levied for violations of any of the provisions of this chapter.⁷

⁷Editor's Note: See Ch. 1, General Provisions, Art. I.

Appendix I Tables

Table I Minimum Safe Distances
 [Amended 08-12-16]

Location of Wells

Sources of Contamination	Minimum Distance (feet)
Chemical storage tanks	100
Feedlots, hog lots, poultry houses	100
(Petroleum) storage tanks	100
Roads surface (public)	25
Septic tanks	100
Absorption field	100
Cesspools, pit privies, etc.	150
Intermittent streams, active mill races (even if sporadic use)	50
Other sewers	35
Perennial streams, surface water bodies such as ponds, lakes	100
Property lines	10
Foundation of buildings of solid masonry	50
Foundation of buildings of wood framing or exterior	50
Sinkholes and cave entrances	100
Chemically Termite treated foundations	100
Cemetery	100

NOTES:

In such installations where Class I wells are constructed, the distance between the potential sources of pollution may be reduced, provided that geological conditions indicate that such would be satisfactory and in accordance with the Division of Engineering, State Health Department, standards for location of public supplies in relation to potential sources of contamination.

Table II Casing Pipe Weights and Dimensions

Size (Inches)	Weight Threads & Couplings (lbs./ft.)	Pipe Thickness (Inches)	Pipe Diameter (Inches)	
			External	Internal
4	10.89	.237	4.500	4.026
6*	13.00	.188	6.625	6.25
6	19.18	.280	6.625	6.065
8*	17.80	.188	8.625	8.249
8	29.35	.322	8.625	7.981
10*	32.75	.279	10.750	10.192
10	41.85	.365	10.750	10.020
12*	45.45	.330	12.750	12.090
12	51.15	.375	12.750	12.00

NOTES:
See § 184-11C(1).

Table III- Feet of Storage Required in Well to Meet Total Well Water Supply Standard

Nominal Well Sizes (inches)

	2	3	4	5	6	7	8
1.0	--	--	--	375	255	190	150
1.5	--	--	--	315	220	160	125
2.0	--	--	400	255	180	130	100
2.5	--	--	310	200	140	100	80
3.0	--	380	220	140	95	70	55
3.5	--	220	125	80	55	40	35
4.0	125	53	35	15	15	10	10

NOTES:
Caution: Table III is intended to aid in determining minimum well storage requirements. Additional storage may be necessary to adequately protect the pump during normal operation.

Appendix II Maximum Contaminant Levels

The current drinking water standards, exclusive of the eight volatile chemicals, are maximum contaminant levels contained in the Commonwealth of Virginia/State Board of Health, Waterworks Regulations. The eight volatile organic chemicals (VOC's) are based on current maximum contaminant levels as defined by the United States Environmental Protection Agency.

Appendix III Test Methodologies and Protocols

Wells shall be constructed and tested according to the following:

- A. Well development. The permittee shall develop a well according to the following requirements: Well development shall consist of cyclic or intermittent pumping or surging, or both, either mechanically or by using water or air under pressure. Development shall continue until all formation cuttings, mud, drilling fluids and additives are removed from the well.
- B. Every well shall be developed by the well driller in order to obtain the full yield of the well and a water quality that meets all of the following requirements:
 - (1) The well driller or licensed plumbing contractor shall conduct yield and, when appropriate, drawdown tests as specified in Rules for the Construction of Groundwater Wells, Virginia Water Control Board, and shall report results on Form GW2 to the Health Director or the Health Director's designated agent.
 - (2) Pumping equipment.
 - (a) The pump capacity shall be consistent with the intended use and yield characteristics of the well.
 - (b) A lightning protective device shall be provided for submersible pumps.
 - (c) Installation of the pump shall be in accordance with manufacturer's recommendations and in accordance with Water Systems Handbook, Water Systems Council.
 - (d) The well shall be vented at the well head to allow for pressure changes within the well due to pumping. Well vents shall be positioned to prevent the entrance of

surface water, dust, insects or other foreign material.

- (e) Upon completion of installation, the person installing the pump (i.e., well driller, pump installer or plumber) should disinfect the well, pump and water supply system. The water supply system shall be disinfected immediately upon completion of construction.
- (3) Observation wells. The Health Director may specify special construction standards for wells installed for the sole purpose of monitoring water quality or water levels.
- (4) Domestic water supply system standard.
- (a) A well or double well system shall produce at least one gallon per minute.
 - (b) The water supply system shall produce not less than 500 gallons of water in a two-hour period, at least once each day.
 - (c) If the sustained yield of the well is not capable of meeting the total water supply standard, sufficient storage shall be provided.
 - (d) Well storage.

[1] If well storage is selected, the amount of storage is calculated by subtracting the well yield, as determined in Subsection B(4)(b) above, over a two-hour period from 500 gallons.

[2] The quantity of water in storage in the well is equal to the number of feet between the unpumped static water level and the level of drawdown as determined in the pump test at Subsection B(5)(b)[3], multiplied times 1.5 gallons per foot for a six-inch well or 0.65 gallons per foot for a four-inch well.

[3] Example of determining required storage. If a six-inch well produces a constant one gallon per minute, it will produce 120 gallons in a two-hour period. The well storage, therefore, shall provide

380 gallons (500 gallons - 120 gallons = 380 gallons). To provide this quantity, the well shall contain 253 feet of water in storage (380 gallons - 1.5 gallons per foot = 253).

[4] Table III has been provided to assist in determining the number of feet of water contained in well storage that is required to meet the well water supply standard.

(5) Minimum yield for domestic wells.

(a) Each well shall be tested and approved for yield in accordance with Subsection B(5)(b) below. Replacement wells, servicing an existing improved property, are exempt from this requirement.

(b) Yield test. All wells drilled with a yield determined to be less than five gallons per minute by Subsection B(1) above shall be tested as provided below:

[1] The pump and related equipment shall be placed in the well and the static water level measurement recorded.

[2] Pumping shall begin at a rate of withdrawal greater than five gallons per minute until the water level drops to a point close to the bottom of the well.

[3] When the water level reaches this point, the pump rate shall be adjusted so that the water level remains constant (in effect, pumping out any water which is flowing into the well).

[4] Measure and record the volume of water discharged (flow meter reading) and water level (with an electric tape) at fifteen-minute intervals throughout the test.

[5] Discharge water at least 50 feet from the well and on-site disposal systems.

[6] A single interruption of pumping of up to 15 minutes due to equipment failure or other unusual

circumstances will be permitted, but the amount of downtime shall be made up by additional pumping at the end of the test.

- (c) The criteria for approval shall be a minimum yield of one gallon per minute for six hours of continuous pumping after the well has been pumped out as provided in Subsection B(5)(b)[2] above.
- (d) The pump test can be terminated early and the well yield will be considered adequate if:
 - [1] A well cannot be pumped out after three hours' pumping as provided in Subsection B(5)(b)[2].
 - [2] A well yields an average of 2.5 gallons per minute or greater for three hours' continuous pumping, after the well has been pumped out as provided in Subsection B(5)(b)[2].
- (e) The Health Director may permit two wells to be connected to meet the minimum yield requirement. The well to be connected shall be tested in accordance with the procedure described in Subsection B(5)(b) above, and each shall demonstrate a yield of 0.5 gallons per minute or greater throughout the entire uninterrupted drawdown phase.
- (f) All samples to be analyzed for constituents described in Appendix II shall be taken by representatives of the Lord Fairfax Health District.

**Amendments Chapter
184**

- 1999-08-17* § 184-9-H, Location of Water Supplies, so as to allow repair or replacement wells closer to site features than normally allowed.
- 2000-04-18* § 184-4-16 appeals and Variance Process so as to delete this section and add a reference to Septic Ordinance revised § 143-11.
- 2003-08-19* § 184-1 Definitions – add definition for ground-source heat pump well – closed loop and open loop; § 184-10 General Requirements add J prohibiting open-loop ground-source heat pump wells.

- 2004-04-20 § 184-1 Definitions – remove definition of Spring and reference to definition in § 143.7
- 2005-03-15 § 184-1, -4, -7, -10, -11, -12 General changes to clarify and update. § 184-12 Specifications for construction of shallow wells deleted and subsequent sections renumbered.
- 2008-12-16 § 184-1, -9, -10, Appendix 1 Table 1, 1 add foundation and modify private water supply system; -9 add j. well separation; -10 h 1 modify to read is prohibited. J. change title and add closed loop; Table 1 add comment to perennial and intermittent streams and add “Chemically” termite....