# TOWN OF GRAFTON

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## WELL REGULATIONS

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## I. PURPOSE

These regulations are intended to protect the public health and general welfare by ensuring that private wells are constructed and maintained in a manner that will protect the quality of the groundwater derived from private wells.

## II. AUTHORITY

These regulations are adopted by the Grafton Board of Health, as authorized by MGL, Chapter 111, Section 31. These regulations supersede all previous regulations adopted by the Board of Health pursuant to the construction of private wells.

## III. DEFINITIONS

Abandoned-means a well that meets any of the following criteria:

1) construction was terminated prior to completion of the well
2) the well owner has notified the local Board that the use of the well has been permanently discontinued
3) the well has been out of service at least three (3) years
4) the well is a potential hazard to public health or safety and the situation cannot be corrected
5) the well is in such a state of disrepair that its continued use is impractical
6) the well has the potential for transmitting contaminants from the land surface into an aquifer or from one aquifer to another and the situation cannot be corrected
7) the well is no longer used to supply potable water due to tie-in to Town/Public water supply

Agent: Any person designated and authorized by the Board to execute these regulations. The agent shall have all the authority of the appointing Board and shall be directly responsible to the Board and under its direction and control.

Alteration-A major change in the type of construction or configuration of a private water system, including but not limited to, adding a disinfection or treatment device, extending a distribution system, converting a well using a pitless adapter to one with an extended , above ground casing, deepening the well, changing the type of pumping equipment when that requires making new holes or sealing or plugging existing holes in the casing or wall of a well and repairing, extending or replacing any portion of the inside or outside casing or wall.

Annular space-The space between two cylindrical objects, one of which surrounds the other, i.e., the space between

the wall of a drill hole and a casing pipe or between an inner and outer well casing.

ANR-Approval Not Required

Aquifer: A water bearing geologic formation, group of formations or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian Aquifer-An aquifer that is bounded above and below by impermeable materials or materials of distinctly lower permeability than the aquifer itself. The water in an aquifer confined in this manner will rise in a drilled hole or well casing above the point of initial penetration (above the confining or impermeable layer overlying the aquifer).

API-American Pumping Institute

Artesian Well-A well producing from an artesian aquifer. The term includes both flowing and nonflowing wells.

ASTM-American Society for Testing and Materials.

AWWA-American Water Works Association.

Applicant: Any person who intends to have a private well constructed.

Bedrock-See consolidated formation.

Bentonite-A mixture of swelling clay minerals containing at least eighty-five percent of the mineral montmorillonite (predominantly sodium) which meets the specifications of the most recent revision of API Standard 13A.

Board: The Board of Health of Grafton, Massachusetts or its authorized Agent.

Business of Drilling: A company that charges a fee for drilling a well, or a person who advertises for hire the availability to drill wells within the Commonwealth of Massachusetts. This person or company must be a Registered Well Driller.

Casing: Impervious durable pipe placed in a boring to prevent the walls from caving and to serve as a vertical conduit for well water.

Certified Laboratory: Any laboratory currently certified by the MDEP or EPA to test for drinking water and approved by the Grafton Board of Health. Provisional certification shall also qualify. The laboratory must be certified for each parameter which is reported**.**

CMR-Code of Massachusetts Regulations

Concrete: A mixture consisting of Portland cement (ASTM Standard C150, Type I or API Standard 10, Class A), sand, gravel, and water in a proportion of not more than five parts of sand plus gravel to one part cement, by volume, and not more than six gallons of water. One part cement, two parts sand, and three parts gravel are commonly used with up to six gallons of water.

Confined Aquifer-An aquifer in which the groundwater is under pressure greater than atmospheric pressure: the static water level in a well tapping a confined aquifer rises to a level above the top of the aquifer.

Confining Bed-A layer or body of soil, sediment or rock with low vertical permeability relative to the adjacent aquifers above or below it.

Consolidated Formation-Any geologic formation in which the earth materials have become firm and coherent through natural rock forming processes. The term is sometimes used interchangeably with the word 'bedrock' and includes but is not limited to basalt, granite, limestone, sandstone and shale. An uncased drill hole will normally remain open in these formations.

Contaminant-The presence of any physical, chemical, biological or radiological substance or matter

Cross Connection-Any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other water of unknown or questionable safety, whereby water may flow from one system to the other, the direction of flow depending on the pressure differential between the two systems.

Decommissioning-Proper abandonment of an abandoned well by a Registered Well Driller

Disinfect-To cleanse of harmful microorganisms.

Drawdown-The difference between the static and pumping water levels.

Drilled Wells-Wells in which the hole is excavated using mechanical means such as rotary, cable tool or auger rigs.

Drive Shoe-A forged or tempered steel collar, with a cutting edge, attached to the loser end of a casing by threading or welding, to protect the lower edge of the casing as it is driven.

Flushing-Causing a rapid flow of water from a well by pumping, bailing or similar operation.

Formation-An assemblage of earth materials grouped together into a unit that is convenient for description or mapping.

Groundwater-Subsurface water in the zone of saturation.

Grout-A stable, impermeable bonding material which is capable of providing a watertight seal.

Hydrofracking (fracking)-The method of pumping water under high pressure into a well to fracture the surrounding rock to increase the yield.

MDCR-Massachusetts Department of Conservation and Recreation.

MDEP-Massachusetts Department of Environmental Protection.

MGL-Massachusetts General Laws

Neat Cement Grout: A mixture consisting of one bag (94 pounds) of Portland cement (ASTM Standard C 150, Type I or API Standard 10, Class A) to not more than six gallons of clean water. Bentonite (API Standard 13A), up to two percent by weight of cement, shall be added to reduce shrinkage. Other additives, as described in ASTM Standard C494, may be used to increase fluidity and/or control setting time.

Overburden-See 'Unconsolidated formation'.

Person: An individual, corporation, company, association, trust, or partnership.

Public Water System (PWS): Includes wells that pipe drinking water to at least 15 service connections or regularly serve an average of 25 or more people daily at least 60 days of the year. Also, any water system that has one or more wells on commonly owned property (such as a condominium development) and collectively serves more than 25 people for more than 60 days of the year is considered a PWS. Serving bottled water on the premises does not exempt a system from meeting public drinking water requirements. Public water system wells are under the jurisdiction of the Commonwealth and must meet the state permitting requirements and regulations of 310 CMR 22.00, the Massachusetts Drinking Water Regulations. MDEP oversees the siting, drilling, pumping, water quality testing, treatment, and ongoing operations of public water system wells.

Private Water System: Private water supply for human consumption, which has less than fifteen (15) service connections and serves less than twenty-five (25) individuals daily or serves an average of twenty-five (25) or more individuals daily for less than sixty (60) days per year.

Protective Well Seals: An impervious material (grout) used to seal the annular space between the casing and the borehole wall.

Pumping Test: A procedure used to determine the volume of a well and adjacent aquifer by means of installing and operating a pump.

Registered Well Driller: Any persons registered with the MDCR to drill wells in Massachusetts and approved by the Grafton Board of Health.

Sand Cement Grout: A mixture consisting of Portland cement (ASTM Standard C150, Type I or API Standard 10, Class A), sand and water in the proportion of one part cement to three or four parts sand, by volume and not more than six gallons of water per bag (94 pounds) of cement. Up to five percent, by weight of bentonite (API Standard 13A) shall be added to reduce shrinkage.

Service Connection: Each building served by a potable water source is considered to be a service connection of that system.

Static Water Level: The level of water in a well under non-pumping conditions.

Structure: A combination of materials assembled at a fixed location to give support or shelter, such as a building, framework, retaining wall, fence or the like.

Unconfined Aquifer-The static water level does not rise above the top of the aquifer.

Unconsolidated Formation-Uncemented, unlithofied material such as sand, gravel, clay or soil.

Water Table-The upper surface of the zone of saturation in an unconfined formation at which the pressure is atmospheric.

Well – Bored, drilled or driven shaft, a dug hole, or seepage pit whose depth is greater than its largest surfaced dimension, or an improved sinkhole or a soil absorption system.

Well Development-Removal of fine sand and drilling fluid from the water bearing sand, gravel or rock materials opposite the well screen.

Well Rehabilitation-Restoring a well to its most efficient condition by various methods of treatment or reconstruction.

Well Vent-An outlet at the upper end of a well casing or basement end of a non-pressure conduit to allow equalization of air pressure in a well but at the same time so constructed a to prevent entry of water and foreign material into the well.

Yield-The quantity of water per unit of time which may flow or be pumped from a well under specified conditions.

Zone of Saturation-The zone below the water table in which all interstices are filled with groundwater.

## IV. WELL CONSTRUCTION PERMIT

The property owner or his designated representative shall obtain a permit from the Board of Health prior to the commencement of construction of a private well, **as well as any alteration, repair, abandonment or development** regardless of whether it will supply water for an existing or proposed building.

In the case of undeveloped lots for new construction, well applications must be accompanied by ANR's recorded at the Registry of Deeds, Zoning Permits and Conservation Commission Determination or Orders when applicable.

The Board may not approve any proposed private water supply well which does not meet the permitting approval requirements and/or which is located where an approved public water system (municipal public water system, water district or private water company) can reasonably supply the consumers.

Replacement wells may be waived from meeting certain well permitting requirements, at the discretion of the Board.

Each permit application to construct a well shall include a fee to be determined by the Board of Health as well as a plan with the following:

1) Professional Engineer (PE), Registered Surveyor (RLS) or Registered Sanitarian (RS) stamp and signature.
2) Design to 20 scale showing the location of the proposed well in relation to existing or proposed above or below ground structures including but not limited to:
   a) Visible and/or known, prior and current land uses within two-hundred (200) feet of the well locations, which represent a potential source of contamination;
   b) Existing and proposed structures;
   c) Subsurface sewage disposal systems;

d) Subsurface fuel storage tanks;
e) Public and utility rights of way;
f) Location of waste sites within 500 to 1,000 feet of the well site;
g) Agricultural land use;
h) Any other potential sources of pollution- whenever possible, the well should be as far removed and upgradient from potential sources of contamination. Further, the well location should be as accessible as possible for repair, inspection, testing, etc. given the site layout;
i) Minimum of two permanent benchmarks not more than 75' from the proposed well location. Naturally occurring landmarks not likely to be disturbed or removed such as stone walls, boulders, tree clusters, etc. should also be shown on the plan and may with the approval of the Board serve as the required benchmark. A septic design plan may also be acceptable for this purpose;
j) Any other known existing or proposed wells;
k) Any wetlands or other resource areas.

**If the well plan is to be changed a revised plan must be submitted for approval and may also require an additional review fee.**

3) A plumbing permit to connect the well to the house.
4) An Order of Conditions/ Determination of Applicability from Conservation if well is to be constructed within an area under their jurisdiction.
5) Emergency well installations, alterations and repairs must follow the same requirements as stated above; every effort will be made to expedite the application.
6) If any information on a well application permit changes, such as the driller, property owner, etc. a new permit must be issued.

The permit shall be on site at all times that work is taking place; each permit shall expire one (1) year from the date of issuance unless revoked.

Well Construction Permits are not transferable and non refundable.

## V. WELL LOCATION AND USE REQUIREMENT

The well shall be completed in a water bearing formation that will produce the required quantity of water under normal operating conditions and to the extent possible upgradient of any potential sources of contamination.

All private wells shall be located within the lot boundaries for which its use is intentioned. No well shall be used to supply more than one dwelling.

Whenever water supply lines must cross sewer lines, both pipes shall be constructed of class 150-pressure pipe and shall be pressure tested to assure water tightness.

No private well, or its associated distribution system, shall be connected to either the distribution system of a public water supply system or any type of waste distribution system.

Some of the distances listed may need to be doubled in sand and gravel.

The Board reserves the right to impose minimum lateral distance requirements from other potential sources of

contamination not listed below or to increase distances listed below if in the Board's opinion circumstances warrant it. All such special well locations requirements shall be listed, in writing, as a condition of the well construction permit.

| Setback Description | Setback Distance |
|---|---|
| Property line | 10 feet |
| Adjacent structure (including overhangs) | 10 feet |
| Public roadway (normal driving surface) | 25 feet |
| Right of way | 15 feet (see right of way management regulations, 333 CMR 11.00) w/in 100 feet |
| Driveway, parking lot (residential)* | 25 feet |
| High water mark, floodplain* * | 50 feet (resource area, catch basin, dry well) |
| Culvert, detention basin, catch basin, dry well, storm water drains | 50 feet |
| Building sewer, grease traps | 10 feet (corrosion resistant with watertight joints); 50 feet (non-corrosion resistant) |
| Septic tank | 50 feet |
| Leaching field | 100 feet |
| Agricultural field, barnyard, corral | 100 feet |
| Water supply lines | 10 feet (18 inches above) |
| Petroleum Storage Tanks (aboveground) | 50 feet |
| Petroleum Storage, fuel lines/pumps (belowground) | 150 feet |
| Stables, barns, feedlots, manure storage areas | 100 feet |
| Gas lines | 50 feet |
| Transmission Lines | 25 feet |
| Chemical mixing area w/containment structure | 200 feet |
| Salt storage areas | 100 feet |
| | |
| * Commercial 100 feet<br>** Should be above floodplain whenever possible. | |

## VI. WELL CONSTRUCTION REQUIREMENTS

**The Board will be notified forty-eight (48) hours prior to the commencement of drilling and may choose to confirm the location of the well in advance. Messages on answering machines are not considered notification unless receipt is confirmed.**

If utilities are in place, Dig Safe should be contacted before construction of the well begins.

Any work involving the connection of the private well to the distribution system of the residence must conform to the local plumbing and electrical codes. All electrical connections between the well and the pump controls and all piping between the well and the storage and/or pressure tank in the house must be made by a pump installer or registered well driller, including the installation of the pump and appurtenance in the well or house.

A physical connection is not permitted between a water supply which satisfies the requirements of these regulations and another water supply that does not meet the requirements of these regulations without prior approval of the Board.

## A. General Well Design and Construction

All private water supply wells shall be designed such that:

1) The materials used for the permanent construction are durable in the specific hydrogeologic environment at the well site.
2) No unsealed opening will be left around the well that could conduct surface water or contaminated groundwater vertically to the intake portion of the well or transfer water from one formation to another.

Permanent construction materials shall not impart toxic substances, taste, odors, or bacterial contamination to the well water.

The driller shall at all times conduct the business of drilling in strict compliance to all applicable state and local regulations**,** operate all equipment according to generally accepted standards in the industry and shall take appropriate precautions to prevent damage, injury or other loss to persons and property at the drilling site.

Well construction design shall insure that surface water does not enter the well through the opening or by seepage through the ground surface. Construction site waste and materials shall be disposed of in such a way as to avoid contamination of the well and the aquifer. During any time that the well is unattended, the contractor shall secure the well in a way as to prevent either tampering with the well or the introduction of foreign material into the well.

Well yield should be measured and recorded at least every fifty (50) feet during drilling.

All water used for drilling, well development, or to mix a drilling fluid shall be obtained from a potable source which will not result in contamination of the well or the water bearing zones penetrated by the well. Water shall be conveyed in clean, sanitary containers and chlorinated to between fifty (50) and one hundred (100) ppm and be maintained at ten (10) ppm while on site.

All drilling fluids shall be nontoxic. Drilling fluid additives shall be stored in clean containers and shall be free of material that may adversely affect the well, the aquifer, or the quality of the water to be pumped from the well; surfactant should be biodegradable. The use of biodegradable organic polymers shall, when possible, be avoided.

All drilling equipment, including pumps and down hole tools, shall be clean and disinfected prior to drilling.

The completed well shall be sufficiently straight so that there will be no interference with installation, alignment, operation or future removal of the permanent well pump.

## B. Well Development

All drilling methods alter the hydraulic characteristics of the formation materials adjacent to the borehole impairing the transmission of water from the aquifer into the well. Well development removes fine materials introduced into the pore spaces or fractures during construction such as clay, silt and fine sand from the formation adjacent to the well intake and restores the natural properties of the aquifer, maximizing the capacity of the well.

Well development, which should be conducted prior to the pumping test, should be accomplished by over pumping, backwashing, surging, jetting, airlift pumping or any combination of these methods. Well design and the character of the subsurface materials determine which method or methods are most appropriate. Development should proceed

until all drilling fluids are removed and sediment-free water (no more than 5 ppm of sediment) can be obtained when the well is pumped at the designed production rate. Incomplete development may lead to premature incrustation of the well screen or cementation of the adjacent formation.

**C. Well Casing**

Private water supply wells shall be constructed using either schedule 40 steel, concrete or thermoplastic well casing. The casing shall be of adequate strength and durability to withstand anticipated formation and hydrostatic pressures, the forces imposed on it during installation and the corrosive effects of the local hydro geologic environment. The casing material used depends on the drilling method, depth and diameter of the well, the character of the subsurface materials and local groundwater quality. Wall thickness shall withstand hydraulic loading if casing is pumped dry and collapse strength >one (1) pound per square inch for every 2.31 feet beneath the top of the aquifer. Regardless of the type all casing, couplings or welds used shall conform to the standards approved by the AWWA, NSF and ASTM for materials of construction and standards; in no case shall the casing depth be less than thirty (30) feet.

Steel casing shall be used with cable tool drilling or when the casing is installed in an open drill hole in which formation materials may suddenly collapse against the casing.

All casing used in the construction of private water supply wells shall be free of pits, breaks, gouges, deep scratches and other defects. If previously used casing is installed, it shall be decontaminated and disinfected prior to installation.

Installation of water well casing shall be done in a manner that does not alter the shape, size or strength of the casing and does not damage any of the joints or couplings connecting sections of the casing. A standard drive shoe shall be used when casing is installed. The drive shoe shall be either welded or threaded to the lower end of the string of casing and shall have a beveled metal cutting edge forged, cast, or fabricated for this specific purpose.

**D. Well Screen**

A well screen is necessary for all drilled wells that are completed in unconsolidated formations. Wells completed in bedrock do not require a screen unless the bedrock formation is brittle in nature or has a potential for collapse. The well screen aperture openings, screen length and diameter shall be selected so as not to limit the aquifers' water yielding characteristics while preventing access of soil particles that would detract from well efficiency and yield.

**E. Grouting and Sealing**

Private wells drilled in bedrock shall be grouted in order to protect the well from contaminated surface water, prevent the transfer of water between two water bearing zones that differ in water quality or hydrostatic pressure and to protect the well casing from corrosion or physical damage by material collapsed from the borehole wall. The grout shall extend from the top of the weathered rock interface to fifteen (15) feet into competent bedrock. Either neat cement grout or sand cement grout shall be used and it shall be employed using standard grouting techniques as described in the MDEP Private Well Guidelines.

**F. Pumps and Pumping Equipment**

All potable water pumps shall be installed below the frost line with either a pitiless adapter or other approved location. Above ground pumps shall be installed in a sheltered, dry, accessible location and shall be protected from freezing. Pump selection is based primarily on the design, depth and yield of the well as well as the use and pressure requirements.

**G. Wellhead Completion**

Well casing shall not be cut off below the land surface. Well casing terminating above-grade shall extend at least 18 inches above the predetermined ground surface at the wellhead except when the well is located in a flood plain. When a well is located in a flood plain, the well casing shall extend at least two feet above the level of the highest recorded flood. The top of the well casing shall be reasonably smooth and level and all above grade connections shall be sealed so as to be watertight. The completed well shall be secured with a locking cap to prevent tampering with or entrance of foreign material into the well.

A flowing artesian well shall be equipped with a shut-off valve and backflow preventer so that the flow of water can be stopped completely when the well is not in use. The location of the well must be clearly marked and easily accessible.

The ground immediately surrounding the well casing shall be sloped downward and away from the well in all directions to eliminate the possibility of surface water ponding.

**H. Well vent**

All wells except flowing artesian wells and dug wells should be vented. The opening of the vent pipe should be covered with a twenty-four (24) mesh corrosion resistant screen and should be large enough to prevent water from being drawn into the well through electrical conduits or leaks in the seal around the pump when the pump is turned on. The vent should terminate in a downward position at or above the top of the casing.

**I. Disinfection**

During the construction, repair or well alteration and during pump installation, maintenance and repair, bacteria can be introduced into both the well and aquifer. The simplest and most effective way to kill these bacteria is to disinfect the entire water supply system with a chlorine solution.

Upon completion of any of these activities, the well contractor shall disinfect the well. When the pump is to be installed the contractor shall disinfect the well and the pumping equipment after the pump has been installed. In order to thoroughly distribute the disinfectant, the well should be pumped, recirculating the pumped water back into the well for at least fifteen (15) minutes. The disinfectant should remain undisturbed in the well and, if connected, in the distribution system for a minimum of two hours.

The pump contractor shall also disinfect the entire water supply system after any maintenance or repair work. A permit must be obtained prior to repairs being initiated.

When a well is disinfected the initial chlorine concentration shall be 100 mg/l throughout the entire water column.

For newly constructed or altered wells in which the pump is not immediately installed, the chlorine concentration used to disinfect the well shall be 10 mg/l. Upon installation of the pump, disinfection of the well, the pumping equipment and the distribution system, if connected, shall be accomplished with a chlorine concentration of 100 mg/l.

The disinfectant solution shall remain undisturbed in the well for a minimum of two (2) hours. After all the chlorine has been flushed from the water supply system, a water sample shall be collected and submitted to a certified laboratory.

Ineffective disinfection may be related to the chlorine concentration of the disinfectant, the pH or turbidity of the water or the retention time of the disinfectant solution.

**J. Flushing**

The system should be flushed to remove all traces of chlorine from the distribution system, provided that all household faucets are opened. If the water supply system discharges to a septic system, care should be taken to flush the distribution system slowly, keeping the faucets on low. This will prevent the septic system from becoming overloaded.

**K Access Port**

All new, repaired or altered wells should be equipped with an access port that will permit unobstructed measurement of the depth to the water surface or a pressure gauge fitting that will permit access for measurement of shut-in pressure of a flowing artesian well. These ports shall have an inside diameter greater than or equal to one-half of an inch and should be fitted with a threaded plug or cap. Air lines and removable well caps are acceptable alternatives.

The water line from the well to the house must be constructed below the frost line at a minimum depth of four feet.

## VII. WELL ALTERATION, MAINTENANCE, REHABILITATION, REPAIR

The property owner or his designated representative shall obtain a permit from the Board prior to any repair, alteration, rehabilitation or maintenance of a private well.

All materials and construction practices used in the maintenance, repair, alteration or rehabilitation should be the same as those required for the construction of a new well. All work should be done only by a registered well driller, licensed plumber or electrician, depending upon the work to be done.

Upon completion, the contractor should disinfect the well, the pumping equipment and distribution system before the well is returned to service. Appropriate disinfection procedures are discussed in the section entitled 'Disinfection'.

## VIII. WATER QUANTITY REQUIREMENTS

The applicant shall submit to the Board for review and approval a Pumping Test Report. This Report shall include:

- The name and address of the well owner
- Parcel and lot number of proposed well location
- Well location referenced to at least two permanent structures or landmarks and location coordinates (latitude and longitude)
- Date of the pumping test
- Depth at which the pump was set for the test,
- Location for the discharge line
- Static water level immediately before pumping commenced
- Discharge rate
- The time the discharge rate changed,
- Pumping water levels and respective times after pumping commenced
- Maximum drawdown during the test,
- Duration of the test, including both the pumping time and the recovering time during which measurements were taken,

- Recovery water levels and respective time after cessation of pumping,
- Reference point used for all measurements
- Date of hydrofracturing, if relevant

**A minimum of forty-eight hours notice is required before the pump test is performed, which may be witnessed by the Board at their discretion.**

Upon completion of drilling and developing the well, and prior to beginning the pumping test, the aquifer should be allowed to recover from stresses induced by drilling and development procedures. The discharge line, which should be located where it will not cause recirculation of pumped water, should be filled with water to prevent unnecessary fluctuation in the discharge rate at the beginning of the test.

In order to demonstrate the capacity of the well to provide the required volume of water, a pumping test shall be conducted at the rate of five gallons/minute for a period of not less than four complete hours. The discharge line should be checked periodically for sediment, which could both damage the pump and be an indication that the well needs additional development.

Water level measurements should be measured in feet and hundredths of a foot.

Following the pumping test, the water level in the well must be shown to recover to within eighty-five (85) percent of the pre-pumped static water level within a 24-hour period.

If the well fails to yield the required volume within a twenty four (24) hour period, of if the water level in the well fails to recover to within eighty-five (85%) of the prepumped static water level within a twenty-four (24) hour period, the well should be redeveloped, hydrofractured, and/or deepened. Any additional procedure(s) will need to be followed by another pump test.

Due to seasonal variations in recharge of the groundwater, pumping tests performed during times of seasonally high ground water may not accurately predict performance during times of reduced water availability. Tests performed between June and October are more reliable for determining if a well will satisfy household water demands than tests performed at other times of the year.

## IX. WATER QUALITY TESTING REQUIREMENTS

A minimum of forty-eight (48) hours notice must be given to the Board prior to sampling being performed. The Board reserves the right to witness any well sampling at their discretion.

Testing shall be conducted by a Massachusetts or EPA certified laboratory which is certified for testing applicable potable water contaminants.

All results shall be submitted to the Board for approval.

The laboratory performing the testing must provide an authorized, competently trained person to collect all required water samples. Written proof of the individual's qualifications must be supplied to the Board upon request. The name of the sampler must appear on the analytical report.

**SAMPLE 1.** A water sample shall be collected either after purging three well volumes or following the stabilization

of the pH, temperature and specific conductance in the pumped well. The water to be tested shall be collected at the pump discharge or from a disinfected tap in the pump discharge line. In no event shall a water treatment device be installed prior to sampling. In the case of new construction, upon receipt of the first set of well results, the Board will conduct a review and issue either an approval or denial to the Building Department regarding the issuance of the Building Permit. If the well is a replacement well for an existing home or commercial establishment, approval of the water test results will result in a Certificate of Compliance for use of the well.

**SAMPLE 2**. If notified by the Board after review of the initial test results, a water sample shall be collected from the kitchen tap after all of the permanent plumbing, including the faucets, have been installed and electricity is available to run the pump. The parameters requiring retesting will include those not in compliance with EPA or State standards as recorded in this document on the initial sample or as otherwise required by the Board.

The water quality test, utilizing applicable US EPA approved methods for drinking water testing shall include analysis for the parameters listed on Attachment (A). The results shall not exceed Massachusetts and/or EPA drinking water standards, or other standards as may be established by the Board.

Following a receipt of the water quality test results, the applicant shall submit a Water Quality Report to the Board which includes:

1) A copy of the certified laboratory's test results
2) A copy of the chain of custody which will clearly state:
    - The property location
    - The date and time of collection
    - Where in the system the sample was obtained (point of use is recommended)
    - If the system was flushed prior to sampling, the length of time that the system was flushed
    - The name of the sampler
    - Whether chlorination was performed and if so, when
    - The date and time that the sample(s) were received at the laboratory and by whom
    - The sample temperature upon receipt

The analytical report shall include a statement that the sample was collected in accordance with recommended sampling techniques and procedures, a copy of which must be provided upon request.

The Board reserves the right to require retesting or testing for additional parameters when, in the opinion of the Board, it is necessary due to local conditions or for the protection of the public health, safety and welfare. All costs and laboratory arrangements for the water testing are the responsibility of the applicant.

If contaminant levels are higher than recommended and require a permanent treatment system, the specification of the installed treatment system will be submitted along with any required post treatment analysis results. Systems with backwash systems must be permanently discharged into a dry well. Backwash systems will not be permitted to be discharged into a septic system or into the basement floor of the building. The current and future property owners must be notified of the contaminants present and those contaminants , recommended levels, treatment required and the routine maintenance of the treatment system. Future water testing may be required by the Board**.** This information shall be filed with the Registry of Deeds.

In some cases, the presence of the contaminant could result in the well not being certified for use.

**Additional Testing***

It is prudent to have well water sampled periodically (every three years is recommended) and tested by a certified laboratory. Total coliform bacteria are recommended to be tested yearly. Results should be forwarded to the Board. In addition, the following types of facilities should have their wells tested on a more frequent basis.

1) Permanent, year round food establishments; temporary or seasonal should be tested annually, one month prior to opening;
2) Rental properties;
3) Daycare facilities and schools;
4) Homes/businesses undergoing property transfer; and
5) Non-rental properties with wells located proximal to land uses and/or intensive residential developments that are potentially impacting groundwater quality or located in relatively rural areas or located in areas where current or historical land use includes agriculture.

*Properties and well uses considered public water supplies, which are regulated by MDEP, shall follow MDEP regulations and guidelines.

Licensed daycare facilities shall have baseline testing conducted for the parameters listed in Attachment (A) upon application for said use and/or prior to the renewal of licensure. After baseline testing, annual testing shall be conducted to include at a minimum: total coliform bacteria, nitrate, nitrite, arsenic, lead, copper, manganese, and volatile organic contaminants.

The Board reserves the right to require existing wells to comply with applicable construction and water quality standards. The Board may require baseline or other additional parameter testing on existing private wells upon the initial application or renewal of any permits or licenses under local jurisdiction and/or in any case where the Board deems it necessary for protection of the public health and welfare.

## X. DECOMMISSIONING REQUIREMENTS

Private water supply wells removed from service including but not limited to wells, test holes, and borings shall be decommissioned so as to prevent the well, including the annular space between the casing and the wall of the boring, from the following:

1) Becoming a physical hazard
2) Allowing groundwater to become contaminated by flooding or disposal of waste materials
3) Preventing the intermingling of potable and non-potable water
4) Conserving the yield and hydrostatic head of confined aquifers

The owner of the private well shall decommission the well if the well meets any of the following criteria:

1) Construction of the well is terminated prior to completion of the well
2) The well owner notifies the Board that the use of the well is to be permanently discontinued and obtains a permit to decommission (such as in the case of connecting to a public water supply)
3) The well has been out of service for at least three years
4) The well is a potential hazard to public health or safety and the situation cannot be corrected
5) The well is in such a state of disrepair that its continued use is impractical
6) The well has the potential for transmitting contaminants from the land surface into an aquifer or from one aquifer to another and the situation cannot be corrected
7) The property is being connected to a public water supply

The property owner shall be responsible for ensuring that all abandoned wells and test holes or borings associated with private well installation are properly plugged. Only registered well drillers may plug abandoned wells, test holes and borings.

NOTE: Wells abandoned prior to these amended well regulations are not grandfathered and when discovered will be required to be officially decommissioned.

The abandonment shall be witnessed by the Board, with notification of the scheduled abandonment forty-eight (48) hours in advance.

In the case of new well construction, all test holes and borings shall be plugged before the well driller leaves the site.

Abandoned wells or borings shall be completely filled with a grout which cures with a final permeability of less than 1x10-7 cm/sec. Wells shall be plugged with neat cement grout, sand cement grout, concrete, or bentonite grout.

Regardless of the type used, the grout:

1) Shall be sufficiently fluid so that it can be applied through a tremie pipe from the bottom of the well upward
2) Shall remain as a homogeneous fluid when applied to the subsurface rather than desegregating by gravity into a two phase substance
3) Shall be resistant to chemical or physical deterioration
4) Shall not leach chemicals, either organic or inorganic, that will adversely affect the quality of the groundwater where it is applied

The plugging materials shall be introduced at the bottom of the well or boring and placed progressively upward to a level approximately four (4) feet below ground surface. Sealing materials shall never be poured from the land surface into the well, borehole, or annular space.

The contractor shall emplace the surface seal no sooner than 24 hours after the well or boring has been plugged. Before the surface seal is placed, casing remaining in the hole shall be cut off. The remaining four feet at the top of the well or boring shall then be filled with concrete. The top of the seal shall comprise a concrete slab above the top of the plugged well or boring. This concrete slab shall be at least six inches thick and shall be at least two feet greater in diameter than the well casing or borehole wall.

A Well Completion Report must be submitted by the registered well driller to the DCR within thirty days following the completion of the decommissioning procedure with a copy to the Board and submit to the property owner a Decommissioning Report, which should be filed with the Registry of Deeds. A copy of this same Decommissioning Report may also be submitted to the Board if it contains additional information not included in the Well Completion report. The information required to be submitted to the Board shall include the following:

- Name and address of the property owner
- Name, address and registration number of the well driller
- Reason for abandonment
- Location of the property with the decommissioned well referenced to at least two permanent structures and/or location coordinates determined by a registered land surveyor or registered civil engineer

- All information about the well including depth, diameter and type of casing
- Volume of the well with accompanying calculations
- Static water level before plugging
- Type and quantity of material used to plug the well, including mix specifications
- Description of the procedure used and preparation to perform the procedure, such as pump and screen removal
- A copy of the original well completion report when available

## XI. WELL CERTIFICATE OF COMPLIANCE

The issuance of a Well Certificate of Compliance by the Board shall certify that the private well may be used as a drinking water supply as regulated under Board jurisdiction. A Well Certificate of Compliance must be issued for the use of a private well prior to the issuance of an occupancy permit for an existing structure or prior to use of the well water in the event of a replacement well.

A Well Certificate of Compliance does not approve or otherwise authorize the use of the well for uses which may require state, federal or other agency permit approvals.

The following shall be submitted to the Board of Health to obtain a Well Certificate of Compliance:

1) A well construction permit;
2) A copy of the Water Well Completion Report as required by MDRC (313 CMR 3.00**).** If hydrofracking is performed an amended Well Completion Report or other suitable document is required stating the date the hydrofracking was done;
3) A copy of the Pumping Test Report required pursuant to Section VII of these regulations;
4) A copy of the Water Quality Report required pursuant to Section VIII of these regulations;
5) A copy of recorded deed notification if the well needs primary treatment;
6) Specifications for any needed water treatment/purification system and a receipt to prove that the system was installed**.**
   If backwashing is required, that backwash must, on a property with a septic system, be disposed of onto the ground or into a dry well. In no case may it discharge to the septic system or through a hole drilled into the basement floor. An inspection or other means of verification may be required.

Upon receipt and review of the above documents, the Board shall make a final decision on the request for a Well Certificate of Compliance. A final decision shall be in writing and shall comprise one of the following actions:

1) Issue a Well Certificate of Compliance;
2) Deny the applicant a Well Certificate of Compliance Water Supply Certificate and specify the reasons for the denial; or
3) Issue a conditional Well Certificate of Compliance Water Supply Certificate with those conditions which the Board deems necessary to ensure fitness, purity and quantity of the water derived from that private well. Said conditions may include but not be limited to requiring treatment or additional testing of the water.

## XII. IRRIGATION WELLS

The construction/installation of new wells or the conversion of drinking water wells for the purpose of irrigation will not be permitted.
Irrigation systems connected to approved drinking water wells will be allowed only when in the opinion of the Board, there is sufficient capacity to sustain both residential service and irrigation.

## XIII. MONITORING WELLS

Installation and construction of monitoring wells will require a well construction permit (see Section IV) and comply with all applicable regulations.

## XIV. EXISTING WELLS

The Board reserves the right to require existing wells to comply with applicable construction and water quality standards. The Board may require baseline or other additional parameter testing on existing private wells upon the initial application or renewal of any permits or licenses under local jurisdiction and/or in any case where the Board deems it necessary for protection of the public health and welfare.

Licensed daycare facilities shall have baseline testing conducted for the parameters listed in Attachment A upon application for said use and/or prior to the renewal of the licensure. After baseline testing, annual testing shall be conducted to include at a minimum: total coliform bacteria, nitrate, nitrite, arsenic, lead, copper, manganese, and volatile organic contaminants.

The conversion of a private water supply to a public water supply or other use shall not be permitted unless appropriate permits and approvals are obtained from MDEP or other applicable regulatory agency prior to change in use of the well.

## XV. ENFORCEMENT

The Board shall investigate any and all violations and may take such actions as the Board deems necessary for the protection of the public health and the enforcement of these regulations.

If any investigation reveals a violation of these regulations or the Water Supply Certificate conditions, the Board shall order the private well owner or other responsible party(s) to comply with the violated provision(s**)** and may require that a non-compliance fee be paid for each day the violation is not corrected.

These orders shall be in writing and served in the following manner:

a) Personally, by any person authorized to serve civil process; or
b) By any person authorized to serve civic process by leaving a copy of the order at the well owners' last and usual place of abode; or
c) By sending the well owner a copy of the order by registered or certified mail, return receipt requested, if the well owner is within the Commonwealth; or
d) If the well owner's last and usual place of abode is unknown or outside the Commonwealth, by posting a copy of the order in a conspicuous place on or about the premises and by advertising it for at least three out of five consecutive days in one or more newspapers of general circulation within the municipality wherein the private well affected is situated.

## XVI. HEARING

The private well owner to whom any order has been served may request a hearing before the Board by filing with the Board within 7 days after the day the order was served by submitting a written petition requesting a hearing on the matter. Upon receipt of such petition, the Board shall set a time and place for such hearing and shall inform the well owner thereof in writing. The hearing shall be commenced not later than 30 days after the day on which the order was served. The Board, upon application of the well owner, may postpone the date of hearing for a reasonable time beyond such 30-day period if it is the judgment of the Board that the well owner has submitted a good and sufficient reason for such postponement.

At the hearing the well owner shall be given an opportunity to be heard and to show why the order should be modified or withdrawn. After the hearing, the Board shall sustain, modify, or withdraw the order and shall inform the well owner in writing of its decision. If the Board sustains or modifies the original order, it shall be carried out within the time period allotted in the original order or in the modifications.

Every notice, order, or other record prepared by the Board in connection with the hearing shall be entered as a matter of public record in the office of the Clerk of the city or town, or in the office of the Board.

If a written petition for a hearing is not filed with the Board within 7 days after the day an order has been served or if after a hearing, the order has been sustained in any part, each day's failure to comply with the order as issued or modified shall constitute an additional offense.

## XVII. APPEAL

Any person aggrieved by the final decision of the Board may seek relief within thirty (30) days in any court of competent jurisdiction, as provided by the laws of this Commonwealth.

## XVIII. PENALTIES

Whoever violates any provision of these rules and regulations may be penalized by a complaint brought in the District Court or a Non-compliance Fee.

## XIX. VARIANCE

The Board may, after a public hearing, grant a variance to the application of these regulations when, in its opinion, the enforcement thereof would do manifest injustice, and the applicant has demonstrated that the equivalent degree of protection will still be provided to the private water supply without strict application to particular provisions of these regulations.

Every request for a variance shall be made in writing and shall state the specific variance sought and the reasons therefore. The writing shall contain all the information needed to assure the Board that, despite the issuance of a variance; the public health and environment will be protected. Notice of the hearing shall be published by the Board, at the applicant=s expense, at least **(5)** days prior thereto, by publication in a newspaper of general circulation in the town or city upon which the private well is located. The applicant shall, by certified mail, notify all abutters of the property (as determined by the Grafton Assessors Office) upon which the private well is located, at least **(5)** days prior thereto. The notice shall include a statement of the variance sought and the reasons therefore. Any granting or denial of a variance shall be in writing and shall contain a brief statement of the reasons for approving or denying the variance. A copy of each variance shall be conspicuously posted for **(10)** days following its issuance and shall be available to the public at all reasonable hours in the Office of the Board of Health. No work shall be done under any variance until **(10)** days elapse from its issuance, unless the Board certifies in writing that an emergency exists.

Any variance may be subject to such qualification, revocation, suspension, condition or expiration as is provided in these regulations or as the Board expresses in its decision. A variance may otherwise be revoked, modified or suspended, in whole or in part, only after the holder thereof has been notified in writing and has been given an opportunity to be heard.

## XX. SEVERABILITY

If any provision of these regulations or the application thereof is held to be invalid by a court of competent

jurisdiction, the invalidity shall be limited to said provision(s) and the remainder of these regulations shall remain valid and effective. Any part of these regulations subsequently invalidated by a new State law or modification of an existing State law shall automatically be brought into conformity with the new or amended law and shall be deemed to be effective immediately, without recourse to a public hearing and the customary procedures for amendment of repeal of such regulation.

## XXI. EFFECTIVE DATE

These regulations were adopted by vote of the Town of Grafton, Massachusetts Board of Health, at their regularly scheduled meeting on April 25, 2005 and are to be in full force and effect immediately upon signing. These regulations or any portions thereof may be amended, supplemented or repealed from time to time by the Board, with notice as provided by law, on its own motion or by petition.

## XXII. DISCLAIMER

The issuance of a well permit shall not be construed as a guarantee by the Board or its agents that the water system will function satisfactorily nor that the water supply will be of sufficient quality or quantity for its intended use.

A Well Certificate of Compliance does not approve or otherwise authorize the use of the well for uses which may require state, federal or other agency permit approvals.

A TRUE COPY,
ATTEST:

GRAFTON BOARD OF HEALTH

_____
Dorothea L. Frederico, Chairman

_____
Richard J. Kirejczyk, Vice-Chairman

_____
Shawn P. McAvey, Clerk

**ATTACHMENT (A)**
**POTABLE WATER TESTING PARAMETERS**

- The listed limits reflect those as established in MDEP Drinking Water Standards and Guidelines for Chemicals in Massachusetts Drinking Waters.
- The Board may establish more stringent limits and require additional parameter testing at the Board's discretion.

Units of Measure (UOM)

mg/l = milligrams per liter, or parts per million (ppm) To convert mg/l to ug/l divide the value by 1000
ug/l = micrograms per liter, or parts per billion (ppb) To convert ug/l to mg/l multiply value by 1000
pCi/l = picocuries per liter (a measure of radioactivity) To convert pCi/L to ug/l multiply by 1.49, to convert ug/l to pCi/L multiply by 0.67

| PARAMETER | LIMIT | UOM |
|---|---|---|
| **INORGANIC COMPOUNDS** | | |
| Antimony | 0.006 | mg/l |
| Arsenic | 0.010 | mg/l |
| Barium | 2.0 | mg/l |
| Beryllium | 0.004 | mg/l |
| Cadmium | 0.005 | mg/l |
| Chromium (total) | 0.1 | mg/l |
| Cyanide | 0.2 | mg/l |
| Fluoride | 2 | mg/l |
| Lead | 0.015 | mg/l |
| Copper | 1 | mg/l |
| Mercury | 0.002 | mg/l |
| Nitrate (N) | 10 | mg/l |
| Nitrite (N | 1 | mg/l |
| Total Nitrate (N) & Nitrite(N) | 10 | mg/l |
| Selenium | 0.05 | mg/l |
| Thallium | 0.002 | mg/l |
| perchlorate | 1 | mg/L |
| **SYNTHETIC ORGANIC COMPOUNDS** | | |
| Alachlor | 2.0 | ug/l |
| Atrazine | 3.0 | ug/l |
| Benzo(a)pyrene | 0.02 | ug/l |
| Carbofuran | 40 | ug/l |
| Chlordane | 2.0 | ug/l |
| Dalapon | 200 | ug/l |
| Di(2-ethylhexyl)adipate | 400 | ug/l |
| Di(2-ethylhexyl)phthalate | 6.0 | ug/l |
| Dinoseb | 7.0 | ug/l |
| Endrin | 2.0 | ug/l |
| Toxaphene | 3.0 | ug/l |
| 2,4-D | 70 | ug/l |
| 2,4,5-TP (Silvex) | 50 | ug/l |
| Ethylene Dibromide (EDB) | 0.05 | ug/l |
| Dibromochloropropane (DBCP) | 0.2 | ug/l |
| Heptachlor | 0.4 | ug/l |
| Heptachlor epoxide | 0.2 | ug/l |
| Hexachlorobenzene | 1.0 | ug/l |
| Hexachlorocyclopentadiene | 50 | ug/l |
| .Lindane | 0.2 | ug/l |
| Methoxychlor | 40 | ug/l |
| Oxamyl(Vydate) | 200 | ug/l |
| Polychlorinated Biphenyls (PCB's) | 0.5 | ug/l |
| Pentachlorophenol | 1.0 | ug/l |
| Picloram | 500 | ug/l |
| Simazine | 4.0 | ug/l |
| | | |
| **BACTERIA** | | |
| Total Coliform | 0 | /100 mls. |
| | | |
| | | |

| PARAMETER | LIMIT | UOM |
|---|---|---|
| **VOLATILE ORGANIC COMPOUNDS** | | |
| Benzene | 5 | ug/l |
| Carbon Tetrachloride | 5 | ug/l |
| Dichloromethane | 5 | ug/l |
| o-Dichlorobenzene | 600 | ug/l |
| p-dichlorobenzene | 5 | ug/l |
| 1,2-Dichloroethane | 5 | ug/l |
| cis-1,2-Dichloroethylene | 70 | ug/l |
| Trans-1,2-Dichloroethylene | 100 | ug/l |
| 1,1-Dichloroethylene | 7 | ug/l |
| 1,2-Dichloropropane | 5 | ug/l |
| Ethylenebenzene | 70 | ug/l |
| Methyl Tertiary Butyl Ether (MTBE ) | 20/70* | ug/l |
| Monochlorobenzene | 100 | ug/l |
| Styrene | 100 | ug/l |
| Tetrachloroethylene (PCE) | 5 | ug/l |
| 1,1,1-Trichloroethane (1,1,1-TCA) | 200 | ug/l |
| 1,2,4-Trichlorobenzene | 70 | ug/l |
| 1,1,2-Trichloroethane | 5 | ug/l |
| Vinyl Chloride (VC) | 2 | ug/l |
| Xylenes (Total) | 10,000 | ug/l |
| Trichloroethleyne (TCE) | 5 | ug/l |
| Toluene | 1000 | ug/l |
| | | |
| **RADIONUCLIDES (natural deposits)** | | |
| Gross Alpha Activity | 15 | pCi/L |
| Radium-226 &228 (combined) | 5 | pCi/L |
| Uranium | 30<br>≈20 | ug/L<br>pCi/l |
| Radon 222 | 10,000 | pCi/L |
| | | |
| **OTHER** | | |
| Aluminum | 0.2 | mg/l |
| Chloride | 250 | mg/l |
| Color | 15 | C.U. |
| Nitrogen (Ammonia) | 0.1 | mg/l |
| Sediment | negative | neg/pos |
| Iron | 0.3 | mg/l |
| Manganese | 0.05 | mg/l |
| Odor | 3 | T.O.N. |
| pH | 6.5-8.5 | --- |
| Sulfate | 250 | mg/l |
| Total Dissolved Solids | 500 | mg/l |
| Zinc | 5 | mg/l |
| Silver | 0.10 | mg/l |
| Sodium | 20 | mg/l |
| Nickel | 0.1 | mg/l |
| Calcium | 50-150 | mg/l |
| Alkalinity | 30-100 | mg/l |
| Hardness | 50-200 | mg/l |
| Chlorine Residual | 0 | mg/l |

* 20-40 ppb: water may taste or smell sweet 70 ppb: water considered unsafe to drink

AMENDMENT 1

**Geothermal Heat Pump Wells**

WELL-Bored, drilled or driven shaft, a dug hole, or seepage pit whose depth is greater than its largest surfaced dimension, or an improved sinkhole or a soil absorption system.

GEOTHERMAL HEAT PUMP WELL- A geothermal heat pump system is defined as an electrically powered system that utilizes energy in the form of the groundwater's relatively constant temperature to provide heating and cooling. A vertical closed-loop geothermal heat pump well is a well or borehole drilled to a specific depth either singly or in series where a continuous closed-loop of pipe is inserted from one well to another for the purpose of non-contact thermal energy transfer from a fluid in the loop to or from the earth. In an open-loop geothermal heat pump well, there is an actual withdrawal and discharge of water to the environment. Discharge can be either re-injected into a well or to surface water.

Applications for Geothermal wells should meet all requirements as outlined in Regulatory requirements for Heat Pump Wells, 310 CMR 27.00 Underground Injection Control and 314 CMR 5.00 Grounwater Discharge Permit Program as well as any other regulations or policies recognized by the State of Massachusetts and the Town of Grafton.

A TRUE COPY,
ATTEST:

GRAFTON BOARD OF HEALTH

_____
Karen Gwozdowski Gauvin, Chairman

_____
Richard J. Kirejczyk, Vice Chairman

_____
Deborah A. Chouinard, Clerk